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CLIMATE CHALLENGES: THE TAX CODE'S ROLE IN CREATING AMERICAN JOBS, ACHIEVING ENERGY INDEPENDENCE, AND PROVIDING CONSUMERS WITH AFFORDABLE, CLEAN ENERGY

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CLIMATE CHALLENGES: THE TAX CODE'S ROLE IN CREATING AMERICAN JOBS, ACHIEVING ENERGY INDEPENDENCE, AND PROVIDING CONSUMERS WITH AFFORDABLE, CLEAN ENERGY

TUESDAY, APRIL 27, 2021

U.S. SENATE,
COMMITTEE ON FINANCE,
Washington, DC.

The hearing was convened, pursuant to notice, at 10:05 a.m., via Webex, in the Dirksen Senate Office Building, Hon. Ron Wyden (chairman of the committee) presiding.

Present: Senators Stabenow, Cantwell, Menendez, Carper, Cardin, Brown, Bennet, Warner, Whitehouse, Hassan, Cortez Masto, Crapo, Grassley, Thune, Portman, Toomey, Scott, Lankford, Daines, Young, and Barrasso.

Also present: Democratic staff: Robert Andres, Professional Staff Member; and Joshua Sheinkman, Staff Director. Republican staff: Gregg Richard, Staff Director.

OPENING STATEMENT OF HON. RON WYDEN, A U.S. SENATOR FROM OREGON, CHAIRMAN, COMMITTEE ON FINANCE

The CHAIRMAN. The Finance Committee meets this morning for its first hearing on the climate crisis in 12 years. It comes right on the heels of President Biden's announcement of an ambitious new climate goal, cutting emissions at least in half by the end of the decade, compared to 2005 levels.

The target comes with big challenges, starting with energy-related emissions, as well as transportation. The reality is, a debate on energy and transportation is largely a debate on tax policy. That puts our committee in the driver's seat when it comes to job-creating legislation that addresses head-on existential challenges. The energy tax code in America is a cluttered, outdated, old heap of more than 40 different tax breaks for energy sources and technologies, including clean energy and transportation. And most of those incentives are temporary, and that keeps clean energy businesses and workers living in an uncertain state of limbo.

On the other hand, at the base of the system are centuries-old permanent tax breaks for oil and gas companies. No uncertainty for them. They get guaranteed benefits funded by American taxpayers each year. At a time when Oregonians and Americans everywhere are routinely clobbered by the disastrous effects of the climate

emergency, it is important to be clear about what this broken crazy-quilt of energy taxes means in practice.

Under the laws on the books, taxpayers in America are subsidizing the climate crisis. That is what it means when fossil fuel interests get special permanent breaks above and beyond what is available to everybody else. There is a taxpayer subsidy for megastorms and terrible floods along our coastlines and waterways. There is a taxpayer subsidy for massive wildfire infernos bigger than any decades ago. There is a taxpayer subsidy for wintertime bouts of extreme cold that send the privileged fleeing to tropical resorts, while their neighbors freeze to death in their homes. What is worse, taxpayers are also on the hook for much of the cleanup after those disasters strike.

Last week I introduced the Clean Energy for America Act that would throw the old set of more than 40 tax breaks in the dust bin. This bill now has more than two dozen Senate sponsors, and would replace the old hodgepodge of tax breaks with a new set of three incentives: one for clean energy, one for clean transportation, and one for energy efficiency. We believe this is the right policy because the emissions-based approach also can work hand-in-glove with the smart, fresh ideas that several other members on the Finance Committee are going to discuss today.

In terms of tax certainty and predictability, it would level the playing field for everybody. It would be a job-creating free-market competition to get to net-zero carbon emissions. Clean energy producers and businesses that focus on cutting-edge transportation would no longer have to worry about their tax incentives disappearing because Congress is in yet another deadlock.

The bill helps to supercharge innovation in clean transportation and energy storage. That is a big reason why a new coalition is lining up behind the Clean Energy for America Act. You have folks from the environmental community—the Environmental Defense Fund, the Sierra Club, the Natural Resources Defense Council—folks from our union groups led by the building trades—the Edison Electric Institute, representing utilities of all sizes. They have all announced their support for the Clean Energy for America Act. It is a new coalition for a new day.

There is a big opportunity in the months ahead to pass this legislation, along with investments that have powered the United States over the last century. It is essential to make sure that nobody is left behind in the process of tackling the challenges in moving to clean energy.

The Clean Energy Act for America is the right approach for high-wage, high-skilled jobs. It is the right approach for addressing the existential threat of the climate emergency. It is the right approach for promoting innovation and competing with companies in China and around the world.

If the Congress does not work hard to create these jobs in America, other countries are going to grow at our expense. And to be clear, under the Clean Energy for America Act, what matters, what the bottom line is, is reducing emissions. A nuclear plant, or a gas- or coal plant that fully captures its emissions would qualify for the same amount as a wind or solar farm. The goal here is not to pick

winners or losers, it is to reduce carbon emissions, and do it in a way that drives investment in jobs.

Today is an important day for the Finance Committee. We appreciate our excellent witness panel for joining us, and let's now turn to Senator Crapo.

[The prepared statement of Chairman Wyden appears in the appendix.]

OPENING STATEMENT OF HON. MIKE CRAPO, A U.S. SENATOR FROM IDAHO

Senator CRAPO. Thank you, Mr. Chairman. Thanks for holding this timely hearing.

The tax code, as you said, plays an important role in the economy and jobs in the energy sector. Energy incentives have the potential to grow our economy and create jobs, if executed properly. A number of energy-related policy areas have the potential for bipartisan agreement, and I look forward to working with Senator Wyden to develop that agreement.

While there are not a lot of specifics on President Biden's energy tax credits in the American Jobs Plan, he is clearly proposing to increase the corporate and international tax rates and penalize the oil and natural gas industry through the tax code. We must understand the impact of this proposal on the 10.9 million American jobs in the oil and natural gas industries. They pay on average seven times the Federal minimum wage. I look forward to hearing from our witnesses their policy expertise and their understanding of how President Biden's proposal will either grow or shrink good-paying American energy jobs.

Prior to the pandemic, the United States was experiencing one of the strongest economies in decades. With the Tax Cuts and Jobs Act in place and an agenda focused on smart regulation, we saw progress for all Americans, including record low unemployment rates for African Americans, Hispanics, and others; 50-year lows in overall unemployment; robust wage gains skewed toward lower-wage earners; and record high household incomes followed by record low poverty.

Considering offsetting the cost of energy provisions with a corporate tax rate increase or increasing international taxes, especially during a pandemic, is counterproductive and a non-starter on my side of the aisle.

It will be increasingly challenging to return to an economy as robust as we saw before the pandemic with endless streams of tax hikes and actions by the administration such as revoking the permit for the Keystone XL Pipeline. The Biden administration's revocation of the presidential permit for the Keystone XL Pipeline was short-sighted and eliminated over 1,000 jobs, the majority of which were unionized. I am willing to work on constructive proposals to modernize and innovate our Nation's energy production, while not adversely affecting the millions of good-paying American jobs and the existing energy sources necessary for a comprehensive, affordable, and reliable domestic energy network.

We should discuss ways to improve and potentially expand incentives to increase domestic energy production and manufacturing.

However, it is important that we also consider the effectiveness of existing incentives.

Congress should not be picking winners or losers every year when temporary credits expire. We must assess whether these credits continue to be necessary, or whether they have served their intended purpose of incentivizing growth and investment. Yet we continue extending credits to technologies that have achieved a significant market presence in the United States, an inefficient use of taxpayer dollars.

While I support Congress taking a neutral approach to energy tax credits, we must consider whether some of these technologies continue to require assistance and ensure we are designing the tax code to be fair and effective. Our tax code should incentivize technology-wide clean energy innovation, helping to bring breakthrough power generation to deployment until it can compete independently in the market.

My technology-inclusive bipartisan energy tax proposal, the Energy Sector Innovation Credit, or ESIC, legislation would accomplish this by working with experts at the Department of Energy, national labs, and other stakeholders to target tax credits for innovative, clean technology industries. In addition, ESIC would implement a credit phase-down system based on market penetration, systematically reducing credits as technologies increase their market share, instead of allowing Congress to pick winners and losers. I thank Senator Whitehouse for leading this proposal with me in the Senate.

Mr. Chairman, I look forward to working collaboratively with you through the committee process to strengthen U.S. energy competitiveness by rapidly scaling and diversifying innovative clean energy technologies.

Thank you, Mr. Chairman.

[The prepared statement of Senator Crapo appears in the appendix.]

The CHAIRMAN. I thank my Northwest colleague. And I want everybody to understand that I think there is an opportunity for the members of this committee to come together. The bottom line has to be reducing carbon emissions. That is something that I think Americans in every nook of this cranny care deeply about, and I look forward to working with my colleague on it.

The first witness is going to be Mr. Jason Walsh, executive director of the BlueGreen Alliance. Our next witness, from my hometown, will be Ms. Maria Pope, the president and chief executive officer of Portland General Electric. Our third witness will be Mr. Alex Brill, resident fellow at the American Enterprise Institute. Our final witness will be Mr. Kevin Sunday, who is director of government affairs for the Pennsylvania Chamber of Business and Industry.

We thank all of our witnesses. As is customary, your prepared statements will automatically be made part of the record. And if you can summarize your views in 5 minutes, that would be good.

Mr. Walsh, please proceed.

STATEMENT OF JASON WALSH, EXECUTIVE DIRECTOR, BLUEGREEN ALLIANCE, WASHINGTON, DC

Mr. WALSH. Thank you, Chairman Wyden and Ranking Member Crapo, distinguished members of the committee. My name is Jason Walsh. I am the executive director of the BlueGreen Alliance, a national partnership of labor unions and environmental organizations. On behalf of my partners and the millions of members and supporters they represent, I want to thank you for convening this important hearing.

It is our belief that Americans should not have to choose between good jobs and a clean environment. We can and must have both. We are in a unique moment to address the climate crisis and create good jobs as we work to rebuild our economy and recover from the COVID–19 pandemic.

The Federal tax code is vital to supporting clean technology deployment. We can also use it to ensure equity in the transition to a clean economy by maximizing the benefits of job growth in that economy for all American workers, and for communities disproportionately impacted by pollution, de-industrialization, and job loss from incumbent energy sectors.

The science is unambiguous that our climate is in crisis, and action is required. We have to get to net-zero emissions by 2050 and ensure we are solidly on that path by 2030.

Clean energy investments will be central to accomplishing our climate goals. These investments already spur economic growth and significant job creation across this country. At the same time, not enough of the new jobs that have been created in the clean energy economy are high-quality family-sustaining jobs. We need to do better.

As we continue to use the tax code to catalyze necessary investments in clean technologies and energy efficiency nationwide, we must ensure that these investments translate into strong domestic supply chains, high-quality jobs, and accessible pathways into those jobs, including for workers who have historically been underrepresented in the energy economy.

To this end, we would like to make three recommendations to the committee, which I elaborate on in my written testimony.

First, Congress should extend and strengthen clean energy tax credits, including those for onshore and offshore wind, solar energy, clean transportation, grid modernization, and energy efficiency. Congress should couple these tax credits with standards that ensure the use of domestic clean and safe materials, made by law-abiding corporations throughout the supply chain, and support employers that adopt high-road labor practices including prevailing wages, protection against worker misclassification, and the use of registered apprentices and community benefit and project labor agreements.

We look forward to working with this committee on Chairman Wyden's Clean Energy for America Act, which outlines a very promising technology-neutral approach to clean energy tax policy that would reward carbon abatement and spur the deployment and innovation of low- and no-carbon technologies. Importantly, this bill includes prevailing wage and registered apprenticeship utilization standards.

Second, Congress should invest directly in manufacturing and clean energy supply chains. Policies that increase the demand for clean technology must go hand in hand with direct investments to support and grow American manufacturing. Congress can help accomplish these goals by renewing and robustly funding the Advanced Energy Projects Tax Credit, 48C. We think 48C can also be strengthened along the lines of the American Jobs and Energy Manufacturing Act sponsored by Senators Stabenow and Manchin, in which qualifying projects must meet key labor standards and are targeted to support investments in the communities that have lost jobs in manufacturing, mining, or power generation.

Congress can also adapt the 45M technology production tax credit to fund domestic production of strategic clean energy and vehicle component technologies. Upholding such a PTC with other manufacturing and deployment incentives would help reverse decades of disinvestment, offshoring, and inconsistent manufacturing policy that has weakened the competitive edge we once held in clean tech manufacturing.

Third, Congress should support a job-sustaining transition to clean vehicles. Consumer incentives stand to play a significant role in shaping the shift to electric vehicles and the manufacturing jobs and community impacts of that transition. The existing 30D consumer tax credit should be updated to support domestic assembly, domestic content, and high-road labor standards.

The structure of the credit must help retain and grow the next generation of high-skilled, family-supporting jobs in the U.S., and support the growth of domestic electric vehicle production and supply chains.

In closing, let me reflect on the reason this committee is gathered here today, which is to discuss the tax code's role in creating American jobs, achieving energy independence, and providing consumers with affordable clean energy. I am here to argue that we can achieve all of these policy goals, while also ensuring that workers are paid fair wages; that we support and grow American manufacturing; and that communities that have too often been left behind in our economy can share fully in the benefits of clean air, clean water, and middle-class-supporting jobs.

Thank you for the opportunity to speak to you today.

[The prepared statement of Mr. Walsh appears in the appendix.]

The CHAIRMAN. Thank you very much, Mr. Walsh. And I would just like to note for the record that the BlueGreen Alliance was for coalition building before anybody knew it was cool. And I thank you very much, and we look forward to working very closely with you.

Our next witness will be Ms. Maria Pope, president and chief executive officer of Portland General Electric.

STATEMENT OF MARIA M. POPE, PRESIDENT AND CEO, PORTLAND GENERAL ELECTRIC, PORTLAND, OR

Ms. POPE. Thank you, Chairman Wyden, Ranking Member Crapo, and members of the committee. I am honored to testify today on the critical issues of climate change, jobs, and effective clean energy tax policy.

Climate change is having very real global impacts, and greenhouse gas emissions must be dramatically reduced on an economy-wide basis. It will take all of us working together to make a difference.

Portland General Electric is a fully integrated utility. We serve roughly half of all Oregonians and three-quarters of the State's industrial and commercial activity. We share our customers' and our communities' vision for a clean, reliable, and affordable energy future. We have ambitious climate goals to reduce greenhouse gas emissions associated with the power we serve customers by at least 80 percent by 2030, with an aspirational goal of zero greenhouse gas emissions by 2040.

We are not alone in our emissions reduction work. The Edison Electric Institute's members, representing the Nation's investor-owned utilities, are collectively on a path to reduce their emissions by at least 80 percent by 2050, and many companies are pledging even faster, more aggressive timelines.

As of year-end 2019, the U.S. power sector has reduced its CO_2 emissions by 33 percent below 2005 levels. Advancements in policy, regulations, and technology are needed to meet these emissions goals, while maintaining reliable service at reasonable prices.

According to the Intergovernmental Panel on Climate Change, we have a decade to make significant progress to curb greenhouse gas emissions. Utilities, or any sector of our economy, cannot achieve these ambitious goals alone. The climate crisis will require substantial investments and Federal policies that serve everyone equitably, maximizing both benefits to customers and the deployment of a wide variety of clean energy resources.

The right technology-neutral incentives will accelerate this transition and activate all players to make significant investments. To move forward with speed requires new thinking, which is exactly what we see in the Clean Energy for America Act.

Chairman Wyden, I want to thank you and your team for this thoughtfully crafted bill. The legislation provides tax incentives to address many of these issues, and motivates everyone, utilities and independent developers alike, to transform how electricity is generated and used.

Portland General Electric enthusiastically supports this bill, and we urge its enactment. Critical to PGE and the utility industry is the optionality between production and investment tax credits, while also allowing utilities to opt out of normalization requirements from the new energy storage credits.

These provisions ensure that the full benefits of tax incentives are passed through to customers, and that regulated utilities will not be disadvantaged, leveling the playing field to accelerate deployment and ensure affordability for all customers.

Along with affordability, preserving reliability is essential. Dispatchable clean resources will play an important role. So will a smarter grid that can harness electricity from wind, solar, and other resources when they are available, and store that energy for when it is needed.

We appreciate that Chairman Wyden's bill provides tax incentives for stand-alone energy storage facilities and new clean resources that provide important capacity. Additionally, the option to

elect direct payment of these credits enables broader use and lower costs, savings that can be passed directly on to customers.

The legislation requires that eligible facilities must be built by workers who are paid prevailing wages. We value our partnership with labor, including the IBEW, and PGE supports this requirement.

I am pleased that the BlueGreen Alliance is here to discuss their perspective. Today the transportation sector is the largest source of greenhouse gas emissions. The bill's clean transportation credits enable transformational change, encouraging purchase of electric vehicles and investments in critically important charging infrastructure.

Mr. Chairman, I would like to express my appreciation for your thoughtful legislation. Your long-term technology-neutral approach enables all parties' participation in the path to decarbonization. This is vital as we work together to bring about change.

Chairman Wyden, Ranking Member Crapo, committee members, thank you for your time. I look forward to working with you as you craft these essential policies. Thank you.

[The prepared statement of Ms. Pope appears in the appendix.]

The CHAIRMAN. Thank you very much, Ms. Pope. And what is little known is our wonderful Oregon witnesses at these hearings have to be up very early in the morning in order to participate, and we very much appreciate PGE's focus not just on being here today, but on a relentless assessment that this ball game is all about reducing carbon emissions. And I know we will have some questions for you in a moment.

Our third witness will be Mr. Alex Brill, resident fellow at the American Enterprise Institute.

STATEMENT OF ALEX BRILL, RESIDENT FELLOW, AMERICAN ENTERPRISE INSTITUTE, WASHINGTON, DC

Mr. BRILL. Thank you, Chairman Wyden, Ranking Member Crapo, and members of the committee. My name is Alex Brill, and I am a resident fellow at the American Enterprise Institute.

Thank you for the opportunity to testify at today's important hearing on the tax code's role in our country's pursuit of clean energy and energy efficiency.

Let me begin my remarks with a comment on jurisdiction. As others have noted as well, it is my strongly held view that lawmakers' interests in curbing CO_2 emissions and addressing climate change are best handled through policy that can be adopted by this committee. Other committees may have energy in their names, and important agencies may have regulatory authority over these issues, but the tax-writing committees—the Senate Finance Committee and the House Committee on Ways and Means—are uniquely situated to drive market-oriented change that reduces carbon emission and encourages innovation in low-carbon, renewable, and energy-efficient technologies.

The tax code is a powerful tool. Time and again, taxes have been shown to affect decision-making by businesses and individuals. For this reason, basic principles of tax policy argue for a broad-based, simple, transparent tax system that treats like activities alike and keeps tax rates as low as possible.

There are exceptions to these principles. Tax policy can be effective at intervening when markets are imperfect, and energy is one such example. Because the environmental and economic costs of carbon emissions are not reflected in private transactions between producers and consumers, it is appropriate that policy-makers use the tax code to encourage clean energy and energy conservation.

The historical approach has been to enact tax preferences to encourage specific forms of clean energy or to encourage specific types of energy efficiencies. But tax subsidies can be, and often are, costly, complicated, overly narrow, overly generous, and non-neutral in a technological sense. It is simply impossible to appropriately and efficiently subsidize every energy-saving tool or activity. Most subsidies are temporary, and this creates costly uncertainty for many taxpayers.

The better option from an economic policy perspective may carry some political baggage. I am here today to encourage the committee to give it fair consideration. A price on carbon, or a fee on polluters, a carbon tax, whatever it is called, is a superior policy to subsidies. Now I would also note that these approaches are not mutually exclusive.

A carbon tax is technology-neutral and encourages shifts away from carbon-intensive sources of energy while encouraging energy efficiency and conservation, as well as research and development in new technologies. It is the climate policy endorsed by thousands of economists, both Democrats and Republicans, including four former Federal Reserve Board Chairmen, 28 Nobel laureates in economics, and 15 former Chairs of the White House Council of Economic Advisers. Most recently, it has earned the support of the business community as well.

A carbon tax would increase the rate of return on energy efficiency upgrades, encourage the utilization of more fuel-efficient vehicles, reduce miles traveled, and drive many, many small and modest adjustments in the choices made by consumers, manufacturers, and others on energy consumption. And revenues from a carbon tax can be used to avoid other tax increases or to offset other taxes that are more distortionary.

Speaking of tax increases, let me conclude with a final observation. The tax policy least likely to promote economic growth and competitiveness in the United States is an increase in the corporate tax rate to 28 percent. Such a change would raise the cost of capital for all corporations, widen the disparity between debt and equity financing, and place the U.S. first among OECD nations in the combined State and Federal corporate marginal tax rates.

A carbon tax could raise the same amount of revenue while avoiding all these pitfalls, and efficiently and effectively reduce CO_2 emissions.

I urge you to give it a fair look, and I look forward to your questions.

[The prepared statement of Mr. Brill appears in the appendix.]

The CHAIRMAN. Thank you very much, Mr. Brill. I know we are going to have questions for you in a moment.

Our final witness will be Mr. Kevin Sunday, director of government affairs for the Pennsylvania Chamber of Business and Industry.

STATEMENT OF KEVIN SUNDAY, DIRECTOR, GOVERNMENT AFFAIRS, PENNSYLVANIA CHAMBER OF BUSINESS AND INDUSTRY, HARRISBURG, PA

Mr. SUNDAY. Thank you, and good morning. Thank you, Chairman Wyden, Ranking Member Crapo, honorable members of the committee. I appreciate the opportunity and privilege to appear before you this morning.

My name is Kevin Sunday, director of government affairs for the Pennsylvania Chamber of Business and Industry. Our State is blessed in many respects to be a microcosm of the United States, whether that is over urban split, or average age, income, education, and political affiliation, but where we are not average is on energy.

Pennsylvania is the number two State for natural gas development, energy production, and nuclear power and is the biggest power producer on the country's biggest grid. Our companies are up to the task to meet the many challenges of the 21st century, but meeting those challenges means not fighting climate change with one hand tied behind our back.

If the United States is going to succeed, it will do so because it leverages our State's workforce, infrastructure, and human capital in our energy and manufacturing sectors, including nuclear, natural gas, and carbon capture.

So we encourage you to work towards a durable, bipartisan policy that makes it easier to build things again in this country and that leverages our strengths. But we have little confidence that Federal policy, established through executive action or partisan reconciliation, would not simply just run roughshod over our State's energy economy, an energy economy that led by prolific production from natural gas and through competitive markets to lower energy costs by the billions for families and businesses in Pennsylvania and the United States.

Air quality has continued to improve dramatically in our State, and since 2005 Pennsylvania has reduced CO_2 emissions more than any one other State—as EPA officials recently noted—in large part because of markets. The nationwide 2030 goals of the Obama administration's Clean Power Plan have already been achieved. And in part due to Pennsylvania's resource base, reducing emissions and sending power prices in the PJM grid down to generational lows, no country has a story to tell like that of the United States when it comes to reducing energy costs and emissions, while growing the economy.

The U.S. lapped the European Union in growth over the past decade and a half while reducing emissions more. Our energy prices are much lower, and we have an abundance of resources that are lowering our geopolitical risk and that of our allies. But we cannot take the success for granted.

Tax policy that discourages continued investment and growth into our States' energy, commodities, and manufacturing sectors will be a drag on the national economy as a whole. As various reports noted, the Tax Cuts and Jobs Act significantly improved the international competitiveness of the United States. In its wake, companies invested in their facilities and workers. In fact, in Pennsylvania, wages went up across all occupations by double digits, with the biggest gains coming from the bottom quartile of workers.

This is indicative of the fact that the burden of tax policy is ultimately shouldered by workers, and policy-makers should take care that the tax policy does not further cost us jobs or raise energy costs for families and businesses. In just 1 year, the pandemic and associated response measures cost our State a decade's worth of job growth.

Our industries, particularly those working in energy and infrastructure, need long-term certainty. Such certainty will be certainly eroded if Federal officials follow up on generational tax and regulatory reform with even more sweeping mandates and regulations in the other direction in short order.

Tax increases on their face are chilling to investment, but so is establishing the precedent that there will be massive changes to tax and regulatory policies following every election cycle. If in fact it truly is the case that there is a desired outcome for a cleaner and more efficient economy—and that is a goal we share—we are not going to reach that goal by pairing the highest corporate rate in the developed world with the slowest, most bureaucratic, most expensive infrastructure build-out regime.

Too often, whether it is due to the National Environmental Policy Act, or spurious litigation from third parties, or States obstructing federally approved infrastructure, it is taking entirely too long to build things in this country. Neither will be well served by tariffs and trade policies that raise costs across the supply chain.

In closing, our State's success and programs and policies at the Federal level have helped the United States keep costs low, produce massive economic growth, become energy independent, and lead the world in reducing greenhouse gas emissions. There is more work to be done, to be sure. So let's come together and produce durable, effective bipartisan energy and environmental policy that keeps the United States in a flagship position in an increasingly challenging and dynamic global marketplace.

I thank you for the opportunity to appear before you today and look forward to answering any questions you may have. Thank you.

The CHAIRMAN. Thank you very much, Mr. Sunday.

[The prepared statement of Mr. Sunday appears in the appendix.]

The CHAIRMAN. Now let me start with you, Ms. Pope. The President committed our country to reducing carbon emissions more than 50 percent below 2005 levels by 2030. This is an ambitious target, but in line with what the science says is needed to avert a climate disaster.

My take is that the lynchpin here is the power sector. To meet the President's goal, America will need to reduce carbon emissions from the power sector by 80 percent in the next decade.

Now, we are obviously digging in to how the tax system affects this, and my view is, the combination of certainty with flexibility, putting a system in place that provides long-term certainty to businesses, while simultaneously providing the flexibility to innovate and to make the best clean energy investments, is what we are going to need.

In your view, what would be the most helpful tax policies to put that 80 percent target in reach for you and other utilities?

[Inaudible.]

The CHAIRMAN. Ms. Pope, you are on mute.

Ms. POPE. I beg your pardon. Thank you, Chairman Wyden.

The CHAIRMAN. Thank you.

Ms. POPE. Let me just start over again. You are absolutely right. To meet these ambitious goals, we are going to need the certainty and the flexibility that you are talking about.

Certainly it is going to take us a number of years to get Portland General Electric to 80-percent reductions by 2030, and then the more ambitious net-zero goals. But we need to make investments in clean, renewable technologies consistently, and the well-designed tax incentives like those in your Clean Energy for America Act will give us that long-term certainty and flexibility to accelerate the energy transition and activate all players for that investment.

So for us, it is particularly important that we have technology-neutral incentives that encourage and reward innovation that really works. Our customer mix, and all of the regions across the country's utilities, are diverse. And the widest set of solutions is needed to meet the broader sets of demands for the entire country.

It is critical also that all parties are able to fully utilize tax credits. So for us to work together on these ambitious goals, we are going to need to be able to have a choice between production tax credits and investment tax credits, and the normalization alternative for the energy storage investment tax credits.

It is especially important to utilities that we are able to participate in these credits effectively and level the playing field. Affordability passed directly on to customers is top of mind as we work towards a clean energy future. It is going to take all of us working together. So thank you.

The CHAIRMAN. Reducing carbon emissions from the power sector by 80 percent in the next decade is clearly going to be ambitious, but we are committed to working with you and others to get there, as without it, there is a climate catastrophe, and we cannot have that.

Now let's move to Mr. Walsh. I want to talk about this argument that if you move to a clean energy economy, somehow you are throwing in the towel on good jobs. I am going to submit for the record now an independent analysis from the Rhodium Group that shows that a clean energy plan like mine would create nearly 600,000 new jobs, more than eight times as many as might be lost in fossil fuels over the next decade.

[The report appears in the appendix beginning on p. 91.]

The CHAIRMAN. Now, Mr. Walsh, in your testimony you say that the real issue is ensuring more good-paying jobs. And I note that you call for applying Federal labor standards to areas like tax incentives, which is similar to what I have proposed.

What in your view—because we are talking about the real world—is the impact of these kinds of provisions for workers? And what else should the Congress be looking at to make sure that jobs are high-quality and well-paid?

Mr. WALSH. Thank you, Mr. Chairman. I think provisions in labor standards like the ones you included in your technology-neutral bill make it much more likely that the wages that are paid on these projects building out this infrastructure pay family-supporting wages and benefits and give workers a voice on the job.

So including standards like prevailing wage and registered utilization is key. There are other standards to include as well. And I would argue for domestic content standards as well to make sure that we capture the whole manufacturing supply chain benefit of these kinds of investments.

The CHAIRMAN. Now, one other question for you, if I might, Mr. Walsh. We held a hearing on U.S. manufacturing in the committee here recently. It was a hearing on incentives for domestic manufacturing, and there was enormous interest among committee members, broad bipartisan interest. And clearly the climate crisis is wreaking havoc from storms and fires and droughts. But it also provides an opportunity for the country to reclaim the mantle of manufacturing and technological leadership through investments in clean energy.

We had a leader from the Steelworkers, Donnie Blatt, argue at the March hearing that this is not an abstract issue of global power; it is a real challenge in American communities every single day for American workers.

Your organization has been putting a lot of time into this issue. What would be the one or two policies, let us say, in the interest of brevity, that you think are most important to make sure the clean energy revolution is a catalyst for American manufacturing?

Mr. WALSH. Thank you for the question. In terms of one or two policies, I would say we need to come at this from both the supply and the demand side. So on the demand side, ensuring that domestic clean energy products and materials and components are manufactured in this country by tying clean energy tax credits to domestic content incentives. And then on the supply side, ensuring that domestically manufactured components receive tax credits that directly support the build-out and retooling of domestic manufacturing.

There are ways to do that and examples that we have from 48C potentially also, and adapting the 45M tax credit. And we would love to explore those with the committee.

The CHAIRMAN. All right; let's go to Senator Crapo next.

Senator CRAPO. Thank you, Chairman Wyden.

First to you, Mr. Brill. A number of companies and organizations have made reduced or zero-carbon commitments by 2050, and some by 2030. However, global and national emissions goals will be hard to achieve until the technologies essential to meet them, many of which currently do not exist, are developed and deployed.

Can you speak to our current energy technology landscape and how energy innovation will play a key role in significant decarbonization?

Mr. BRILL. Thank you, Senator Crapo. As we work towards reduced carbon emissions in the United States, both the increased utilization of existing technologies is important—that is, wind and solar that we know today, geothermal, and others—but over the longer term and the medium term, new technologies, some which may exist in a lab or some which may not exist at all, will be increasingly important, both here in the United States and globally.

This involves both developing those technologies which are new and innovative ways to generate energy without carbon emissions, but also to do that in a cost-effective way, to bring down the costs

of those new technologies over time. Policies, whether they be R&D-focused, or the carbon pricing that I suggested, all of these will encourage private-sector activity in the development of these new technologies which are necessary, both here and around the world.

Senator CRAPO. All right; thank you.

And, Mr. Sunday, like Pennsylvania, my State of Idaho has a rich history with nuclear energy development and deployment, particularly because of the Idaho National Lab's leadership in nuclear energy R&D. Currently, nuclear energy provides roughly 20 percent of our electricity and is the largest clean energy source in the United States.

Do you think we can meet our clean energy targets without continued investment and R&D in nuclear power? And can you speak to the benefits that nuclear power provides not only for clean energy production, but also for providing reliable baseload power and grid reliability?

Mr. SUNDAY. Thank you for the question, Senator. And no, I do not think we can meet our goals without nuclear power, and I am not aware of a credible international commission forecast that does not have a role for nuclear power moving forward.

In terms of the benefits, according to the National Association of State Energy Officials' jobs report, nuclear pays the highest hourly average wage of all energy resources. And within our State, the PJM grid, but for the maintenance outages every 18 to 24 months, nuclear is going to operate 24/7 regardless of weather conditions. And it has the benefit of storing fuel onsite. So it is very unlikely to ever have a disruption. It is a fuel source that is safe, it is reliable. We have a strong vendor and supply chain base in Pennsylvania, and our leading universities, like Carnegie Mellon and Penn State, are continually producing world-class nuclear engineering graduates who are looking for opportunity now and in the future.

Senator CRAPO. Well, thank you. I think nuclear energy needs to be one of the key parts of our national energy policy in achieving these laudable goals.

My final question, back to you, Mr. Brill, is on the capital gains rate increase that we expect to be proposed by the President in his speech tomorrow night, and has already been proposed, frankly.

On April 25th, *The Wall Street Journal* editorial board responded to talk about raising the top tax rate on capital gains to 43.4 percent, with a headline that read "The dumbest tax increase."

The most important reason to tax capital investment at low rates is to encourage savings and investment. Consumption—buying a car or a yacht—faces a sales tax, but not a Federal tax. But if someone saves income and invests in the family business or stock, he or she is smacked with another round of tax. If you tax something more, you get less of it. Tax capital income more, and you get less investment, which means less investment to improve worker productivity and thus smaller income gains over time.

My question to you is, why is it important to have a low capital gains rate to encourage investment and growth? And what do you think of the trial balloon to raise the top rate on capital gains almost double?

Mr. BRILL. Thank you for your question, Senator. The capital gains tax rate has bounced around over time, but economists know that, in terms of long-term economic growth, it is important in our country, or in any economy, to constantly invest and grow the capital stock.

The capital gains tax rate works counter to that objective. In particular, raising the capital gains tax rate to 40 or 43 percent would encourage what is known as lock-in. It would discourage investors from reallocating capital into more productive ways. It is probably counter to our objectives to move towards cleaner energy. It is also counter to the objective for achieving capital deepening, a larger capital base here in the United States, which is good for productivity and good for workers' wages.

Senator CRAPO. Thank you. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Crapo. And next we have—with their hectic schedules, next will be Senator Stabenow. And Senator Stabenow has been the leader of the green manufacturing effort with Senator Manchin and Senator Daines.

Why don't you go ahead, Senator Stabenow?

Senator STABENOW. Well, thank you so much, Mr. Chairman. And I first just want to thank you for this really important hearing. And I am proud to be a co-sponsor of your Clean Energy for America Act, which I think is so significant.

And before asking a question—I know, Mr. Chairman, you have heard me say this before, but whenever we talk about winners and losers, I just have to go back to 1914 when Henry Ford and Thomas Edison in Michigan first started out making an automobile and tried to have it battery-operated, and it was so difficult with all the challenges on range and a whole host of things. And 2 years later, Congress decided to put its full weight on tax policy behind oil and gas in 1916, and basically gave robust tax credits that ended up essentially in no-interest loans, and 100 years later, they are still winning.

So we did actually, in our tax policy, pick winners and losers. And I really appreciate that you are just simply trying to level the playing field. And maybe we will get back to what Henry Ford and Thomas Edison actually envisioned over 100 years ago.

There is no question that when you think about the climate crisis, we have unprecedented challenges. But what is exciting is the fact that we have great economic opportunities as well. And that is really what we are talking about here.

We have some catching up to do on clean energy manufacturing. We know, as our other hearings have shown—I mean, today China holds 75 percent of the world's manufacturing capacity for lithium ion battery cells and builds over 70 percent of the solar panels. And the current semiconductor shortage shines a light on the threat that supply chain vulnerabilities pose to U.S. global competitiveness.

But we know we can change that, and that is what this is really all about. So, Mr. Walsh, thank you for the BlueGreen Alliance's work for so many years. I remember when you first got it started, and I have been a strong supporter the entire time.

Thank you for endorsing the American Jobs and Energy Manufacturing Act, which, as you indicated, is a bipartisan initiative

with Senator Manchin and Senator Daines. And we really believe that the 48C program can once again drive investments in clean energy manufacturing.

And also, before asking you to respond, Mr. Walsh, I think it is important to know—and I am really pleased to be working with our chairman on the production tax credit for domestic production of batteries, semiconductors, solar cells. I wondered if you could speak to why we need to be providing incentives, not only investments in new and retooled manufacturing plants, which I think is critical, but also a tax incentive for each unit produced.

And what would be the implications of providing an investment tax credit only, but not a production tax credit, for manufacturing?

Mr. WALSH. Thank you for the question, Senator Stabenow, and thank you very much for sponsoring the American Jobs and Energy Manufacturing Act. We were proud to endorse it.

As you know, that is a 30-percent investment tax credit, which was created to re-equip, expand, and establish domestic clean energy transportation grid technology manufacturing facilities. We particularly appreciate the way in which you provide incentives in that legislation to site facilities in communities that have suffered whole economy job loss and deindustrialization. We think that is a critical equity consideration. 48C is incredibly important. It has historically been successful in generating investments in new facilities and equipment. It has been less successful in generating large-scale investments and the durable incentives necessary to grow domestic manufacturing supply chains over the long term.

So production tax credits like 45M can fill this gap and provide enough security in terms of demand for investors to create the kind of large-scale facilities that are not only necessary to meet our climate ambitions, but to keep us globally competitive.

As you know, these are big capital expenditures. Investors are going to need that certainty, and they are going to need some assistance. And we view an investment tax credit and a production tax credit as complementary to achieving those goals.

Senator STABENOW. Thank you. And, Mr. Chairman, I know we have a number of members who are all balancing schedules, so I will not ask another question. But I have many questions and appreciate the panel, including the 30B consumer incentives that are so important on the front end on electric vehicles, and I look forward to working with you and with everyone as we move what I think is a very exciting economic opportunity forward.

It is a win/win on how we address the climate crisis, and also create jobs. So thank you.

The CHAIRMAN. Thank you, Senator Stabenow. And we look forward to working with you on greening up manufacturing and getting that win/win.

Our next panel member to ask questions will be Senator Carper, who is also chairman of Environment and Public Works. He has his hands full. We appreciate him.

Senator CARPER. Mr. Chairman, thanks so much. This is a terrific hearing, with terrific witnesses, and I am grateful to both you and the ranking member.

The ranking member raised the issue of nuclear. My wife and I usually come home after church on Sunday mornings, and the first

thing we do is go to the kitchen and fix breakfast. And we had breakfast with a guy named Fareed Zakaria. And this last Sunday he spent the last 4 minutes of his show talking about nuclear, just providing advice, unsolicited advice, about nuclear.

Anyway, he provided some friendly advice to President Biden that he should not dismiss and lose sight of what nuclear is already doing in terms of providing carbon-free electricity, and the future that it might provide with advanced technology. So I just leave that with my colleagues.

I am going to send around a copy of his 4-minute close on his show to our colleagues and just ask you to take a look at it, if you will.

I would thank all the witnesses for joining us today. This could not be more interesting, more important, more timely. Last week our President celebrated Earth Day by committing the United States to becoming 50-percent cleaner in terms of greenhouse gas emissions by the end of the decade.

Through my work on this committee, and as chairman of the Senate Environment and Public Works Committee, I remain committed to passing laws that would drive down dangerous emissions and clean energy costs for consumers, help tackle the climate crisis head-on, and support economic growth in this country.

Today, clean energy investment and production tax credits have been indispensable tools in driving clean energy and economic growth in our country. But to me, with our ambitious climate goals, we can do better, and indeed we must do better.

That is why I was delighted to join our chairman again in introducing the Clean Energy for America Act, and I was particularly pleased that this year's legislation draws on a number of commonsense policies that some of our colleagues and I have co-authored this year. The Save America's Clean Energy Jobs Act, which I introduced with Senator Whitehouse and Senator Heinrich, will provide temporary refundability for clean energy credits.

Clean energy developers are currently unable to access tax equity financing as a result of the pandemic, leaving clean energy projects frozen and unable to break ground. Refundability of these credits will provide efficient access to capital that will immediately help facilitate job creation in the clean energy sector, all while contributing to more reliable power, cleaner air, and a true win/win/win situation.

Question: Ms. Pope, would you share with us, please, your thoughts on how refundability of these credits could lead to increased clean energy innovation and capital employment, as well as to more good-paying jobs? Ms. Pope, please.

Ms. POPE. Senator, thank you. And thank you for your question and your leadership on this issue, as well as your leadership on the nuclear issue.

Your legislation recognizes near-term challenges that many projects face in terms of a direct-pay option. The short-term nature is helpful, but longer-term it would be more helpful if there was more certainty.

Direct-pay lowers the project costs, and these are savings that can be directly paid to customers. And as you know, there is transi-

tion in the work we have to do that is very significant. So keeping customer prices low is very important.

But it also frees up capital to invest in additional clean energy projects. These investments, as has been noted, will result in additional jobs. Direct-pay's impact on innovation lowers project costs, and, when combined with technology-neutral credits, gives us the ability to innovate and choose technologies that best maintain a reliable and affordable energy grid.

Given the investments that are needed in the next decade in order to reach the aggressive greenhouse gas emission reduction goals that the President, Congress, and we at PGE share, as do many other utilities across the country, it is going to take even longer-term direct-pay options such as that proposed by Chairman Wyden.

But thank you so much for your support of the direct-pay option.

Senator CARPER. Thanks, Ms. Pope.

Mr. Chairman, I think I am probably close to out of time, but I would like to ask one last question for the record, if I could.

Mr. Brill laid out a thoughtful endorsement of implementing a technology-neutral carbon tax to address global warming. I am going to ask, for the record, for the reaction of our witnesses to what he had to say. Is this a fool's errand? Is this something that we ought to get serious about? And if you could just respond to that for the record.

I think I have one more minute. If I can, I will ask a quick question. It is a question of Mr. Walsh, please, and it deals with the 30C tax credit for vehicle charging and refueling stations. The transportation sector generates about 29 percent of our carbon emissions, the highest source of carbon emissions in our country, global emissions. To clean up our transportation sector, we need cleaner vehicles powered by sources other than oil, and we can't have clean vehicles without clean vehicle fueling infrastructure. We've got to have both.

That is why I recently introduced the Securing America's Clean Fuels Infrastructure Act with Senator Richard Burr, our colleague on this panel, along with our colleagues Senator Cortez Masto and Senator Stabenow.

This legislation will improve and expand the 30C tax incentive for investments in clean vehicle infrastructure, like electric vehicle charging stations and hydrogen fueling stations. And this legislation is complementary to broader efforts in the EPW Committee, which I chair, to decarbonize our transportation sector. This infrastructure is necessary for the success of our American automakers and for the widespread adoption of cleaner vehicles. That's why the major automakers, along with the fuel cell and electric vehicle infrastructure sector, support the legislation.

The question for the record for Mr. Walsh: Mr. Walsh, can you speak for us—on the record—to the importance of tax policy that supports the deployment of clean vehicles and clean vehicle infrastructure?

Thank you all for coming today, and for responding to our questions, and your willingness to respond to a few more for the record. Thank you so much.

The CHAIRMAN. Thank you, Senator Carper.

Senator Grassley?

Senator GRASSLEY. Thank you, Mr. Chairman.

Green energy, of course, is music to my ears. I am the father of the wind energy tax credit, and 30 years have proven it to be a very successful initiative.

Now on a different note, leading to a question for Mr. Brill, I often hear my Democrat colleagues complain about companies paying zero taxes. However, oftentimes the reason a profitable company pays no tax is they are eligible for tax incentives such as green energy incentives.

Recently, there have been proposals from both sides of the aisle to make incentives in green energy essentially refundable by providing a direct-pay option. This option is included in the chairman's technology-neutral proposal.

I do not necessarily object to direct-pay. It might make sense in certain circumstances, but in light of my colleague's concern about a company paying zero tax, my question for Mr. Brill is, couldn't a direct-pay option result in companies having a negative tax liability, that is, receiving a tax refund in excess of taxes paid?

Mr. BRILL. Thank you for the question, Senator. The answer is, certainly yes, the direct-pay option is only useful or effective in the cases where there is no other tax liability. So it, by definition, would increase the number of firms paying no, or in fact negative tax rates. These two issues are, just as you are suggesting, certainly in conflict: to be concerned about businesses in particular years not paying Federal income tax and then, at the same time, promoting policies that would exacerbate that reality.

The truth is that it is quite normal and natural in many instances for firms not to pay corporate income tax, even if they are showing book income. That is a result of a sound corporate income tax system involving net operating loss carried forward and carried back, and is not necessarily something that policy-makers should be concerned with.

The proposal is to create minimum taxes for certain businesses that do not pay tax when they report income, which is in effect bringing back the alternative minimum tax in another form, something that is not good, I think.

Senator GRASSLEY. You are getting into my next question, Mr. Brill, so stay there. Due to the concerns for a company reducing their tax liability to zero, President Biden has proposed a new 15-percent corporate minimum tax based on book income. Of course, book income generally does not reflect tax incentives.

So, Mr. Brill, for some companies, wouldn't a book tax effectively remove the benefit of green energy incentives, thus undermining the legislative intent of those provisions?

Mr. BRILL. It very well could, Senator; you are correct. The minimum tax that President Biden has proposed, if fully implemented as it is being described, would negate many of the provisions that are also being advocated and proposed. And so, they work at cross-purposes, for sure.

Senator GRASSLEY. The next question will be for Mr. Walsh. President Biden's infrastructure program calls for over $174 billion in consumer rebates for electric vehicles. However, the Energy Information Administration projects that in 2050, 81 percent of the

new vehicle sales will still be gas-powered or flex fuel. Biofuels are the only option to make significant, immediate carbon reductions on the cars that are on the roads today.

So, Mr. Walsh, would you agree that the investment should also be made in biofuels infrastructure to maximize carbon reductions in the near future?

Mr. WALSH. Thank you for the question, Senator Grassley. As a coalition of a bunch of different partners, we have typically not taken positions on biofuels. But let me talk to some of our partners and get back to you on that one.

Senator GRASSLEY. Well, thank you very much. And then also for you, Mr. Walsh—and this will have to be my last question—the United States only comprises one-sixth of all global greenhouse gas emissions, and the international demand for energy is rapidly growing.

As you mentioned in your testimony, the United States has a significant number of manufacturing facilities specializing in wind energy. One of those is in my State of Iowa.

How can the United States support more exports of our clean energy production and other technologies to meet global demand for alternative energy?

Mr. WALSH. We can support the wind industry and other clean technology industries with a range of both tax policies and direct investments. And doing so, we would argue—to the points you make—would make them competitive to capture market share in what will be one of the most important global economic races of this century.

So we would be strongly supportive of that.

Senator GRASSLEY. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Grassley.

Senator Cantwell?

Senator CANTWELL. Thank you, Mr. Chairman, and thanks for this important hearing. It is ironic that over in the Energy Committee we are having a discussion about carbon production on public lands. And I think there is an important nexus here.

I know one of the speakers was saying how this is the committee of jurisdiction on important incentives, but over there we are not really charging the right royalty response to the impacts of carbon pollution on public lands. If we did, and took into consideration their true impact, we would generate billions in royalties.

So maybe Mr. Walsh would have a second to respond to that. But generally, I am here to continue to talk about the price on carbon—you know, making sure that we move forward. Senator Hatch and I, in 2007, did the first tax incentive, $7,500 for electric vehicles. So just think about that. That was 2007. And now look at where we are today with the plethora in the marketplace of many electric vehicles, and in some States even like mine, moving forward on trying to create all-electric markets by a certain time period.

So one of the issues I think that we have to address is, about 5 percent of our vehicles represent 23 percent of the emissions, and that is heavy-duty trucks. So thank you, Senator Wyden, for your legislation.

But I want to hear whether either Mr. Brill or others support a 30-percent ITC, investment tax credit, on heavy-duty trucks, so

that we can get that aspect, which is again disproportional to the amount. They might be 5 percent of the vehicles, but they are 23 percent of the emissions.

So can we—and should we—tackle that next? And obviously I would like to hear people's views on why setting a price on carbon—Senator Collins and I had a cap and dividend bill. So we were trying to send the right market signals and give time for the market to adjust. So I see now where chambers of commerce and people like AEI and others are saying, "Yes, that is right. We need this price signal."

So I am not talking about—I am asking the AEI witness to comment about why predictability is so important. But first, Mr. Walsh, if you wanted to comment on public lands and why a 30-percent ITC on heavy-duty trucks is important?

Mr. WALSH. Thank you for the question, Senator. I mean we are, I think, supportive of getting a fair return for taxpayers in terms of royalties from extraction on public lands. I'm happy to follow up with you on that, to get into a little bit more detail.

On trucks, we would have to look at the specifics of an investment tax credit on trucks, but conceptually that is going to be incredibly important. We are already on, I think, a clear pathway with passenger cars. We have some more work to do to get there with trucks. And we would welcome an opportunity to talk with you and your staff about that.

Senator CANTWELL. Well, I think the technology is there. And just like with everything, nonrefundable engineering costs are costly things that drive or prohibit the market. And what we found with the tax credit for automobiles is that it really accelerated in just a short period of time, and look at where we are. And that is the whole point. I think that is what we do best, frankly. I think we incent things that take some of those costs off the table to make the manufacturing market go faster than it might normally, when otherwise the cost of the cars is prohibitive and they cannot get the market up and running.

So anyway, Mr. Brill, on the larger question about AEI and chambers of commerce looking for a focused approach, and why that is better and predictable——

Mr. BRILL. Thank you very much, Senator. As I mentioned in my written testimony, numerous economists across the political spectrum have, for a long time, advocated for a price on carbon. And as you noted, more recently the business community, BRT, the Chamber of Commerce, API, and others have also joined in that view.

A price on carbon is a very broad-based strategy for addressing climate emissions, as opposed to the narrow approach of a specific subsidy or a targeted tax credit. For that reason, it works through a myriad of channels. It encourages both the innovation of new technologies, encourages consumers to alter their behavior to reduce energy consumption overall, and encourages the deployment of existing technologies.

It is my view—and I think the view of many who say this from an academic perspective, as well as now from a business perspective—that this broad-based approach is a durable policy and one that could lead to the increase in deployment of the technologies

we know, as well as the development of the technologies that we cannot yet even imagine.

Senator CANTWELL. Thank you. And, Mr. Chairman, I just would be remiss if I did not reiterate my interest in—look, I think we have to work across global markets on these issues. I think we must engage other countries, big markets that are big CO_2 polluters, and get them to join us on pledges to drive down the price on products that are going to help us deal with carbon emissions.

I think the more we create that global market, the better we create the opportunities for our U.S. products as well. So anyway, thank you for this important hearing, and I certainly support your legislation that was just recently introduced, as a broad way to incent generation of more carbon-free energy. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you. I would note the fact that in 2007, once again, you were ahead of the times with Senator Hatch on electric vehicles, and so we appreciate all the leadership.

Next is Senator Menendez.

Senator MENENDEZ. Well, thank you, Mr. Chairman.

In a newly released study by the largest reinsurance company in the world, it found that climate change would cost the global economy 18 percent of GDP by 2050, including 10 percent of U.S. GDP.

While some have said that transitioning to renewable energy is too expensive, or that it kills jobs, with every passing day and every passing disaster it becomes more and more clear that the cost of inaction is far higher than the cost of creating a modern, sustainable clean-energy economy.

So, Mr. Walsh, will the transition to a clean energy economy, coupled with strong coordination with our global partners to combat climate change, be beneficial for our economy and our Nation in the long run?

Mr. WALSH. Thank you for the question, Senator. I think it would. And actually the first analysis I would point to is one by the Rhodium Group that Senator Wyden entered into the record at the start of this hearing, which shows net job creation of roughly 600,000 jobs annually over a 10-year period. That is only looking at decarbonizing the electricity sector. Obviously we have to do this economy-wide. Bottom line, we are going to have to manufacture and install and operate and maintain an enormous amount of new generation capacity, along with transmission lines and energy storage, to make that possible. And that will create an enormous number of jobs.

I think the bigger challenges will be, one, ensuring that these jobs are high-quality and accessible and across the full value chain, including manufacturing; two, targeting investment, and the jobs it creates, to parts of the country where that investment in job creation has lagged to date; and three—which is very much related to two—ensuring that workers and communities that have relied on fossil energy sources are not left behind.

Senator MENENDEZ. Absolutely. So we use our tax code to incentivize private-sector investment in areas that fit the public good. And I think we have established that acting on climate is an economic imperative, and that our continued reliance on fossil fuels not only harms public health and our environment, but also our

economy—and that clean energy technologies have the potential to create millions of good-paying jobs right here at home.

Yet, the United States continues to subsidize the fossil fuel industry to the tune of billions of dollars every year. Instead of moving us in the right direction, my Republican colleagues used the 2017 tax bill to give even more handouts to big oil.

I previously introduced the Close the Big Oil Tax Loopholes Act to try to correct some of these taxpayer subsidies to corporate polluters, and I am working towards reintroducing that legislation. I know the chairman has worked to incorporate some of these principles into his Clean Energy for America Act as well, which I support, and I hope we can work together to move the pertinent parts of the tax code in the right direction.

And speaking of the right direction, last year PSE&G, the parent company for New Jersey's largest electricity utility, announced that it was divesting its fossil fuel assets. At the same time, they maintained a 25-percent stake in the Ocean Wind project in Federal waters off of our State.

Ms. Pope, as companies like yours face decisions on decarbonization going forward, in order to ensure a smooth transition, how vital is it that the tax code catches up to current market trends?

Ms. POPE. Thank you, Senator. It is definitely time to update the tax code to match current demand with new technologies, flexibility, and long-term certainty. The technology-neutral approach does this, and it does not pick winners or losers, or lock in specific technologies, but it is a good way to encourage innovation and incent clean energy deployment.

Your example of PSE&G's offshore wind is a great one. And certainly that long-term tax policy is critical to utilities that routinely engage in long-term planning and invest in long-lived assets, 20 to 40 years or more.

Tax incentives also help keep customer prices affordable, especially when designed to ensure that the full credits reach customers. Tax policy needs to be paired with continued Federal funding for research, development, and deployment of emerging technologies, including the offshore wind that you were talking about, but also renewable hydrogen, long-term storage, and smart grid advances.

So thank you.

Senator MENENDEZ. Thank you. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Menendez.

Senator Thune is next.

Senator THUNE. Thank you, Mr. Chairman. Good morning, and thank you to all the witnesses for your testimony.

On President Biden's first day in office, he issued an executive order canceling the permit for the Keystone XL Pipeline. The decision led to the loss of good-paying jobs in South Dakota and across the country and set the Nation back in terms of modernizing our energy infrastructure.

Even the Canadian Prime Minister, a member of the liberal party, supported the pipeline and included it in Canada's clean energy roadmap.

The pipeline's operator committed to operate Keystone with net-zero emissions by 2030 and pledged to invest $1.7 billion on solar, wind, and battery power to operate the pipeline. This would have ranked the operator among the highest corporate backers of renewable energy purchases directly supporting the green energy agenda.

Since the executive action, the President has proposed trillions of new taxpayer dollars to address infrastructure and the climate, but the $9-billion pipeline project would have helped benefit both of those areas and added thousands of American jobs.

Mr. Sunday, if our Nation wants to maintain its place as an economic superpower, will we need to modernize both conventional energy infrastructure and the build-up of low-emissions energy projects?

Mr. SUNDAY. Thank you for your question, Senator.

Yes, absolutely. As a recent report from Columbia University said—while it is counter-intuitive—the most efficient and cost-effective way to reach climate goals is going to be to continue to invest in our gas infrastructure. Along with that, I would encourage continued reforms and streamlining and certainty on siting interstate energy projects like the one that you referenced.

Senator THUNE [off mic]. That chill other large-scale private investments that are both good for American energy security and for the environment.

Mr. SUNDAY. I apologize, Senator. You were on mute the first half of that question.

Senator THUNE. I am off mute. So just tell me how it is that preventing such projects as Keystone chill other large-scale private investments that are both good for America's energy security and the environment.

Mr. SUNDAY. The infrastructure space has a decades-long timeline for certainty in making estimations on if the investment makes sense. If we enter this frame where the only period of time you know that you might have certainty is over the next couple of years, capital is not going to be interested in investing in the type of projects that we are actually going to need to meet energy demand now and into the future.

Senator THUNE. The U.S. has moved from being a net importer of most forms of energy to a declining importer and, as of 2019, a net exporter of energy, a truly remarkable transformation.

U.S. oil production and natural gas production hit record highs in 2019, and today our country is the largest producer of natural gas in the world. Much of this progress, of course, has come from American innovation in extractions from unconventional formations such as shale, and a policy and a regulatory environment that encourages growth.

Mr. Brill, how would raising the corporate tax rate by a third, and eliminating all fossil fuel tax incentives, impact America's energy security? And would such policies increase the costs of energy consumption for Americans?

Mr. BRILL. Thank you, Senator Thune. Raising the corporate tax rate, as has been proposed by President Biden, from 21 percent to 28 percent, or even from 21 percent to 25 percent, raises the cost of capital, raises the cost of new investments for all corporations, including energy corporations, including clean energy corporations

and businesses trying to develop new clean energy, as well as existing businesses working in the natural gas space, which are relatively low-carbon technology, and other industries as well.

This has a myriad of adverse consequences. This is bad for our U.S. economy from an international competitiveness perspective, but it is bad from an energy perspective with respect to those businesses that are trying to make investments here in the United States.

And so this policy works at cross-purposes to the overall objective, I think of this hearing, and I think of the objective of energy security and clean energy in the United States.

Senator THUNE. Anybody on the panel can respond to this, but one concern I have about the proposed carbon fees or other emission-based proposals is that we first have to have an accurate count of emissions.

South Dakota is a leader in clean energy in terms of wind, hydroelectric, and biofuels, yet we face obstacles like the EPA using outdated greenhouse gas modeling for ethanol, which cuts fuel emissions by roughly half. Biodiesel cuts emissions by 70 percent, and advanced biofuels, when paired with CO_2 storage, could approach carbon-negative territory.

How do we ensure that we are accurately accounting for the real emissions of all sources to ensure that we have a level playing field when it comes to these incentives? Anybody? And I know I am out of time, so whoever wants to take that one.

[Pause.]

The CHAIRMAN. Senator Thune, could we take that one for the record?

Senator THUNE. No one wants to answer it, evidently, so, yes, that is fine, Mr. Chairman.

The CHAIRMAN. I thank my colleague.

Senator Portman?

Senator PORTMAN. I appreciate you fitting us all in.

First of all, I appreciate the witnesses. Some of you talked about permitting today, and one of the things that concerns me is that it takes so long to permit a project, and it is so darned expensive.

In your testimony, Mr. Sunday, you talked about that and the need for reform. Back a few years ago, former Senator Claire McCaskill and I offered legislation called the Federal Permitting Improvements Hearing Council, called FAST–41 because it was in the FAST highway bill. And the AFL–CIO Building Trades Council, as well as a lot of business groups, supported it. And it has worked. It saved large infrastructure projects well over a billion dollars. By the way, a bunch of these projects were clean energy projects, including hydro on the rivers in Ohio.

And so my question for you is, should we be doing more of that? My concern is that it sunsets. This bill sunsets the Council in 2022. Are you aware of this FAST–41 proposal project, Mr. Sunday? And would you support lifting the sunset so it can continue?

Mr. SUNDAY. Thank you, Senator. Absolutely. We appreciate your leadership on this issue. The business community is behind it, and we would certainly support its extension. We have seen FAST–41 permitting help get some very important Pennsylvania energy infrastructure projects built more efficiently, including a pipeline

that is helping gas get exported to developing worlds to help them meet their energy needs and reduce security risks.

The fact that you mentioned the reduced statute of limitations and time for environmental reviews, that has helped collect capital on the ground and put people to work in this country. So, we appreciate your leadership on this issue.

Senator PORTMAN. Great. Well, I would hope that, no matter what we do, we extend FAST–41 and ensure that we can have the Federal dollar stretch further by reducing the costs and the time for permitting.

Ohio is one of these energy States, like Pennsylvania, Mr. Sunday, where we have a lot of manufacturing. We also have a lot of coal and natural gas. We have nuclear. We have renewables. We have solar, wind, hydro.

The fossil fuels, though, the natural gas in particular, we are going to need to continue in our energy mix for some time as a reliable and affordable baseload energy source. Because of this, I think carbon capture is absolutely critical. And you know, for our Nation to reduce emissions along the lines that are being talked about is absolutely essential, without undercutting our economy.

Carbon capture and direct-air capture facilities are costly. They are very expensive—and up to a billion dollars, as an example, at a power plant. And I think there is an opportunity for us to use the tax code more here.

We have 45Q, which is the tax credit which we just extended for an additional 2 years in our 2020 year-end spending bill. That is an important incentive. I continue to work with Senator Bennet—who is on the committee—on carbon capture through our Carbon Capture Improvement Act, which allows the use of private activity bonds. And I like the private activity bonds in part because they are an incentive for private investment as well for creating efficiencies for the government.

Mr. Brill, are you aware of our carbon capture legislation that uses private activity bonds, as was used in the 1970s for scrubbers? And how do you feel about that? And, Mr. Sunday, can you share the similarities to Ohio and can you comment on that as well?

Mr. BRILL. Thank you, Senator Portman. Broadly speaking from a technology perspective, carbon capture, I think, is critically important going forward, because we are going to continue to have forms of energy that do contain some carbon emissions, such as natural gas, and so really to capture that is a critical way to get to lower emissions overall and eventually perhaps to net-zero.

So, carbon capture is critically important, and as you noted, is expensive. R&D in this area to help bring down those costs will be important. And the development of a price on carbon will be important to make adjustments for carbon emissions which are captured.

And of course, as you noted, other strategies such as the private activity bonds, 45Q, or reforms to those provisions, may also encourage the deployment of carbon capture.

Senator PORTMAN. Mr. Sunday, any comment?

Mr. SUNDAY. Thank you, Senator. Yes, as I mentioned in my opening statement, no State but one reduced emissions. Ohio is number one. So I know we compete on a lot of fronts, but this is certainly one area where our States should work together, given

shared energy interests, the shared pipeline infrastructure, similar geologies. We have some projects in the beginning stage on carbon capture. It certainly makes sense to continue to pursue that. There is no real reasonable scenario that we meet net-zero by 2050 without continued investment into carbon capture.

Senator PORTMAN. But we think these private activity bonds are an effective way to finance it. We also finance direct air capture facilities in our new version of the legislation. So we look forward to working, Mr. Chairman, with the committee on that. And thank you for letting me ask questions.

The CHAIRMAN. Thank you, Senator Portman.

Let me also just say to colleagues, under the Clean Energy for America Act, a gas or coal plant that fully captures its emissions would qualify for the same amount as a wind or solar farm, because this bill is all about reducing emissions. So I appreciate my colleague's questions on this.

Senator Toomey, you are next.

Senator TOOMEY. Thank you, Mr. Chairman.

You know, the 2017 tax reform was guided by an underlying theory in terms of the design on the business side of that. The idea was, if we would lower the after-tax cost of investing capital, we would have an increase in invested capital. And it is invested capital that makes workers more productive, and we said that if we do this, we are likely to get that investment, and the results will be more income for workers as well as an accelerated growth in our economy. This is exactly what happened.

Mr. Sunday, as you mentioned in your testimony, in the wake of the TCJA, Pennsylvania companies in particular invested in their facilities and their workers. From 2016 to 2020, Pennsylvania alone added over 238,000 jobs. Median wages grew by 13½ percent. In some sectors like the chemical plant operators and natural gas power plant operators, wage growth was 34 percent and 20 percent respectively.

The fact is, by January 2020, in the wake of our tax reform, we had the strongest economy of my lifetime. We were at full employment. We had more job openings than people looking for jobs. The poverty rate was at a record low. African American unemployment was at an all-time record low. Wages were growing for everyone, but they were growing fastest for the lowest-income workers, so we were narrowing the income gap as well.

And now, shockingly, what the Biden administration and many of my Democratic colleagues want to do is reverse the policies that got us there, unwind the tax reform that gave us the best economy of my entire lifetime.

So, Mr. Sunday, could you comment on how you think Pennsylvania businesses and workers would be affected if the Biden tax increases went into effect?

Mr. SUNDAY. Thank you for the question, Senator, and thank you for your leadership on tax reform and all the work you have done on behalf of our State over these many years.

We cannot lose sight of the fact that Pennsylvania has the second highest CNI tax in the country. We have unfair treatment of NOLs. Layer all that on top of raising the Federal rate, and keeping in place all the base broadeners that were part of TCJA, and

suddenly, not only does America have the highest corporate rate in the world, Pennsylvania is 10 points higher than that and we become a very uncompetitive place to do business.

We just saw that we are losing a congressional seat. I do not think that unfair, unattractive measures or policies are going to do anything to reverse that type of population and investment loss.

Senator TOOMEY. Yes, I would just strongly stress, it would be okay to get back to the best economy of my lifetime. That would be a good thing to aspire to. Maybe keeping in place the policies that got us there would be a good idea.

Speaking of which, in your testimony, and just a moment ago with Senator Portman, there was a discussion about CO_2 emissions. According to the data I have seen, the U.S. as a whole has brought its CO_2 emissions down. We have been doing that steadily. And by 2019, our CO_2 emissions were back to the level they were at in 1992, in absolute amounts. On a per capita basis, we had brought the CO_2 emission level down to the level of 1950.

Now we all know what did that. It was natural gas replacing coal as a source of electricity. And Pennsylvania has led the way; together with Ohio, we are the two top States in CO_2 emission reductions. Pennsylvania is an energy powerhouse.

Could you give us some sense of your view on how central a role natural gas has played in the Pennsylvania economy, but also in America achieving this remarkable success in reducing the level of CO_2 emissions at a rate faster than most people thought even possible?

Mr. SUNDAY. Sure. Over the last decade, we have seen an 11-fold increase in natural gas production in Pennsylvania, and that has brought utility bills down by the billions, and aggregate electricity prices in PJM are at generational lows. That is more money that folks had to save and meet their budgets, low-income folks in particular who were spending 10 to 15 to 20 percent of their budget on utility bills. A lot of breathing room there.

We have seen manufacturers in our State invest in combined heat and power projects to reduce costs, enhance output, add shifts. One consumer packaged goods plant in the Northeast went from one of the most expensive plants in that company's footprint to meeting a net revenue raise on energy because they can now sell power back to the grid. It has been a total game changer for our economy and the environment.

Senator TOOMEY. And I will close with this, Mr. Chairman. All the while this has been happening, since 2010, from 2010 to last year, Pennsylvania's power sector emissions have declined by 36 percent. It is really a remarkable story of the success of natural gas. Thank you.

The CHAIRMAN. Thank you, Senator Toomey.

Senator Cardin?

Senator CARDIN. Mr. Chairman, first I want to thank you for your leadership on the legislation that you have introduced. We do need a level playing field. We do need predictability. We do need a rational basis for how we provide, in the tax code, for our energy sources, and I think you have given us a template. And I just really want to first thank you for your leadership on this issue.

I do want to acknowledge several of the witnesses. Their comments have been what I agree with. Ms. Pope said we need a level playing field, and I could not agree more that we do need a level playing field on energy.

And, Mr. Brill, I appreciate your comments in regards to a carbon tax. I do think that is the clearest, easiest way that we can reward clean energy, and we incentivize the private sector to do what is right. So I think that is extremely important.

And then Senator Crapo asked the questions of Mr. Sunday in regards to nuclear power, which I agree with. I am a Democrat. He is a Republican. We need nuclear power. It is 20 percent of our electricity today. It is a carbon-free, basically, source of energy.

So, until we can get to that level playing field, nuclear power is at a disadvantage in that it does not have a production tax credit, or an investment tax credit. The cost of power today makes it very difficult to modernize our nuclear power plants without some form of a tax credit.

So we are looking at a production tax credit in this Congress as a way of leveling the playing field on nuclear power. So I wanted to give Ms. Pope, and perhaps Mr. Brill, an opportunity to respond as to, on at least the current basis, what we need to do to encourage the modernization of our nuclear power plants.

Ms. POPE. Thank you, Senator. Additional tax policies that enable the continuation of the country's nuclear plants are critically important if we are going to achieve the 2030 and 2035 goals.

Existing nuclear is an important carbon-free resource that today, as you know, makes up 20 percent of the country's energy supply, and, it is clear, a much higher percentage of the clean energy supply for the country. But new nuclear is going to take investments. It is going to take investments that have certainty. We obviously know the complexity. It is going to take investments for partnering with Idaho National Labs and other labs that are part of DOE. It is going to take credits. And that's why the discussion we have had today, with regards to tech-neutral incentives that allow for all participants to be able to participate equally and allow people to be able to use investment tax credits, is so timely. Most importantly, policy-makers need to make sure that everyone is able to access these credits, and that we have a normalization fix for all participants, particularly utilities, most of which operate many of the nuclear plants in the country.

Senator CARDIN. Thank you. Mr. Brill, do you want to add anything?

Mr. BRILL. Yes; thank you, Senator Cardin. I would note, I would agree with you and others who have talked about the importance of nuclear power as a consistent and reliable source of energy in the United States. Consistent with my testimony, a price on carbon would likely extend the life of the existing fleet or stock of nuclear power in the United States and get to new investments in nuclear power that will allow new technologies, new research, and regulatory changes that will facilitate and bring down the cost of those new investments as well.

Senator CARDIN. Thank you. I want to mention one other area, and that is conservation. Conservation, conserving energy, is a win/win/win for everyone. And our tax code needs to be sensitive on

how we can use it to encourage conservation. We were able to get section 179B, which allowed for the energy efficiencies of our buildings, to be made permanent, but there are still areas where we could vastly improve the tax code as it relates to the conservation of energy in our buildings under section 179B.

There are other sections of the tax code that can encourage conservation and reduce the amount of energy use, which would be friendly towards our climate and reduce greenhouse gas emissions.

So, I just really want to put on the table that one of the areas that I think is low-hanging fruit is to improve the provisions we have in our tax code as it relates to conserving the use of energy. We can do that in the auto industry in electric vehicles. We can do that in so many different areas, and I applaud the chairman for his leadership in this area, and the other members of our committee, as we work together to develop an energy policy.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Cardin. You are the first to explicitly mention conservation, and we appreciate it.

Our next two Senators will be Senator Cassidy and Senator Brown. And, colleagues, we are going to try to keep this moving even though we have a vote.

Senator Cassidy?

Senator CASSIDY. Thank you, Mr. Chairman. Thank you for being here. Thank you all for being here.

Mr. Sunday, I am always struck when people talk about things like intangible drilling costs as being some big bailout for a super major, but as you and I both know, they do not qualify for the intangible drilling cost deduction. Is that correct?

Mr. SUNDAY. That is my understanding. It is more limited to the independents.

Senator CASSIDY. And it is only 1,000 barrels a day, which for ExxonMobil is, one, they do not qualify, but, two, it would not be very important in their overall production.

Now that would be very important for the small, independent producer who diversifies, if you will, prevents the monopoly of the super majors and the larger independents. So how essential is such a thing for that smaller producer who is creating such prosperity for working Americans in your State?

Mr. SUNDAY. Thanks for the question, Senator. Our natural gas producers have been a huge win for the economy and the environment, but it is a challenged price environment because of infrastructure constraints and regulations. So the folks who are still able to sustain are those independents, but their business structure is such that 80, 85 percent of their capex is intangible drilling costs. That is what we quote for that industry and other industries——

Senator CASSIDY. Let me stop you, because I have limited time. So the point is, there are all these folks who are providing great-paying jobs for working Americans, great-paying jobs that have persisted despite the pandemic, they are dependent upon this particular provision which does not go to ExxonMobil, but does go to these very small companies in some cases, and they are the ones providing this employment. I want to make that point.

Mr. Brill, I am always interested in the carbon tax because it seems as if it leaves various things out. By the way, I think philosophically you and I are in agreement on many things. But we know—let's just be honest: we are not going to have battery production on the scale that is required for this vision of the administration for at least a decade, if not a lot longer.

And we also know that currently most of the batteries are produced in China, where they use coal as feedstock. And the cobalt is mined in the Congo, with abhorrent conditions, a very energy-intensive process. And I have read that if you take into account the mining of the cobalt, the processing in China, and the shipment of the battery to the U.S., the amount of savings in life-cycle costs on global greenhouse gas emissions is minimal, and perhaps even nonexistent.

So as we do a—and by the way, hear that: it is minimal or nonexistent. So everybody who looks at EVs as kind of the savior of the environment is looking at U.S. emissions. They are not looking at global greenhouse gas emissions. And if we had more time, we could develop that further.

Mr. Brill, though, in your carbon tax, are we not effectively outsourcing the carbon relief to China and India, et cetera, unless we are going to put in place a border adjustment tax which takes into account the mining of the cobalt with the equipment that is used in the Congo, the shipping cost to China, the concrete that is laid in China, et cetera? Is that practical?

Mr. BRILL. Thank you for your question, Senator. You are absolutely right that in a well-designed carbon tax there needs to be a border adjustment mechanism that would exclude the tax on U.S. exports of carbon-intensive goods and impose that tax on imports of goods containing carbon from other countries.

That policy is something that tax lawyers and tax economists have thought about a lot, and it can protect the U.S.'s competitiveness——

Senator CASSIDY. I accept—we both accept the need for the border adjustment tax. Is it practical, if you are going to have heavy equipment in the Congo which is going to be, you know, scraping this out of the ground, putting it in a diesel-spewing truck to take it to the port to ship it to China, with a 50-percent coal-fired energy source, and then shipped over here, not to mention the fact that the factories in China are made with lots of concrete and other vessels, other trucks spewing diesel? How practical is it to have a VAT which totally captures all of that?

Mr. BRILL. My view, Senator, is that it is definitely possible to capture most of the trade in carbon emissions from the——

Senator CASSIDY. Just for a second, Mr. Brill; everything is possible. Is it practical?

Mr. BRILL. Yes.

Senator CASSIDY. I mean, are we really going to get the diesel truck that is 20 years old in the Congo bringing the stuff made by child labor to the port?

Mr. BRILL. I am not suggesting that it can capture 100 percent of the carbon emissions involved in trade, but I do believe that one can practically design a policy that captures the vast majority of trade in carbon emissions——

Senator CASSIDY. I am over time, but I will say that it is in the interest of our trading partners to bury those costs. And so I do think the practicality of it may be subject to definition. But thank you all for your testimony.

The CHAIRMAN. Thank you, Senator Cassidy.

Next will be Senator Brown. I am going to run and vote, and Senator Crapo will keep this hearing moving, and I will vote and be right back.

Senator BROWN. Thank you. Thank you, Chairman Wyden and Senator Crapo.

Mr. Walsh, the Banking and Housing Committee, which I chair, last week had the pleasure of hearing from Zoe Lipman of BGA. We talked about the potential for my State as the Nation shifts to a low-carbon economy. Mr. Walsh, where do you see the most potential job growth in domestic manufacturing?

Mr. WALSH. Well, I think—thank you for the question, Senator. I think certainly in component parts and assembly of EV vehicles, there is an enormous amount of work to be done. We have talked a little bit about how the tax code could be used to support EV production in this country. We also have direct investment via the Department of Energy programs that we can use.

I think we need to reflect on the fact, which has been commented on, that China controls roughly 60 percent of EV car production, roughly 70 percent of battery cell production. That was not accidental. That was the result of focused industrial policy which included roughly $60 billion worth of investment from the Chinese Government.

I think we also have the ability to make key material like steel and cements in lower-carbon ways. And I think this is an area where we have a lot of work to do. We have been doing a bunch of work with different policy models that can, I think, better reward U.S. manufacturers vis-à-vis our international competitors.

I think it is worth noting that every kind of steel made in China has roughly twice the embodied emissions compared to the steel made in the United States. So I think if we can have policy designed that actually takes that into account, we are going to set up U.S. manufacturers of a wide range of materials that are the fundamental building blocks of this country and the world.

Senator BROWN. Well, you talked about the existing industrial policy in China, and I would add, lack of industrial policy in the United States, coupled with Presidents of both parties from George Bush the first through Donald Trump, and a trade policy and a tax policy that undermined our efforts.

You note that the union density in the traditional energy sector likely accounts for the wage differential between it and the renewable sector. Why are we seeing this? How do we increase wages in solar and wind, whether it is in the factory, or whether it is in the field?

Mr. WALSH. Yes. I think there are a couple of reasons. One of the reasons is that one of the most important deployment drivers of clean energy technologies like solar and wind has been the tax code. And we have, at least historically, not included labor standards or domestic content standards in our clean energy tax incentives. We think that needs to change to level that wage gap and

that union density gap. And Senator Wyden's bill, I think, shows us a good first step.

Senator BROWN. So if I could interrupt, Mr. Walsh, in other words, you do not provide clean energy tax incentives without—or energy tax incentives, period—without some kind of labor standards, and some kind of domestic content standards?

Mr. WALSH. That is what we believe, Senator. I think it is also worth noting that that alone is not enough, that we need to fundamentally rebalance power between workers and their employers in this country. We need to support and reinforce workers' ability to organize amongst themselves, to collectively bargain with their employers for better wages and benefits and working conditions.

The PRO Act is, I think, a very important piece of legislation that our coalition, all of our partners, support. And we are hoping to see support from the U.S. Senate of the PRO Act, because that, to our minds, is critical as we build out this clean energy economy, but also important to addressing what is fairly profound income inequality in our economy as a whole.

Senator BROWN. Thank you. And the BlueGreen Alliance has partnered with many Ohio and other Appalachian stakeholders on opportunities to clean up the legacy of extractive industries.

What sort of work—and I see Senator Bennet, who is going to be in the same meeting I am in on the Child Tax Credit in a moment—what sort of work needs to be done there?

Mr. WALSH. Well, we have a lot of cleanup that needs to be done. Just in looking at abandoned mine lands, some estimates go as high as $20 billion of cleanup costs.

This is heavy construction work. It is moving a lot of earth. With prevailing wages, we think these jobs can support middle-class jobs and careers and, importantly, can be an important source of job creation in parts of the country that have been hurt economically by the transitions going on in our energy economy.

So we are extremely supportive of cleanup, both on abandoned mine lands, but also on brown fields, on Superfund sites, and oil and gas wells as well. The job-producing potential is really significant.

Senator BROWN. Thank you, Mr. Walsh.

Senator CRAPO [presiding]. Thank you very much.

Next is Senator Lankford, and he will be followed by Senator Bennet.

Senator LANKFORD. Thank you very much. Let me ask a couple of questions.

Mr. Sunday, I want to first start with you, talking about tax policy on this. Europe, and Germany in particular, is losing some of its energy independence of late by trying to be more dependent on Russia and the Nord Stream 2 pipeline for natural gas. That is an enormous geopolitical shift that will have very long-term effects on Western Europe.

We in the United States started exporting natural gas half a decade ago, specifically dealing with the geopolitical importance of that, and also dealing with the carbon issues of trying to be able to reduce carbon usage around the world by using cleaner natural gas for energy around the world.

So geopolitically, it is important. In other ways it is important as well. The reason I want to talk about that is, one of the key issues is the intangible drilling costs on that, with just normal operating costs for oil and gas and for their production. There has been conversation about that.

Mr. Sunday, what would that mean to lose intangible drilling costs, both geopolitically for us and our energy independence domestically, as well as just in tax policy?

Mr. SUNDAY. Thanks for the question, Senator. It would incredibly disadvantage the producers that are still able to operate here in Pennsylvania. That would translate to reduced production, fewer jobs, and a reduction in the LNG exports to countries, as you mentioned, in Southeast Asia, India—and it would increase their geopolitical risks and our ability to shrug off geopolitical turmoil in the Gulf.

Senator LANKFORD. So let me ask the same type of question. Enhanced recovery has been a process that has been around for a while. It has been very important to actually reduce our footprint.

Mr. Sunday, do you want to give any additional details on enhanced recovery, what that could mean to be able to reduce our carbon footprint?

Mr. SUNDAY. Sure. I think if the goal is reduced emissions, you want to get the most molecules out of the ground with the least surface activity possible. So that is certainly something that we would want to continue to support, if that is our goal.

Senator LANKFORD. Thank you for both of those.

Mr. Brill, I want to ask you about the wind production tax credit. The issue is not whether we should engage in wind. Wind is a great source of energy around the country. It is an effective piece of energy, when the wind is actually blowing, to be able to engage in that.

My question is, we still continue to put billions of dollars into the wind production tax credit as a specific set-aside to incent new construction on that. It obviously changes the formula of the price for wind compared to everything else. But it seems to be something that should be fading. There is a lot of great wind production out there. It is very efficient. But we are doing it the same way, though, that we have done it now for 30 years.

Is it effective to continue to do the same credit over and over again, even when wind is no longer a startup entity?

Mr. BRILL. Thanks for the question, Senator. It is true that the technology has advanced by leaps and bounds over the last few decades, and the price of wind energy has plummeted over this same period of time. Depending on how one does the calculations, it is often cost-competitive even without the subsidies.

The subsidies, of course, further encourage additional investment and additional deployment of a carbon-neutral source of energy, and there are climate and economic advantages to that. But continuing a strategy of large subsidies for all clean energy will become increasingly costly over time as we continue to transition towards lower carbon emissions. And so therefore, the cost of these policies, I think, should be carefully examined.

Senator LANKFORD. Thank you.

Ms. Pope, I want to ask you specifically about an issue that I do not think you were directly affected by, but 2 months ago, obviously, we had a really deep cold snap that came across the central part of the United States. I was in that. Southwest Power Pool had a pretty dramatic shift during that time period, as we saw a lot of wind towers that froze up. Our solar panels were all covered in deep snow. A lot of our natural gas facilities that were active in gas processing froze up in the central part of the United States. There was a pretty dramatic set of issues there, and it seemed to cascade.

Part of the challenge is, we are trying to go through this to continue to be able to focus on energy diversity. Some of the tax incentives, when you put those in place, obviously capital runs towards where it is going to get the greatest return. That has been wind, and that has been other things, which again, in my part of the country in Oklahoma, you know, wind comes sweeping down the plain and we actually turn wind towers with it and make energy out of it. It has been great as a source. But the question becomes over-reliance, and on peak days, what that really means, that over-reliance.

How can tax policy actually push us in our energy diversity area so that we over-create some areas and under-supply others? And so on peak days hot and cold, we need to mix that. How do you balance that out in your own portfolio?

Ms. POPE. Thank you very much for the question.

First of all, in Oregon and across the Pacific Northwest, we saw tremendously harsh weather, particularly the last 2 weeks of February. And at Portland General Electric in particular, we had more than half of our customers lose power during that time. And we spoke with Chairman Wyden, as well as many others, while getting that power restored.

One of the things that happened during those significant ice, wind, and snow storms in our part of the country, was the generation continued to produce, whether that be wind, whether that be solar, whether that be hydro, or whether that be thermal resources.

One of the reasons for that is that those resources are all constructed for the weather conditions that we have in the Pacific Northwest on the hottest days of the year, and on the very, very coldest days of the year. The storms that we were impacted by were probably one-in-40-year events. So I am very aware of the reliability issues and the problems for all of our customers and community members and your constituents when there is not power, particularly during this pandemic.

As we look forward to how to incent diversity across all of our resources, it is something we feel very strongly about, and it is one of the reasons that we really like the tech-neutral aspects of Chairman Wyden's proposals—and most importantly, that all participants, utilities and independent power producers alike, can participate.

And thirdly, I say that to balance renewables—wind, solar, hydro, as well as others—Portland General Electric, as well as many utilities in the west, belong to the Energy Imbalance Market. And we work with each other to lower the costs of renewables, to

be able to use the maximum amount of renewables across a much wider geography of the entire west.

So, through a variety of mechanisms, I think there is a real opportunity to expand the use of renewables in a reliable and low-cost fashion. Thank you.

Senator LANKFORD. Thank you, Mr. Chairman.

Senator CRAPO. Thank you.

Senator Bennet?

Senator BENNET. Thank you, Mr. Chairman. Can you hear me?

Senator CRAPO. Yes.

Senator BENNET. Thank you. Thank you for running an excellent hearing, and thank you to the witnesses for your testimony.

Ms. Pope, cleaning up electricity generation is critical to meeting our climate goals, as we have discussed this morning. It is responsible for 30 percent of the greenhouse gas pollution in this country.

Clean electricity will also be critical to reducing emissions in other sectors, like transportation. And while we have made important progress already without new policy, the electric power sector is poised to reduce emissions roughly 45 percent below 2005 levels by 2030.

Analysis after analysis shows that this sector is where the fastest and cheapest opportunities to cut emissions remain. These studies also show we need to reduce emissions from electricity by at least 80 percent below 2005 levels by the end of the decade to reach our economy-wide climate targets.

I was really encouraged to see a group of leading power companies, including yours, Ms. Pope, recently release a letter calling for a new policy to limit electricity sector emissions to that level nationwide. And as we have heard, Portland General Electric recently upgraded its corporate greenhouse gas reductions goal, pledging to reduce emissions 80 percent by 2030. At the same time, your company has supported public policy efforts both in Oregon and federally that would provide certainty around the emissions reductions necessary from both the power sector and economy-wide.

Can you talk about the role of policy frameworks that limit carbon emissions from electricity such as the clean electricity standard like the one currently under consideration in the Oregon legislature, and how they can be a critical complement to Chairman Wyden's tech-neutral bill and help ensure we meet our climate goals?

Ms. POPE. Thank you. And first of all, Senator Bennet, let me mention that one of the reasons that we have been successful in achieving the goals that we have, and being able to set more aggressive goals as we go forward, is the utility sector across the United States works closely together, shares best practices. In particular, your State of Colorado and how you manage wind energy that integrates that resource not only from the IOUs, but from your public power participants in the State, has been an example to us for many years. So, thank you.

We believe very strongly that State policy and Federal policy need to work hand in hand with one another. And we view these as complementary to help us move faster and meet all needs.

We have seen in the past that when there is a disconnect between Federal and State policies, it can be challenging for utilities, particularly those that operate in different States and different

parts of the country, and we do not move as fast toward a clean energy future.

So having more certainty is important, as well as having tech-neutral approaches, and allowing all participants to be able to work collaboratively together as we do this important work to get an 80-percent reduction from the electric sector, so that our broader economy can hit 50-percent reductions by 2030, and then go beyond with more technology advancements to 2035 and 2040.

Senator BENNET. Thank you for that.

Mr. Chairman, I cannot see a clock, so I do not know what I have left.

Senator CRAPO. You have about a minute and a half left.

Senator BENNET. Excellent.

So, Mr. Walsh, workers in communities in coal-dependent regions across our country are struggling to make ends meet. And in order to safeguard our environment, health, and economy we need to transition to cleaner sources of energy to achieve net-zero emissions by 2050, and we need to do this, as you have said, while ensuring there are good-paying jobs for energy workers. We need to support communities that rely on local government revenue from fossil fuels to support core services like education, water, and public safety. I have in mind places like Craig, CO, in my own State.

Mr. Walsh, in terms of tax policy, what lessons should Congress learn from experiences in States or cities—or even at particular facilities—about how to support workers and communities in transition, especially in rural communities like Moffat County, or like Craig, CO?

Mr. WALSH. Thank you for the question, Senator. I mean, I think we can start by learning from your State of Colorado, where we see a great example of a coordinated whole-of-state-government approach to using public investment to support workers and communities in the coal economy, Craig and Moffat County being a big part of that in northwest Colorado.

I think they would be the first to tell us, though, that States cannot do this by themselves; that they need the Federal Government as a partner, and a whole-of-government approach from the Federal Government. You note ways in which we can potentially use the tax code. We have already talked a little bit about how legislation can target new investment in manufacturing and infrastructure to communities that have been disrupted by coal economy transition. The 48C proposal from Senator Stabenow and Senator Manchin is one such example.

You do flag, though, the importance of local tax revenue that comes from facilities like coal power plants and coal mines. I think this is something we really need to explore. I think, as a coalition, we would be very interested in working with you and other folks on the committee to figure out how we can most reasonably help local and State and tribal governments replenish revenue they have lost when, for example, a coal mine or power plant closes.

I think there is a strong role in that for this committee, and the Federal tax code.

Senator BENNET. I agree with that. Thank you, Mr. Chairman.

Senator CRAPO. Thank you.

And next is Senator Daines.

Senator DAINES. Thanks, Senator Crapo.

Instead of investing in Colstrip and the high-paying jobs it creates, PG&E and the Pacific Northwest owner have done everything they could to avoid investing in the plant. It is in part because of the State-wide carbon-free mandates in Oregon and Washington, and early closure of Colstrip will have huge, huge impacts on the communities, on jobs, and reliable baseload power in the region.

It is one thing to be forced to close because of State policies. It is another to actively advocate for them.

Ms. Pope, has PG&E been party to any communication directed to the Washington utility commission urging the immediate closure of Colstrip?

Ms. POPE. Thank you, Senator Daines. We reflect, as an Oregon utility, the values of our customers, and the values of the community leaders in the State in which we serve and operate.

As for the operation at Colstrip, we have been an owner of that facility since its inception, and are committed to doing the right thing for our employees, for the community of Colstrip, and for the environment.

We are working collaboratively with the——

Senator DAINES. Ms. Pope, the question was, has PG&E been a party to any communication directed to the Washington utility commission urging the immediate closure of Colstrip?

Ms. POPE. We have not engaged with the Washington utility commission. We are governed by the Oregon utility commission.

Senator DAINES. But I asked Washington or Oregon. So Oregon, you have?

Ms. POPE. Our Oregon commission, we have a utility regulation. It includes not having coal in our customer rates by 2030.

Senator DAINES. But regarding the Oregon utility commission, you have been a part of urging the immediate closure of Colstrip with the Oregon utility commission?

Ms. POPE. We haven't. We are working collaboratively with stakeholders to figure out a solution that reflects the values of Oregon customers, community leaders, and others across the State, as well as customer prices, making sure that we are doing the right thing for the employees of Colstrip, working collaboratively with other owners in our contractual relationships there, as well as the communities in Montana that have supported the facility for the decades it has been operating.

Senator DAINES. So, regarding serving your customers, as you know, the Pacific Northwest has a looming capacity shortage with a possibility that baseload power will not be able to meet peak demand. We saw this happen, of course, in California last summer.

Would extending and expanding clean energy credits address that problem? Or would it make it worse due to the intermittent energy and decreased baseload?

Ms. POPE. As we look forward to a clean energy future, we look to using technology to integrate new sources of renewable energy like battery storage, also traditional storage of pumps, hydro, as well as others. We also are working to ensure that we have distributed energy resources. That will allow us to more flexibly manage load and customer usages so that we are able to take advantage of the diverse set of energy resources—wind, solar, hydro, and oth-

ers. In particular, we are looking at investments in the State of Montana around wind energy and solar energy.

Senator DAINES. So I know Oregon's legislature is considering a bill to require PG&E to service Oregon customers with 100-percent clean energy by 2040, I believe. Is that something your company supports?

Ms. POPE. We have been in dialogue with the parties with regard to legislation currently in front of the Oregon Legislature on both the House and the Senate side.

Senator DAINES. So PG&E relies on Colstrip to reliably serve the load. The economics of operating the plant have been changed in part by renewable tax subsidies. If that continues, Colstrip's continued operation could be put in jeopardy. This would result in displacement of an entire community, and remove from the region a facility that has served to maintain grid reliability.

The question is, what do you think we should do as part of this legislation to enable PG&E to exit Colstrip while enabling others to continue to own and operate the plant to supply, certainly a State like Montana, and aid regional grid stability?

Ms. POPE. So, there are a number of owners in the Colstrip facility that have different interests, and some interests that are aligned. In working through the contractual relationships, with both its owners and its operators, finding a workable solution for the plant is important.

We will make sure that we do the right thing by the plant's employees—who have worked there for a long time—as well as the operations, the environment, and the community of Colstrip. As you note, two of the units have already closed, and we have worked collaboratively as those costs have been incurred by the other co-owners of the other units. And we have continued to meet regularly to discuss the operations of the facility.

Senator DAINES. Thanks, Ms. Pope.

Senator Crapo, thanks; I am out of time.

Senator CRAPO. Thank you. Next is Senator Casey, and he will be followed by Senator Young, if he is able to get back, and Senator Warner.

Senator Casey?

Senator CASEY. Senator Crapo, thanks very much. I will have a question, I hope, for both Mr. Walsh and Mr. Sunday.

Mr. Walsh, I wanted to start with you. In your written statement, you noted how important it is that we seek out ways to build career pathways in order to increase access to clean energy jobs. I agree, and I know a lot of people do as well. And at the same time, we have to look to address the climate crisis, as well as addressing the economic and jobs crises that we are confronting right now.

We must also prioritize training and skill development opportunities. So obviously, this has to include pathways to good jobs, and I believe one of the best pathways to a good job is union jobs for new workers, as well as workers seeking new opportunities within the energy sector.

I have a Civilian Conservation Corps proposal that I have been working on. While it is not limited to energy jobs, it prioritizes opportunities for a Civilian Conservation Corps member to not only

obtain short-term employment, but also to gain both skills and connections as well as opportunities that will help them set up for the long term.

So here is the question. As we look to advance policies, including through the tax code, that will expand the clean energy sector, what steps should we be taking to ensure that training programs—whether it is registered apprenticeships or career apprenticeship programs—what steps should we be taking to ensure that we are focused on the broader goal of creating new clean energy jobs?

Mr. WALSH. Thank you for the question, Senator Casey. We agree that unions and the registered apprenticeship and union-affiliated training programs they create with their signatory employers, are a key pathway to doing that.

You mentioned your Conservation Corps proposal. That, for example, could be used as a pathway into registered apprenticeship programs. The key is to make sure that we have incentives within our tax credits to actually leverage those existing assets, right? So, for example, Senator Wyden's inclusion of registered apprenticeship utilization in his bill is a way to do that.

We have other ways to do that as well. We can incent or require project labor agreements which come with them. Typically a large project has a very sophisticated plan on not only the use of registered apprentices on those projects, but then the pathway that usually starts with a pre-apprenticeship program, often based in a local community so that folks actually have the skills they need to get into those apprenticeships and therefore earn a pathway to what ultimately becomes a career-track middle-class job.

So I think intentionality about the standards we apply to tax credits is the key, and we look forward to working with you and working with this committee to expand on some of the good first steps that Senator Wyden has made in including registered apprenticeships and prevailing wages in his legislation.

Senator CASEY. Mr. Walsh, thank you very much.

I will move to Mr. Sunday with regard to kind of three interrelated issues: methane, jobs, and infrastructure. In your testimony, you refer to the need to take steps to both reduce methane emissions from natural gas, but also the potential that it has. Methane, as we know, is a terribly powerful greenhouse gas. Its effect on climate change is more than 30 times greater than that of CO_2 when averaged over a 100-year time period—and even greater when considered over the first 20 years after it is emitted.

We know that in my home State of Pennsylvania, this opportunity is a real win/win to help address methane leaked from natural gas production, but also to protect and create new jobs at the same time we are addressing the climate.

You know the significance of pipeline infrastructure in this question, so I guess I would just ask you to speak to the economic opportunity for a State like ours with regard to further investment in methane leak detection and repairs at all stages, and whether this is a good opportunity to create good-paying jobs in taking steps on lowering emissions?

Mr. SUNDAY. Thanks for the question, Senator. I think you have the upstream stage where drillers are committing to corporate stability goals, the same with the pipeline. On the utility side, with

the infrastructure, we have to figure out a way to repair some of those leaks and aging mains and not sock rate-payers. And then we cannot forget about the contributions from methane from abandoned oil and gas wells, which, as you know, some estimates say that several hundred thousand of them are scattered across the State. We need to find a viable way to get those things plugged.

Senator CASEY. Thanks very much.

Senator CRAPO. Next is Senator Young. Is he back? Senator Young, are you here?

[No response.]

Senator CRAPO. I see Senator Warner——

Senator WARNER. Yes; thank you, Senator Crapo, and my apologies to Senator Young. Thanks for this hearing. I am going to have a couple of questions for Mr. Walsh.

Here in Virginia, we are taking bold steps to modernize our energy economy, particularly through the development of offshore wind. The Commonwealth is currently in the midst of developing a 2.6-gigawatt commercial offshore wind project in Federal waters. And that will be the first in Federal waters. It will be, when fully operational, capable of providing clean renewable energy to about 650,000 homes. As I mentioned, it is currently the largest project in Federal waters.

The Global Wind Energy Council has said that the outlook for wind energy is going to ramp up exponentially. As a matter of fact, it is looking at 13,000 megawatts in 2024, and over 20,000 megawatts in 2025. All this is good news. But that also means there is more competition for capital. There is going to be a lot more focus here.

Mr. Walsh, what can this committee and the administration do to make sure that the United States is more successful in both attracting domestic and international capital? And how can we make sure that we maintain that supply chain?

One of the things we are trying to do in Virginia is make sure that some of those wind turbines are actually made in Virginia, as they will help produce wind for Virginians and others. But can you help address that question around supply chain? And since Senator Crapo did not mute himself and is over-talking, I am going to probably get an extra 30 seconds or so out of that.

Senator CRAPO. Thanks for letting me know, Mark. I will mute myself.

Senator WARNER. Mr. Walsh, can you take that question on the supply chain and wind?

Mr. WALSH. Yes. Thank you for the question, Senator. We agree with you that the economic potential of offshore wind is truly dramatic. And we have a great example from the first grid-connected offshore wind farm in this country, in Block Island off of Rhode Island, of how unionized craftspeople from a whole set of building trades under a project labor agreement built that wind farm.

The only place where it fell short—and this gets to your question—is in the materials and the technologies that were actually used for the wind turbines. The nacelles came from France. The towers came from Spain. And the blades came from Denmark.

We can do better than that. One of the ways to do that is to include domestic content incentives or requirements in our offshore

wind production tax credit. Another way to do that is on the supply side, because to make the kind of components for offshore wind that are going to be necessary, size and scale are enormously important. There are going to be big capital expenditures going into that, for example, to make one of those blades by domestic manufacturers. And we think we are going to need some supply-side help for U.S. manufacturers to actually become competitive in what will be an enormously important economic opportunity.

You have seen the data that we have. The National Renewable Energy Laboratory estimates that the Atlantic coast States could create roughly $200 billion in new economic opportunities.

So we want to make sure that we capture those benefits, not just on the installation and operation and maintenance—those are important—but also in the manufacturing supply chain as well.

Senator WARNER. Well, as we get into that, one of the things that we need to guarantee is that there is going to be that domestic demand. And as you may be aware, we got approved in Virginia, but there are a lot of other offshore projects stacking up in terms of getting through the approval process. We want to make sure these are all environmentally sound, but if we do not have a faster approval process, we do not—there was so much dismantling done in the previous administration. And just the administrative oversight, if we do not get these projects approved on a timely basis, we are not going to have the kind of guaranteed domestic generation that will then move some of those European companies to say, well, you know, we need to actually build some of those turbines and blades here in the United States.

In the last 24 seconds, can you speak to that issue of getting this approval process speeded up a little bit?

Mr. WALSH. We completely agree with you. Efficiency and transparency in permitting are going to be really important, as well as fully attending to environmental mitigation issues. I mean, we have had direct conversations with Director Leftin at BOEM. I think she shares that vision and is committed to making sure that BOEM uses all the resources at its disposal to make sure that that permitting is done in an expeditious and thorough way.

As you note, capital expenditures are going to be absolutely reliant on that kind of certainty. Otherwise, we are not going to see manufacturers and developers and other businesses in the value chain make the kind of investments necessary to capture this economic opportunity.

Senator WARNER. And that is, again, why I think—I know my time has expired—but that is why I think, again, my Republican colleagues, this is an area where I think there was agreement that we need a faster regulatory review and approval process. And BOEM needs the resources to get that done.

Thank you, Senator Crapo.

Senator CRAPO. Thank you, Senator Warner.

And I do see Senator Whitehouse. Senator Whitehouse, you are next.

Senator WHITEHOUSE. Thanks, Senator Crapo. I appreciate it. And thanks to all the witnesses.

Since Mark raised the question of BOEM, let me just flag that one of the reasons Rhode Island got steel in the water and elec-

trons on the grid first is because we did two very smart things that had not been done before. One was, we got a very robust data plan together so that everybody knew who was doing what in the waters where the siting was to take place. And the second was, we front-loaded the use conflicts, and we got those resolved, or minimized, at the very get-go. And BOEM, despite that, has not learned that lesson yet.

And so, Mr. Walsh, I would urge you, and Mark, and everybody else, to join me in pushing that BOEM require applicants, when they come in with these projects, to have done a conflicting use survey, and report to BOEM what conversations they have had with the other users so that you do not end up with warfare breaking out between conflicting users that could have been headed off, and instead slows things down.

So I will just flag that issue, because I think we have real common cause there.

Some background on this. You know, I think the fossil fuel industry has known for decades about this problem. They have had every chance to deal responsibly with the pollution. We could have robust technologies in place for dealing with carbon, but instead the industry chose to set up front groups, and traffic in lies, and attack the real scientists, and use immense amounts of dark money to influence politics. In effect, they ran a big covert operation against their own country to try to prevent the action that we are trying to push for now. And I think they need to be held accountable for that, plain and simple.

Moreover, the rest of corporate America—there has been a lot of talk about how the rest of corporate America supports a lot of what we are talking about, kind of. I mean, they do when they are meeting BRT and CLC, but when they come to this building, when it is their lobbyists and their trade associations, that support has evaporated.

So please, nobody watching this should think that there is effectual corporate support, particularly for carbon pricing, in Congress right now. They just are not doing it. And I do not know if it is because the CEOs do not know what their posture is, or because they want to stick with the trade associations who have been so much trouble, but whatever it is, the effect is, there is simply no real business pressure for carbon pricing at this point.

And the last point I would make is, you cannot talk about natural gas emissions without talking about methane. And methane has been a nightmare, and the industry has been very sloppy about reporting and has backed away from commitments to report. So we have a lot of work to do to get the methane problem solved, and I think there are a lot of jobs in solving the methane problem.

So let me turn to just a couple of quick questions. One is to Mr. Brill. Mr. Brill, the IMF has put the subsidy for fossil fuel in the United States at $600 billion—billion—per year, which obviously includes the negative externalities and not just the direct subsidies we are addressing today.

Is that an economically correct way to look at the subsidy for fossil fuels, the IMF way?

Mr. BRILL. Well, I would not attribute that subsidy to the industry. I would agree that there are negative externalities associated

with emissions, and that is the reason why a carbon tax can help move the economy, the energy economy, away from fossil fuels and towards alternative energies and clean energies.

Senator WHITEHOUSE. And you are aware of the IMF report that puts the number at $600 billion with——

Mr. BRILL. I have not seen that report.

Senator WHITEHOUSE. Okay; take a look.

I think Mr. Sunday, Mr. Brill, and Mr. Walsh, all their testimony supported carbon capture and removal. I would love to offer Ms. Pope the chance to make it unanimous. And I would note that it is hard to get much carbon capture and removal going if just dumping it into the atmosphere is free. There is not much of a revenue proposition for carbon capture and removal until there is a price on emissions. And so I think those of us who support carbon capture and removal as an essential way to safety in all of this need to think about it in those terms.

Mr. Brill, would you agree with that? And, Ms. Pope, how do you feel about carbon capture and removal?

Mr. BRILL. I would agree, yes.

Senator WHITEHOUSE. Ms. Pope?

Ms. POPE. And, Senator, yes, we would agree. We also believe that we need to have a combination of policies.

Senator WHITEHOUSE. Yes, there is no single—it is silver buckshot, not silver bullet, I think is the way to describe it.

Lastly, Mr. Brill, you talk about making progress globally. With a price on carbon, that would be consistent with global progress, you say, but it would also facilitate global progress through border adjustments, because nothing is easier to reconcile in a border adjustment than international prices on carbon. Isn't that true?

Mr. BRILL. I'm sorry? I do not understand the question, Senator.

Senator WHITEHOUSE. Like if different countries have completely different regulatory systems for regulating carbon emissions, that makes it hard to figure out, at the border, who should pay what. But if one country has $100 per ton and the other has $50 per ton, figuring out what the border adjustment should be gets a lot easier.

Mr. BRILL. Absolutely. Many of our regulatory policies are not and cannot be border-adjusted, but a carbon tax can be border-adjusted. And your point is absolutely correct.

Senator WHITEHOUSE. And that is how you get to global progress. Thank you very much, everybody. Great hearing. Much appreciated.

Senator CRAPO. Thank you, Senator Whitehouse.

Next is Senator Young. Is Senator Young back?

[No response.]

Senator CRAPO. I will just explain to the witnesses. We have a series of votes going on, so members are having a hard time getting back.

I see the chairman is back now.

Senator Young is next, and then I will turn the gavel back over to the chairman.

The CHAIRMAN. Thank you, Senator Crapo, and there is a vote on.

Senator Young?

Senator YOUNG. I am headed to vote. Thank you, Mr. Chairman. Very well-engineered and choreographed.

Well, I thank our witnesses for joining us today. And it is really important we hold this hearing today, so I commend the chairman for doing that.

Despite being considered a promising carbon alternative for years now, hydrogen has not seen national investment like other nationally important renewable energy sources. In the meantime, innovators have been expanding the uses of hydrogen, while global investors have directed over $100 billion toward hydrogen infrastructure.

To ensure that the United States is rightly leveraging this resource, last week I reintroduced a piece of legislation, the Hydrogen Sustainability and Utilization Act, along with Senator Whitehouse. The bill would incentivize investment in hydrogen energy infrastructure by adding hydrogen to the list of renewables that qualify for the renewable electricity production tax credit.

Mr. Walsh, it is estimated that the growth of hydrogen infrastructure could generate 700,000 jobs in the next 10 years. Now, as we look forward to rebounding from the economic impact of this global pandemic, do you believe that hydrogen is a worthy Federal investment?

Mr. WALSH. Thank you for the question, Senator Young. Hydrogen is, I think, enormously important as an energy carrier. It is also extremely intriguing for a number of other reasons. I will just cite steelmaking, given the State that you represent. Hydrogen is actually being used as a reductant—not in this country, because we do not have a policy regime in place to actually support that—but as a reductant for steelmaking over in Europe right now.

So there are a number of really interesting uses for hydrogen. I think it is particularly interesting to look at ways in which we can produce free hydrogen, using renewable energy sources that are otherwise curtailed in off-demand cycles to create the hydrogen in clean ways.

So I think this is an issue that we would be very interested in talking with you further about. The other benefit of hydrogen, of course, is that it allows us to use some of our existing infrastructure in lower-carbon, or even zero-carbon ways, if done right. And I think that is another benefit that we need to look at as well. There is a set of safety and co-pollutant issues associated with hydrogen that I think need to be looked at very, very carefully, but I know that is something that you would welcome looking at as well.

Senator YOUNG. You are correct, sir. Thank you for your fulsome response.

We will leave behind the hydrogen for a moment, and I will pivot to another topic, which is renewable energy incentives. And I am looking for the time clock here. Okay. This is always a challenge when we are remotely asking questions, so I want to be sensitive to that.

Renewable energy incentives, particularly within the tax code, often have unintended consequences. For example, nearly two-thirds of solar panel production occurs in China, with many more companies sourcing inputs from Communist China.

With an expansion of demand for more solar panel installation, this means that Americans will have to rely on Chinese manufacturing in order to increase utilization of solar energy.

Of course, reshoring solar panel manufacturing is one option, but it will be very capital-intensive and time-consuming. The disadvantages of relying on China for the supply chain are multi-fold. Let me just move forward to some questions for Mr. Brill.

Mr. Brill, to what extent should we be concerned about the level of dependence on China in our renewable energy supply chains? And what is the role of the Federal Government in supporting domestic reshoring without causing even more market disruptions?

Mr. BRILL. Thank you, Senator Young, for your question. I think it is important that the United States has a diversified supply chain with respect to renewable energy. And so to the extent that—that does not necessarily mean that all of our renewable energy needs to be manufactured here in the United States, but to the extent that we are relying on a single country, and particularly a country with which we have an adverse relationship, that does put at risk that supply chain.

Bringing some of that manufacturing onshore or ensuring that other countries are capable and active in the production of solar panels or other technologies, I think, is to our advantage.

Senator YOUNG. Yes, sir. Well, thank you for the concise response. I just add, as I pass it back to the chairman, that I think the Federal Government should examine the effects of increasing our dependence on China before launching a sweeping policy to further incentivize the use of renewable energy sources.

The CHAIRMAN. I thank my colleague. And I also want to note that his interest in hydrogen is well-taken. And hydrogen would get the same kind of treatment as wind and solar with respect to this effort to reduce emissions. And I thank my colleague.

Senator Cortez Masto?

Senator CORTEZ MASTO. Thank you, Mr. Chairman. And thank you to the panel members. This is a great discussion. I am one who believes we have to invest in building and modernizing our infrastructure to meet the demands of tomorrow with the 21st-century technology. And I think it is going to be key. Otherwise, we are going to be left behind.

I want to talk a little bit about the EV infrastructure. And I apologize if this question has already been asked. I know I have had other hearings and had to go vote, but let me just say I am very proud of Nevada. It is leading the way in electric vehicle innovation production, and I am proud to support that, first by joining my colleagues in signing on to the Securing America's Clean Fuels Infrastructure Act to provide incentives to support building the infrastructure that is necessary to support Americans as they move toward electric vehicles. I even have some bills that focus on incentivizing that new modern technology.

But, Ms. Pope, let me start with you. How can bills like these, and the Clean Energy for America Act, support the growth of EV infrastructure to make drivers' commutes cleaner and more fuel-efficient, while also driving our global economic competitiveness?

Ms. POPE. Thank you. There are three main areas that would make a significant difference. The first is charging infrastructure,

making sure that all participants can participate in building out charging infrastructure.

The second is overall utility infrastructure, what the industry tends to call "make ready," and that is ensuring that we have the right equipment in the distribution system all the way to the charging area.

And then the third is really around clean energy and being able to charge the vehicles when the wind is blowing and the sun is shining, to make sure that we are maximizing the use of renewables.

We can also then begin to use the batteries in the vehicles to return energy back to the grid for stability. So the benefits to the transportation sector also accrue to the utility customers overall in making a stronger, more resilient grid.

Portland General just launched a partnership with Daimler North America on an electric island charging area for—and Senator Cantwell will appreciate this—for heavy-duty trucks, medium-duty trucks, buses for our local transit authority, as well school buses. And that was done just last week, and there is tremendous growth in this area. So thank you.

Senator CORTEZ MASTO. Well, thank you. And I see that in my own State. Most people do not even know where Lovelock, NV is. But I'll tell you what, if you have an electric vehicle and you are traveling across Interstate 80, you know Lovelock, NV, because there is a charging station there.

And I think it is so important that we make these investments now in the infrastructure that is necessary to utilize the technology that is going to bring us to a cleaner environment as well.

Let me ask this: future investments in our transmission system must prioritize strategic choices that maximize distribution for the consumers and businesses that will rely on it.

So, Ms. Pope, do you have any thoughts on how Congress can clearly define and target transmission investments?

Ms. POPE. Sure. And before I answer your question on transmission, I do want to acknowledge that many of the batteries that are used across the entire west, in fact across the entire country, are manufactured in Nevada. And I have visited that facility.

Senator CORTEZ MASTO. Thank you. Thank you for highlighting that. We are very proud. And that is what I say: Nevada is primed with its innovation on this new technology really to create jobs, lead in this technological age, and contribute economically and reduce our carbon footprint. I am very proud of all of the work everyone in Nevada has done here, including the private sector that has been instrumental in this innovation space.

But, please, go ahead.

Ms. POPE. And with regard to transmission, as we look at the lowest-cost resources that are renewable, generally they are very large and they are away from the areas where most electricity is used in urban centers and whatnot. So transmission is absolutely critical. And as you know, across the west and across the rest of the country, we have not kept up with our transmission investments.

As we change our sources of electricity, it will be important that we also invest in transmission to deliver it. And so whether that

is, to take an example, a transformation within many States in the west, including Montana, there will need to be additional transmission built, but we can also leverage existing transmission. And some of the transmission projects in Nevada are particularly important in terms of stability of the grid. So, thank you.

Senator CORTEZ MASTO. Thank you. I know my time is up. Thank you, Mr. Chairman. Thank you to the panelists.

The CHAIRMAN. Thank you, Senator Cortez Masto.

Senator Hassan?

Senator HASSAN. Well, thank you, Mr. Chair and Ranking Member Crapo, for holding this hearing. And thank you to our witnesses for testifying today.

I wanted to start with a question to you, Ms. Pope. The year-end relief package contained my bipartisan bill to increase access to capital for residential and commercial energy storage projects. I am also a supporter of bipartisan efforts led by Senator Heinrich and others to strengthen tax incentives for energy storage.

Ms. Pope, how do battery storage incentives help improve the reliability of the electrical grid and cut costs for consumers?

Ms. POPE. Thank you, Senator Hassan. Battery storage is an absolutely critical component to the future of the reliability of our systems, both connected with the generation by renewables, as well as for reliability of the distribution system when connected with substations, as well as in individual homes for reliability and resilience. And if you look at the grid of the future, we will be able to store solar and wind energy for use during times when the wind is not blowing and the sun is not shining, and be able to have truly a bi-directional integrated, much more reliable grid.

For example, Portland General Electric, together with NextEra Energy Resources, just brought online the wind portion of the largest-scale solar/wind/battery storage facility in eastern Oregon. And what that does—to the prior discussion on transmission—is it allows us to utilize better the transmission that goes across the State on more of a 24/7 basis when you otherwise would not be generating, because that storage has been able to store the solar. And in the future, with Chairman Wyden's bill, we would also be able to store the wind. So it is a very, very important component as we move forward, and technology is moving very quickly.

Senator HASSAN. Thank you for that answer.

I want to move now to Jason Walsh. Mr. Walsh, I have introduced bipartisan, bicameral legislation, along with Senator Collins, to modernize and expand energy efficiency tax incentives.

The energy efficiency sector is one of the largest clean energy employers, with millions of workers spread out across every State. Our bills would expand tax credits for homeowners who upgrade appliances, and improve incentives for building new energy efficient homes.

Can you comment on how promoting energy efficiency can simultaneously create high-quality jobs, reduce homeowners' energy bills, and help fight climate change?

Mr. WALSH. Thank you for the question, Senator.

Well, you are right. It does all of those things. It is a triple win. The only thing I would add to the very useful way you framed the question, which I completely agree with, is that, if you look at the

U.S. energy employment report, energy efficiency jobs are the biggest source of clean energy economy jobs in our entire economy.

There is a ton of good building trades work in particular that is done on energy efficiency, as we move to more fully deploy energy efficiency resources across the country and across the economy in multiple sectors. The job growth potential is really significant. We obviously care a lot about the quality of those jobs and access to those jobs. But energy efficiency is enormously important, and I am really glad you asked the question and are such a champion on energy efficiency issues.

Senator HASSAN. Thank you very much. I have another question.

I have additional legislation, the Net Meter Act, that would support the renewable energy market by helping States expand net metering programs. Net metering allows consumers and businesses to reduce their electric bills by compensating them for renewable energy that they produce and return to the grid.

So, Mr. Walsh, can net metering complement our efforts to fight climate change by strengthening solar and wind tax incentives?

Mr. WALSH. I think it can, Senator. We have done comparatively little work on net metering, but on the legislation you mentioned, we would be happy to talk with you further and work with you further on that.

Senator HASSAN. Thank you very much.

The last question is to you, Mr. Walsh. The tax code currently hands numerous special tax giveaways to big oil, including special deductions for oil drilling.

How do these special tax giveaways for big oil hurt our efforts to combat climate change, including good-paying clean energy jobs?

Mr. WALSH. Senator, we do not take a position on those tax credits. We are much more focused on the affirmative tax credits that can be made, that invest in energy efficiency and new renewable energy generation, and doing so in an equitable way.

Senator HASSAN. Well, I thank you for your care with that answer. I suggest that those tax credits should be eliminated as we transfer to clean energy tax incentives. Thank you.

Mr. WALSH. Thank you.

The CHAIRMAN. Thank you, Senator Hassan.

Senator Barrasso?

Senator BARRASSO. Well, thanks so much, Mr. Chairman, and I appreciate you taking the time to hold the hearing and involve so many of us.

America is energy-independent right now. Our Nation reached that goal through the hard work of hundreds of thousands of American workers. Securing energy independence provides all Americans with a safer and stronger future. That is why I am baffled, really baffled, by the efforts of President Biden and his supporters in Congress to destroy entire industries in America, and to force tens of thousands of America's fossil fuel energy workers into the ranks of the unemployed.

I continually hear the administration tell oil rig workers, coal miners, pipeline workers, that they can simply get new jobs building solar panels. Shortly after President Biden took office, John Kerry said the Biden administration policies will give these workers, in his words, better choices.

In 2019, the average salary of solar panel technicians was about $30,000 a year less—$30,000 a year less—than the average salary of workers in oil, gas, coal, in all those industries. That is even if these green jobs even exist.

To that point, *The Washington Post* fact checker took a look at what John Kerry had said. They said he was offering—Kerry and the administration were offering false hope with a misleading use of statistics.

America needs all of the energy. We need the solar. We need the wind. We need the oil. We need the gas. We need the coal. We need the uranium for nuclear power. We need it all. And the demands for energy in this country are going to continue to increase.

Choosing to use the tax code to intentionally destroy America's fossil fuel industry, to hurt our economy, to force more American workers to lose their jobs, and to strengthen the economic power of the government's of China, Venezuela, Iran, and Russia, is a path I will not go down.

Today at the Energy Committee hearing, where I am the ranking member, Joe Manchin and I were talking with those people who were there to testify. Senator Murkowski from Alaska said that right now Russia is providing more energy to the United States than is Alaska. What is that going to make Americans feel if they hear that that is a result of the Biden administration?

So for me the choice is easy. I am going to continue to be on the side of, and support America's fossil energy workers, their families, their communities, all of the things related to it.

So a question for Mr. Sunday. Following up with Senator Lankford's question to you, Chairman Wyden's tax proposal released last week includes several provisions I think are harmful, that are going to raise costs for businesses and for consumers. The provisions threaten the jobs of tens of thousands of American workers.

One of these provisions is the elimination of the percentage depletion allowance for oil and gas and coal operations. The allowance has been in the tax code since 1926. The percentage depletion allowance is available to businesses engaged in extraction operations. That is sand, gravel, granite, marble, coal, borax, sulfur, gold, copper, silver, and oil and gas. But for oil and gas operators, the allowance is available to the smallest, usually family-owned oil and gas companies that usually employ anywhere from 10 to 15 workers.

Large integrated companies cannot claim the deduction. And a producer can only claim the allowance for the first 1,000 barrels of oil or gas equivalent produced a day. So you can take a look in comparison of the big oil companies that can produce 370 net oil barrels a day.

What people do not often realize is that the royalty owner can also claim the percentage depletion allowance on their tax return. Well, the owners are a diverse group, from the professional investor, to a retiree, a rancher, farmer, people who receive some little extra income each month to help with ongoing bills. Often, but not always, the payments are small.

So I was talking to a royalty owner who mentioned his most recent oil royalty payment for production on land that he owned was about $120 for 2 months of royalties—period. He does not take ad-

vantage of the percentage deduction allowance, but eliminating the allowance will likely result in the well that he has had, which has been producing for nearly 40 years, to be shut down.

The royalty payment is going to disappear. No question, American workers are going to lose their jobs. So the question is, what in your opinion will the economic impact be of eliminating the percentage depletion allowance, particularly as it affects your independent producers, as well as individual royalty owners?

Mr. SUNDAY. Thank you. And in the commodities space, we are talking percentage of the depletion. Everywhere else it is expensing and depreciation, and we have bipartisan support for that. So this is not special in the oil and gas industry, it is just different terminology.

Making it harder to drill for the commodity that we need to sustain our modern economy is just going to raise costs on households and consumers, and leave local governments with fewer revenues for things like conservation in Pennsylvania. There are billions of dollars that come into State government because of energy development, and the less we drill, the less we are going to have that type of revenue in the State.

Senator BARRASSO. So with the elimination of this long-time business deduction, is it likely to consolidate more control or less control of oil and gas markets into the hands of the large, integrated oil and gas companies?

Mr. SUNDAY. I think it is fair to say you would see continued pressure on the independents.

Senator BARRASSO. And in the long run, if an industry consolidates into only a handful of companies, what is the economic impact for consumers?

Mr. SUNDAY. I would venture to say they would lose out in that situation, sir.

Senator BARRASSO. Mr. Chairman, I assume my time is about up. I do not really see a clock on the screen.

The CHAIRMAN. Yes. Does my colleague have anything else he wanted to talk about? Your time is up.

Senator BARRASSO. If my time is up, no; thank you, Mr. Chairman.

The CHAIRMAN. Okay.

So 2½ hours into the hearing, I want to close with what I believe is the clean energy lodestar for our times: a job-creating, free-market competition to get to net-zero carbon emissions.

Now, over the last nearly 3 hours, Senators asked about natural gas, coal, nuclear, conservation, hydrogen, the list goes on and on. And as we wrap up, I want to make it clear that all of those sources, when they capture emissions, fully capture emissions, they would qualify just as wind and solar do under my legislation.

In my view, that makes sense for the times, even though to pick up on Senator Barrasso's last comments, nobody would have contemplated something like this as necessary way back in 1926.

Now, committee members have brought up a number of areas where they have interests. I think that they are compatible with the legislation that I have authored, and I would just wrap up by way of saying that writing legislation is about bringing Senators together. We are going to do everything we possibly can to do that.

But what is non-negotiable is just saying that this can wait, because that is something, given what scientists are saying, our country cannot afford.

So I want to thank all our guests. A special commendation to Ms. Pope, because not only was it very helpful to have her testimony, but she got up before all of us in order to be here, and we thank her for it, because she is home in Oregon.

And my final comment is just to remind Senators they have 1 week to submit questions for our witnesses. With that, the Senate Finance Committee is adjourned. And I thank all of our guests.

[Whereupon, at 12:34 p.m., the hearing was concluded.]

APPENDIX

ADDITIONAL MATERIAL SUBMITTED FOR THE RECORD

PREPARED STATEMENT OF ALEX BRILL, RESIDENT FELLOW, AMERICAN ENTERPRISE INSTITUTE

Chairman Wyden, Ranking Member Crapo, and members of the committee, my name is Alex Brill, and I am a resident fellow at the American Enterprise Institute, a public policy think tank here in Washington, DC. Thank you for the opportunity to testify about the tax code's role in our country's pursuit of clean energy. The views and opinions I offer today are mine alone and do not represent those of my employer or necessarily those of my colleagues at AEI.

INTRODUCTION

Today's hearing addresses a timely and important topic: the tax treatment of energy. A broad, efficient, technology-neutral tax policy geared toward encouraging less energy consumption and more renewable energy production is critical to ensuring a reduction in CO_2 emissions. The US tax code has long encouraged the use of clean and renewable energy, as well as energy conservation and efficiency, with policies dating back to the Energy Tax Act of 1978. Unfortunately, a scattershot approach to tax policy aimed at reducing U.S., reliance on fossil fuels—whether in pursuit of energy independence or to address concerns about climate change—has led to a complex and convoluted tax code.

Over the years, Congress has enacted dozens of deductions, credits, exclusions, and other favorable tax policies to incentivize a broad array of renewable energies (wind, solar, geothermal, biomass, etc.); structural efficiency technologies (residential energy efficiency upgrades, commercial energy efficiency investments, etc.); and low-carbon transportation (plug-in vehicles, electric motorcycles, alternative fuels, vehicle refueling facilities, etc.). In some cases, policies encourage additional investment in existing technologies, foster demand for and broader adoption of clean energy, and incentivize research and development. In other cases, policies may be little more than windfall gains for manufacturers of existing products.

As Congress considers the role of tax policy in addressing our climate challenges, I encourage members to consider options that simplify the tax code with respect to energy, avoid the economic distortion of provisions that are not technology-neutral, and adopt a broad-based and fiscally responsible approach.

TRENDS IN ENERGY USE

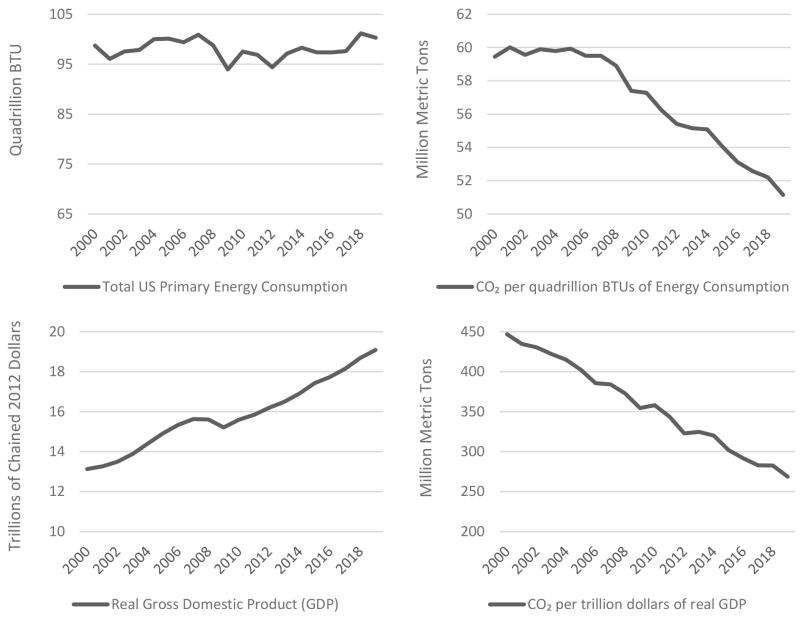
In broad terms, the United States is becoming more energy-efficient relative to gross domestic product (GDP), and the energy consumed in the United States results in significantly less CO_2 emissions per BTU than in the early 2000s. Total energy consumption has been relatively constant in the last two decades and CO_2 emissions from the energy sector peaked in the United States in 2007. From that year through 2019, the US economy grew 22 percent in real terms while the amount of CO_2 emitted per unit of energy fell more than 14 percent (EIA, 2021). Recent data from the Energy Information Administration (EIA) indicate that energy-related CO_2 emissions in the United States fell an additional 11 percent in 2020. This was due in part to the pandemic and recession (in particular a decline in transportation-related energy consumption), but in large part to a decline in CO_2 intensity from less coal and more natural gas and renewable energy use (EIA, 2021).

In addition, from 2007 to 2019, the amount of energy per dollar of GDP dropped more than 30 percent, as the service sector grew faster than the goods-producing

sector (EIA, 2021). In other words, our energy sector has become significantly less carbon-intensive, thanks to the decreasing share of coal and increasing share of natural gas and renewable energies, *and* the U.S. economy has become less energy-intensive.

Figure 1 illustrates these trends. The first panel presents total U.S. energy consumption, which fluctuated between approximately 94 and 101 quadrillion BTUs from 2000 to 2019. The second panel illustrates the decline in the carbon intensity of the energy that is consumed in the United States, a ratio that was relatively constant through 2007 but has since steadily declined 14 percent. The third panel presents the overall upward trend of the U.S. economy, and the fourth panel plots energy-related CO_2 emissions as a share of GDP. Since 2000, the U.S. economy's CO_2 emissions dropped from nearly 450 million metric tons per trillion dollars of GDP to 269 million metric tons. Of course, total emissions matter most with regard to climate change, but the progress toward lower emissions, relative to near-constant levels of energy consumption and significant economic growth, is noteworthy.

Figure 1. US Energy Consumption, CO_2 Emissions, and Economic Growth, 2000–2019



Source: Data from the Energy Information Administration and Federal Reserve Bank of St. Louis.

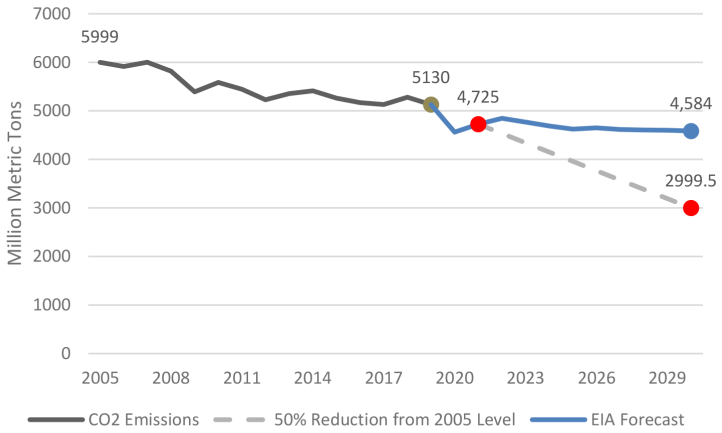
Nevertheless, a much greater reduction in CO_2 emissions is necessary to address the significant risks of climate change. Meaningful policy interventions are required to achieve additional large-scale carbon emission reductions. Such progress must be achieved globally, but a lack of binding commitments from all nations does not preclude the U.S. from adopting sensible, market-based policies domestically.

President Biden recently announced an emissions reduction target of 50 percent of 2005 economy-wide greenhouse gas pollution levels by 2030 (White House, 2021). This is a significant goal, as the Energy Department's current baseline forecast for energy-related CO_2 emissions in 2030 changes little from current levels (EIA, 2021). Even less ambitious reductions will require significant changes in the carbon intensity of the energy consumed and the quantity of energy consumed in the United States.

For perspective, in 2019, energy-related CO_2 emissions accounted for 78 percent of total U.S. greenhouse gas emissions (EPA, 2021). Figure 2 reports CO_2 emissions from the energy sector since 2005 and shows that total emissions have declined 14.5

percent from 2005 through 2019. Figure 2 also presents the baseline forecast from the Department of Energy's Annual Economic Outlook along with the level equivalent to a 50 percent reduction in energy-related CO_2 emissions relative to 2005.

Figure 2. US Energy-Related CO_2 Emissions: Levels, Forecasts, and Targets, 2005–2030



Source: Data from the Energy Information Administration.

THE CASE FOR TARGETED ENERGY TAX POLICY

Policy interventions to encourage market-based reductions in carbon emissions are justified by the lack of price signals associated with the societal cost of these emissions. Private transactions between buyers and sellers of carbon-intensive products fail to incorporate the negative externalities associated with emissions of CO_2 into the atmosphere. Instead, the cost of CO_2 emissions is borne by society as a whole, including both current and future generations.

This negative externality is becoming increasingly obvious. Beyond the increase in sea level, extreme weather (intensity and frequency), and environmental damage, the consequences of climate change can be measured in economic terms. Recent research published by the Congressional Budget Office (CBO, 2020) estimates that, absent meaningful intervention, climate change will cause output in the United States to be 1 percent lower in 2050 and in every year after. As I recently noted, policymakers need to understand that the cost of inaction on climate change is nowhere close to zero (Brill, 2021).

Tax policies can correct for the negative externality by putting an explicit price on CO_2 emissions, providing a tax subsidy that encourages energy conservation and renewable or low-carbon forms of energy, or a combination of both strategies. Tax subsidies can reduce the after-tax cost of an investment in a source of renewable energy (an investment tax credit) or can be designed to increase the price received for the sale of clean energy (a production tax credit). Moreover, tax subsidies can serve to bolster nascent technologies seeking to achieve production cost efficiencies through scale. For example, there have been extremely valuable and important technological advances in wind and solar energy. The average prices of solar and wind energy have tumbled over the last decade, and markets have responded with significant increases in demand for these renewable forms of energy. Tax credits further lower the cost of these technologies and positively contribute to their adoption (Mai, 2016). However, there are downsides to energy tax subsidies that should be noted.

DRAWBACKS OF ENERGY TAX SUBSIDIES

The tax code includes a wide array of tax incentives to encourage clean energy, energy efficiency, or energy conservation. Broadly speaking, these policies can be grouped in the following categories:

- Production tax credits for renewable energy.
- Production credits for alternative fuels.
- Investment tax credits for renewable production capacity.
- Tax credits for energy-related residential property investments such as renewable energy generation and energy-efficient upgrades.
- Alternative fuel vehicles and refueling properties.
- Other provisions, including accelerated depreciation for certain energy-related properties and pollution control facilities; tax credit bonds for renewable energy; an energy research tax credit; and a carbon sequestration tax credit.

Table 1 provides a summary of these provisions that are considered tax expenditures by the Joint Committee on Taxation (JCT, 2020).

Table 1. Clean Energy Related Federal Tax Expenditures by Category

Production tax credits for renewable energy
Credits for electricity production from renewable resources (sec. 45) – Wind – Geothermal – Qualified hydropower – Small irrigation power – Municipal solid waste – Open-loop biomass
Credit for electricity production from closed-loop biomass facilities (sec. 45(d)(2))
Production tax credits for alternative fuels
Credit for second-generation biofuel production (sec. 40(a)(4)) Credit for biodiesel and renewable diesel fuel (sec. 40A) Credit for producing fuels from a nonconventional source (sec. 45K)
Investment tax credits for renewable production capacity
Energy credit (sec. 48) – Solar – Geothermal Fuel Cells – Microturbines – Combined heat and power – Small wind – Geothermal heat pump systems
Tax credits for energy-related residential property investments
Credit for nonbusiness energy property (sec. 25C) Residential energy-efficient property credit (sec. 25D) Credit for construction of energy-efficient new homes (sec. 45L) Credit for investment in advanced energy property (sec. 48C)
Alternative fuel vehicles and refueling properties
Credit for plug-in electric vehicles (sec. 30) Credit for fuel cell vehicles (alternative motor vehicle credit) (sec. 30B) Credit for alternative fuel vehicle refueling property (sec. 30C) Credit for electric motorcycles (sec. 30D)
Other clean energy-related tax provisions
Credit for carbon dioxide sequestration (sec. 45Q)

Table 1. Clean Energy Related Federal Tax Expenditures by Category—Continued

Credit for holders of clean renewable energy bonds (sec. 54)
Credit for holders of qualified energy conservation bonds (sec. 54A)
Exclusion of energy conservation subsidies provided by public utilities (sec. 136)
Exclusion of interest on State and local government qualified private activity bonds for energy production facilities (sec. 141)
Exclusion of interest on State and local qualified private activity bonds for green buildings and sustainable design projects (sec. 142(a)(14))
Energy efficient commercial buildings deduction (sec. 179D)

Source: Joint Committee on Taxation JCX–23–20, November 5, 2020.

From a budget perspective, many of the existing tax policies are small, sometimes because their value is limited (for example, a 10-percent credit not to exceed $500 per taxpayer for residential window upgrades) and sometimes because the utilization of the policy is low (for example, a cellulosic biofuel producer credit). However, the aggregate cost of tax subsidies for clean energy is significant. Based on estimates provided by the Joint Committee on Taxation, the tax expenditures for clean or renewable energy or energy efficiency policies will exceed $60 billion during the period 2020–2024 (see Table 2). The largest renewable energy tax provisions are the Energy Investment Tax Credit, and the Energy Production Tax Credit. The five-year tax expenditure for these two provisions is $52.5 billion.

Table 2. Clean Energy Related Tax Expenditures: 2020–2024 (Billions of Dollars)

Tax Expenditure Category	2020	2021	2020–2024
Renewables	$13.2	$12.6	$56.1
Efficiency	$0.7	$0.5	$1.4
Alternative Tech. Vehicles	$0.7	$0.6	$3.0
Total	**$14.6**	**$13.7**	**$60.5**

Source: Data from the Joint Committee on Taxation JCX–23–20, November 5, 2020.

The realized cost of these subsidies to the Federal budget could grow exponentially if the clean and renewable energy target that President Biden has proposed is achieved. This dramatic decline in greenhouse gas emissions—a 50-percent reduction relative to 2005 emissions by 2030—would require a dramatic increase in the utilization of renewable energy and electric vehicles, as well as increases in energy conservation. The cost of tax subsidies for these activities will grow as their adoption grows.

In addition to the significant cost and the large number of tax subsidies, there are other limitations to the subsidy approach. The Treasury Department's Inspector General for Tax Administration has identified administrative problems with residential energy tax credits (sec. 25C and sec 25D) involving both improper claims of the credit and incorrect denials (TIGTA, 2011 and 2015). More generally, subsidizing energy production will lower the price of electricity and thereby lead to an overall increase in demand, which is counterproductive to the goal of energy conservation.

It is difficult (if not impossible) for a subsidy agenda to be technology-neutral. Metcalf (2009) illustrates how the hybrid vehicle tax credit offers a subsidy that varies from $0 to more than $11 per gallon of avoided gasoline consumption based on typical usage assumptions and depending on the vehicle purchased. JCT (2016) illustrates the complexity in determining the amount of energy saved from the credit. Metcalf (2009) demonstrates that the production tax credit for wind and geothermal, if measured in terms of subsidy amount per ton of CO_2 avoided, varies significantly due to the fact that geothermal energy likely displaces coal (high in CO_2 per BTU) and wind likely displaces natural gas (lower in CO_2 per BTU). While the production

tax credit, determined based on the quantity of electricity generation, is the same for both wind and geothermal, the subsidy value in terms of CO_2 is unequal.

Finally, many provisions are temporary, which causes uncertainty for taxpayers. For example, in 2020, 15 tax provisions were set to expire. All but two were renewed, and only one was made permanent (see Table 3). This year and in 2022, another 16 energy-related provisions are set to expire (JCT, 2021).

Table 3. Energy-Related Tax Provisions Previously Set to Expire December 31, 2020

Tax Provision	Extended Until
Credit for section 25C Nonbusiness Energy Property (sec. 25C(g))	12/31/2021
Alternative Motor Fuel Vehicle Credit for Qualified Vehicles (sec. 30B(k)(1))	12/31/2021
Credit for Alternative Fuel Vehicle Refueling Property (sec. 30C(g))	12/31/2021
Credit for Two-Wheeled Plug-In Electric Vehicles (sec. 30D(g)(3)(E)(ii))	1/1/2022
Second Generation Biofuel Producer Credit (sec. 40(b)(6)(J))	1/1/2022
Energy Production Tax Credit (sec. 45)	1/1/2022
Credit for Production of Indian Coal (sec. 45(e)(10)(A))	12/31/2021
Credit for Construction of Energy-Efficient New Homes (sec. 45L(g))	12/31/2021
Special Dep. Allowance for Second Gen. Biofuel Plant Property (sec. 168(I))	Expired
Energy-Efficient Commercial Building Deduction (sec. 179(D))	Made Permanent
Special Rule to Implement Electric Transmission Restructuring (sec. 451(k))	Expired
Black Lung Disability Trust Fund: Increase in Amount of Excise Tax on Coal (sec. 4121(e)(2))	12/31/2021
Oil Spill Liability Trust Fund Financing Rate (sec. 4611(f)(2))	12/31/2025
Excise Tax Credits and Outlay Payments for Alternative Fuel (sec. 6426(d)(5), sec. 6426(e)(6)(C))	12/31/2021
Excise Tax Credits for Alternative Fuel Mixtures (sec. 6426(e)(3))	12/31/2021

As the Joint Committee on Taxation (JCT, 2016) noted in a report prepared for this committee:

> While the government can in theory establish an efficient set of subsidies for the activities it chooses to subsidize, in practice it cannot administratively identify and set up programs to subsidize every conceivable energy-saving practice. Additionally, it is not possible to identify meritorious technologies not yet invented. The government must continue to expand the class of credit-eligible activities if it wishes to minimize the economic distortions that come from favoring certain technologies through tax subsidies over other technologies that prove equally capable of achieving reductions in fossil fuel consumption. Furthermore, the investment in research to develop such new technologies might be constrained by the existence of tax subsidies for current technologies. Investors in such research run the political risk that their newly discovered technologies will not be granted any tax subsidies and may find it difficult to compete with existing subsidized technologies.

THE RECENT REFORM PROPOSAL INTRODUCED BY THE SENATE FINANCE CHAIRMAN

Chairman Wyden and other lawmakers recently introduced legislation, the Clean Energy for America Act, that would consolidate tax incentives for renewable energy, transportation, and energy conservation. One admirable intent of this legislation is to establish a more technology-neutral clean energy tax policy. However, as noted above, a fixed rate production tax credit may appear neutral but have disparate impacts on carbon mitigation.

Moreover, the new credits proposed in this legislation phase out once sector-specific CO_2 emissions decline 25 percent (relative to 2021). As a recent report by researchers at the University of Maryland outlines, a plausible path toward President Biden's emissions target would include a 76-percent reduction in CO_2 emissions from electricity generation and a 40-percent reduction in emissions from transportation. Other sectors are likely less adaptable in the coming decade (Hultman et al., 2021). Therefore, the clean electricity and clean transportation provisions in the Clean Energy for America Act are not designed to provide tax incentives during the full transition period proclaimed by the administration. An extension and expansion of these provisions to align with the targets proposed by President Biden would dramatically expand the cost.

EXPLICITLY PRICING CARBON IS THE OPTIMAL WAY TO REDUCE CO_2 EMISSIONS

While tax subsidies for renewable energy production or investment can encourage the deployment of more clean energy, these policies—for reasons just discussed—are certain to be suboptimal relative to a price on carbon, specifically a carbon tax.

Economists have long agreed that a carbon tax is an efficient and effective way to reduce carbon emissions. Prominent economists on the left and right—including Ben Bernanke, Alan Greenspan, Martin Feldstein, Greg Mankiw, and Glenn Hubbard, as well as Janet Yellen, Austan Goolsbee, Jason Furman, Laura Tyson, and Larry Summers—have urged the United States to adopt a carbon tax. These views are not new. A *Wall Street Journal* article in 2007 found that a majority of economists surveyed believed that a "tax on fossil fuels would be the most economically sound way to encourage alternatives" (Izzo, 2007). One carbon tax proposal has earned endorsement from four former Federal Reserve Board chairmen, 28 Nobel Laureates in economics, and 15 former chairs of the White House Council of Economic Advisers.

More recently, the business community has strongly endorsed putting a price on carbon. For example, in September 2020, the Business Roundtable advocated for a carbon tax, and in January of this year, the Chamber of Commerce's position paper on climate change signaled its openness to a carbon tax. The American Petroleum Institute and top companies in the oil industry have also expressed support.

A carbon tax is technology-neutral and encourages shifts away from carbon-intensive sources of energy while encouraging energy efficiency and conservation, and research and development in new technologies. Many of the advantages and design considerations of a carbon tax are considered in Brill (2017).

By imposing a larger burden on coal than on natural gas, a carbon tax would support the transition toward greater natural gas utilization in the United States and would accelerate the retirement of coal plants. Extending and accelerating this trend will further the reduction in CO_2 emissions in the United States. In addition, by imposing a larger burden on natural gas than on renewable energy, a carbon tax would encourage additional investment and deployment of energy sources such as wind and solar.

Unlike tax subsidies targeted toward the production of new renewable energy, a carbon tax has the potential to impact energy demand generally, thereby further reducing CO_2 emissions over time. A carbon tax would increase the rate of return on energy-efficient upgrades; encourage the utilization of more fuel- efficient vehicles; reduce miles traveled; and drive many small and modest adjustments in choices made by consumers, manufacturers, and others on their energy consumption. While the price elasticity for electricity demand is small in the short run, recent evidence suggests that it is quite high in the long run (Burke and Abayasekara, 2018). The significance of this result is that a durable carbon tax has the potential to significantly reduce energy demand in the period after 2030, a contrast to policies targeting wind and solar energy deployment within the current decade.

A carbon tax would, depending on the rate set, raise significant amounts of new Federal tax revenues. While tax increases may not be a desirable outcome to con-

servatives committed to limited government, a carbon tax should be recognized as an opportunity to reduce other more distortionary taxes, or as a substitute to alternative taxes that are more economically damaging. For example, a carbon tax is certainly superior to an increase in the corporate tax rate.

A $15/ton carbon tax that increases 6 percent annually would raise a similar amount of revenue as President Biden's proposal to raise the corporate tax rate to 28 percent. A $35/ton carbon tax could raise as much as President Biden's entire business tax agenda.

President Biden's proposed corporate rate hike would put the United States first among all OECD nations with respect to the average combined State and Federal corporate tax rate (Bunn et al., 2021). It would also raise the cost of capital for corporations and increase the tax distortion between debt and equity financing (Pomerleau, 2020). A carbon tax would have none of these negative consequences but would have positive effects on carbon emissions, energy conservation, and the transition to a clean energy economy. York (2021) estimates the economic advantage of a $25/ton carbon tax versus a 28 percent corporate tax rate.

CONCLUSION

The tax code is a well-suited instrument for policy-makers pursuing market-based strategies to shift energy consumption in the United States toward clean and renewable fuels. This objective is laudable given the costs and risks associated with climate change. In theory, renewable energy consumption can be encouraged with either a tax on carbon or a tax subsidy on items or activities that are alternatives to fossil fuels. To date, the United States has pursued the latter approach and enacted dozens of targeted tax credits and other tax subsidies intended to favor particular types of renewable energy and specific energy conservation investments.

However, as a practical matter, a carbon tax proves far superior. Subsidies are difficult to construct in an efficient, technology-neutral manner when the objective is to displace CO_2 emissions from existing energy forms. Subsidies can be fraught with complexity, and the temporary nature of most clean energy tax provisions creates costly uncertainty. In contrast, a carbon tax offers a broad, efficient, and technology-neutral approach to encouraging wider adoption of existing clean energy sources. It also incentivizes research into new technologies and encourages consumers of energy, whether they be households or businesses, to adopt energy-efficient choices. Finally, a carbon tax is a far superior policy when compared to President Biden's business tax agenda, which includes increasing the corporate tax, increasing the tax on foreign income, and establishing a new alternative minimum tax on certain large businesses.

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QUESTIONS SUBMITTED FOR THE RECORD TO ALEX BRILL

QUESTION SUBMITTED BY HON. ROB PORTMAN

Question. Concerns have been raised regarding the tax equity markets and increased calls for a direct pay option for renewable energy credits. Some proposals have been introduced that would provide a direct pay option in lieu of tax credits.

More than a decade ago, in 2009, Congress created such a program, called the section 1603 program. The creation of this temporary, $26-billion section 1603 grant program was part of the American Recovery and Reinvestment Act in 2009 and motivated by difficult economic conditions and the perceived lack of tax-equity in supporting renewable energy projects. The program allowed the Treasury Department to provide grants for investments in certain energy production properties in lieu of renewable energy tax credits.

However, the U.S. Treasury Inspector General for Tax Administration (TIGTA) outlined serious issues of program integrity, such as companies double dipping to receive both the grant and tax credit. As we continue to engage in these conversations to further define the role of the tax code in helping our country reduce its carbon footprint, program integrity must remain a top priority for us.

Do you think the vulnerabilities such a grant program may have for fraud, waste, and abuse limit the effectiveness of its benefits? Do program integrity problems, as was demonstrated in the section 1603 program, have unintended consequences on the development of the broader industry?

Answer. Senator Portman, you are correct that the section 1603 grant program had significant faults. The December 2013 TIGTA report indicates that the majority of taxpayers who had received section 1603 grants and been inspected by the IRS had compliance issues, including the "double-dipping" concern you raised.

As a matter of sound tax policy, any provision intended to promote renewable energy should pursue that goal in as neutral and cost-effective a fashion as possible. Poor administration of a program that allows taxpayers to claim both the grant (for which they are eligible) and the tax credit (for which they are ineligible if they claim the grant) is costly, wasteful, and concerning.

Programs such as section 1603 should be able to be operated and administered by the IRS as intended. However, it is also the case that the availability of targeted tax credits and grant programs will lure some firms to engage in improper tax activity.

The alternative policy strategy that I proposed in my testimony—that is, a carbon tax—does not carry the risk of "double-dipping" like section 1603 and other tax credits might. Moreover, a carbon tax would be cost-effective and technology-neutral.

QUESTIONS SUBMITTED BY HON. TODD YOUNG

Question. I wanted to follow up on our discussion from the hearing related to the dangers of relying on China for our renewable energy supply chain needs. China has consistently been responsible for unfair trade practices like state subsidization, forced data transfer, and IP theft. And, as we've most recently seen, a supply chain that is completely reliant on Chinese manufacturing is most at risk during adverse events, like this global pandemic.

Should the Federal Government examine the effects on increasing our dependency on China before launching a sweeping policy to further incentivize the use of renewable energy sources?

Answer. China is indeed a major supplier of inputs to renewable energy production. In addition to the concerns you have raised, I am also concerned about the evidence of the use of forced labor in the production of solar panel inputs. The U.S. Government should continue to examine these issues closely and address concerns with China as they arise. Recent actions by the Commerce Department against Hoshine Silicon Industry Company and others, for example, are positive steps. The targeted banning of imports of polysilicon from Xinjiang will be effective in ensuring that renewable energy incentives do not accrue to Hoshine and other firms that use forced labor. In my view, broader policy action to address the risks of climate change and promote renewable energy production in the United States can and should be pursued in parallel with efforts to combat unfair or immoral trade practices.

Question. As this committee considers various strategies to support energy production—specifically renewable energy production—we should diligently keep in mind the number of jobs tied to various energy sectors. Energy use in my home State of Indiana is similar to how the entire country looks—in Indiana, as of 2019, coal fueled almost 60 percent of our electricity net generation. Renewable sources for electricity in Indiana like wind power accounted for 6 percent, and solar power accounted for less than 1 percent. Nationally, renewable energy sources account for 17 percent of electricity.

How do we ensure that jobs tied to energy sectors that are not in the "renewable" category are not abruptly terminated?

With millions of Americans relying on diversified energy sources for their employment, how can disruptions be minimized?

Answer. The consequences of a transition from fossil fuel to renewable energy will, like any technological advance, result in some labor market disruptions. For example, the number of workers in coal mining has declined by roughly 50 percent in the last decade to approximately 42,000. While these jobs are a very small share of total U.S. employment, they are still critical for the workers, their families, and their communities. In all likelihood, the trend in downward employment in this sector will continue as productivity rises and demand falls. While jobs in these industries are unlikely to shift "abruptly" as a result of either technological advances or efforts to support renewable energy production, policy-makers may want to consider strategies to facilitate more effective job retraining opportunities for any displaced workers.

PREPARED STATEMENT OF HON. MIKE CRAPO,
A U.S. SENATOR FROM IDAHO

The tax code plays an important role in the economy and jobs in the energy sector. Energy incentives have the potential to grow our economy and create jobs, if executed properly. A number of energy-related policy areas have the potential for bipartisan agreement.

While there are not a lot of specifics on President Biden's energy tax credits in the American Jobs Plan, he is clearly proposing to increase the corporate and international tax rate and penalize the oil and natural gas industry though the tax code. We must understand the impact of this proposal on the 10.9 million American jobs in the oil and natural gas industries that pay on average seven times the Federal minimum wage.

I look forward to hearing from our witnesses their policy expertise and their understanding of how President Biden's proposals will either grow or shrink good-paying American energy jobs. Prior to the pandemic, the United States was experiencing one of the strongest economies in decades.

With the Tax Cuts and Jobs Act in place, and an agenda focused on smart regulation, we saw progress for all Americans, including record-low unemployment rates for African Americans, Hispanics, and others; 50-year lows in overall unemployment; robust wage gains skewed toward lower-wage earners; record-high household incomes; and record-low poverty. Considering offsetting the cost of energy provisions with a corporate tax rate increase or increasing international taxes, especially during a pandemic, is counterproductive and a non-starter on my side of the aisle.

It will be increasingly challenging to return to an economy as robust as we saw before the pandemic with the endless streams of tax hikes and actions by the administration, such as revoking the permit for the Keystone XL Pipeline. The Biden administration's revocation of the presidential permit for the Keystone XL Pipeline was shortsighted and eliminated over 1,000 jobs, the majority of which were unionized.

I am willing to work on constructive proposals to modernize and innovate our nation's energy production, while not adversely affecting millions of good-paying American jobs and the existing energy sources necessary for a comprehensive, affordable, and reliable domestic energy network. We should discuss ways to improve, and potentially expand, incentives to increase domestic energy production and manufacturing. However, it is important that we also consider the effectiveness of existing incentives.

Congress should not be picking winners and losers every year when temporary credits expire. We must assess whether these credits continue to be necessary or whether they have served their intended purpose of incentivizing growth and investment. Yet we continue extending credits of technologies that have achieved a significant market presence in the U.S., an inefficient use of taxpayer dollars. While I support Congress taking a neutral approach to energy tax credits, we must consider whether some of these technologies continue to require assistance and ensure we are designing the tax code to be fair and effective.

Our tax code should incentivize technology-wide clean energy innovation, helping to bring breakthrough power generation to deployment until it can compete independently in the market. My technology-inclusive bipartisan energy tax proposal—the Energy Sector Innovation Credit, or ESIC—would accomplish this by working with experts at the Department of Energy, national labs, and other stakeholders to target tax credits for innovative clean-energy technologies.

In addition, ESIC would implement a credit phase-down system based on market penetration, systematically reducing credits as technologies increase their market share, instead of allowing Congress to pick winners and losers. I thank Senator Whitehouse for leading this proposal with me in the Senate.

Mr. Chairman, I look forward to working collaboratively with you through the committee process to strengthen U.S. energy competitiveness by rapidly scaling and diversifying innovative clean energy technologies.

PREPARED STATEMENT OF MARIA M. POPE, PRESIDENT AND CEO, PORTLAND GENERAL ELECTRIC

Chairman Wyden, Ranking Member Crapo, and members of the committee, my name is Maria Pope, and I am the president and CEO of Portland General Electric. I am honored to testify before you today on the critical issues of climate change, jobs and effective clean energy tax policy. Thank you for taking up this very important issue. Climate change is having very real global impacts and greenhouse gas emissions must be dramatically reduced on an economy-wide basis. It will take all of us working together to make a difference. National attention and an all-hands-on-deck approach is needed without further delay.

Portland General Electric is a fully integrated electric utility based in Portland, OR. We serve roughly half of all Oregonians and three quarters of the State's industrial and commercial activity. We share our customers' and our communities' vision for a clean, reliable, affordable energy future. We have ambitious climate goals to reduce greenhouse gas emissions associated with the power we serve customers by at least 80 percent by 2030, compared with 2010 levels. We also have an aspirational goal of zero greenhouse gas emissions associated with the power we serve to customers by 2040. Advancements in policy, regulation, and technology are needed to meet these emission reduction goals, while maintaining reliable service at a reasonable cost to customers.

PGE is not alone in our emissions reduction work. Many of our peer utilities across the country have set similarly ambitious targets. The Edison Electric Institute's members, representing the Nation's investor-owned utilities, are collectively on a path to reduce their greenhouse gas emissions at least 80 percent by 2050, compared with 2005 levels. Many companies are pledging even faster, more aggressive timelines. As of year-end 2019, the U.S. power sector had reduced its CO_2 emissions by 33 percent below 2005 levels.

According to the Intergovernmental Panel on Climate Change, we have a decade to make significant progress to curb greenhouse gas emissions. To achieve that progress across the energy sector on the timeline climate science requires, deployment of clean energy resources by utilities and others in the energy industry must be accelerated. Utilities, or any sector of our economy, cannot achieve these ambitious emissions reductions alone. Addressing the climate crisis requires substantial capital investments and Federal policies that serve everyone equitably—maximizing both benefits to customers and the deployment of a wide variety of clean energy resources.

It is also imperative that Federal policy does not pick winners and losers regarding technologies or which entities can deploy the new resources that will be needed. It's clear that the Nation needs all parties, especially those responsible for delivering reliable power, to be able to develop and deploy new resources. The right technology-neutral incentives will accelerate the clean energy transition and activate all players to make significant investments. This committee has the authority to provide those well-designed incentives via the tax code. To move forward with speed requires new thinking, which is exactly what we see in the Clean Energy for America Act.

Chairman Wyden, I want to thank you and your team for this newly introduced and thoughtfully crafted bill. This legislation provides tax incentives in a manner that addresses many of these issues I just identified. Notably, your bill will help incentivize utilities and independent developers alike to transform how electricity is generated and used. It is designed to ensure success as it doesn't pick winners and losers—in terms of technology or business model—and is flexible in that it covers emerging technologies as long as they have zero or net negative carbon emissions. This bill reflects the findings from a recent analysis by the Rhodium Group which concluded that this kind of long-term technology-neutral approach enables all parties to participate in the path to a clean energy future, creating an opportunity for an all hands on deck approach to drive down electricity sector greenhouse gas emissions.

Portland General Electric enthusiastically supports this bill, and we urge its enactment. The Clean Energy for America Act recognizes that utilities play a critical role in meeting ambitious greenhouse gas reduction and clean energy targets and, at the same time, need support to deploy new clean electricity resources and technology supportive of the transportation sector's transformation. The bill paves the way for us to boost investments—more quickly and equitably—to meet our shared goals of reducing emissions and addressing climate change.

We especially appreciate the optionality between production and investment tax credits, while also allowing utilities to opt-out of Internal Revenue Service normalization requirements for the new storage credit. These provisions ensure that the full benefits of these tax incentives are passed through to customers and that regulated utilities will not be disadvantaged—leveling the playing field to accelerate deployment and ensure affordability for all customers. Keeping energy affordable helps build and maintain the broadest support for this critical transition.

Along with affordability, preserving reliability is essential. Dispatchable clean resources will play an important role. So will a smarter grid that can harness electricity from wind, solar and other resources when they are available and store that energy for when it's needed. Chairman Wyden's bill provides tax incentives for stand-alone energy storage facilities and new clean resources that provide important capacity, leading to improvements in reliability.

The bill also provides the option to elect direct payment of these credits. The option enables broader use and lowers costs, creating savings which can be directly passed on to customers. For example, direct pay can financially insulate the development of these projects during challenging economic conditions such as the financial crisis in 2008 or the pandemic that we are currently experiencing. It also mitigates the need for complex tax equity transactions, where credits are heavily discounted by large commercial and investment banks or other parties. Instead, with this option, the benefits of the tax credits can more fully flow through to utility customers and lower the cost of the clean energy transformation.

The Clean Energy for America Act requires that eligible facilities must be built by workers who are paid prevailing wages. PGE values our partnership with labor, including the IBEW, and we support this requirement. We are pleased that the BlueGreen Alliance is here today to discuss their perspective.

Today, the transportation sector is the largest source of greenhouse gas emissions. The bill's clean transportation credits enable transformative change, encouraging the purchase of a range of electric vehicles and investment in critically important charging infrastructure. These credits will help us meet our commitment to electrify our own fleet and will also enable our customers to make the transition to electric vehicles, important steps if our state is to meet its decarbonization goals. PGE appreciates and values the inclusion of Chairman Carper's charging infrastructure proposal for robust charging credits that will boost installation and provide access across the Nation.

I would like to express again my appreciation for Chairman Wyden's thoughtful legislation. As we continue our transition to clean energy resources, what we need from Congress are the tax incentives contained the Clean Energy for America Act, as well as Federal funding for the research, development and deployment of new technologies that will help us deliver dispatchable clean energy resources. These Federal investments will enable utilities to reach deep reductions in greenhouse gas emissions.

As Congress begins discussion on an infrastructure package, there is an opportunity to include provisions to help modernize the electric grid and transition the Nation to the clean infrastructure of tomorrow. This includes legislation such as Chairman Wyden's Clean Energy for America Act. We are also aware that Ranking Member Crapo has developed his own tax legislation. We look forward to working with Ranking Member Crapo, his staff, and the committee as these proposals move forward in the months ahead.

Chairman Wyden, Ranking Member Crapo, committee members, thank you for your time and the opportunity to share our perspective on these important matters.

QUESTIONS SUBMITTED FOR THE RECORD TO MARIA M. POPE

QUESTIONS SUBMITTED BY HON. CATHERINE CORTEZ MASTO

Question. One of the key provisions of the Clean Energy for America Act of 2021 is its flexibility for new zero-emission facilities to utilize either a production tax credit or an investment tax credit—based on the needs of each facility. Can you discuss the importance of having this flexibility in clean energy legislation?

Answer. Flexibility for new zero-emission facilities to utilize either a production tax credit or an investment tax credit is critical to accelerate decarbonization of the power sector and mitigate cost impacts on utility customers. The scale of this effort

requires the active engagement of all parties to build out needed clean energy resources. The option to choose the PTC, which is not subject to IRS tax normalization rules, creates a level playing field when utilities seek new clean energy facilities. Without this optionality, or the ability to opt out, regulated utilities must normalize the tax benefit over the life of these resources and are therefore at a competitive disadvantage during the bidding process. A level playing field between unregulated developers and regulated utilities will ensure robust competitive procurement processes that result in customers getting the best prices for these new clean resources. It is important to note that for State-regulated utilities like Portland General Electric, the full value of Federal tax credits and other incentives are passed directly back to customers in the form of rate credits or rate decreases.

Question. In line with Chairman Wyden's tech-neutral legislation which outlined a stand-alone investment tax credit for transmission, and in order to direct public dollars to the appropriate projects, we must ensure that any project meets sufficient capacity. Do you think that the incentive needs to be focused on building large-scale, interregional, difficult to build transmission lines, not subsidize lines within already existing utility territories?

Answer. Limiting the credit to exclude certain transmission lines that are needed to integrate and deliver clean energy will make it more difficult to achieve the administration's decarbonization goals. It also would be difficult to exclude lines in existing utility territory. Utility territory covers much of the map of the U.S. and transmission within a utility's territory is not necessarily owned, built, or controlled by that utility.

There have been efforts to try to quantify the need for new transmission, with a number of studies finding that a significant expansion of transmission will be needed to support the clean energy transition and get renewable resources from where they are located to where the customer need is. For example, one study from the National Academy of Sciences, Engineering and Medicine *(Carbon-Neutral Pathways for the United States)* found that a 2.5-fold increase over 2020 transmission levels would increase the share of wind and solar to 60 percent of total generation. If we wish to support this needed expansion of transmission, it will be important to provide broad-based incentives and assistance, as there is no one single answer that will address every challenge associated with transmission.

New transmission lines are difficult to site, permit, and build, and they do not necessarily need to be interregional to be vital to our decarbonization efforts. Even projects that proponents had hoped would be less complicated, for example by proposing to use existing rights of way to connect clean energy to load centers, have run into challenges with lengthy permitting and siting processes, with significant cost outlays.

Chairman Wyden's proposed tax credit for transmission strikes the right balance and addresses the need for transmission by applying the credit to transmission 275 kV and above, which would encompass an estimated 22 projects across the country currently in some stage of development, including the Greenlink West and Greenlink North projects in Nevada. These high-capacity, regionally significant transmission lines will interconnect large amounts of new generation and the electricity will travel long distances to serve load or will be transmitted between energy markets. This will provide diversity among renewable resources, increasing resilience and integrating wind, solar, and other needed generation to decarbonize the generation resource mix.

PREPARED STATEMENT OF KEVIN SUNDAY, DIRECTOR, GOVERNMENT AFFAIRS, PENNSYLVANIA CHAMBER OF BUSINESS AND INDUSTRY

EXECUTIVE SUMMARY OF TESTIMONY

The Pennsylvania Chamber encourages lawmakers on both sides of the aisle to come together to produce durable, bipartisan policy that applies the lessons from Pennsylvania's successful leveraging of our historic leadership positions in energy and industry through competitive markets to produce electricity, natural gas and a host of goods and commodities in an increasingly affordable and sustainable manner, to Federal policy that positions America for continued leadership in an increasingly competitive and dynamic global marketplace.

Among all States, Pennsylvania ranks second in total energy production, second in natural gas production, second in installed nuclear capacity, third in coal produc-

tion, third in electricity production and eighth in manufacturing output. Pennsylvania is also the largest net exporter of electricity of any State and is the largest producer on the 13-State PJM grid, where prices are at generational lows and GHG emissions have fallen 34 percent across the region since 2005.

Pennsylvania's energy assets have contributed to significant nationwide decreases in commodity costs for gas and electricity and in emissions of NAAQS and greenhouse gasses. Our State has helped position the United States as a leader in sustainable economic growth, as our Nation has outpaced other developed countries in keeping energy prices low while growing the economy and reducing emissions.

The private sector is deploying a number of innovative technology and energy solutions to support traditional and emerging industries in a sustainable manner.

Federal tax and regulatory reform led to substantial wage growth across all occupations and job creation in Pennsylvania; however, the pandemic has wiped out a decade's worth of job growth. All sectors of Pennsylvania's economy fared worse than national averages in terms of lost jobs in 2020. Congress must not burden our State with uncompetitive, anti-growth tax and regulatory policy.

Federal infrastructure and air quality permitting must be reformed to position our country for continued leadership. Federal policy should also reward stewardship and build upon existing public and private commitments and leverage the human capital and technology base of traditional industries. Regardless of the future energy mix, our Nation's economy will require a strong, competitive domestic industrial base to provide critical minerals, timber, aggregates, concrete, steel and cement.

A strong economy and continued improvements in quality of life depend upon ongoing increases in labor productivity in every region of the country. At present, the only rural communities that are matching urban and metropolitan regions in terms of wage and productivity growth are those communities with natural resource development. Given the high wage premiums for workers in the power generation, oil and gas, and manufacturing industries, Federal policy must support the continued operation and expansion of critical energy and manufacturing industries in these nonmetro areas.

Good morning, Senator Wyden, Senator Crapo, and honorable members of the Senate Finance Committee, it is an honor and a privilege to appear before you this morning to discuss Federal energy and environmental policy. It is our sincere hope that lawmakers on both sides of the aisle come together to produce durable, bipartisan policy that applies the lessons from Pennsylvania's successful leveraging of our historic leadership positions in energy and industry to produce electricity, natural gas and a host of goods and commodities in an increasingly affordable and sustainable manner, to Federal policy that positions America for continued leadership in an increasingly competitive and dynamic global marketplace. The private sector is continuing to innovate and lead on technology solutions to energy challenges, and it is imperative that Federal policy produce a reformed permitting and regulatory process that allows innovation to flourish through a predictable and timely decision-making process. In contrast, policy that brackets energy resources into either mandates or bans, or that simply encourages the closure of domestic facilities and the offshoring of their output to locales with less stringent environmental requirements, will not produce a sustainable economy.

Pennsylvania is the second-largest energy producing State, the second-leading State in natural gas production, the third-largest coal producing State, and the third-largest electricity producer.[1] Our State is also the largest net exporter of electricity in the country and is the largest electricity producer on the 13-State PJM grid that provides power to 65 million Americans, thanks to our competitive, diverse fleet of power generation resources, including the second-largest amount of nuclear power of any State in the country. Pennsylvania is also eighth in total manufacturing output, with leadership positions in food manufacturing, refined products, pharmaceuticals, steel, cement, aggregates and pulp and paper.

All of our members are committed to the stewardship of our State and Nation's land, air, and water, and we seek to provide a thoughtful and balanced approach on ways we can continue to reduce our environmental impacts and grow the economy. As policy-makers at the Federal level take a long-term vision towards energy policy, it is imperative that the goals be established thoughtfully after careful consideration of their ability to be executed in an efficient and effective manner. As en-

[1] Pennsylvania State Energy Profiles, U.S. Energy Information Administration, *https://www.eia.gov/beta/states/states/PA/rankings.*

ergy crises in multiple States have shown, failure to adequately consider the magnitude of downside risks by getting assumptions wrong can produce real-world suffering and impose enormous costs on businesses and consumers.

COMPETITIVE MARKETS AND PRIVATE-SECTOR LEADERSHIP HAVE DELIVERED SIGNIFICANT ENVIRONMENTAL AND ECONOMIC PROGRESS IN PENNSYLVANIA AND THE UNITED STATES

Among all States, Pennsylvania is the biggest net exporter of electricity in terms of megawatt hours, according to a recent analysis by the U.S. Energy Information Administration (EIA).[2] Based on an analysis of EIA data, Pennsylvania exported 36 percent of total megawatt hours in 2019. Pennsylvania is also the largest power producer in the 13-State PJM grid, the largest grid in the country and one that delivers power to the homes, schools, and workplaces of more than 65 million Americans. The competitive markets managed by PJM have resulted in significant reductions in NAAQS criteria and greenhouse gas emissions from the power generation sector. Since 2005, carbon dioxide emission fell across PJM by 34 percent in large part due to competition among generation and improvements in technology.[3] Remarkably, Pennsylvania has remained in a leadership position with respect to power generation and net exports even with a substantial decrease in both tons of emissions and emissions intensity among the portfolio. According to a profile of the State's generation and transmission assets compiled by PJM,[4] Pennsylvania's average CO_2 intensity declined from approximately 1,150 lbs/MWh in 2005 to approximately 765 lbs/MWh in 2019 (a reduction of 33 percent), and SO_2 intensity declined from 10 lbs/MWh in 2005 to less than 1 lb/MWh in 2019 (a reduction of more than 90 percent). Since 2005, only one other State has reduced its energy-related CO_2 emissions more in terms of absolute tons.[5] Additional reductions from our State's power generation sector are expected to continue, with PJM reporting more than 11,000 MW of natural gas and solar in the State's capacity queue. Across the 13-State grid, significant amounts of wind (6,240 MW), solar (25,759 MW), storage (3,920 MW) and new natural gas (24,990 MW) capacity are also in the queue.

These significant declines in air emissions have also been paired with decreases in the commodity costs within PJM's energy markets. During the first 9 months of 2020, prices in the energy markets were the lowest in the 21-year history of the RTO's organized markets. Energy markets provide approximately two-thirds of the weight of wholesale power prices in PJM. Wholesale prices across PJM for 2019 were the lowest in 15 years, according to the Independent Market Monitor's recent annual report.[6]

With respect to natural gas costs, residential consumers in Pennsylvania have seen utility bills, inclusive of commodity costs and distribution charges, fall by as much as 56 percent, with annual savings ranging between $321 and $1,643 depending on the utility. With respect to commercial and industrial customers, total bills have fallen at minimum by 28 percent and as much as 56 percent, depending on the utility. These cost reductions have resulted in significant improvements in one of the highest cost pressures for these types of facilities, and by extension their competitiveness.[7]

With specific regards to the commodity cost components of gas utility bills, utilities' purchased gas costs are between 67 percent and 83 percent lower compared to 2008 levels. These costs are passed directly to consumers with no mark-up by the utility. Absent infrastructure buildout and the onset of production from the Marcellus shale that has occurred since 2008, the average household would be paying between $1,368 and $2,467 more annually on commodity charges. Commercial customers would be paying between $3,800 and $6,855 more per year, and large commercial and industrial customers would be paying between $68,400 and $123,390

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[2] Today in Energy, December 7, 2020. U.S. EIA, *https://www.eia.gov/todayinenergy/detail.php?id=46156.*

[3] Emissions Continue to Drop Throughout PJM Footprint. PJM Interconnection, March 4, 2020, *https://insidelines.pjm.com/emissions-continue-to-drop-throughout-pjm-footprint/.*

[4] 2019 Pennsylvania State Infrastructure Report. PJM Interconnection, July 2020, *https://www.pjm.com/-/media/library/reports-notices/state-specific-reports/2019/2019-pennsylvania-state-infrastructure-report.ashx?la=en.*

[5] State Energy-Related CO_2 Emissions by Year, Adjusted (1990–2018). U.S. Energy Information Administration, March 2, 2021, *https://www.eia.gov/environment/emissions/state/.*

[6] 2019 State of the Market Report for PJM. Independent Market Monitor, March 2020, *https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2019.shtml.*

[7] Rate Comparison Reports for 2008 and 2020, Pennsylvania Public Utility Commission, *https://www.puc.pa.gov/filing- resources/reports/rate-comparison-reports/.*

more.[8] In a hypothetical alternative timeline in which natural gas production from the Marcellus shale never occurred and these higher costs held constant over the last 12 years, natural gas utility customers across all ratepayer classes would have paid tens of billions of dollars more in higher costs in Pennsylvania alone.

Reductions in air emissions have not been limited to the power generation sector. Overall, Pennsylvania's industrial sources have achieved significant declines in emissions of federally regulated pollutants over the past several decades. According to data available on PA DEP and U.S. EPA's websites, these reductions include decline in annual emissions of NO_x on the order of 65 percent, SO_2 by 90 percent, CO by 69 percent, VOCs by 36 percent and PM 10 by 37 percent. Further, these reductions are yielding a demonstrable improvement in air quality. Every monitoring point in the State is measuring attainment for the 2008 ozone standards of 75 ppb, and in just 1 year the number of monitoring points measuring non-attainment for the 2015 ozone standard of 70 ppb fell from eight to just four. The State is also measuring attainment at all points for both the annual and 24-hour standards from PM 2.5, and the Allegheny County Health Department announced in February that for the first time in decades its monitors were measuring healthy levels of air quality for all criteria pollutants.

Pennsylvania's contributions to growing the economy while reducing energy prices and emissions have positioned the United States for leadership in sustainable growth. As EPA's Acting Assistant Administrator Joseph Goffman noted in a recent memo to regional offices, "ongoing changes in electricity generation mean that the emission reduction goals that the [Obama administration's Clean Power Plan] for 2030 have already been achieved."[9] From 2005 to 2019, according to an analysis of World Bank, EIA and International Energy Agency data,[10] the United States' economy grew by 64 percent, to roughly $21.4 trillion in GDP, while reducing carbon dioxide emissions by 16 percent. Over the same period, Europe's economy grew at half the same pace (31 percent) yet lagged the United States on emissions reductions on an absolute basis—a reduction of 742 mmt for Europe compared to a reduction of 936 mmt for the United States, or a delta of 210 million metric tons of CO_2. More broadly, over the same 15-year period, OECD countries as a whole reduced on net carbon dioxide emissions by 1,524 mmt—of which the United States can proudly lay claim to having been responsible for more than 60 percent of those reductions. Policy-makers must not lose sight of the fact that while these reductions were taking place in the developed world, as the economies of India and China grew, so did their greenhouse gas emissions. India's CO_2 emissions grew by more than 1,200 mmt, or a 115-percent increase, nearly single-handedly dwarfing reductions in OECD countries. China's emissions grew by 4,400 mmt, or an 81-percent increase—nearly three times the total reductions of OECD countries. Further, as this international comparison in emissions demonstrates, the offshoring of domestic manufacturing as a result of uncompetitive tax, labor, and regulatory policy will result in operations in countries that have much higher emissions intensities.

As the United States develops new technology solutions in both fossil and zero-carbon resources, it is imperative trade and energy policy support the continued export of these solutions to developing countries. In the near term, this must include liquefied natural gas (LNG), which is currently being shipped to India and East Asia. In addition to providing a reliable, low-carbon resource for countries abroad while supporting domestic exploration and pipeline activity, LNG also provides, for the importing country, greater geopolitical optionality and a reduced reliance on energy developed in countries whose regimes favor neither democracy nor sustainable development.

IEA electricity and natural gas commodity pricing data also hint at why economic growth in the EU has trailed the United States. Industrial users in the United States pay much less for electricity than any European country—in some cases, less than half. Residential electricity prices in the United States are also the fourth-lowest among all developed nations. The United States is also second among all de-

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[8] Purchased Gas Costs, Pennsylvania Public Utility Commission, *https://www.puc.pa.gov/NaturalGas/pdf/PGC.pdf.*

[9] Memorandum to EPA Regional Administrators: Status of Affordable Clean Energy Rule and Clean Power Plan. United States Environmental Protection Agency Office of Air and Radiation, February 12, 2021.

[10] World Bank Open Data, March 9, 2021, *https://data.worldbank.org/;* International Energy Statistics, U.S. EIA, *https://www.eia.gov/international/data/world;* CO_2 Emissions from Fuel Combustion, International Energy Agency, *http://wds.iea.org/wds/pdf/Worldco2_Documentation.pdf.*

veloped nations in terms of lowest natural gas commodity costs for industry and third for residential users. Leveraging these low costs with pro-growth tax and regulatory policy will position Pennsylvania and the United States for further global leadership in economic growth and emissions reductions, but policy-makers must not sacrifice these economic advantages on costly mandates or unwieldy regulatory mechanisms that raise costs and offshore economic activity. In sum, higher energy prices due to taxes, regulatory requirements or a lack of infrastructure do not result in better environmental outcomes, but they do result in worse economic performance.

CONGRESS SHOULD NOT ENACT PUNITIVE FEDERAL TAX AND ENERGY POLICY, GIVEN THE PANDEMIC ERASED SUBSTANTIAL ECONOMIC GAINS ACHIEVED IN YEARS LEADING UP TO 2020

Various recent analyses noted the significant benefits that accrued to the Nation, its economy and its workforce in the years following the passage of the Tax Cuts and Jobs Act. Research published in late 2019 from the St. Louis Federal Reserve concluded that "the evidence suggests that both innovation and [venture capital] investment increased significantly after the Tax Cuts and Jobs Act. The level of innovation and VC investment in 2018 and the first half of 2019 should support increased growth rates in the next years."[11] Last month, the Joint Committee on Taxation reported to this committee that in the year immediately following enactment of TJCA, business investment and employment rose in the United States.[12] Finally, tax reform moved the United States from having the highest corporate rate among all OECD nations to a more competitive position. As the U.S. Chamber noted in its recent statement to this committee, ". . . on the Tax Foundation's International Tax Competitiveness Index (ITCI), the United States ranks 21st out of 36 countries on overall competitiveness, a jump from the 28th ranking prior to tax reform, and 19th on corporate taxes, up from 35th before tax reform."[13]

Pennsylvania benefitted significantly from the passage of this act as well. Using 2016 as a baseline, economic conditions in Pennsylvania significantly improved through 2020, in part due Federal tax and regulatory reform. As noted throughout various media reports, companies in Pennsylvania and across the country raised wages, increased hiring, and boosted benefits in the wake of the act's passage. Across all occupations, Pennsylvania added more than 238,000 jobs between 2016 and 2020. Based on the most recently available State and Federal labor and employment data,[14] median wages across all occupations in Pennsylvania increased by $6,410 in the 4-year period, or roughly 13.5 percent. Notably, workers in the 25th percentile saw the biggest gains in average annual income (+16.84 percent) versus workers at the median (+13.8 percent) or at the 75th percentile (+13.76 percent). The table below notes income gains among several broad categories of occupations in Pennsylvania. We also highlight the significant wage growth since 2016 in growing Pennsylvania sectors: chemicals manufacturing and natural gas power plant operations.

Occupation	Median wage, 2016	Median wage, 2020	Net increase in average wages since 2016	% chance since 2016
All occupations	$47,540	$53,950	$6,410	+13.48%
Business financial	$72,010	$78,750	$6,740	+9.36%
Community social service	$42,840	$48,360	$5,520	+12.89%
Education	$55,760	$63,690	$7,930	+14.22%

[11] Tax Cuts, Venture Capital, and Long-Term Growth. Juan M. Sanchez, Federal Reserve Bank of St. Louis Economic Research, August 8, 2019, *https://research.stlouisfed.org/publications/economic-synopses/2019/08/30/tax-cuts-venture-capital-and-long-term-growth.*

[12] U.S. International Tax Policy: Overview and Analysis. Joint Committee on Taxation, March 19, 2021, *https://www.jct.gov/publications/2021/jcx-16-21/*.

[13] U.S. Chamber of Commerce letter to Senators Wyden and Crapo, regarding March 25, 2021 hearing, April 6, 2021.

[14] State Occupational Employment and Wage Estimates—Pennsylvania, 2020 and 2016. U.S. Bureau of Labor Statistics, May 2020, *https://www.bls.gov/oes/current/oes_pa.htm*

Occupation	Median wage, 2016	Median wage, 2020	Net increase in average wages since 2016	% chance since 2016
Health care	$74,590	$80,640	$6,050	+8.11%
Food service	$22,530	$26,130	$3,600	+15.98%
Personal care	$25,190	$30,030	$4,840	+19.21%
Construction trades and extraction	$49,610	$55,570	$5,960	+12.01%
Maintenance and repair workers	$45,620	$52,270	$6,650	+14.58%
Manufacturing workers	$38,130	$42,010	$3,880	+10.18%
Chemical plant operators	$54,130	$72,480	$18,350	+33.90%
Gas plant operators	$58,730	$70,440	$11,710	+19.94%

However, our State's economy suffered greatly during the pandemic and in just 1 year lost major ground in terms of Pennsylvanians employed. Comparing February 2021 to February 2020, Pennsylvania lost nearly 436,000 jobs, the seventh-highest job loss figure of all States. To put it another way, in just 1 year, the pandemic (and the impacts of mitigation response measures and individual behavior) cost Pennsylvania nearly twice as many jobs as were created over 4 years, and the total number of Pennsylvanians employed in the State today is smaller than it was 10 years ago, despite a larger population.[15] Over the past year, Pennsylvania has outpaced national averages in job losses in all sectors, with outsized losses in mining and logging, manufacturing, and leisure and hospitality. While State and Federal pandemic recovery efforts are helping these industries recover, Federal policymakers must not enact tax, trade and regulatory policy that will further damage already ailing sectors. As we note throughout this testimony, Pennsylvania is a leader in the vital energy, manufacturing and service industries that produce the goods necessary to sustain a modern economy.

[15] Pennsylvania Local Area Unemployed Statistics. U.S. Bureau of Economic Analysis, April 14, 2021, *https://data.bls.gov/timeseries/LASST420000000000006?amp%253bdata_tool=XGtable&output_view=data&include_graphs=true.*

	February 2016	February 2020	Net change, 2016 vs. 2020	% change, 2016 vs. 2020	February 2021	Net change, 2020 vs. 2021	% change, 2020 vs. 2021, PA	% change, 2020 vs. 2021, USA
Total Nonfarm Jobs	**5,855.10**	**6,093**	**238**	**4.06%**	**5,656.70**	**−435.90**	**−7.15%**	**−6.21%**
Goods Producing Industries	**826.8**	**861.5**	**35**	**4.20%**	**812**	**−49.50**	**−5.75%**	**−4.59%**
Mining and Logging	29.6	26.1	−4	−11.82%	21.4	−4.70	−18.01%	−14.64%
Construction	229.6	264.6	35	15.24%	253	−11.60	−4.38%	−4.03%
Manufacturing	567.6	570.8	3	0.56%	537.6	−33.20	−5.82%	−4.38%
Service Providing Industries	**5,028.30**	**5,231**	**203**	**4.03%**	**4,844.70**	**−386.30**	**−7.38%**	**−6.56%**
Trade, Transportation and Utilities	1,125.90	1,129.40	4	0.31%	1101.7	−27.70	−2.45%	−2.86%
Information	85.8	89.2	3	3.96%	81	−8.20	−9.19%	−8.51%
Financial Activities	318.5	333.4	15	4.68%	323.6	−9.80	−2.94%	−1.18%
Professional and Business Services	780.9	812.8	32	4.09%	770.3	−42.50	−5.23%	−3.59%
Education and Health Services	1,192.60	1308.6	116	9.73%	1,233	−75.60	−5.78%	−5.28%
Leisure and Hospitality	558.6	584.2	26	4.58%	439.2	−145.00	−24.82%	−20.4%
Other Services	259.8	264.3	5	1.73%	228.2	−36.10	−13.66%	−7.41%
Government	706.2	709.2	3	0.42%	667.2	−42.00	−5.92%	−6.08%

Significant Federal intervention into the private sector through energy and environmental policy may result in economic damage to local communities, many of them in rural America. The energy and manufacturing base in many such communities create high labor productivity and well-paying jobs for workers. While from a national perspective, workers in metropolitan areas on average are more highly paid and productive than in rural areas, as researchers at the Brookings Institution have noted, the most productive industries outside cities are those involving natural resources. To quote their analysis, "many small metro economies are highly productive as well, especially those that specialize in oil, gas and mining."[16] As noted throughout this testimony, the United States will continue to need a strong domestic manufacturing, mining, energy production, and infrastructure base to continue to grow its economy and meet environmental goals. Regulatory policy that results in the loss of these industries will not produce a sustainable economy and will only further exacerbate the challenges already facing rural communities. Many of the provisions envisioned in the American Jobs Act and Clean Energy for America Act are sweeping in their scope and may have significant unintended consequences; as such we strongly encourage deliberation and economic evaluation of these proposals, given the potential for economic harm to much of our State's energy economy. A recent jobs and wage report from the National Association of Energy Officials notes that while energy workers earn on average 34 percent more than the media worker, the lowest paid energy jobs are those in solar, wind and energy efficiency.[17] Conversely, workers in natural gas earn 59 percent above median wages and 42 percent above average for power generation workers. Within Pennsylvania, oil, petroleum and natural gas provide the most employment of all energy resources, according to the report.

SWEEPING CHANGES TO FEDERAL TAX AND REGULATORY POLICY WOULD THREATEN LONG-TERM INVESTMENT, GIVEN CHALLENGING DYNAMICS AT THE STATE LEVEL

While much detail remains to be filled in regarding how the Biden administration would pay for proposed infrastructure investments and other social programs under the American Jobs Act, our members remained concerned with discussions around proposals to raise the corporate tax rate. As noted by the U.S. Chamber in its statement for the record to this committee dated April 6, 2021, the 2017 Tax Cuts and Jobs Act resulted in significant improvements in the United States' competitiveness among OECD nations. Raising the Federal corporate rate to 28 percent while leaving in place provisions of TCJA that broadened the tax base would result in the United States being in an even worse competitive situation than prior to 2017. Additionally, as the U.S. Chamber's statement notes, various reports, including those compiled by the Joint Economic Committee, have estimated labor bears a significant burden of the corporate income tax—"70 percent or higher [being] the most likely outcome" according to one of the analyses.[18] As the Tax Foundation has noted, just a 1-percentage-point increase in the Federal corporate rate would reduce long-run GDP by $56 billion, with commensurate losses in average wages and employed Americans. An increase to 25 percent would reduce GDP by $220 billion and cost more than 175,000 jobs.[19]

The National Association of Manufacturers also released an analysis of the detrimental consequences to our economy should Congress raise taxes on business and repeal key provisions of the TCJA.[20] These consequences include a significant decline in total employment—nearly 1 million jobs by 2023—as well as a reduction in annual employment of 600,000 jobs per year and a reduction in national GDP of $117 billion over the next 2 years.

Should Congress raise the Federal corporate tax rate, Pennsylvania's economy would be disadvantaged worse than most States, given our State corporate net income tax rate is 9.99 percent, the second-highest flat rate among all States. In addi-

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[16] Understanding US productivity trends from the bottom-up. Joseph Parilla and Mark Muro, Brookings Institution, March 2017, *https://www.brookings.edu/research/understanding-us-productivity-trends-from-the-bottom-up/#cancel.*

[17] Wages, Benefits and Change: A Supplemental Report to the Annual U.S. Energy and Employment Report. NASEO and Energy Futures Initiatives, 2020, *https://www.usenergyjobs.org/*.

[18] Labor Bears Much of the Cost of the Corporate Tax. Tax Foundation, October 24, 2017, *https://taxfoundation.org/labor-bears-corporate-tax/*.

[19] Proposed Corporate Rate Hike Would Damage Economic Output. August 23, 2018, *https://taxfoundation.org/proposed- corporate-rate-hike-damage-economic-output/*.

[20] Study: Tax Increases Cause Major Job Losses, Harm U.S. Economy. National Association of Manufacturers, April 2021, *https://www.nam.org/wp-content/uploads/2021/04/TaxStudy OnePager.pdf.*

tion, Pennsylvania is one of only a handful of States that limits the ability of companies to carry forward net operating losses. Significant increases in corporate rates at the Federal level, on top of Pennsylvania's middling status for competitiveness and attractiveness for new and expanded investment, would further disadvantage our State's economy and, by extension, its vital industries that, as noted in this testimony, have helped this Nation grow its economy and reduce its emissions.

Further, to impose sweeping tax and regulatory changes just a handful of years after the largest change to the Federal tax code in a generation threatens to set up a dynamic which will ultimately harm the long-term attractiveness of investment in Pennsylvania and the United States—which is rapid swings of the pendulum of policy. Such a dynamic would make long-term planning and investment extremely challenging.

In addition, key industries in energy and manufacturing in Pennsylvania face an inordinate number of challenges at the State and regional level. These include: persistent calls by some policy-makers and stakeholders for a punitive severance tax on natural gas development (in addition to the already challenging business tax structure at the State level and the State's unique impact fee that is assessed on every unconventional gas well), neighboring States attempting to obstruct the construction of federally approved infrastructure or taking other regulatory actions to raise costs on our State's manufacturing, energy, and infrastructure facilities, continual litigation over local land use and State and Federal permitting approvals for new and expanded infrastructure and operations, and a generally challenging regulatory environment for air and water permits.

To reiterate, our State's energy economy, including continually increasing output from the Marcellus shale and other natural gas plays, has helped position the United States in a leadership position with respect to emissions reductions and economic growth. Among independent, non-integrated oil and gas drillers, an outsized portion of capital expenditures are related to intangible drilling costs—in some cases upward of 80 percent—which is expected given their predominant business is extracting hydrocarbons. Changes to Federal tax policy that discourage continued investment into the exploration and production of oil and gas would not only harm our State's economy, they would have the effect of restricting supply of vital commodities but not the demand for them—with the result being higher energy costs paid by consumers and businesses. As the International Energy Agency's most recent World Energy Outlook notes, the world and the United States still need to invest $390 billion per year into oil and gas development after 2030 to meet energy demand.

The U.S. Department of Labor announced recently that the Consumer Price Index increased month over month by a level unseen in a decade, in large part due to higher gasoline and natural gas prices.[21] Tax or regulatory policy that discourages new production or the construction or operation of associated infrastructure will only further cause further upward pressure on prices, given expected demand.

Further, the State is in the midst of a debate regarding whether Governor Wolf can and should have Pennsylvania join the Regional Greenhouse Gas Initiative, a cap-and-trade program for power generators. The Pennsylvania Chamber has, while noting the merits of market-based approaches to reduce emissions and the challenges that climate change presents, repeatedly raised concerns over the potential costs of doing so. Meeting energy and environmental challenges will require continued innovation, and innovation is much more likely to come through market-based systems that send investment signals, rather than command-and-control regulatory structures that mandate the use of certain energy resources and that ban (in practice or in the plain definition of the term) other resources. To this end, we have advocated that should Pennsylvania join RGGI, it must be a workable program that encourages the continued development of combined heat and power projects at manufacturers and that does not sacrifice, through leakage (the displacement of generation to non-RGGI States within PJM) Pennsylvania's role as a net energy exporter and largest generating State in PJM. Beyond RGGI, the Republican State legislature and Democratic governor's administration continue to engage on long-term energy policy conversations related to climate change, net metering, tax policy, regulatory reform, electric vehicles and land use policy. Any durable energy policy established through legislation under the current political dynamics in Pennsylvania will be the product of bipartisan compromise and collaboration; we remain greatly con-

[21] Consumer Price Index—March 2021. U.S. Department of Labor Bureau of Labor Statistics, April 13, 2021, *https://www.bls.gov/news.release/pdf/cpi.pdf.*

cerned that Federal energy and infrastructure policy established solely through executive action or partisan reconciliation will erode the value of such a give and take at the State level and eclipse the policy choices our State has made.

To cite one example, the State legislature is contemplating policy to address deployment of electric vehicle charging stations in a manner that is equitable with respect to the various ratepayer classes—residential, commercial and industrial—and that respects that many counties are rural and whose populations lack interest in purchasing an electric vehicle. The legislature, the Governor, and various stakeholders, including the Pennsylvania Chamber, are also in dialogue regarding sustainable transportation funding given the increased use of more efficient and alternative fuel vehicles. Federal policy that mandates deployment of electric vehicles is, in our view, extremely unlikely to respect these dynamics and any compromise policy outcome reached by stakeholders at the State level.

FEDERAL INFRASTRUCTURE DECISION-MAKING MUST BE STREAMLINED TO SUPPORT DOMESTIC MANUFACTURING AND ENERGY SECURITY

As Federal lawmakers debate a long-term vision for energy and environmental progress, administration officials and Congress must not lose sight of the many challenges currently facing our existing industries. Addressing these issues through bipartisan reforms can unlock further investment and continue to position the United States for long-term growth. Among these include streamlining the permitting process for infrastructure, providing for a more common-sense and flexible air quality permitting regime, and rewarding stewardship in key industrial sectors.

First, while Pennsylvania has abundant supplies of energy and exports roughly one-third of its electricity and three-quarters of its natural gas, nearby States are facing self-imposed energy crises due to short-sighted political decisions on infrastructure. As a few examples of the real-world impacts of these States attempting to impose unilateral vetoes on federally approved infrastructure projects, utilities in New Jersey have warned State regulators that there may be inadequate supplies of natural gas during the winter season.[22] Electricity market regulators in New England continue to grapple with fuel security and natural gas supply issues, with ISO–NE noting "inadequate infrastructure to transport natural gas has at times affected the ability of natural gas-fired power plants to get the fuel they need to perform. This energy-security risk has become a pressing concern for New England, considering the major role natural gas-fired generation plays in keeping the lights on and setting prices for wholesale electricity."[23] Infamously, several winters ago a ship carrying LNG from Russia delivered its cargo to a Boston port despite the city being just a short drive away from some of the most prolific producing shale gas wells in the world in northeastern Pennsylvania. Our Federal infrastructure permitting regime was not designed with the intention of allowing single States to unilaterally veto federally approved interstate projects—a position the Biden administration endorses in its recent Supreme Court filing in *PennEast Pipeline v. New Jersey.*[24]

Oil pipelines and associated infrastructure are also being impacted or threatened by Federal and State regulatory actions—the result of which would eliminate jobs and jeopardize economic vitality. To our north, our allies in Canada are crying foul over the Federal Government's revocation of the Keystone XL pipeline's cross-border permit. To our west, the State government in Michigan is attempting to obstruct the international, interstate Line 5 project—which supplies crude oil and natural gas liquids to domestic refiners in Michigan, Ohio, and Pennsylvania as well as Ontario and Quebec. Crude shipped on Line 5 makes its way to northwest Pennsylvania to be refined and sold at retail outlets in the Great Lakes region. Growing our economy, ensuring reliable energy and meeting environmental goals will require a durable Federal permitting approach that considers State interests in interstate

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[22] New Jersey utilities warn of gas shortages, argue for new pipelines. Politico Pro New Jersey, October 25, 2019, *https://subscriber.politicopro.com/states/new-jersey/story/2019/10/25/new-jersey-utilities-warn-of-gas-shortages-argue-for-new-pipelines-1225986.*

See also comments of New Jersey Natural Gas, Levitan and Associates, and PSEG Services Corporation in New Jersey Board of Public Utilities Docket GO19070846.

[23] Natural Gas Infrastructure Constraints. ISO–NE, *https://www.iso-ne.com/about/what-we-do/in-depth/natural-gas-infrastructure-constraints.*

[24] *See* Brief of the United States as Amicus Curiae Supporting Petitioner, filed March 8, 2021, *https://www.supremecourt.gov/DocketPDF/19/19-1039/171249/20210308193306999_19-1039 tsacUnitedStates.pdf.*

permitting but does not allow them to obstruct the construction of vital and necessary projects.

Siting and permitting reforms for interstate infrastructure, broadly speaking, would also be a boon to investment into electric transmission projects specifically in a way that additional socialization of costs for these projects through investment tax credits would not. Given the return on equity rates approved by State and Federal commissions as well as the identified need to increase supply and reduce congestion in certain regions of the country, the barriers to construction of interstate projects have not been from a lack of financing but from a dysfunctional permitting process, obstruction by States and litigation by disaffected NGO's. Further, socialization of costs through Federal investment tax credits for electric infrastructure may only exacerbate the on-going controversy regarding equitable cost allocation of certain transmission project costs between and among States and their ratepayer classes.

Second, and relatedly, the decision-making process for infrastructure permitting in this country needs streamlining. Whether the project in question is a port expansion, a new highway, or an energy project, the National Environmental Policy Act (NEPA), while well-intentioned, has resulted in years of delay to the point where it can take longer to approve a project than to build it. These unreasonable delays are not only costly, but deprive the public and our economy of the benefits that modern infrastructure can deliver. Keeping our transportation, logistics, manufacturing, aviation and energy industries competitive in an intensely dynamic global marketplace will require a more transparent, fair, and nimble approval process, and as Congress and the Biden administration turn the page to an infrastructure package, it is vital these projects be built quickly and efficiently. The PA Chamber is a proud member, alongside leaders from the building trades, agriculture, construction, transportation, manufacturers, and trade associations as part of the Unlock American Investment coalition that supports reforms to NEPA.

Finally, given the significant energy security, economic opportunity, and environmental benefits such a storage hub would represent, we strongly encourage the Biden administration and lawmakers to continue to support an ethane storage hub in Appalachia. Continued investment into the operation and expansion of domestic petrochemical and plastics manufacturing capacity is necessary, given that recent supply chain disruptions, leading to a shortage of semiconductor chips and plastics components, have caused automakers to halt production in several States. An energy-focused economic development strategy for Pennsylvania, as outlined in an economy analysis dubbed Forge the Future, has the potential to bring an additional $60 billion in State GDP and more than 100,000 jobs to our State. The Appalachian region, including Pennsylvania, Ohio, West Virginia and Kentucky, could become a petrochemicals and plastic manufacturing hub—according to the American Chemistry Council, more than $28 billion in economic expansion and more than 100,000 jobs could be created should the region capitalize on an ethane storage project and secure the construction and operation of several petrochemical plants.

PENNSYLVANIA'S ENERGY AND MANUFACTURING SECTORS CONTINUE TO LEAD

Pennsylvania is a leading State in terms of food manufacturing, refined products, pharmaceuticals, steel, concrete, cement, aggregates, and pulp and paper, as well as industries that helped us weather and overcome the pandemic: health care, telecommunications and logistics. Every one of these industries are working to innovate and make use of domestic energy resources to improve resiliency and sustainability. A few examples include:

- A major metropolitan airport working with leaders in natural gas and renewables to develop a microgrid using natural gas developed on site.
- Innovative deployment of nuclear power to provide reliable, baseload, zero-carbon power to a data center warehouse.
- A former underground mine now houses a secure, world-class data center and documents storage facility.
- Fertilizer and ammonia manufacturers producing vital products for the agriculture sector through the use of domestic natural gas liquids and carbon capture and sequestration technology.
- Use of natural gas helps a leading pharmaceutical company's manufacturing facility reduce.emissions and costs to remain competitive
- A cement manufacturer switching to natural gas to reduce costs and emissions.

- A leading pulp and paper manufacturer turning to natural gas for on-site heat and power to reduce cost and emissions.
- A global integrated oil and gas company selecting southwestern Pennsylvania to site a multi-billion-dollar petrochemical facility, with its produced products boosting domestic medical, automotive, and food manufacturing industries.
- A leading consumer products company harnesses local gas reserves to provide all of its heating and power needs while sending excess power back out to the grid.
- Waste management, logistics and utility companies are partnering to capture biogas for use as a clean fuel for heavy trucking.

These success stories demonstrate just a fraction of the renewal of opportunity that can be achieved in part through policy that allows all segments of the energy value chain to flourish. These segments include the development of our natural resources, power generation from a diverse portfolio of fuel sources, expanded oil, gas, and electric infrastructure, and the use of those commodities in manufacturing and industry. The American economy stands to benefit tremendously as energy is developed and moved through infrastructure for final use in homes and businesses; we can also continue to secure additional improvements in air and water quality as we develop this value chain.

FEDERAL ENERGY AND ENVIRONMENTAL POLICY MUST ALSO ENCOURAGE INVESTMENTS INTO EFFICIENCY IMPROVEMENTS, DOMESTIC OUTPUT, AND LONG-TERM ENERGY SECURITY

We must, however, not lose sight of the fact that if the goal of Federal energy and infrastructure policy is to encourage and accommodate the rapid and efficient buildout of new and expanded energy and manufacturing facilities and related infrastructure, financing is only one aspect of the process. Permitting reform must come hand in hand with any Federal policy, and end-users in industrial and manufacturing sectors must be able to operate in a regulatory environment that encourages the adoption of cleaner burning fuels and allows such facilities' to continue and expand domestic operations. The PA Chamber also urges adequate funding and resources be provided to States commensurate with any Federal partnership in funding key infrastructure projects. The regulatory schema established by EPA and USDOT, among other Federal agencies, are in large part passed down to State and local resource agencies for implementation. This may come in the form of State environmental agencies incorporating Federal air or water permitting requirements into State approvals of projects. Broadly speaking, in many years the practical extent of EPA's involvement in the permit review process is to hand down substantial regulatory obligations to the States without commensurate funding and then delay projects approvals by second-guessing the State regulators' work.

As noted previously in testimony before other congressional committees, economic growth and environmental progress depend upon a well-functioning and rational regulatory system; the Federal air quality permitting regime shows signs of being neither and must be modernized.[25] Pennsylvania Chamber members have reported that the current process is an impediment to investing in the efficiency of their operations and improving their ability to compete abroad. Because of the costs associated with triggering New Source Review (NSR) thresholds, companies have canceled projects that would have reduced emissions, lowered operating costs and provided an overall benefit to public health and the environment. Disputes between State and Federal regulators over interpretation and application of regulatory criteria result in sizeable legal and engineering costs and leave projects in limbo for months, or years. Lenders will not provide financing until the resolution of litigation from third-party groups over the perpetually changing universe of Best Achievable Control Technology (BACT) and Lowest Achievable Emissions Rate (LAER) controls.

Our members have supported reforms to these programs, including greater consideration for the net emissions benefit when a facility is going through the NSR or

[25] Hearing on the CLEAN Future Act: Industrial Climate Policies to Create Jobs and Support Working Communities, March 18, 2021, *https://energycommerce.house.gov/committee-activity/hearings/hearing-on-the-clean-future-act-industrial-climate-policies-to-create.*

New Source Review Permitting Challenges for Manufacturing and Infrastructure, February 14, 2018, *https://www.pachamber.org/advocacy/legislative_agenda/communications/PA_Chamber_House_EC_Sub_Enviro_NSR_Testimony_021418.pdf.*

Modernizing Environmental Laws: Challenges and Opportunities for Expanding Infrastructure and Promoting Development and Manufacturing, February 16, 2017, *https://www.pachamber.org/advocacy/legislative_agenda/communications/House_EC_Sub_Enviro_Modernizing_Environmental_Laws.pdf.*

PSD process for a facility modification. We have also applauded the Trump administration's end of the longstanding "once in, always in" rule for major sources of hazardous air pollutants, the repeal of which encouraged sustainability by no longer requiring facilities who reduce annual emissions below major source thresholds to continue to be permitted and operate as major sources. We also encourage contemplation of two reforms regarding the use of offset credits—one, given the focus of the Clean Air Act on interstate impacts, being expanding the geography of where a credit may be secured beyond the purchasing facility's region or county, and two, given the shortage of some types of credits and regulators' penchant for justifying new rules on the co-benefits of emissions not being directly regulated, being more accommodating to securing and retiring emission reduction credits (ERCs) of one pollutant (for example, nitrogen oxide) to offset emissions of another (for example, particulate matter).

Given the challenges presented by NSR and other air and permitting programs, and the fact that there is no scenario in which the United States achieves substantial decarbonization without widespread deployment of carbon capture and underground storage technology (CCUS), policy-makers should enact reforms such that the permitting obligations do not discourage a power plant, manufacturing or industrial facility looking to retrofit CCUS technology into the facility's operations. A company proposing to install CCUS technology at an existing facility will have to undergo applicability determinations with State and Federal regulators to determine if the project is significant enough to constitute a "major modification" and thus subject to NSR requirements. NSR may also be triggered if the installation of carbon capture technology results in a significant change in the process design of the plant, even if the overall emissions profile of the facility does not change. In a hypothetical future carbon-constrained policy environment, NSR may also be triggered by power plants or industrial facilities seeking to install and operate carbon capture technology that will allow the facilities to run more frequently but with less emissions intensity. Depending on the structure of State air quality requirements (*i.e.,* if the State outright adopts by reference Federal NSR requirements) and the judgment of EPA's regional air offices, applicability determination process may include notice and comment and public hearings. Should the project be located in an area that is in attainment with NAAQS, the project may be required to conduct air modeling, which can take a year. As noted in this testimony, there is also risk of litigation from third-party NGO's over what is the relevant technology under LAER or BACT. We project that, absent litigation and with a commitment from air quality regulators on timely permitting, it will take upwards of 2 years to permit a CCUS project in a best-case scenario. Within PJM, the installation of the technology may require the power plant to go idle for a period of time and lose out on energy and capacity market revenues, which again speaks to the need for a timely, fair and predictable process. Finally, there may be additional delays in constructing and operating infrastructure associated with a CCUS project, due to permitting requirements as they relate to endangered species, pipeline siting, underground injection and NEPA. These challenges were discussed in a recent report from DOE's Lawrence Liverpool National Laboratory,[26] which examined challenges associated with constructing CCUS projects in California—an analysis that is especially salient given that much of the CLEAN Future Act appears to borrow, in both intent and design, from environmental policy established by California State regulators.

Further, as Dr. Brian Anderson, director of the Department of Energy's National Energy Technology Laboratory (NETL), situated in southwestern Pennsylvania, recently testified to the Pennsylvania State Senate,[27] given the carbon-emitting resources' significant share of domestic energy resources and the intermittent nature of renewable resources such as wind and solar, carbon capture and underground storage "will continue to be necessary to grid-scale energy storage for grid reliability during this energy transition." In other words, should Congress establish a goal of net-zero emissions for the United States by mid-century, it will be absolutely necessary to continue to invest in fossil fuel exploration and associated transmission infrastructure—so that both the fuels themselves and the greenhouse gasses pro-

[26] Permitting Carbon Capture and Storage Projects in California. George Peridas, Lawrence Liverpool National Laboratory, February 2021, *https://www-gs.llnl.gov/content/assets/docs/energy/CA_CCS_PermittingReport.pdf.*

[27] Written Comments of Dr. Brian Anderson, Director of the National Energy Technology Laboratory, U.S. Department of Energy, Informational Briefing to the Pennsylvania Senate Environmental Resources and Energy Committee, March 10, 2021, *https://environmental.pasenategop.com/wp-content/uploads/sites/34/2021/03/2021-03.10.2021-Anderson-Written-Comments_PA-Senate-ERE-Committee-8MAR2021.pdf.*

duced during combustion can be moved through a robust and safe network of pipelines. Several leading energy companies are working with DOE NETL on innovative research and demonstration projects involving carbon capture, including applications in power generation and consumer products. Pennsylvania Chamber members are also working with innovative leaders in the ammonia and fertilizer industries to pair carbon capture technology with locally produced natural gas to produce vital products for the agriculture sector. Companies working in the concrete and cement industries are also switching to natural gas in the near term to power their industrial processes and examining ways to, in the long term, develop their products with carbon capture.

As these efforts show, traditional energy resources can be paired in innovative ways with new technology to create new markets and support vital existing industries. Continued investment into both electric and gas infrastructure is necessary to meeting energy and climate goals. As researchers as Columbia University recently noted in an analysis, "while it may seem counterintuitive, investing more in the domestic natural gas pipeline network could help the US reach net-zero emission goals more quickly and cheaply. Fortifying and upgrading the system could prepare the existing infrastructure to transport zero-carbon fuels as they become available and, in the meantime, reduce harmful methane leaks from natural gas."[28]

Pennsylvania also continues to be a leader with respect to nuclear power, having the second-most installed nuclear capacity of any State. These facilities represent nearly 80 percent of the State's zero-carbon generation and are supported by a strong base of vendors and human capital in the State, augmented by nuclear engineering graduates produced by leading universities such as Penn State and Carnegie Mellon. An economic report sponsored by our organization, the Pennsylvania Building and Construction Trades Council, the Allegheny Conference on Community Development and the Greater Philadelphia Chamber of Commerce found that the nuclear industry contributes approximately $2 billion to State GDP and supports nearly 16,000 jobs.[29] Nuclear jobs are also the highest-paying of all energy jobs, according to a recent report—105 percent more than the average median wage.[30] Our State was host to the Nation's first commercial nuclear facility and we have a resource and knowledge base to support continued innovation and operation of these facilities, and it remains imperative that Federal policy recognize emissions reduction goals will not be met without continued contributions from the nuclear energy industry.

As domestic and international demand for renewable resources expands, it is also imperative the United States establishes policy that encourages the domestic mining of critical minerals, which are used not just in solar panels but a variety of applications in telecommunications, computer chips and other hardware. Pennsylvania's mining, steel, and timber industries, as well as that of other States, must not be regulated out of existence. Regardless of the composition of our energy mix, our economy will still need timber, aggregates, concrete, steel and cement to build infrastructure, and the human capital and equipment stock used by these industries today can be put to use for critical minerals mining and low- carbon manufacturing and infrastructure buildout tomorrow. Federal policy must also continue to support development of strong domestic energy and manufacturing bases, which includes trade policy that does not result in higher costs for vital supply chain components. At the same time, policy should also continue to encourage research and development, including advances in modular nuclear technology, hydrogen and other emerging energy resources.

In closing, Pennsylvania's success in energy production and leading in a variety of industrial and manufacturing segments while reducing emissions demonstrates how competitive markets, private sector innovation and stable policy can reap enormous dividends for our environment and our economy. Our success has helped the United States keep costs low, produce massive economic growth, and lead the world in reducing greenhouse gas emissions. We stand ready to work with leaders in Washington to continue those trends. I reiterate our encouragement that the Biden

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[28] Investing in the US Natural Gas Pipeline System to Support Net-Zero Targets. Blanton, Lott and Smith, Columbia University, April 22, 2021, *https://www.energypolicy.columbia.edu/research/report/investing-us-natural-gas-pipeline-system-support-net-zero-targets.*

[29] Pennsylvania Nuclear Power Plants' Contribution to the State Economy. Brattle Group, December 2016, *https://www.pachamber.org/assets/pdf/pa_nuclear_report.pdf.*

[30] Wages, Benefits and Change: A Supplemental Report to the Annual US Energy and Employment Report. NASEO and Energy Futures Initiatives, 2020, *https://www.usenergyjobs.org/*.

administration and lawmakers on both sides of the aisle come together to produce durable, effective, bipartisan energy and environmental policy that keeps the United States in a flagship position in an increasingly challenging and dynamic global marketplace. Thank you for the opportunity to appear before you today.

QUESTIONS SUBMITTED FOR THE RECORD TO KEVIN SUNDAY

QUESTIONS SUBMITTED BY HON. ROB PORTMAN

Question. Concerns have been raised regarding the tax equity markets and increased calls for a direct pay option for renewable energy credits. Some proposals have been introduced that would provide a direct pay option in lieu of tax credits.

More than a decade ago, in 2009, Congress created such a program, called the section 1603 program. The creation of this temporary, $26 billion section 1603 grant program was part of the American Recovery and Reinvestment Act in 2009 and motivated by difficult economic conditions and the perceived lack of tax equity in supporting renewable energy projects. The program allowed the Treasury Department to provide grants for investments in certain energy production properties in lieu of renewable energy tax credits.

However, the U.S. Treasury Inspector General for Tax Administration (TIGTA) outlined serious issues of program integrity, such as companies double dipping to receive both the grant and tax credit. As we continue to engage in these conversations to further define the role of the tax code in helping our country reduce its carbon footprint, program integrity must remain a top priority for us.

Do you think the vulnerabilities such a grant program may have for fraud, waste, and abuse limit the effectiveness of its benefits? Do program integrity problems, as was demonstrated in the section 1603 program, have unintended consequences on the development of the broader industry?

Answer. As our testimony noted, Pennsylvania's embrace of competitive markets has secured significant economic and environmental benefits for the State, region, and country. We therefore are concerned over the potential for distortive effects into the energy marketplace through subsidies and mandates, which too often have the effect of not producing innovation in the private sector but competition in the lobbying space to preserve favorable financial and regulatory treatment granted by Congress and regulators. As the Independent Market Monitor for the 13-State PJM grid (which manages the competitive electricity markets in states including Pennsylvania and Ohio) has noted on several occasions, "subsidies are contagious." With this in mind, we must raise serious concerns over direct pay provisions, which as outlined in your question for the record would function as direct financing by the government to preferred energy resources in a manner that may not be transparent or equitable. With respect to entities without tax liabilities either due to the financial circumstances of a tax reporting period or due to their status as a non-profit, tax credits can still be monetized through sales between private parties. Such practice is common today among many recipients of tax credit programs and as such speaks against the need for direct pay.

Finally, as it remains a live policy question at FERC as to how regional transmission organizations, who oversee electricity markets, must account for State and Federal subsidies in market offerings as established in approved tariffs such as the Minimum Offer Price Rule, we also encourage the committee to engage with PJM, FERC, and stakeholders as to how these tax credits would be incorporated into competitive electricity market structures in a just and reasonable manner.

Please consider our organization a resource for further discussion on this or any other policy matter. Thank you for the opportunity to provide our perspective on these important matters, and for your leadership in promoting pro-growth tax and energy policy for our region.

PREPARED STATEMENT OF JASON WALSH, EXECUTIVE DIRECTOR, BLUEGREEN ALLIANCE

Thank you, Chairman Wyden, Ranking Member Crapo, and distinguished members of the committee. My name is Jason Walsh. I am the executive director of BlueGreen Alliance, a national partnership of labor unions and environmental organizations. On behalf of my organization, our partners, and the millions of members

and supporters they represent, I want to thank you for convening this important hearing to discuss the role of the Federal tax code in transitioning to a clean energy economy and ensuring the creation of quality, family-sustaining jobs across the economy.

The BlueGreen Alliance unites America's largest and most influential labor unions and environmental organizations to solve today's environmental challenges in ways that create and maintain quality jobs and build a stronger, fairer economy. Our partnership is firm in its belief that Americans don't have to choose between a good job and a clean environment—we can and must have both. I believe we are in a unique moment to address the climate crisis, create good jobs, and inject equity into our society as we work to rebuild our economy and recover from the COVID–19 pandemic.

This committee and the U.S. tax code can play a critical role in achieving these goals. Federal tax policies can be enacted to ensure we are deploying the technology needed to meet our climate goals, while ensuring jobs created in the clean energy sector are high-quality union jobs and that investments made drive growth in U.S. manufacturing. We can also work to ensure equity in the transition to a clean economy by maximizing the benefits of job growth in the clean energy sector for low-income workers and workers of color, as well as for communities disproportionately impacted by pollution, deindustrialization, and energy transition.

GOOD JOBS IN THE CLEAN ECONOMY

We are in the midst of a massive energy transition. The world's leading scientific organizations have been unambiguous that climate change is a dire and urgent threat and that the longer we delay, the stronger the action required. Over the last decade, we have witnessed the worsening impacts climate change is having on our communities. To avoid the catastrophic consequences of climate change, we must ensure rapid greenhouse gas emissions reductions—based on the latest science and in line with our fair share—to put America on a pathway of reducing its emissions to net-zero emissions by 2050, and to ensure we are solidly on that path by 2030.

As the Nation works to drive down emissions to address the climate crisis and fights to stay competitive in the global race to develop the clean technology of the future, we can see examples of how clean energy investments can spur economic recovery, the growth of a clean economy, and high-quality job creation across the country. For example, a heavily unionized crew of trades people built the Block Island offshore wind project off the coast of Rhode Island, union auto workers on factory floors across the country are building cleaner cars and trucks, and workers in St. Louis and Los Angeles are gaining access to high-skilled jobs in energy efficiency retrofitting, pipefitting, and transit manufacturing. These are good, union jobs building and maintaining a clean energy and climate-resilient economy, today.

At the same time, not enough of the new jobs that have been created or promised in the clean energy economy are high-quality, family-sustaining jobs. Before the COVID–19 pandemic, more than 3.3 million Americans were working in the clean energy economy.[1] On average, clean energy workers make more than the typical worker in America. A recent report found that clean energy jobs—defined by that report as jobs in renewable energy, energy efficiency, grid modernization and storage, clean fuels, and clean vehicles—pay 25 percent more than the national median wage[2] at an average of $23.89 an hour for clean energy jobs compared with the 2019 national median of $19.24.

However, it is also the case that workers in clean energy sectors earn less on average than workers in fossil fuel energy sectors. The primary reason for this wage gap is the gap in union density between renewable energy jobs and jobs in the traditional energy sector. For example, jobs in wind and solar industries average 4 percent to 6 percent union density, compared to 10 percent to 12 percent union density in natural gas, nuclear, and coal power plants. Likewise, we see that clean energy-specific occupations are in general lower paid than traditional energy-specific occupations. While highly unionized fossil fuel utilities workers earn over $82,000 a year, solar PV installers with a 4-percent unionization rate make a median annual

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[1] BW Research Partnership, *Clean Jobs, Better Jobs; An Examination of Clean Energy Job Wages and Benefits,* 2020. Available online: *https://e2.org/wp-content/uploads/2020/10/Clean-Jobs-Better-Jobs.-October-2020.-E2-ACORE-CELI.pdf.*

[2] BW Research Partnership, *Clean Jobs, Better Jobs; An Examination of Clean Energy Job Wages and Benefits,* 2020. Available online: *https://e2.org/wp-content/uploads/2020/10/Clean-Jobs-Better-Jobs.-October-2020.-E2-ACORE-CELI.pdf.*

wage of less than $45,000, though that wage does increase slightly if those workers have an electrician's license.

Wind and solar generation currently employ significantly more workers than most traditional energy generation sectors. Solar energy, which is the energy sub-sector with the lowest union density, employs 345,393 workers. By comparison, the nuclear generation sector employs 60,916 workers and has a much higher union density at 12 percent. Likewise, the wind generation sector employs 114,774 workers with union density of just 6 percent, while coal generation employs 79,711 with a unionization rate of 10 percent. The two lowest paying occupations in the clean energy sector—solar PV installers and wind turbine technicians—are also the two with the highest projected growth, meaning that the sectors within the energy industry that are expected to grow the fastest are not currently producing good-paying jobs relative to other jobs in the energy sector.

Unionization is a key pathway to quality jobs and family sustaining wages. Union jobs on the whole pay better, have better benefits, and are safer than non-union jobs.[3] Workers who are members of, or are represented by a union, earn significantly more than those who are not across all relevant industries and occupations, with especially pronounced benefits for lower-paid workers. For example, on average, union members earn a premium of 15 percent higher wages than non-union workers in the utilities sector, and 45 percent higher wages in the construction sector.

As we work to meet our climate goals, we need to make a massive investment in energy efficiency and the deployment of clean and renewable technology nationwide, including low- and no-carbon electricity production; carbon capture, removal, storage, and utilization; natural ecosystem restoration; and zero carbon transportation options. At the same time, we must ensure that these investments translate into good jobs and that in doing so we eliminate the disparities between job quality of renewable and traditional energy sectors.

While we're working to grow clean energy jobs in this country, we must ensure that we are not only ensuring those are good jobs, but *accessible* jobs. This includes supporting and growing pathways into good union jobs in these and other sectors for workers of color and other segments of the population historically left out of these jobs.

Historically—and persistently—black Americans fare worse in the economy, having lower wages, less savings to fall back on, and significantly higher poverty rates as systemic racism has stacked the deck against people of color. Regardless of education level, black workers are far more likely to be unemployed than white workers. Historically, unemployment rates are twice as high for black workers. That disparity carries into the workplace as well, with black workers paid on average 73 cents to the dollar compared to white workers.[4] The wage gap persists regardless of education, and even with advanced degrees black workers make far less than white workers at the same level. The poverty rate for white Americans sits at about 8.1 percent. For black households, it is 20.7 percent.[5]

One of the tools at our disposal in the fight for equity is unionization. Research has shown that through the collective bargaining power of unions,[6] workers are able to get more and better benefits such as health insurance and pensions, and are able to fight for more enforcement of the labor protections they have a right to under the law, like enforcement of safety and health regulations, and overtime. And research has shown that across the board, union members earn higher wages than non-union workers,[7] and the difference is most pronounced for workers of color and

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[3] AFL–CIO, *Building Power for Working People,* 2021. Available online: *https://aflcio.org/what-unions-do/empower-workers#:~:text=Union%20Jobs%20Help%20Achieve%20Work%2DLife%20Balance&text=There%27s%20more%20to%20life%20than,schedules%20and%20no%20mandatory%20overtime.*

[4] Economic Policy Institute, *Black workers face two of the most lethal preexisting conditions for coronavirus—racism and economic inequality,* 2020. Available online: *https://www.epi.org/publication/black-workers-covid/.*

[5] Economic Policy Institute, *Black workers face two of the most lethal preexisting conditions for coronavirus—racism and economic inequality,* 2020. Available online: *https://www.epi.org/publication/black-workers-covid/.*

[6] Economic Policy Institute, *Black workers face two of the most lethal preexisting conditions for coronavirus—racism and economic inequality,* 2020. Available online: *https://www.epi.org/publication/black-workers-covid/.*

[7] Bureau of Labor Statistics, New Release, January 22, 2021. Available online: *https://www.bls.gov/news.release/pdf/union2.pdf.*

women. White union members earn on average 17 percent more than their non-union counterparts. Female union members earn 28 percent more, black union members earn 28 percent more, and Latino union members earn 40 percent more in wages than non-union Latino workers.

Increasing union density in the clean energy sector is therefore a key way to address the inequity inherent in our economy. Another key mechanism for building career pathways and increasing access is through registered apprenticeship, pre-apprenticeship, and other union-affiliated training programs. Community Workforce Agreements (CWAs) and Community Benefit Agreements (CBAs) are another key opportunity. Similar to a project labor agreement, these are collective bargaining agreements that are negotiated with both union and community partners. These types of agreements often include local hire provisions, targeted hire of low-income or disadvantaged workers, and the creation of pre-apprenticeship pathways for careers on the project. Beyond the obvious benefits to workers of these higher wage, benefit, and career path opportunities, it's also relevant to this committee the fiscal benefits of decreased reliance on Federal programs such as Medicaid, EITC, SNAP, and the like, that come with a well-paying union job with strong, stable benefits.

MANUFACTURING SUPPLY CHAIN

Although the environmental benefits to Americans of a wind or solar farm or a car lot full of electric vehicles (EVs) may be obvious, to truly bring home the benefits of the clean energy transition, policy-makers must make sure that the manufacturing facilities producing these products, as well as the machines that make the parts and materials that go into them, are also here at home. Manufacturing has a long history of supplying good-paying jobs to workers across this country and has been the backbone of the American middle class. Manufacturing currently employs about one in 11 American workers, in addition to contributing $2 trillion a year[8] to the gross domestic product (GDP). However, the Nation has lost nearly 5 million manufacturing jobs since 1997.[9] If the Nation fails to make the investments needed and put in place smart policies, American manufacturing will continue to weaken. Countries around the world are rushing to capture the manufacturing and jobs benefits of the global shift to clean energy and the United States could lead the pack with the right policies in place.

Unfortunately, decades of bad policy, offshoring, and outsourcing have weakened supply chains and lost jobs, and the United States has not been taking full advantage of the opportunity to support and strengthen domestic manufacturing along that supply chain. Today, far too many of the solar panels,[10] solar components, EV components,[11] and parts and materials for wind turbines[12] that build the clean economy are manufactured overseas and shipped to the United States. Steps should be taken now to rebuild those vital supply chains and grow jobs here in the United States.

Solar

The story of the U.S. solar industry is illustrative of the consequences of the failure to act proactively in the early days of a budding industry and the need for a comprehensive, coordinated industrial policy that marries strong trade and manufacturing rules.

In the early days of solar energy, the U.S. was the leader of solar energy research, development, and manufacturing. However, due to China's aggressive moves though trade policy, subsidy, and massive domestic investment in PV manufacturing

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[8] Economic Policy Institute, *The Manufacturing Footprint and the Importance of U.S. Manufacturing Jobs.* Available online: *https://www.epi.org/publication/the-manufacturing-footprint-and-the-importance-of-u-s-manufacturing-jobs/*.

[9] Economic Policy Institute, *We can reshore manufacturing jobs, but Trump hasn't done it,* 2020. Available online: *https://www.epi.org/publication/reshoring-manufacturing-jobs/#:~:text=Overall%2C%20the%20U.S.%20has%20suffered,Census%20Bureau%202020a%2C%202020b.*

[10] U.S. Energy Information Administration, *U.S. shipments of solar photovoltaic modules increase as prices continue to fall,* 2020. Available online: *https://www.eia.gov/todayinenergy/detail.php?id=44816#:~:text=Effective%20February%207%2C%202018%2C%20the,subsequent%20year%20for%20four%20years.&text=In%202019%2C%20imports%20accounted%20for,of% 20total%20solar%20PV%20shipments.*

[11] United States Trade Commission, Journal of International Commerce and Economics, *The supply chain for electric vehicle batteries,* 2018. Available online: *https://www.usitc.gov/publications/332/journals/the_supply_chain_for_electric_vehicle_batteries.pdf.*

[12] IBIS World, *Wind Turbine Manufacturing Industry in the U.S.,* 2021. Available online: *https://www.ibisworld.com/united-states/market-research-reports/wind-turbine-manufacturing-industry/*.

around 2008–2013, U.S. manufacturing of solar components was largely pushed to the sidelines. Because of inconsistent international trade policy and incoherent Federal clean technology manufacturing strategy, the Nation has struggled to build a competitive solar manufacturing industry. The few solar manufacturers we have left rely on international supply chains.

For example, for American polysilicon manufacturers, this means they are entirely captive to Chinese wafer manufacture, which dominates the global market, as their only customers. When China strategically decided to shut down the use of non-Chinese polysilicon in their wafer manufacturing, the U.S. suppliers were essentially frozen out of the supply chain. And it's no better at the other end of the supply chain, where U.S. module manufacturers have no control over the materials sourcing, labor, or environmental practices behind the key components in their modules, because they have no choice but to source them from China. Recent reporting on the substantially lower environmental, human rights, and labor standards, in China, show how ultimately unsustainable this arrangement is, for example, in the ongoing accusations of forced labor.[13]

Over the years to come, with the dramatic fall in prices for solar and continuing improvements in the manufacture of solar components, the United States has an opportunity to expand PV manufacturing capacity in a way that provides quality, high-road jobs. With strong deployment measures, crafted hand in hand with deliberate manufacturing policies—including manufacturing investment, measures to fill critical supply chain gaps, and a fairer trade policy—the United States can create high-quality jobs and improve our economic security at the same time. Our policies must also support high labor and environmental standards throughout the clean energy supply chain.

Wind

Primarily due to the extraordinary size of the components and the attendant logistical issues of international shipping, the story is brighter when looking at the onshore wind industry, though there is still room for improvement. There are currently more than 500 U.S. manufacturing facilities specializing in wind components.[14] Currently more than 90 percent of nacelles [15]—the housing for the generator, gearbox, and other mechanics—for U.S. onshore wind turbines are assembled in the United States, along with 40 percent–70 percent of blades and hubs and 65 percent–85 percent of wind towers.[16] However, the materials that can readily be shipped, such as internal nacelle components, like electronics, have very little domestic content. And very few of these facilities are union-represented. We must ensure we expand our domestic supply chain for wind and increase job quality.

The opportunities and risks are even more acute with respect to the budding offshore wind industry. The potential for responsible offshore wind development in the United States is substantial. According to the U.S. Department of Energy, if the Nation utilized even 1 percent of its technical potential offshore wind capacity, it could power nearly 6.5 million homes.[17] The industry is rapidly expanding both domestically and internationally.

Currently, the United States has just one offshore wind project operating—the Block Island Offshore Wind Farm off the coast of Rhode Island.[18] This project was the result of years of collaboration between labor unions, environmental organizations, industry, and key government officials and entities. The project demonstrates the diverse, highly skilled workforce that will be necessary for all future offshore projects the United States is now projected to create 18.6 gigawatts (GW) of clean and cost-effective offshore wind power in seven Atlantic States within the next dec-

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[13] Council on Foreign Relations, *China's Repression of Uyghurs in Xinjiang,* 2021. Available online: *https://www.cfr.org/backgrounder/chinas-repression-uyghurs-xinjiang.*

[14] DOE Office of Energy and Renewable Energy, *Wind Manufacturing and Supply Chain,* 2021. Available online: *https://www.energy.gov/eere/wind/wind-manufacturing-and-supply-chain#:~:text=There%20are%20more%20than%20500,to%20multi%2Dmegawatt%20power%20ratings.*

[15] Lawrence Berkeley National Laboratory, *Wind Energy Technology Data Update: 2020 Edition,* 2020. Available online: *https://escholarship.org/uc/item/9r49w83n.*

[16] Lawrence Berkeley National Laboratory, *Wind Technologies Market Report,* 2020. Available online: *https://emp.lbl.gov/wind-technologies-market-report.*

[17] DOE Office of Energy and Renewable Energy, *Computing America's Offshore Wind Energy Potential,* 2016. Available online: *https://www.energy.gov/eere/articles/computing-america-s-offshore-wind-energy-potential.*

[18] Orsted, *Offshore Wind Projects in the U.S.,* 2020. Available online: *https://us.orsted.com/wind-projects.*

ade.[19] This has the potential of 133,000 and 212,000 jobs per year in seven Atlantic States.[20] The Atlantic coast States could create $200 billion in new economic opportunities, as well as over 43,000 high-paying, permanent jobs, simply by developing 54 GW of their 1,283 GW offshore wind energy potential.[21]

However, with very little domestic infrastructure to support offshore wind, the risk of components coming from overseas along with the installation vessels is high. For example, with the exception of the foundation, all of the major parts and components of the Block Island Wind Farm were manufactured outside of the United States. The nacelles for the project came from France, the towers from Spain, and the blades from Denmark.[22] As the industry grows, sourcing components domestically represents a significant opportunity to help revitalize American manufacturing. SIOW's recent white paper predicts an almost $70 billion buildout of U.S. offshore wind supply chain by calculating growth in a number of sectors, which include wind turbines and towers; turbine and substation foundations; upland, export, and array cables; onshore and offshore substations; and marine support, insurance, and project management. However, currently there is no domestic supply chain for these items, meaning that we risk significant portions of the investment to build offshore wind projects flowing out of the economy to purchase technology manufactured abroad, rather than supporting the growth of manufacturing and jobs domestically.

Strong, long-term policy that drives rapid and responsible deployment and provides investment certainty in offshore wind is necessary, coupled with policies to ensure utilization of domestically manufactured materials, invest directly in U.S. manufacturing facilities, and in related infrastructure like transmission.

Electric Vehicles

Happening alongside the Nation's transition to cleaner, cheaper forms of energy is an ongoing shift to cleaner vehicles, including EVs. The auto sector is at the heart of U.S. manufacturing, and ensuring the United States leads in EV deployment and manufacturing will be critical to sustaining good jobs in auto and auto components manufacturing. The global transition to EVs is already underway, with our competitors moving quickly to capture the manufacturing and jobs gains in this transition. Today China holds 70 percent share of global EV battery production capacity, with U.S. and Europe lagging with 16 percent and 10 percent respectively. Looking out 10 years, current business-as-usual market projection puts the U.S. even further behind—now lagging Europe with only 12 percent of global battery capacity. The security of American jobs in an EV-dominated automotive market depends on swift policy action to leverage our world class manufacturing base and enable it to move rapidly to build electric vehicles, cells, batteries, and electric drivetrain components, at scale, in the U.S. In short, the United States is at a crossroads with EV development. Either we enact policy that secures and potentially grows manufacturing jobs or we step away from technological leadership and cede the next generation of manufacturing jobs to our competitors.

As is true across the clean energy sector, the quality of EV jobs varies a great deal throughout the industry.[23] Looking across the supply chain, some manufacturers in the auto sector offer wages just over minimum wage with no benefits and hazardous working conditions. Others pay workers in the $20–$30 per hour range with full benefits and rigorous safety processes and oversight. Jobs in the automotive sector can either provide a ladder of training and rewarding career paths or they can be temporary and dead-end jobs.

As we make investments to grow deployment of energy efficiency and clean and renewable energy, we must ensure that those investments simultaneously spur growth of domestic supply chains and American manufacturing.

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[19] Oceana, *Offshore Wind Report,* 2010. Available online: *https://oceana.org/sites/default/files/reports/Offshore_Wind_Report_-_Final_1.pdf.*

[20] National Renewable Energy Laboratory, *Offshore Wind Power in the United States, 2010.* Available online: *https://www.nrel.gov/docs/fy10osti/49229.pdf.*

[21] National Renewable Energy Laboratory, *Offshore Wind Power in the United States, 2010.* Available online: *https://www.nrel.gov/docs/fy10osti/49229.pdf.*

[22] General Electric, *My Turbine Lies Over the Ocean: It Takes Herculean Labor to Build America's First Offshore Wind Farm.*

[23] BlueGreen Alliance, *Electric Vehicles at a Crossroads: Challenges and Opportunities for the Future of U.S. Manufacturing and Jobs.* Available online: *https://www.bluegreenalliance.org/wp-content/uploads/2018/09/Electric-Vehicles-At-a-Crossroads-Report-vFINAL.pdf.*

And we must also ensure that throughout the manufacturing sector steps are taken to require or incentivize high road labor standards and responsible labor practices, and to strengthen workers' rights by protecting the right of workers to unionize, fighting back against offshoring and outsourcing with strong domestic procurement and trade policies, and discouraging worker misclassification, which allows employers to deny benefits to workers by claiming they are temporary or part-time employees while they are working full time.

RECOMMENDATIONS

I believe we can update and improve our tax policy to reshape our clean energy economy and ensure that family sustaining jobs come with it. We can also enhance tax credits to strengthen American manufacturing and domestic supply chains.

In particular, I urge this committee to:

1. **Extend and Strengthen Clean Energy Tax Credits:** Key clean energy tax credits should be extended and strengthened, including those for onshore and offshore wind, solar, clean transportation, EV charging infrastructure, grid modernization, and energy efficiency. Congress should also make these tax credits temporarily refundable—many of the newer companies in this space don't have taxable income to fully take advantage of these credits and lower income consumers may be unable to gain the benefits of these credits if they aren't refundable. Congress should couple these tax credits with labor standards and procurement policies that ensure the use of domestic, clean, and safe materials made by law-abiding corporations throughout the supply chain and support employers that adopt high road labor practices, including organizing neutrality, prevailing wages, registered apprenticeship, protection against worker misclassification, excessive use of temporary labor, safety and health protections, project labor agreements, community benefit agreements, local hire, and other provisions and practices that prioritize improving training, working conditions, and project benefits. As I mentioned earlier, not only are these important worker protections, but they substantially lower costs to the Federal Government of enforcement actions as well as lessening the expenditures from low-income support programs, such as EITC, Medicaid, and SNAP.

   We are eager to engage with this committee and congressional offices around consideration of a technology-neutral approach to future energy tax credits, such as the approach outlined in Chairman Wyden's Clean Energy for America Act. We appreciate that this approach rewards carbon abatement, spurring deployment and innovation of low- and no-carbon technologies and rewarding existing zero-emission generation. Nuclear power is the single largest source of zero-emission electricity in the United States. A recent report by the Union of Concerned Scientists found that nearly 35 percent of the country's nuclear power plants, representing 22 percent of U.S. nuclear capacity, are at risk of early closure or slated to retire and that retiring plants early could result in a cumulative 4- to 6-percent increase in U.S. power sector carbon emissions by 2035. The study also found that to avoid the worst consequences of climate change we need carbon-reduction policies that better reflect the value of zero-emission electricity, coupled with policies to ensure safety and waste remediation.

   We are also encouraged to see inclusion in this bill of prevailing wage and registered apprenticeship language to better ensure that clean energy construction jobs are safe and family-sustaining and provide competitive benefits. We look forward to working with Chairman Wyden and this committee to expand on these provisions, including addressing domestic content.

2. **Support Manufacturing and Clean Energy Supply Chains:** Policies that increase the demand for clean technology must go hand in hand with incentives to support and grow American manufacturing and domestic supply chains. Already, as the Nation increases deployment of clean technology, our ability to manufacture those products and the parts and materials that go into them is falling further behind as demand increases.[24] That is why targeted investments and smart policies are needed to ensure that the Nation is able to capture the benefits of the clean energy economy.

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[24] E&E News, *Biden's "Buy America" plan may hit a solar wall,* 2021. Available online: *https://www.eenews.net/stories/1063726219*.

In 2020, the BlueGreen Alliance released a comprehensive manufacturing agenda[25] proposing a set of national actions to achieve global leadership across clean technology manufacturing; cut emissions from the production of essential materials; upgrade and modernize the entirety of the U.S. industrial base; and undertake a new generation of industrial development that rebuilds good American jobs and is clean, safe, and fair for workers and communities alike.

There are two key policies this committee should consider. First, it should **renew and robustly fund the Advanced Energy Projects Credit (48C):** The Advanced Energy Projects Credit is a 30-percent investment tax credit created to reequip, expand, or establish domestic clean energy, transportation, and grid technology manufacturing facilities. The program should be funded at at least $10 billion, or made permanent and, given the current economic climate, the program should be made refundable. The scope of the program should be expanded to capture the manufacture of key energy and carbon reducing technologies, such as battery cells. Furthermore, both the manufacture of and deployment of industrial emissions reduction technologies and processes should be eligible for support under this or other existing relevant tax credits.

We also recommend the committee improve the 48C tax credit along the lines of the American Jobs in Energy Manufacturing Act, sponsored by Senators Stabenow and Manchin, which would ensure projects pay prevailing wage and would be targeted in a way to support clean technology manufacturing in communities that have lost jobs in manufacturing, mining, or power generation and other disadvantaged and impacted communities and should prioritize those firms hiring displaced workers. Legislation like this can help jumpstart our economic recovery, ensure we are building America's energy future here at home, reduce industrial emissions, and deliver good union jobs for workers and the communities that need it the most, including those impacted by changes in our Nation's energy systems.

Second, it should **create an incentive, similar to the 45M technology production tax credit (PTC)** to create a durable incentive for domestic production of strategic clean energy and vehicle component technologies. In addition to the up-front investment incentive of 48C, this structure would give an incentive to expand operations to a globally competitive scale quickly and substantially. For example, to help fill gaps in the solar supply chain, such a manufacturing PTC could provide a per-unit or per-watt credit for domestically produced modules, photovoltaic cells, photovoltaic wafers, and solar grade polysilicon. Coupling a PTC with other manufacturing and deployment incentives could help reverse decades of disinvestment, offshoring, and inconsistent manufacturing policy that has weakened our once competitive edge. Importantly, such an incentive would reward large scale and efficiency, exactly what we need to compete in these rapidly expanding global industries and help ensure our manufacturing remains strong and resilient against future subsidies and potential dumping by our competitors. We need a coordinated approach, including measures such as an adapted 45M technology production tax credit as proposed here, to incentivize strategic technology manufacturing here, harness American ingenuity, and drive down deployment costs while adding family-sustaining jobs across the country.

3. **Support a job-sustaining transition to clean vehicles:** Consumer incentives stand to play a significant role in shaping the shift to electric vehicles and the manufacturing, jobs, and community impacts of that transition. The existing 30D consumer tax credit should be updated to support domestic assembly, domestic content, and high-road labor standards. The structure of the credit must help retain and grow the next generation of high-skill, high-wage, family-supporting jobs in the United States and support the growth of high-volume, high-quality domestic electric vehicle production and supply chains necessary to remain competitive in this space over the long term. To address equity issues with the existing credit, the credit should be converted to a refundable credit or ideally refunded at the point of sale, and the incentive should be targeted towards more moderate income and working-class

[25] BlueGreen Alliance, *Manufacturing Agenda: A National Blueprint for Clean Technology Manufacturing Leadership and Industrial Transformation,* 2020. Available online: *https://www.bluegreenalliance.org/resources/manufacturing-agenda-a-national-blueprint-for-clean-technology-manufacturing-leadership-and-industrial-transformation/*.

households. Additionally, we believe that Congress should establish a tax credit to incentivize the purchase of used EVs, which could improve access to EVs for low- and moderate-income consumers, and Congress should ensure that such a credit is similarly refundable and targeted. Additionally, similar criteria for domestic manufacturing, labor standards, and addressing equity should be applied to the 30B credit for other advanced technology vehicles.

We also support the ongoing work to expand the 30C tax credit for charging infrastructure, as the robust proliferation of easily accessible charging will be essential to the success of EV adoption. Incentives for charging infrastructure should ensure availability for all communities, with a priority on filling gaps in low-income, rural, and deindustrialized communities and communities of color, and availability for residents of multi-family housing, and be refundable. These incentives should also require certified training of electric vehicle supply equipment (such as the Electric Vehicle Infrastructure Training Program, or EVITP) and the domestic manufacture of charging stations.

POTENTIAL IMPACT OF GOOD JOBS AND DOMESTIC MANUFACTURING IN CLEAN ENERGY

This committee is gathered today to discuss the tax code's role in creating American jobs, achieving energy independence, and providing consumers with affordable, clean energy. I'm here to argue that we can achieve all of these policy goals while also ensuring that workers are paid fair wages, that we support and grow our domestic manufacturing supply chains, and that communities that have traditionally been left behind in our economy experience the gains in clean air, clean water, and middle-class-enabling jobs. This is a classic example of the BlueGreen Alliance's mission: we don't have to choose between achieving our climate goals by deploying clean, affordable energy and creating quality, family-sustaining jobs across our economy. We can have both at the same time.

Researchers from Princeton University[26] in a recent working paper found increasing wages for workers in the clean energy sector by 20 percent would only increase the capital costs of solar and wind projects by 2–4 percent and operations and maintenance costs by approximately 3–6 percent across technologies, assuming current domestic content shares. Those small technology cost increases may very well be offset by an increase in labor productivity—an increase, by the way, that often comes from better training and the stability that comes from higher wages. For example, a 20-percent labor cost premium can be offset by an increase in domestic labor productivity of 20 percent. The research also found the impact of increased domestic manufacturing for clean energy to be similarly minimal, with a 10-percent increase in domestic sourcing associated with only a 1-percent increase in project costs for solar PV projects.

When looking at the larger picture of the impact that increasing the wages of clean technology workers and domestic content utilization would have on the total cost of transitioning to a clean energy system, again, the Princeton researchers found that the impact was very minimal, determining that there is only a 3-percent difference in supply-side investment cost over the entire transition period from 2020 to 2050, and that these costs would have no recognizable impact on deployment of clean energy.

While increasing wages and the amount of domestic content in the solar and wind energy industries will have a very minimal impact on project costs, workers in those industries would see significant benefits, including billions in higher wages and hundreds of thousands of new jobs in the 2020s. The researchers found paying workers 20 percent more and increasing the use of domestic content would generate an additional $5 billion in annual wages in the 2020s, which equates to increasing each worker's average annual wages by over $12,000–$13,000. And by producing more of these components here in the United States, we can support an additional 45,000 jobs in the 2020s. Importantly, this committee has before it a set of policies that it can undertake to ensure that even these small potential increases are "lost in the noise" of robust incentives to re-shore and expand domestic deployment. The smart incentives we're talking about today can not only increase the standard of living of millions of Americans, but can increase their quality of life, all while continuing to drive down the costs of the clean energy technologies we need to deploy

[26] Princeton University, *Influence of high road labor policies and practices on renewable energy costs, decarbonization pathways and labor outcomes,* 2021. Available online: *https://www.dropbox.com/sh/ad9pzifo9w1a49u/AAC2milGD44MlwXo1Sk7EAgsa?dl=0.*

to secure our children's future—a win-win-win opportunity that is nearly unprecedented in our history.

CONCLUSION

As the United States ramps up efforts to grow the clean economy, we must invest in a range of clean energy sources, energy efficiency, and electric vehicles. At the same time, moving forward without putting the right policies in place to lift up the quality of the jobs created and ensure workers and communities see the benefits of these investments would put the burdens of economic transition on workers.

Through Federal tax policy, we can make strategic investments in clean energy projects in ways that ensure the jobs created are good jobs and that the investments deliver gains for American manufacturing, for workers, and for communities, particularly disadvantaged communities and workers. I urge this committee to advance policies to support clean energy development together with high-road labor standards and policies to reinvigorate our domestic supply chains and American manufacturing, and to prioritize these investments in places hit by energy transition and deindustrialization.

Thank you for the opportunity to speak in front of the committee.

QUESTIONS SUBMITTED FOR THE RECORD TO JASON WALSH

QUESTION SUBMITTED BY HON. CATHERINE CORTEZ MASTO

Question. In line with Chairman Wyden's tech-neutral legislation which outlined a stand-alone investment tax credit for transmission, and in order to direct public dollars to the appropriate projects, we must ensure that any project meets sufficient capacity. Do you think that the incentive needs to be focused on building large-scale, interregional, difficult-to-build transmission lines, not subsidize lines within already existing utility territories?

Answer. Thank you for the question. In my testimony, I spoke about how we should create policy that supports the deployment of clean energy and related infrastructure including expanding our transmission capacity and grid security.

To accommodate for the increased demand for renewable energy, we need to build out our transmission lines by two or three times our grid's current capacity. I believe we should incentivize new transmission capacity for where it is necessary, which will predominantly be new lines, connecting existing or future projects. The Federal Government should increase availability for Federal loan guarantees and grants for high-voltage transmission lines. DOE should develop a national transmission plan and address gaps in the grid to avoid shortages and ensure consistent supply. We should also increase funding for energy storage and grid resiliency RD&D. We can do this through revitalizing the Smart Grid Investment Grant Program, and increasing funding for the Energy Storage program. That said, ensuring existing lines within utility territories have the capacity to transport the energy necessary should also be a competitive factor when awarding Federal funds. Further, lines built with Federal dollars should also have high-road labor standards, such as prevailing wage and apprenticeship utilization. We were pleased to see these standards included in the chairman's Clean Energy for America Act, which has an investment tax credit for transmission. Additionally, high-voltage lines should utilize domestically sourced materials and supply chains when possible.

QUESTION SUBMITTED BY HON. TODD YOUNG

Question. Thank you for your comments during the hearing related to Federal investment in hydrogen. Beyond the promising energy uses, you had mentioned some other unique opportunities for hydrogen utilization.

Can you please expand further on the economic opportunities that hydrogen energy provides given its broad potential in the electricity sector—in addition to transportation, energy storage, and many other uses?

Answer. Thank you for this question. As I mentioned in the hearing, hydrogen has enormous potential as an energy carrier.

We are particularly interested in the role zero-carbon hydrogen can play in reducing emissions from hard-to-abate sectors, like heavy industry. Manufacturing is crit-

ical for the health of our economy, and the industrial sector is a key source of good jobs for American workers. At the same time, the sector represents a large and growing share of U.S. greenhouse gas emissions. To meet our climate goals, we need to reduce these emissions while ensuring we do not drive jobs and emissions overseas.

Using zero-carbon hydrogen as a fuel or feedstock for industrial processes is a promising pathway to reduce industrial emissions. As one example, primary steel can be produced through direct reduction of iron ore with renewables-based hydrogen as a fuel and feedstock instead of coal. These kinds of projects are already underway. In Hamburg, Germany, ArcelorMittal launched a project aimed at the first industrial scale production and use of Direct Reduced Iron (DRI) made with 100 percent hydrogen as the reductant. And in a trial at its Hofors mill, the Swedish steel maker Ovako found that using hydrogen instead of natural gas as a source of high-temperature heat is not only possible to power commercial steel production but also had no effect on the quality of steel.

Hydrogen is also showing promise as a fuel source for aviation, marine shipping, and long-haul trucking—sectors where electrification is more challenging.

What is more, hydrogen allows us to decarbonize sectors while using some of our existing infrastructure and workforce. And workers, especially those already trained in the utility sector and in pipefitting, already have many of the skills necessary to operate a hydrogen economy.

As I mentioned in the hearing as well, while hydrogen is promising, we need to work out concerns over safety and co-pollutants.

PREPARED STATEMENT OF HON. RON WYDEN,
A U.S. SENATOR FROM OREGON

The Finance Committee meets this morning for its first hearing on the climate crisis since 2009. It comes right on the heels of President Biden's announcement of an ambitious new climate goal: cutting emissions at least in half by the end of the decade compared to 2005 levels. That target comes with a lot of big challenges, starting with energy-related emissions, as well as transportation.

The reality is, a debate on energy and transportation is largely a debate on tax policy. That puts this committee in the driver's seat when it comes to job-creating legislation that addresses head-on the existential challenge of the climate crisis.

The energy tax code in America is a cluttered, old heap of more than 40 different tax breaks for a variety of energy sources and technologies, including clean energy and transportation. Most of those incentives are temporary. That keeps clean energy businesses and workers living in an uncertain state of limbo. On the other hand, at the base of this system are century-old, permanent tax breaks for oil and gas companies. There's no uncertainty for them; they get guaranteed benefits funded by American taxpayers every year.

At a time when people in Oregon and around the country are routinely clobbered by the disastrous effects of the climate emergency, it's important to be clear about what this broken, old energy tax system means in practice. Under the laws on the books, taxpayers are subsidizing the climate crisis. That's what it means when fossil fuel interests get special, permanent breaks above and beyond what's available to everybody else.

There's a taxpayer subsidy for megastorms and terrible floods along our coastlines and waterways. There's a taxpayer subsidy for massive wildfires bigger and hotter than any the west experienced decades ago. There's a taxpayer subsidy for wintertime bouts of extreme cold that send the privileged fleeing to tropical resorts while their neighbors freeze to death in their homes. What's worse, taxpayers are also on the hook for much of the cleanup when disasters strike.

Last week I introduced the Clean Energy for America Act that would throw the old set of more than 40 tax breaks in the dustbin. The bill, which has more than two dozen cosponsors, would replace that old hodgepodge with a new set of three incentives: one for clean energy, one for clean transportation, and one for energy efficiency.

Experts tell us that getting the policy right in those areas is the whole ballgame. This emissions-based approach also works hand in glove with the smart, fresh ideas that several other members will bring forward today.

In terms of tax certainty and predictability, it would level the playing field for everybody. It would be a job-creating, free market competition to get to net-zero carbon emissions. Clean energy producers and businesses that focus on cutting-edge transportation would no longer have to worry about their tax incentives disappearing because Congress is deadlocked yet again. The bill would help to supercharge innovation in clean transportation and energy storage.

That's a big reason why there's a new coalition lining up behind this proposal. The Environmental Defense Fund, the Sierra Club, the Natural Resources Defense Council, the building trades and the Edison Electric Institute, among others, have all announced support for this bill. It's a new coalition for a new day.

There's a big opportunity in the months ahead to pass this legislation along with investments in communities that powered the United States over the last century. It's essential to make sure that nobody is left behind in the process of tackling these challenges and moving to clean energy.

This is the right approach for high-wage, high-skill jobs. This is the right approach for addressing the existential threat of the climate emergency. This is the right approach for promoting innovation and competing with companies in China and around the world. If the Congress doesn't work hard to create these jobs in America, other countries are going to grow at our expense.

I'm looking forward to discussing the Clean Energy for America Act today. And I want to thank our excellent witness panel for joining the committee.

RHODIUM GROUP
5 Columbus Circle
New York, NY 10019
Tel: +1 212–532–1157
Fax: +1 212–532–1162
Web: *www.rhg.com*

U.S. Energy and Climate

April 20, 2021

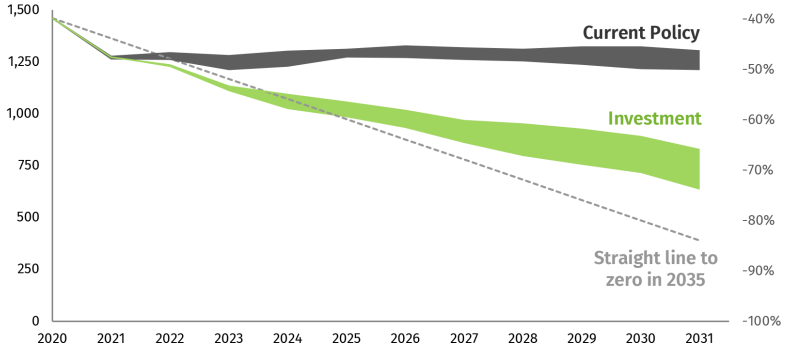
Pathways to Build Back Better: Jobs From Investing in Clean Electricity

One of the primary goals of President Biden's American Jobs Plan is to create millions of new jobs through new federal investments in clean infrastructure. This note focuses on the electric power sector and assesses job creation and retention potential associated with a substantial clean energy investment package. We find that investments in decarbonizing electricity on net can create more than 600,000 jobs a year on average over the timeframe of 2022–2031. We find that the jobs created or retained in clean generation far outweigh jobs lost at fossil fuel-fired power plants and upstream fuel supply.

Investing in a clean future

President Biden's American Jobs Plan (AJP) includes a series of new programs and extensions of tax credits to drive investment in new clean electricity infrastructure. The core of the plan is a Clean Electric Standard (CES) coupled with a long-term extension of renewable tax incentives and new tax credits for storage and transmission. Meanwhile, members of Congress are considering their options for clean electricity investment policies and procedural pathways for passing legislation. We previously assessed the impact of an investment package consisting solely of tax credits and incentives to expand new clean generation, retain existing clean capacity and accelerate coal retirements. That research found that the federal spending package on its own could get electric power sector emissions on a straight-line path to zero in 2035, at least through 2025. In 2031, the package drives emissions down to 66–74% below 2005 levels depending on the costs of clean energy technologies (Figure 1). EPA regulations on CO_2 and conventional pollutants deliver further gains.

FIGURE 1
US electric power sector CO_2 emissions under current policy and investment scenarios, 2020-2031
Million tons, % change from 2005



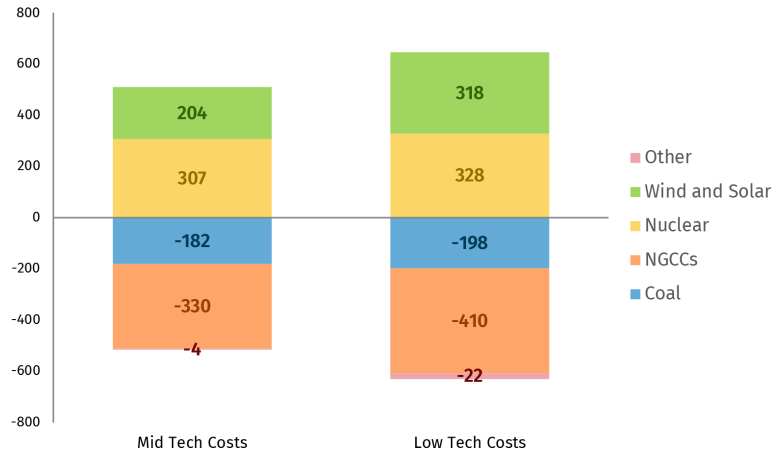
In this note, we take the next step and quantify the employment impact of our investment scenario. With 9 million Americans still out of work 14 months into the COVID–19 pandemic, understanding if and how new clean energy investments can get people back to work is critical. While our investment scenario is not identical to the clean electricity provisions in the AJP, it is directionally consistent. Our investment scenario also reflects recent legislative proposals, including the Clean Energy for America Act and the American Nuclear Infrastructure Act. While it's too early to know the contents of a congressional clean electricity infrastructure package, we think that the investment scenario is a decent proxy for what potentially is yet to come. It is also a good foundation for assessing the job impacts of clean electricity investment overall.

A clean infrastructure investment transition

As we discussed in our previous note, federal investment can drive new clean capacity additions onto the grid at an annual average rate up to twice as fast as last year's record. Investment also retains existing clean generators such as nuclear plants that would otherwise retire due to competition with cheap natural gas. The net impact is a surge of zero-emitting generation onto the grid over the next decade at the expense of coal and natural gas. In our analysis, on an annual average basis over the 2022–2031 budget window, every 3 megawatt-hours (MWh) of additional clean generation from investment displaces roughly 2 MWh of natural gas combined cycle (NGCC) generation and 1 MWh of coal. This leads to 307–328 MWh of additional nuclear generation and 204–318 MWH of wind and solar compared to current policy (Figure 2). The range reflects mid and low technology costs. Meanwhile, coal declines by 182–198 MWh, and NGCCs ramp down by 330–420 MWh on an annual average basis.

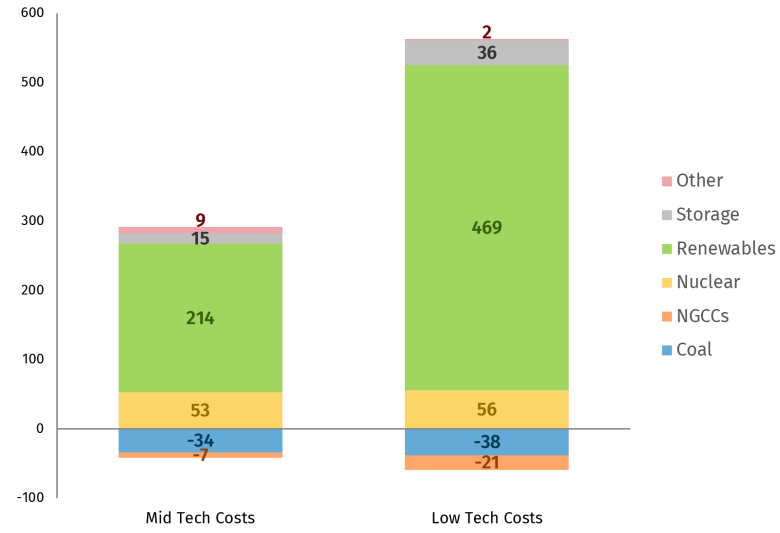
Reductions in fossil generation directly impact jobs both at the power plants generating electricity and at the coal mines and gas fields where the power plant fuel comes from, and in the transportation of those fuels to generation sites. The main driver of jobs associated with clean energy is the number of gigawatts (GW) of retained and new capacity built in response to federal investment. Think workers running nuclear plants and crews building record amounts of wind, solar, and storage over the next decade across the US. On a cumulative capacity basis, retained and new clean capacity dwarf the decline of fossil capacity (Figure 3). Under mid tech costs, clean capacity additions and retentions are 6.5X greater than fossil subtractions. This grows to nearly 9X when we consider low tech costs.

FIGURE 2
Investment scenario annual average generation change from current policy, 2022-2031
Megawatt-hours



Source: Rhodium Group analysis. Note: Other includes hydro, oil & gas steam units, geothermal, and combustion turbines.

FIGURE 3
Investment scenario cumulative capacity change from current policy, 2022-2031
Gigawatts

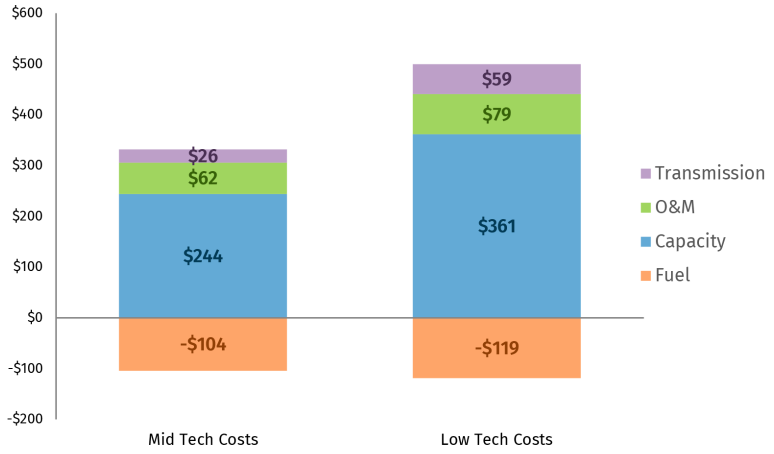


Source: Rhodium Group analysis. Note: Other includes hydro, oil & gas steam units, geothermal, and combustion turbines.

All of the new clean capacity additions and clean capacity retention reflect private investment into US clean energy infrastructure leveraged by federal spending. We estimate that federal spending catalyzes $332–$399 billion in net new investment in the bulk power system from 2022 through 2031. The investments consist of $244–$361 billion for new and retained capacity, plus another $26–$59 billion in transmission and $62–$79 in net new spending on operation and maintenance of genera-

tors (Figure 4). Meanwhile, switching the grid from fossil to clean results in $104–$119 billion in savings from avoided fuel costs. While this represents savings for consumers, it also reflects fewer work opportunities for coal miners, gas drillers, and fossil power plant operators.

FIGURE 4
Cumulative net bulk power system spending, 2022-2031
$ Billions



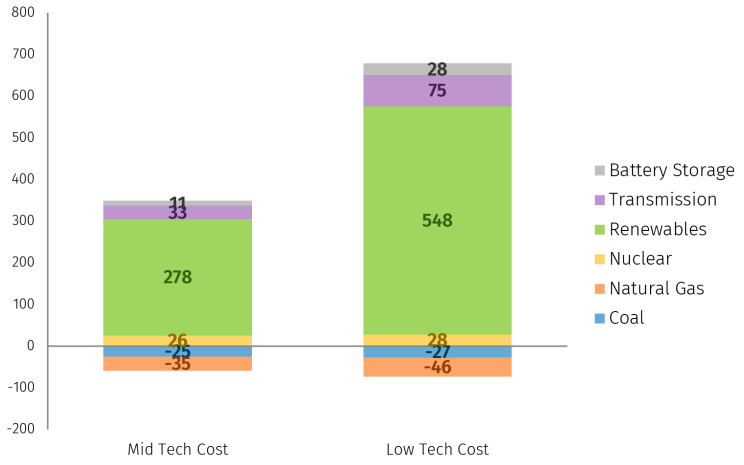
Source: Rhodium Group analysis. Note: Figure does not include $0.5-$1 billion in avoided international imports of electricity.

The employment implications of federal electricity investment

To assess what new federally driven spending on electricity infrastructure and clean energy deployment means for jobs, we developed an employment projection model calibrated to the Energy Futures Initiative and NASEO's annual US Energy and Employment Report. This survey identifies total annual employment in both electricity generation and fuel supply, broken down by technology and sector. We identify employment intensity trends in all generation technologies over the past five years (including solar, wind, geothermal, nuclear, coal, natural gas, oil, geothermal, hydro, and biomass), as well as all fuel supply and transportation categories and transmission investment by comparing historical employment survey data from the US Energy and Employment Report with historical energy data from the Energy Information Administration (EIA). We then apply these historical relationships to projected changes in electricity capacity additions, retirements, transmission buildout, and fuel supply from RHG-NEMS, a detailed energy system model used to produce the generation, capacity, and investment results described above.

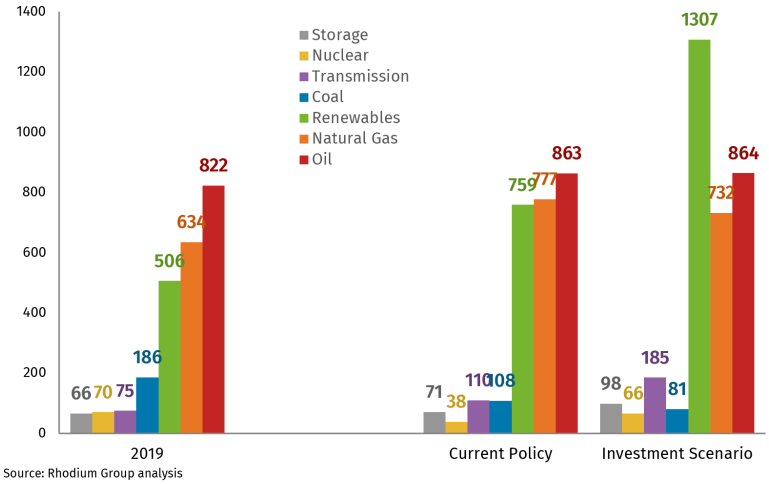
We find that in our investment scenario, net national employment in power generation, upstream fuel supply, and downstream transmission is 290,000 jobs higher on average between 2022–2031 in our mid technology cost case and 606,000 jobs higher in our low technology cost case than under current policy over the same period (Figure 5). That's 2.9 and 6.1 million job-years respectively. In our mid technology cost case, coal mining and transportation jobs are 14,000 and coal generation jobs are 11,000 lower in the investment scenario than in the current policy counterfactual. Natural gas production and transportation jobs are 31,000 lower and generation jobs are 3,600 lower (oil-related jobs are relatively unchanged due to the small amount of oil used for power generation in the U.S.) These losses in fossil fuel employment are dwarfed by gains in nuclear and renewable generation, battery storage and transmission. 26,000 jobs are saved at currently operating nuclear plants and 278,000 jobs are gained through the manufacture, installation and operation of new wind, solar, geothermal and other renewable energy sources. Jobs associated with building and operating transmission lines and battery storage are 33,000 and 11,000 higher respectively on average between 2022 and 2031 in our investment scenario than under current policy.

FIGURE 5
Change in average annual jobs from federal clean electricity investment relative to current policy, 2022-2031
Thousand full-time jobs



Source: Rhodium Group analysis

FIGURE 6
Total employment by energy type, 2019 vs 2022-2031 average, low technology cost case
Thousand full-time jobs



Source: Rhodium Group analysis

In our low technology cost case, coal employment (mining, transportation and power generation) is 27,000 jobs lower and natural gas employment (production, transportation and power generation) is 46,000 jobs lower on average between 2022 and 2031 as a result of federal clean electricity investment than under current policy. But the job gains in clean generation, storage and transmission are more than 8x larger than those lost in fossil generation and upstream fuel supply. Renewable electricity-related jobs are 548,000 higher on average between 2022 and 2031. Transmission jobs are 75,000 higher and battery storage jobs are 28,000 higher. All told, we project 1.7 million Americans on average would be working in the manufacture,

installation and production of clean electricity between 2022 and 2031 (Figure 6). That's nearly 1 million more than work in these fields today, and 679,0000 more than would be employed under current policy over that same time period. In our investment scenario, clean electricity would employs as many people between 2022 and 2031 in the US as all fossil fuel production, transportation, distribution and generation combined.

A core promise of the AJP is not just creating jobs but creating "good-paying union jobs." How do the clean electricity jobs a federal investment package would create fare on this metric? A new US Energy and Employment Report provides national survey data on current average wages across all occupations associated with different energy sources (Table 1). Unfortunately, there is not the same kind of comprehensive survey data on unionization rates. The US Energy and Employment Report recommends the federal government start collecting and publishing these data going forward.

Across all energy types, median hourly wages are considerably higher than the national median wage. Workers in nuclear power and electricity transmission and distribution earn the most—105% and 66% more than the national median, respectively. In our investment scenario there are 49,000 more jobs on average in these areas combined between 2022 and 2031 in our mid technology cost case, and 103,000 more in our low technology cost case. Coal and natural gas jobs, both of which decline in our investment scenario relative to a current policy counterfactual pay 50% and 59% more than the national median respectively. Median wages for wind, solar and storage jobs, all of which grow considerably in our analysis, are 36%, 28%, and 27% higher than the national median.

Table 1. Average Wages by Energy Type Across Occupations

Thousand full-time jobs

Industry Crosscut	Median Hourly Wage	Premium Compared to National Median
Coal	$28.69	49.9%
Natural Gas	$30.33	58.5%
Oil	$26.59	38.9%
Nuclear	$39.19	104.8%
Wind	$25.95	35.6%
Solar	$24.48	27.9%
Electricity Transmission and Distribution	$31.80	66.1%
Electicity Storage	$24.36	27.3%

Source: U.S. Energy Employment Report.

It's worth noting that while the majority of current solar jobs are associated with rooftop solar and other distributed applications, the majority of additional solar capacity built in our investment scenario is utility-scale solar serving the bulk power system. Utility-scale solar is less labor intensive than distributed solar, so this feature of our modeling significantly reduces projected job gains compared to a future where the current split between utility-scale and distributed solar remained constant. But utility-scale solar-related jobs also tend to pay more and are more likely to be unionized, so we would expect the median wage associated with the renewable energy jobs created as a result of the plan to be higher than Table 1 suggests. The inclusion of prevailing wage, project labor agreement (PLA) or other job quality requirements in a federal infrastructure package, as some in Congress are considering, would further increase future wages in renewable energy-related professions.

While the increase in clean generation jobs we project in our analysis far outweighs declines in fossil generation jobs and associated fuel supply, Congress can take additional steps to mitigate the impact of those job declines—particularly for coal communities. In our investment scenario, total natural gas-related employment still grows relative to 2019 levels, just less than it would under current policy. Oil-related employment stays relatively flat. Coal-related employment, which has been declining for decades, continues to fall sharply under current policy due to already announced and projected coal power plant retirements. Average annual employment between 2022 and 2031 is 42% lower than 2019 levels in our low technology cost

case. In our investment scenario this grows to 56%. There will be some opportunities for coal mine, transport and power plant workers to find employment in renewable energy, nuclear, transmission, storage, or in carbon capture and sequestration (which is not the focus of this analysis but a likely additional area of infrastructure investment with substantial economic and employment benefits). But investments as part of a federal infrastructure package can also help diversify the economic and employment base of coal communities beyond energy and create new pathways to economic growth and prosperity.

Conclusion

It's still unclear whether a clean energy infrastructure investment package will make it through Congress, and if it does, what it will include. What is clear from our analysis is that an ambitious effort to invest in decarbonizing the electric system will, on net, create and retain far more jobs in clean generation than will be lost in fossil fuel generation and associated fuel supply. These can be well-paid, high-quality jobs, particularly if an infrastructure investment package includes labor standards and support for coal communities. If one of the goals of an infrastructure package is to get Americans back to work after a pandemic-induced recession, robust investment in the electric power sector is a solid place to start.

Disclosure Appendix

This nonpartisan, independent research was conducted with support from Bloomberg Philanthropies, ClimateWorks Foundation, the Heising-Simons Foundation, and the William and Flora Hewlett Foundation. The results presented in this report reflect the views of the authors and not necessarily those of supporting organizations.

COMMUNICATIONS

AMERICAN CHEMISTRY COUNCIL
700 Second Street, NE
Washington DC 20002

May 10, 2021

The Honorable Chairman Wyden
The Honorable Ranking Member Crapo
U.S. Senate
Committee on Finance
Dirksen Senate Office Bldg.
Washington, DC 20510–6200

Re: Senate Committee on Finance Hearing on "Climate Challenges: The Tax Code's Role in Creating American Jobs, Achieving Energy Independence, and Providing Consumers with Affordable, Clean Energy" Hearing April 27, 2021—10 a.m.

Dear Chairman Wyden and Ranking Member Crapo:

The American Chemistry Council (ACC) represents the leading companies engaged in the business of chemistry. ACC member companies apply the science of chemistry to create and manufacture innovative products that make people's lives better, healthier, and safer. The business of chemistry is a $565 billion enterprise and a key element of the nation's economy. Over 25% of U.S. GDP is generated from industries that rely on chemistry, ranging from agriculture and automotive to semiconductors and electronics, textiles, pharmaceuticals, and building and construction. Materials and technologies from our industry are used to create solutions that enhance sustainability, including electric and fuel-efficient vehicles, wind turbines, solar panels, advanced batteries, and energy-efficient building materials.

To fight climate change, we call upon Congress to enact legislation that will:

- Increase government investment and scientific resources to develop and deploy low emissions technologies in the manufacturing sector;
- Adopt transparent, predictable, technology- and revenue-neutral, market-based, economy-wide carbon price signals; and
- Encourage adoption of emissions-avoiding solutions and technologies throughout the economy to achieve significant emissions savings.

More specifically, ACC appreciates the opportunity to submit comments in response to the Committee's hearing in late April concerning use of the tax code to combat climate change. We approve of all approaches that support U.S. competitiveness and recognize contributions from the products of chemistry to avoid greenhouse gas emissions—including use of the tax code.

To that end, ACC has several suggested proposed changes to the tax code. These include:

- Temporarily extend and expand the Section 48C clean energy manufacturing tax credit and ensure it includes a broad range of technologies, including those that are nascent.
- Increase the value of the Section 45Q tax credit for Carbon Capture Utilization and Storage, extend the start of construction date to 2031, and lower the volume threshold.
- Establish a technology-neutral incentive for production of low-carbon hydrogen.

- Temporarily extend and expand the Section 25C and Section 45L tax credits to promote energy efficient construction and home energy efficiency retrofits in a technology-neutral manner.
- Simplify the cost recovery for energy-efficient building improvements, for example, by enacting the E-QUIP Act and/or enhancing the Section 179D tax deduction.

We are encouraged that many of our suggestions were the topic of the hearing in late April. We look forward to continuing our engagement regarding such changes.

Sincerely,

Robert B. Flagg
Senior Director, Federal Affairs

AMERICAN PETROLEUM INSTITUTE ET AL.
200 Massachusetts Avenue, NW, Suite 1100
Washington, DC 20001–5571

Our organizations represent all the diverse segments of the natural gas, oil, and fuels industry—ranging from fully integrated oil and natural gas companies to independent companies. Together, our industry employs almost 11 million people. Our members are producers, refiners, suppliers, retailers, pipeline operators and marine transporters, as well as service and supply companies providing much of our nation's energy.

As the Senate Finance Committee considers changes to the domestic and international components of the United States' Internal Revenue Code, our organizations wish to submit this statement for the record to ensure all due consideration is given to 1) the contributions made by the oil and natural gas industry in combating global climate change; 2) the unique aspects of the industry necessitating specific taxation rules; and 3) the impact our industry has on the many communities across the country.

The oil and natural gas industry will also continue to play an essential role in the ongoing economic recovery and expansion related to the global COVID–19 pandemic. Our organizations support policies that will continue to facilitate the development of affordable, reliable, and sustainable energy and look forward to working with the Senate Finance Committee to achieve these objectives.

Achieving and Maintaining American Energy Independence and Emissions Reduction

The last decade of American energy production has moved the U.S. into the enviable position of being the world's energy leader. The days of the U.S. being dependent on energy sources from our global competitors and unfriendly regimes is no longer a reality thanks to the American energy renaissance. Prior to the COVID–19 pandemic, the U.S. was a net exporter of energy in 2020.[1] This occurred simultaneously[2] with the U.S. becoming the leader in global carbon dioxide reductions since 2000.[3] A vast majority of these reductions were due to innovations implemented by the oil and natural gas industry. Ensuring the U.S. tax code adequately recognizes the unique aspects of the industry-which has made the American energy renaissance and carbon emissions reductions possible-is essential if further emissions reductions are to be achieved.

It is of critical importance these innovations be paired with a tax code that recognizes the differences between oil and natural gas production and other industries. Preserving intangible drilling costs (IDCs) achieves this goal and puts the oil and natural gas sector on a level playing field with other industries who get to immediately expense their expenditures. IDCs also take into account the unique aspects of the industry that distinguish it from others. By definition, the oil and natural gas reserve is a depleting resource. When a productive well is found, it immediately contains less resources. To continue providing domestically sourced and cost-efficient

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[1] EIA, "U.S. total energy exports exceed imports in 2019 for the first time in 67 years," *https://www.eia.gov/todayinenergy/detail.php?id=43395.*

[2] U.S. Energy Information Administration, "U.S. Energy Facts Explained," *https://www.eia.gov/energyexplained/us-energy-facts/.*

[3] UN Climate Change "GHG data from UNFCC" (CO_2 Total w/o LULUCF 2000–2018), *https://unfccc.int/process-and-meetings/transparency-and-reporting/greenhouse-gas-data/ghg-data-unfccc/ghg-data-from-unfccc.*

energy, new wells must be continually drilled. By comparison, other industries can use the same robot, structure, or piece of equipment for many years before having to replace it.

Drilling is also still an inexact science. Although the odds of drilling a "dry hole" are far lower than in the past, nonproductive, or dry, holes still occur. When constructing a piece of tangible equipment, provided that the plans are followed, a usable piece of equipment will be placed in service. There is no such guarantee with oil and natural gas production. Allowing the oil and natural gas sector to recover its costs in the year of spend is crucial to ensuring that enough capital is available to drill the next well and produce the oil and natural gas that has been crucial to the U.S. becoming a leader energy production. Industry-specific provisions exist in the Internal Revenue Code not because they are tax giveaways, but because they are provisions that recognize the unique aspects of the industry.

The same characteristics apply to percentage depletion, a tax provision that is almost 100 years old and is used by only to the smallest producers-often family-owned businesses. Percentage depletion was created by Congress to compensate extractive industries, like oil and natural gas, for the declining value of extractive resources. In the intervening years, Congress has restricted the provision to only the smallest oil and gas producers. It is currently limited to the first 1,000 barrels of oil (or equivalent) per day and is limited to 60% of the taxpayer's net income. Percentage depletion primarily helps these small businesses operate, retire, and reclaim end of life wells. The elimination of percentage depletion would likely force many of these small businesses to lay-off employees or shutter their businesses altogether. It may also increase the number of orphan wells by significantly reducing the capital needed to cap and reclaim unprofitable wells.

The oil and natural gas industry has also become a leader in finding synergies between the extraction of natural resources and the sequestration of emissions related to global warming. In particular, the deployment of carbon capture, utilization and storage (CCUS), hydrogen and other low and zero-emission technologies hold great promise for reducing emissions while meeting the world's growing energy demand.

The U.S. is the world leader in the deployment of CCUS technology. The U.S. has 12 commercial-scale carbon capture facilities in operation, with the capacity to capture on the order of 25 million metric tons (MMT) of CO_2 annually.[4] An additional 22 carbon capture facilities are in various stages of development in the U.S., including those already under construction.[5] CCUS may not be an oil and gas specific technology, but it offers a way of meeting energy demand while also offering the potential to lower the carbon profile of oil and natural gas production through CO_2-enhanced oil recovery (EOR) with permanent geologic storage. Finding ways to encourage both CCUS, and related EOR projects, will be essential in combating carbon dioxide emissions.

According to the IEA Sustainable Development Scenario for the World Energy Outlook 2020, CCUS accounts for nearly 15% of the cumulative reduction in emissions compared with the Stated Policies Scenario.[6] Similarly, according to the United Nations Intergovernmental Panel on Climate Change (IPCC), the costs of achieving atmospheric CO_2 levels consistent with the Paris Agreement would be more than double without CCUS.[7] The oil and natural gas sector is an essential partner in the global fight against climate change. Having a tax code which reflects this reality will better position the U.S. to lead in both energy production and global emission reductions.

Jobs, Lower Energy Costs, and Other Economic Impacts of the Oil and Gas Industry

The oil and natural gas sector operates worldwide and provides jobs that pay well above the U.S. average. Our organizations urge the Senate Finance Committee to consider the impact of proposals relating to the oil and natural gas sector from the standpoint of economic impact to the American worker. For example, proposals exist to increase the rate of taxation on income earned abroad even if it is in the form

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[4] Global CCS Institute. "Facilities Database" 2020.

[5] *Id.*

[6] International Energy Administration, "Energy Technology Perspectives 2020," *https://www.iea.org/reports/energy-technology-perspectives-2020.* September 2020.

[7] Intergovernmental Panel on Climate Change, Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and Ill to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp. 2014.

of extractive income for which there is zero risk of profit shifting given that oil and gas reserves cannot be physically moved to low or no tax jurisdictions. However, some wish to increase the rate of taxation of this type of income, with some even seeking to end the practice of foreign extraction. Policymakers should recall that a 10% reduction in foreign investment could reduce our ability to invest domestically by 2.6%, and that for every 100 jobs lost abroad, an additional 127 jobs are lost domestically.[8] Although the physical extraction of resources may occur overseas, the support necessary for these operations comes from domestic workers in the form of geologists, planners, accountants, attorneys, and so on.

It is also important to note that many foreign countries impose separate taxes on oil and gas operations since they are immobile and cannot move to a country with lower taxes. For example, on top of a corporate income tax, Norway imposes an additional tax on oil and gas extractive income. Recognizing this, the U.S. tax code provides foreign tax credits (FTCs) to U.S. companies to prevent the double taxation of that income earned abroad. For countries with separate income taxes on extractive income, dual capacity taxpayer rules and a decades long history of legal precedent have created a process for U.S. corporations to demonstrate that those separate taxes on oil and gas operations are in facts and circumstances income taxes. If they are determined to be income taxes, they qualify for FTCs, which ensure that these U.S. corporations are not double taxed.

Any proposal to eliminate this process and these dual capacity rules will subject U.S. companies to double taxation. It will make U.S. corporations less competitive and cede U.S. jobs to foreign competitors, which will result in less investment and fewer jobs here in the U.S.

The oil and natural gas industry is also a major contributor to job creation and investment in our communities. More than ten million jobs in the U.S. are associated with the sector, with direct industry jobs paying nearly double the national private sector average. Furthermore, for every oil and natural gas industry job, an additional 2.7 jobs are also supported.[9] These jobs are found in the restaurant, hotel and hospitality, and transportation sectors. All of these economic sectors have been severely impacted by the ongoing COVID–19 pandemic. Legislation intended to punish the oil and natural gas sector will also inevitably punish these workers, none of whom ought to be unnecessarily subjected to additional pain during this ongoing crisis.

Moreover, the oil and natural gas industry generates billions in revenue for the federal and state governments in rent, royalties, and corporate and income tax payments. In 2019 alone, the industry generated over $14 billion for state treasuries through severance taxes. Now more than ever, our communities rely on those payments to fund schools, infrastructure, and other critical social services.

The natural gas, oil, and fuels industries' investment in this country have also led to a 15% decrease in household energy costs over the last decade-while the costs for food, education, and healthcare have skyrocketed. Those cheaper energy costs are crucial to working families in every single community across the country.

Additionally, there are an estimated 12.5 million private owners of oil and natural gas mineral rights. These royalty owners receive regular payments from companies which develop these mineral resources. Many are retirees who rely on a predictable stream of payments and the associated depletion allowance for retirement security. These royalty owners, residing in all fifty states, also benefit from the percentage depletion allowance. These royalty owners are not producers or operators, rather they are private landowners from all walks of life who operate in partnership with oil and natural gas producers to ensure fair access and fair return for the minerals produced on their land.

No Discrimination Against Economic Sectors

The Internal Revenue Code is most effective when general provisions, rather than industry-specific, are made available to all economic sectors. This creates a level playing field on which all sectors can compete equally. The application of this philosophy can be found in several proposals currently sitting with the Senate Finance Committee. Our organizations are resolutely opposed to the elimination of generally available business provisions, solely applicable to the oil and natural gas sector, such as the availability of emergency economic relief under the CARES Act. These

[8] PwC, "Impacts of the Natural Gas, Oil and Petrochemical Industry on the U.S. Economy in 2018," May 2020.
[9] *Id.*

discriminatory proposals to limit generally available business provisions are based on animus towards individual companies and not accounting, taxation, financial, or prudent energy policy. This lack of consideration for effective energy policy is further demonstrated by proposals to terminate the CCUS credit, which has and can further support substantial amounts of sequestered carbon emissions. Our organizations believe that generally available business provisions should be made available for all.

Thank you for the opportunity to provide feedback on the ongoing efforts of the Senate Finance Committee to address changes to the United States tax code.

Sincerely,

American Exploration and Production Council
American Fuel and Petrochemical Manufacturers
American Petroleum Institute
Energy Workforce and Technology Council
Independent Petroleum Association of America
U.S. Oil and Gas Association

AMERICAN PUBLIC GAS ASSOCIATION
201 Massachusetts Avenue, NE, Suite C–4
Washington, DC 20002

May 10, 2021

The Honorable Ron Wyden
Chairman
U.S. Senate
Committee on Finance
219 Dirksen Senate Office Building
Washington, DC 20510

The Honorable Mike Crapo
Ranking Member
U.S. Senate
Committee on Finance
219 Dirksen Senate Office Building
Washington, DC 20510

Re: April 27, 2021 Hearing on "Climate Challenges: The Tax Code's Role in Creating American Jobs, Achieving Energy Independence, and Providing Consumers with Affordable, Clean Energy"

Dear Chairman Wyden and Ranking Member Crapo,

APGA is the trade association for approximately 1,000 communities across the U.S. that own and operate their retail natural gas distribution entities. They include municipal gas distribution systems, public utility districts, county districts, and other public agencies, all locally accountable to the citizens they serve. Public gas systems focus on providing safe, reliable, and affordable energy to their customers and support their communities by delivering fuel to be used for cooking, clothes drying, and space and water heating, as well as for various commercial and industrial applications. In addition to the residential and industrial uses most are familiar with, natural gas is also used for transportation. Our members supply gas to natural gas vehicle (NGV) fueling stations, and many also maintain and manage fueling stations or operations of their own.

APGA appreciates the opportunity to contribute to the Committee's discussion regarding how to ensure the tax code incentivizes investment in and development of the technology needed for a clean energy future. Public natural gas utilities continue to play a role in reducing greenhouse gas (GHG) emissions in all sectors. Our members are good stewards of the environment and take seriously their role in providing clean, affordable, and reliable energy. Tax code changes that allow for effective and efficient use of all energy, including natural gas, should be a part of the conversation as the Committee develops legislation.

APGA would like to use this opportunity to highlight the importance of tax code provisions that support the NGV industry. APGA has been a strong supporter of the growth and development of NGVs. This important engine technology already provides some of the cleanest vehicles on the road with significantly lower GHG emissions than those using gasoline or diesel. Despite this, the ongoing conversation re-

garding transportation and climate change centers on electrification. We appreciate the opportunity to share more information with the Committee about how natural gas and NGVs can play a part in meeting the Administration's climate goals.

Many APGA members are heavily invested in natural gas transportation fuels, primarily in the form of compressed natural gas (CNG). This fuel has proven to be safe, clean, abundant, and affordable, and our members are proud to distribute it. As a fuel source, CNG provides unmatched reliability. Its delivery is only dependent on the availability of natural gas via underground pipelines. Natural gas supply is far less likely to be disrupted by severe weather events than gasoline and electricity. During the 2017 hurricane season, for example, natural gas remained fully functional even while there were widespread power outages and major gasoline shortages. Natural gas and the NGVs that run on it proved resilient for two reasons. First, the fuel supply could be delivered without interruption because natural gas pipelines are mostly underground and were protected from debris, wind, and storm surges. Further, CNG can be pumped without the use of electricity because NGV fueling stations are run on generators that are powered by natural gas.

Natural gas is not only a reliable energy source; it is also environmentally friendly. The Committee is right to focus on promoting investment in low and no-emission vehicles in America's pursuit of a clean energy future. Electric vehicles, however, are not the only available technology. The Department of Energy estimates that natural gas engines can lower emission levels of GHGs as much as 11 percent when compared to traditional gasoline combustion engines.[1] While NGVs are already cleaner and achieve lower GHG emission levels than traditional vehicles, they also have the immediate potential to become even more environmentally friendly with additional support for the development of renewable natural gas (RNG).

RNG, which is produced by capturing gas created by various waste sources, is chemically identical to fossil natural gas and can be blended with fossil natural gas or, in some cases, used exclusively in a system.[2] Blending even small amounts of RNG with fossil natural gas can produce significant emissions reductions,[3] and RNG currently accounts for more than 53 percent of all natural gas motor fuel.[4] Because RNG is created by recycling biomethane collected from agricultural waste, landfills, and wastewater treatment plants into a usable product, it has the potential to yield a carbon-negative lifecycle emissions result.[5] Using the tax code to promote the development and use of this fuel will only further advance the already existing environmental benefits of NGVs.

The environmental benefits of RNG have led to growing interest from the transportation sector in increasing its use to lower GHG emissions. The United Parcel Service (UPS), for example, is making significant investments in RNG and compressed natural gas (CNG) transportation initiatives. They recently announced plans to purchase more than 6,000 natural gas-powered trucks between 2020 and 2022, a commitment representing a $450 million investment in the company's alternative fuel program to reduce emissions.[6] Amazon, as part of its commitment to become carbon neutral by 2040, also recently signed a five-year contract to purchase RNG for its fleet.[7] The Committee should ensure that any changes to the energy tax code continue to encourage such investments.

It is especially noteworthy that, when fueled by RNG, the newest NGVs are the only fully commercially available option to achieve ultra-low or near-zero emission levels of nitrogen oxides (NO_x).[8] They also produce a much lower amount of particulate matter than other engines, supporting the Administration's goals of decreasing emissions in areas disproportionately impacted by urban air pollution. Cummins Westport, for example, already produces natural gas engines that are 90% cleaner

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[1] "Natural Gas Vehicle Emissions," Alternative Fuel Data Center, U.S. Department of Energy, *https://afdc.energy.gov/vehicles/natural_gas_emissions.html,* accessed May 4, 2021.

[2] *Id.*

[3] *Id.*

[4] "Decarbonize Transportation with Renewable Natural Gas," NGVAmerica, *https://static1.squarespace.com/static/53a09c47e4b050b5ad5bf4f5/t/6079e813a7999069b32ece17/1618602009958/NGV+RNG+Decarbonize+2020+final.pdf,* accessed May 4, 2021.

[5] *Id.*

[6] "UPS adding 6,000 NGVs," Shale Directories, *https://www.shaledirectories.com/blog/ups-adding-6000-ngvs/ accessed* May 4, 2021.

[7] "Amazon Inks RNG Agreement, Considers Possible Stake in Clean Energy Fuels," Natural Gas Intel, *https://www.naturalgasintel.com/amazon-inks-rng-agreement-considers-possible-stake-in-clean-energy-fuels/,* accessed May 4, 2021.

[8] NGVAmerica, *supra* note 4.

than what the current EPA standard requires.[9] The company's 8.9-liter ISL G NZ engine is certified to meet the California Air Resource Board (CARB) standard—the most rigorous emission standard for NO_x.

This already-existing natural gas engine technology can fill an important gap by providing an opportunity to reduce emissions in difficult to electrify applications like long-haul and regional trucking, transit buses, refuse trucks, and high horsepower off-road equipment. Heavy-duty vehicles and equipment are major sources of emissions, and while reliable electric alternatives are not yet available, natural gas options are. Replacing one diesel-burning, heavy-duty truck with a new ultra low-NO_x, natural gas heavy-duty truck has the same emissions reduction impact as removing 119 traditional combustion engine passenger vehicles from the road.[10] If policymakers are serious about achieving the ambitious emissions reduction goals laid out by the Administration, it would be foolish to ignore the opportunity to capitalize on existing natural gas technology to reduce emissions in these areas, simply because it does not fit with the current narrative of electrification as the "end all be all" climate solution.

Finally, APGA would like to urge the Committee to consider the full lifecycle of vehicles and their energy source when choosing the path forward. While we acknowledge that battery powered electric vehicles (BEVs) have the advantage of zero tailpipe emissions, producing lithium-ion batteries is an energy intensive process. In fact, manufacturing an electric vehicle can produce anywhere from 15 to 68 percent more GHG emissions than a conventional vehicle, depending on the size and range.[11] This should be accounted for when evaluating the environmental benefits of BEVs versus other alternatives, like NGVs. It is also important to note that battery disposal is another looming environmental issue associated with BEVs. The current lack of available recycling methods when electric vehicle batteries reach the end of their useful life is an additional environmental cost that should be factored into the Committee's consideration of how to move towards a cleaner transportation future.

APGA supports the Committee's work to reduce emissions and move towards a cleaner energy future, and we are grateful for the opportunity to contribute to the conversation on this important topic. However, the Committee should use the tax code to promote a level playing field for all energy sources in the pursuit of lower GHG emissions. The pursuit of electrification as the sole solution ignores the contributions natural gas has already made to lowering emissions and abandons its potential in achieving environmental goals. When it comes to clean vehicle fuels, if policymakers provide support for the adoption of NGV technology and the increased use of RNG, public natural gas utilities will continue to deliver emissions reductions and environmental benefits well into the future. For these reasons, APGA hopes the Committee will pursue tax incentives that encourage an "all of the above" approach to reducing emissions. Thank you again for the opportunity to submit this input. APGA stands ready to work together in this effort.

Dave Schryver
President and CEO
dschryver@apga.org

ASSOCIATED BUILDERS AND CONTRACTORS
440 First Street, NW, Suite 200
Washington, DC 20001
202–595–1505
www.abc.org

May 4, 2021

The Honorable Ron Wyden
U.S. Senate
Committee on Finance
219 Dirksen Senate Office Building

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[9] "Next Generation Heavy-Duty Natural Gas Engines Fueled by Renewable Natural Gas," NGV America, *https://cdn.ngvgamechanger.com/pdfs/game-changer-graphic-onesheet.pdf,* accessed May 4, 2021.

[10] "Which Road to Take," NGV America, *https://ngvamerica.org/wp-content/uploads/2020/10/NGVAmerica-Which-Road-TX-vs-CA-Investments.pdf,* accessed May 4, 2021.

[11] Cleaner Cars from Cradle to Grave, Union of Concerned Scientists, *https://www.ucsusa.org/resources/cleaner-cars-cradle-grave,* accessed May 4, 2021.

Washington, DC 20510

Dear Chairman Wyden:

On behalf of Associated Builders and Contractors, a national trade association with 69 chapters representing more than 21,000 member companies in the construction industry, I submit the following letter expressing concerns with changes proposed to a number of clean energy program tax credits in the Clean Energy for America Act as a statement for the record for the April 27, 2021, full Senate Finance Committee hearing titled, "Climate Challenges: The Tax Code's Role in Creating American Jobs, Achieving Energy Independence, and Providing Consumers With Affordable, Clean Energy."[1]

As builders of America's clean energy projects and infrastructure, ABC members appreciate your leadership in support of a sustainable and resilient clean energy ecosystem to fuel America's economic comeback from the COVID–19 pandemic and maintain its global competitiveness in the 21st century. However, ABC is troubled by provisions in the legislation that will needlessly increase construction costs and reduce competition from qualified companies and their skilled employees who participate in the construction of the clean energy marketplace.

The increased costs resulting from the legislation's proposed government-registered apprenticeship program requirements and prevailing wage regulations for the construction of projects receiving clean energy tax incentives may make program tax credits unusable—depending on the type of clean energy construction project and geographic market—and hinder the ability of clean energy producers to be competitive against fossil fuel producers, which ultimately undermines critical policies addressing climate change.

As currently drafted, this legislation will create a shortage of skilled labor and contractors able to deliver a rapid, market-driven and cost-effective transition away from fossil fuel energy to clean energy. In addition, these changes will create added costs that will be passed on to ratepayers, manufacturers and consumers, and decrease America's energy cost advantage attractive to manufacturers and businesses in a global marketplace.

Concerns With Government-Registered Apprenticeship Requirements

Section 601 in Title VI of the Clean Energy for America Act requires all contractors and subcontractors building projects receiving applicable tax credits with four or more construction workers on a jobsite to "ensure that not less than 15% of the total labor hours of such work" is to be performed by participants in government-registered apprenticeship programs.[2]

In practice, this will increase costs and have a chilling impact on the ability of contractors—especially local, small, veteran-, disabled-, women- and minority-owned contractors and workers already performing specialty work in the clean energy economy—to continue to compete to build the clean energy ecosystem, and it will artificially limit the pool of scarce labor needed to build out the clean energy marketplace.

To be clear, ABC and its 69 chapters support government-registered apprenticeship programs—offering more than 300 U.S. Department of Labor and state government-registered apprenticeship programs in 20 different construction occupations across America—as part of its all-of-the-above workforce development strategy[3] to tackle

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[1] *https://www.finance.senate.gov/hearings/climate-challenges-the-tax-codes-role-in-creating-american-jobs-achieving-energy-independence-and-providing-consumers-with-affordable-clean-energy.*

[2] Title VI offers some exceptions to this requirement if contractors can demonstrate "a lack of availability of qualified apprentices in the geographic area," and a "good faith effort," although it is unclear how and who makes exception determinations and if it will impact competition during the bidding process for the construction of a clean energy project.

[3] According to the results of *Associated Builders and Contractors' 2020 Workforce Development Survey,* ABC contractor members invested $1.5 billion on workforce development initiatives in 2019, providing craft, leadership and safety education to 1.1 million course attendees to advance their careers in commercial and industrial construction. Safety education accounted for nearly half of the total workforce investment, averaging $1,147 per employee annually. ABC's investment in an all-of-the-above approach to workforce development has produced a network of ABC chapters and affiliates in hundreds of locations across the country that offer more than 800 apprenticeship, craft, safety and management education programs—including more than 300 U.S. Department of Labor and state equivalent government-registered apprenticeship programs across 20 different occupations—to build the people who build America. Available at: *https://*

the industry's skilled workforce shortage—estimated at 430,000 workers in 2021 alone.[4]

In addition, individual ABC member contractors, other construction industry trade associations and community and educational workforce development partners also provide federal and state government-registered apprenticeship programs.

However, as further explained below, participants and graduates of federal and state registered apprenticeship programs in the construction industry constitute only a small fraction of the industry's workforce. In fact, some segments of the industry have almost no government-registered apprenticeship programs. For example, the residential construction sector has few government-registered apprenticeship programs, and this marketplace would be especially harmed by new regulations tied to the 45L New Energy Efficient Home Credit in Title III of this bill.

Other segments of the construction industry have greater concentrations of government-registered apprenticeship programs and contractor participation, but the majority of these contractors do not participate in government-registered apprenticeship programs for a variety of compelling reasons. The majority of industry contractors provide workforce development for employees through vocational and technical schools, community workforce development program partnerships, industry-recognized programs and specialty training designed by employers that are not federal or state government-registered apprenticeship programs.

Data demonstrates the government-registered apprenticeship system is not meeting the industry's demand for skilled labor. According to data from the U.S. DOL,[5] in FY 2020, the construction industry's federal government-registered apprenticeship system produced less than 20,749 completers of its 4- to 5-year apprenticeship programs. In addition, construction industry apprenticeship programs registered with state governments produced an estimated 15,000 to 20,000 completers in FY 2020.[6] At current rates of completion, it would take more than 10 years for all government-registered construction industry apprenticeship program completers to fill the estimated 430,000 vacant construction jobs needed just in 2021.

Almost all unionized contractors, which are concentrated in the nonresidential construction markets, participate in government-registered apprenticeship programs as a condition of collective bargaining with unions. According to Bureau of Labor Statistics data, unionized contractors employ less than 13% of the U.S. construction workforce, while 87% of the U.S. construction workforce freely chooses to work for contractors not affiliated with unions.[7]

It is undeniable that this legislation's government-registered apprenticeship requirement will steer work to unionized contractors and create clean energy jobs for unionized labor, while needlessly eliminating contracting opportunities and killing jobs for nonunion businesses and workers already building the clean energy ecosystem.

Needlessly excluding all contractors who do not participate in government-registered apprenticeship programs from building clean energy projects subject to clean energy tax incentives is problematic. It will create a shortage of contractors and skilled labor to complete these projects, undermine established and preferred industry workforce development pipelines not affiliated with government-registered apprenticeship programs, displace contracts and jobs for businesses and workers already building the clean energy economy, give an unfair competitive advantage to unionized contractors and labor, increase clean energy construction costs and ultimately threaten America's rapid and cost-effective transition to clean energy.

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www.abc.org/News-Media/News-Releases/entryid/17581/abc-members-provided-education-for-1-1-million-course-attendees-in-2019-new-survey-finds.

[4] *ABC: The Construction Industry Needs to Hire an Additional 430,000 Craft Professionals in 2021,* March 23, 2021, *https://abc.org/News-Media/News-Releases/entryid/18636/abc-the-construction-industry-needs-to-hire-an-additional-430-000-craft-professionals-in-2021.*

[5] According to the U.S. DOL Office of Apprenticeship, in FY 2020 the construction industry's 4,793 *federal* government-registered apprenticeship programs had 188,452 active apprentices and produced just 20,749 completers, *https://www.dol.gov/agencies/eta/apprenticeship/about/statistics/2020.*

[6] Unfortunately, there is no centralized reporting of government data for all State Apprenticeship Agency government-registered apprenticeship programs, as discussed by the Workforce Data Quality Campaign's *Registered Apprenticeship Data FAQs,* available at *https://thetruthaboutplas.com/wp-content/uploads/2019/04/Apprentice_FAQ_2pg_web-RAPIDS-020219.pdf.*

[7] U.S. Bureau of Labor Statistics, Union Members Summary, January 22, 2021, *https://www.bls.gov/news.release/union2.nr0.htm.*

Concerns With Davis-Bacon Prevailing Wage Requirements

The Clean Energy for America Act expands Davis-Bacon prevailing wage requirements to eight clean energy tax credit programs, which will reduce competition from contractors already building the clean energy economy, increase construction costs and render some of these tax credit programs unusable.

ABC has long maintained that the Davis-Bacon Act and related regulations are outdated, needlessly raise construction project costs for hardworking taxpayers, stifle contractor productivity and discourage competition while disproportionately affecting small businesses interested in pursuing federal and federally assisted construction projects.

Flaws in the Prevailing Wage Determination System

The 90-year-old Davis-Bacon Act requires the U.S. DOL's Wage and Hour Division to determine and set hourly prevailing wages and benefits contractors must pay to construction workers on federal and certain federally assisted construction projects exceeding $2,000. The DOL WHD determines wage and benefits rates for four different types of construction (Building, Heavy, Highway and Residential), for more than 20 different types of construction trade occupations (*i.e.,* electricians, carpenters, laborers etc.) in more than 3,000 counties across America. Instead of using statistically modern and accurate BLS survey methodology and data, the WHD surveys contractors in various markets on a rolling basis through a convoluted and inefficient process.[8] In short, once survey response data is collected, if a single rate is paid to a majority of the employees in a given classification and locality, it is adopted as prevailing. If no single rate is paid to a majority, then the weighted average of all rates paid is adopted as prevailing wage.

For more than three decades, Congress and government oversight agencies have decried the timeliness and accuracy of the prevailing wage rates determined by the U.S. DOL. In particular, the DOL's survey process leading to the determination of prevailing wages has long been recognized to be arbitrary and unworkable, leading to inflated, outdated and inaccurate prevailing wage determinations and other errors on many projects. Numerous reports from the U.S. Government Accountability Office, DOL's Office of Inspector General and congressional hearings[9] have highlighted the DOL's failure to properly determine prevailing wage rates under the Davis-Bacon Act. These reports and hearings have criticized the DOL WHD for: (1) Using an unscientific method to estimate Davis-Bacon rates with DOL wage surveys that use unrepresentative, self-selected samples;[10] (2) Utilizing unreliably small sample sizes;[11] (3) Combining data from economically unrelated counties;[12] and (4) Failing to update wage rates in a timely manner.[13]

As a result of a flawed, unscientific wage calculation methodology, the DOL's published determinations of federal "prevailing" wages in construction no longer reflect actual local wages in many geographic markets and types of construction. In fact, despite years of low union density, hovering around 13% of the U.S. construction industry workforce,[14] the DOL's wage survey process somehow adopts union wage

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[8] U.S. DOL Wage and Hour Division, Construction Surveys Status By State, *https://www.dol.gov/agencies/whd/government-contracts/construction/surveys/status.*

[9] Congressional hearing, *Promoting the Accuracy and Accountability of the Davis Bacon Act,* June 18, 2013, *https://www.gpo.gov/fdsys/pkg/CHRG-113hhrg81435/html/CHRG-113hhrg81435.htm.*

[10] U.S. Government Accountability Office, *Davis-Bacon Act: Methodological Changes Needed to Improve Wage Survey,* GAO–11–152, March 2011, *http://www.gao.gov/new.items/d11152.pdf;* U.S. Department of Labor, Office of Inspector General, *Concerns Persist with the Integrity of Davis-Bacon Act Prevailing Wage Determinations,* Audit Report No. 04–04–003–04–420, March 30, 2004, pp. 12–13, *http://www.oig.dol.gov/public/reports/oa/2004/04-04-003-04-420.pdf;* U.S. Department of Labor, Office of Inspector General, *Inaccurate Data Were Frequently Used in Wage Determinations Made Under the Davis-Bacon Act,* Audit Report No. 04–97–013–04–420, March 10, 1997, *http://www.oig.dol.gov/public/reports/oa/pre_1998/04-97-013-04-420s.htm;* and U.S. General Accounting Office, *Davis-Bacon Act: Labor Now Verifies Wage Data, but Verification Process Needs Improvement,* HEHS–99–21, January 1999, *http://www.gao.gov/archive/1999/he99021.pdf.*

[11] U.S. Government Accountability Office, *Davis-Bacon Act: Methodological Changes Needed to Improve Wage Survey,* p. 23.

[12] U.S. Government Accountability Office, *Davis-Bacon Act: Methodological Changes Needed to Improve Wage Survey,* Figure 5.

[13] U.S. Government Accountability Office, *Davis-Bacon Act: Methodological Changes Needed to Improve Wage Survey,* p. 18.

[14] *Ibid.* BLS *Union Members Summary.*

rates more than 48% of the time, according to the DOL OIG.[15] Union wage rates are estimated to be mandated in the nonresidential construction categories (Building, Heavy and Highway) of Davis-Bacon wage determinations more than 80% of the time, a statistical improbability given that 87% of the U.S. construction workforce does not belong to a union.[16]

Prevailing Wage's Regulatory Burden on Small and Large Contractors

In a 2021 survey of ABC member companies, roughly 88% of participants stated they do not support prevailing wage laws and the Davis-Bacon Act in its current form, with more than 82% supporting reforms to and/or full repeal of prevailing wage laws.[17]

The construction industry has one of the highest concentrations of small business participation, at more than 82%.[18] In fact, of the 745,207 construction industry establishments employing more than 7 million workers, 81.47% (607,161 establishments) have fewer than 10 employees and 98.77% (736,068 establishments) have less than 100 employees.[19]

The amount of time that contractors must spend educating their payroll administrators, human resource personnel, project estimators, operations managers and foreman in the arcane and arbitrary regulations governing the regulatory framework and current enforcement of Davis-Bacon prevailing wage rules can be overwhelming to small and even large businesses.

DOL wage determinations force contractors performing work on Davis-Bacon covered projects to use outdated and inefficient union job classifications that ignore the productive and safe work practices and efficient labor utilization strategies successfully used in the merit shop construction industry. Further, the DOL has failed to give contractors notice of many of its letter rulings and, with rare exceptions, has not posted such rulings on its website. ABC supports regulatory language requiring the DOL to publish any union work assignment rules that contractors are expected to abide by and prohibiting the DOL from penalizing contractors for misclassifications based on unpublished work rules.

The effort required to determine proper classification of employees in the absence of published information on unwritten union work assignment practices is in itself a significant burden, and each of the issues referenced above leads to compliance dilemmas and additional burdens for many contractors, particularly small businesses in the construction industry.

As a result, many contractors capable of successfully performing prevailing wage work choose not to pursue it. Because of these increased administrative costs and other burdens, 67.6% of ABC member survey respondents said prevailing wage laws result in less competition from subcontractors, and 75% said it would make contractors less likely to bid on public works projects in their own communities, paid for by their own tax dollars.[20]

The DOL's failure to provide detailed information about job duties that correspond to each wage rate makes it difficult to determine the appropriate wage rate for many construction-related tasks in new technologies. In addition, the DOL's lack of wage determinations in new job classifications and programs covered by Davis-Bacon has a history of delaying the distribution of federal assistance, slowing the construction and growth of new technologies and undermining public policy goals.

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[15] U.S. Department of Labor, Office of Inspector General, Better Strategies are Needed to Improve the Timelines and Accuracy of Davis-Bacon Act Prevailing Wage Rates, Audit Report No. 04–19–001–15–001, March 29, 2019, at *https://www.oig.dol.gov/public/reports/oa/viewpdf.php?r=04-19-001-15-001&y=2019.*

[16] *https://www.bls.gov/news.release/union2.nr0.htm.*

[17] ABC Newsline, *Survey Says: ABC Members Strongly Support Repeal or Reforms to Costly Davis-Bacon Act and Prevailing Wage Laws,* March 3, 2021, *https://abc.org/News-Media/Newsline/entryid/18540/survey-says-abc-members-strongly-support-repeal-or-reforms-to-costly-davis-bacon-act-and-prevailing-wage-laws.*

[18] U.S. Small Business Administration, Office of Advocacy, *2019 Small Business Profile, Table 1: U.S. Employment by Industry, 2016, https://cdn.advocacy.sba.gov/wp-content/uploads/2019/04/23142719/2019-Small-Business-Profiles-US.pdf*

[19] U.S. Census Bureau, All Sectors: County Business Patterns by Legal Form of Organization and Employment Size Class for the U.S., States, and Selected Geographies: 2019, *https://data.census.gov/cedsci/table?d=ANN%20Business%20Patterns%20County%20Business%20Patterns&tid=CBP2019.CB1900CBP&hidePreview=true.*

[20] *Ibid,* ABC survey of membership, 2021.

For example. the American Recovery and Reinvestment Act of 2009 expanded federal Davis-Bacon requirements to 40 additional federal programs.[21] Several agencies reported that new Davis-Bacon regulations had a negative impact on ARRA-related program administration and goals that resulted in needless delays, increased costs and complaints from stakeholders impacted by the policy change.[22] Federal agencies maintained that Davis-Bacon regulations directly delayed their ability to spend funds, in part because the DOL was required to determine prevailing wages for home weatherization work in every county in the United States before work could be performed.[23] A related 2010 U.S. Department of Energy Office of Inspector General report cited Davis-Bacon regulations as the prime factor holding up the launch of its Weatherization Assistance Program, which did not begin work until October 2009, eight months after President Obama signed ARRA into law.[24] A March 4, 2010, GAO report determined that "as of December 31, 2009, 30,252 homes had been weatherized with Recovery Act funds, or about 5 percent of the approximately 593,000 total homes that DOE originally planned to weatherize using Recovery Act funds."[25] This bureaucratic boondoggle helped shape the narrative that ARRA failed at creating and funding shovel-ready jobs.[26]

Applying new prevailing wage regulations to the construction of clean energy projects with job classifications that lack DOL-determined rates has the potential to delay projects, increase costs and undermine the market's ability to deliver critical projects to achieve climate goals faster.

Prevailing Wage Regulations Will Increase Costs

It is difficult to determine the exact cost expanding prevailing wage regulations would have on the clean energy marketplace. Doing so would require further complex study for each type of clean energy construction project receiving tax credits and replicating that research in various geographic markets across the country. However, broader research[27] and industry feedback suggests prevailing wage regulations will increase costs.

As a result of the government mandating non-market-wage determinations and increased administrative costs and other burdens described above, 94% of ABC member survey respondents believe that government prevailing wage laws make projects more expensive.[28]

The Congressional Budget Office estimates that repealing the Davis-Bacon Act would save the federal government $17.1 billion between 2021 and 2030.[29] However, additional research that found Davis-Bacon requirements add 9.9% to construction costs and inflate labor costs by an average of 22% above market rates,[30] further sug-

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[21] U.S. Government Accountability Office, *Recovery Act: Officials' Views Vary on Impacts of Davis-Bacon Act Prevailing Wage Provision,* GAO–10–421, Published February 24, 2010, released March 24, 2010, *https://www.gao.gov/products/gao-10-421.*

[22] U.S. Government Accountability Office, Recovery Act: Progress and Challenges in Spending Weatherization Funds, GAO–12–195, December 2011, *https://www.gao.gov/assets/gao-12-195.pdf.*

[23] U.S. Government Accountability Office, Recovery Act: Project Selection and Starts Are Influenced by Certain Federal Requirements and Other Factors, GAO–10–383, Published Feb. 10, 2010, Publicly Released February 18, 2010, *https://www.gao.gov/products/gao-10-383.*

[24] U.S. Department of Energy Office of Inspector General Office of Audit Services, Special Report: Progress in Implementing the Department of Energy's Weatherization Assistance Program Under the American Recovery and Reinvestment Act, OAS—RA–10–04, February 2010, *https://www.energy.gov/sites/prod/files/igprod/documents/OAS-RA-10-04.pdf.*

[25] U.S. Government Accountability Office, Recovery Act: Factors Affecting the Department of Energy's Program Implementation, GAO–10–497T, Published March 4, 2010, *https://www.gao.gov/products/gao-10-497t.*

[26] Jonthan Karl, ABC News, *Report: Stimulus Weatherization Program Bogged Down by Red Tape;* February 8, 2010, *https://abcnews.go.com/WN/Politics/stimulus-weatherization-jobs-president-obama-congress-recovery-act/story?id=9780935.*

[27] Additional studies on the impact of the federal Davis-Bacon Act and state and local prevailing wage laws on construction costs available at *www.abc.org/Davis-Bacon.*

[28] ABC Newsline, *Survey Says: ABC Members Strongly Support Repeal or Reforms to Costly Davis-Bacon Act and Prevailing Wage Laws,* March 3, 2021, *https://abc.org/News-Media/Newsline/entryid/18540/survey-says-abc-members-strongly-support-repeal-or-reforms-to-costly-davis-bacon-act-and-prevailing-wage-laws.*

[29] Congressional Budget Office, *Repeal the Davis-Bacon Act,* December 9, 2020, *https://www.cbo.gov/budget-options/56809.*

[30] Glassman, Head, Tuerck and Bachman, The Beacon Hill Institute, *The Federal Davis-Bacon Act: The Prevailing Mismeasure of Wages,* February 2008, *https://www.beaconhill.org/BHIStudies/PrevWage08/DavisBaconPrevWage080207Final.pdf.*

gests repealing the act would actually save taxpayers more than $11.56 billion a year.

Other research indicates the increased costs of expanding prevailing wage requirements onto clean energy projects receiving tax credits would be especially acute in the single-family and multifamily residential construction markets.

For example, a 2017 study by Blue Sky Consulting Group, *Impacts of a Prevailing Wage Requirement on Market Rate Housing in California,*[31] found that prevailing wage requirements on privately financed residential construction would, "lead to a reduction in the number of new market rate houses built, fewer affordable housing units, and a decrease in the number of construction jobs in the state. . . ." The report concludes, "Overall, our analysis shows that expanding prevailing wage requirements to include privately financed housing construction in California would also increase the costs of building new homes. Requiring prevailing wage rates for residential construction would increase hourly labor costs by 89% on average, with some parts of the state experiencing increases of more than 125%. We estimate that this increase could translate to a 37% increase in construction costs, or about $84,000 for a typical new home."

A 2016 report by the New York City Independent Budget Office on the impact of New York state prevailing wage requirements on affordable housing projects built with the 421a property tax break estimated it would cost the city an additional $4.2 billion, increasing affordable housing construction costs by 23%, or $80,000 per unit.[32]

According to a March 2020 study by the Terner Center for Housing Innovation at the University of California, Berkley, prevailing wage requirements cost an average of $30 more per square foot.[33] An 83 square foot project—smaller than most kitchens—would consume the entire value of the 45L tax credit. An average new home of 2,300 square feet would see increased construction costs of nearly $70,000.

Until the Davis-Bacon Act can be modernized and regulators address the red tape burdens and increased costs resulting from this anti-competitive and costly regulatory scheme, it would be wise to keep prevailing wage regulations in their current form off of clean energy tax credits projects. Doing so would create the conditions for all qualified contractors and their skilled workforce to compete to build the clean energy economy and give taxpayers additional value for investments in clean energy and public works projects as Congress works to enact critical clean energy infrastructure modernization and America faces a $2.6 trillion infrastructure gap by 2029.[34]

The Free Market Should Determine Wages

ABC supports robust wages and benefits for construction workers pursuing their career dreams in the construction industry while building the clean energy economy. In contrast to government wage mandates disconnected from a true prevailing wage, compensation is best set by the free market that can reward a worker's experience, training, commitment to safety and overall work ethic.

Research suggests that clean energy jobs, in general, are good jobs and provide a median hourly wage that is 25% higher than the national median wage. In addition, according to an October 2020 report by BW research, "Clean energy job salaries are also comparable—in some cases better—than fossil fuel job salaries. Jobs in coal, natural gas and petroleum fuels pay about $24.37 an hour, for instance, while jobs in solar and wind pay about $24.85 an hour. Similarly, jobs in energy efficiency—the biggest part of America's energy sector—come with median salaries of about $24.44. Clean energy occupations also had higher rates of health care coverage, and virtually all enjoyed comparable or better retirement benefits than the national average."[35]

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[31] *https://www.mendocinocounty.org/home/showpublisheddocument?id=23824.*

[32] New York City Independent Budget Office, *Correction to Our January 2016 Report on Prevailing Wages,* February 2017, *https://a860-gpp.nyc.gov/downloads/k0698779f?locale=en.*

[33] *https://ternercenter.berkeley.edu/wp-content/uploads/pdfs/Hard_Construction_Costs_March_2020.pdf* (see page 14).

[34] American Society for Civil Engineers, *2021 Report Card for America's Infrastructure, Investment Gap 2020–2029, https://infrastructurereportcard.org/resources/investment-gap-2020-2029/.*

[35] BW Research Partnership, *Clean Jobs, Better Jobs; An Examination of Clean Energy Job Wages and Benefits,* October 2020, *https://e2.org/wp-content/uploads/2020/10/Clean-Jobs-Better-Jobs.-October-2020.-E2-ACORE-CELI.pdf.*

Additional research on construction worker wages and benefits for jobs specific to various sectors of the clean energy ecosystem and in individual geographic labor markets is needed before sweeping government-determined prevailing wage requirements and their accompanying red tape and inefficiencies are implemented on clean energy projects receiving federal tax incentives.

Conclusion

Thank you for considering ABC's serious concerns regarding new government-registered apprenticeship requirements and Davis-Bacon prevailing wage regulations on the construction of clean energy projects receiving tax credits. We hope that you will continue to work with the clean energy marketplace's construction stakeholders and producers to assess the real economic impact of these proposed changes so the credits are usable, create jobs for all Americans and qualified companies in the construction industry and support America's transition to the clean energy economy.

If you or your staff have questions or require any additional information, please do not hesitate to contact me.

Respectfully submitted,

Ben Brubeck
Vice President of Regulatory, Labor and State Affairs

CARBON CAPTURE COALITION
2801 21st Ave. S, Suite 220
Minneapolis, MN 55407

The Carbon Capture Coalition appreciates the opportunity to submit this statement for the record for the Senate Finance Committee's hearing entitled "Climate Challenges: The Tax Code's Role in Creating American Jobs, Achieving Energy Independence, and Providing Consumers with Affordable, Clean Energy." The Coalition thanks the Committee for its efforts to date to respond to the COVID–19 pandemic. As our nation begins to look beyond the crisis, we have a responsibility to rebuild and retool our nation's domestic energy, industrial and manufacturing sectors in ways that put our economy on a path to net-zero emissions by midcentury. Carbon capture must be central to the effort to achieve net-zero emissions reduction goals, while preserving and creating middle-class jobs that pay family-sustaining wages, providing environmental and other benefits to communities, and supporting regional economies across our country.

The Carbon Capture Coalition is a nonpartisan collaboration of more than 80 businesses and organizations dedicated to building federal policy support to enable economy-wide commercial scale deployment of the full suite of carbon capture technologies, which includes carbon capture, removal, transport, utilization, and storage. Widespread adoption of carbon capture technologies at industrial facilities, power plants and future direct air capture facilities is critical to **achieving net-zero emissions to meet midcentury climate goals, strengthening and decarbonizing domestic energy, industrial production and manufacturing, and retaining and expanding a high-wage jobs base.** Convened by the Great Plains Institute,[1] Coalition membership includes industry, energy, and technology companies; energy and industrial labor unions; and conservation, environmental, and clean energy policy organizations.

This statement outlines comprehensive and robust policy recommendations to realize economy-wide deployment of carbon capture, including:

- Providing a direct pay option for the federal 45Q tax credit;
- Extending an additional ten years the commence construction window for the 45Q credit;
- Enhancing 45Q credit values for industrial and power plant carbon capture and direct air capture;
- Making carbon capture and direct air capture projects eligible for tax-exempt private activity bonds;
- Expanding eligibility of master limited partnerships to include carbon capture projects; and
- Implementing technical fixes and direct pay for the Section 48A tax credit to enable carbon capture retrofits of existing power plants.

[1] *https://betterenergy.org/*.

Providing a direct pay option and additional ten-year extension for the federal Section 45Q tax credit

The 45Q tax credit is the cornerstone federal policy for enabling economy-wide deployment of carbon management technologies, and a direct pay option and 10-year extension for 45Q represent the Coalition's top legislative priorities. Implementing direct pay for 45Q is the most important step Congress can take to leverage greater private investment in carbon capture, direct air capture and carbon utilization projects and to realize the full emissions reduction and job creation benefits of the tax credit. Direct pay would eliminate the significant tax credit value currently being lost to burdensome, costly and inefficient tax equity transactions, creating an urgently needed alternative for most project developers, who otherwise lack sufficient taxable income to fully utilize the credits, or who are exempt from federal tax liability altogether. The full value of federally funded tax credits should go directly to investments in technology innovation, emissions reductions and job creation, not to financial and legal third parties.

Extending the commence construction window to qualify for 45Q an additional ten years, to the end of 2035, would establish a critically needed investment horizon to give carbon management projects the time required to scale up between now and midcentury. While federal tax credits were first established for wind and solar energy in 1992 and 2005, respectively, the current 45Q tax credit has only been in place since 2018. Carbon capture technologies deserve a comparable timeframe to benefit from the availability of this crucial federal 45Q incentive.

To that end, the Coalition urges the Committee to pass the Carbon Capture, Utilization, and Storage (CCUS) Tax Credit Amendments Act of 2021 (S. 986) introduced by Senators Tina Smith (D–MN) and Shelley Moore Capito (R–WV) earlier this year. This broadly supported bipartisan bill includes direct pay for 45Q and a 5-year extension of the tax credit, with the aim of helping carbon capture achieve its full potential for emissions reduction, job creation and domestic energy and industrial production.

Enhancing 45Q credit values for industrial and power plant carbon capture and direct air capture

Analyses by the Intergovernmental Panel on Climate Change and the International Energy Agency make clear that economywide deployment of carbon capture and direct air capture is vital to meeting midcentury climate goals. However, carbon-intensive and hard-to-abate industrial sectors, including steel, cement, chemicals and refining; electric power generation; and direct air capture all feature higher costs of capture and greater commercial risk for early deployment. In fact, cement production, natural gas and biomass power generation, and direct air capture do not yet have large-scale commercial projects placed in service anywhere in the world, making it critically important to provide higher 45Q tax credit values to accelerate and expand early carbon capture and direct air capture deployment.

Given the urgency of the climate crisis, the need to safeguard domestic production and jobs as key energy, industrial and manufacturing sectors decarbonize, and the opportunity to maintain U.S. technology leadership in this arena, Congress should increase current 45Q credit values for industrial and power generation projects to $85 per metric ton for CO_2 captured and stored in saline geologic formations and $60 per ton for captured CO_2 stored in oil and gas fields or used to produce low and zero-carbon fuels, chemicals, building materials and other products. For direct air capture projects, credit values should rise to $180 and $130 per ton, respectively.

The above-referenced bipartisan CCUS Tax Credit Amendments Act (S. 986) includes enhanced 45Q credit values for direct air capture projects. However, further bipartisan legislation is needed to augment the value of 45Q for carbon capture and utilization projects in industry and electric power generation, as proposed by the administration.

Make carbon capture and direct air capture projects eligible for tax-exempt private activity bonds

Federal financial incentives beyond the 45Q tax credit often either exclude carbon capture projects or require technical modifications to allow projects to qualify. Expanding the suite of financing mechanisms available to carbon capture, direct air capture and carbon utilization projects will make additional private capital available on more favorable terms, thus increasing future deployment and emissions reduction potential.

Carbon capture and direct air capture projects are currently ineligible for tax-exempt private activity bonds (PABs), a common, well-accepted mechanism for fi-

nancing large-scale private infrastructure projects that have public benefits, including large-scale air pollution control investments in the 1970s and 1980s at privately owned power plants. Compared to conventional bank financing, tax-exempt PABs reduce annual debt payments, both by lowering interest rates and extending the repayment period. The Coalition urges Congress to make carbon capture and direct air capture eligible for PABs, which would, in turn, reduce financing costs and encourage the development of more projects.

Expanding eligibility of master limited partnerships to include carbon capture projects

Carbon capture projects, along with other low- and zero-carbon energy projects, are also currently ineligible for master limited partnerships (MLPs), a business structure that allows for raising equity on public markets, while providing the tax benefits of a partnership.

The Coalition urges the Committee to pass the Financing our Energy Future Act (S. 1034) introduced by Senators Chris Coons (D–DE) and Jerry Moran (R–KS) in March 2021. This bill would ensure the availability of tax-advantaged MLPs as a tool for financing carbon capture projects, reducing the cost of equity and providing project developers with access to capital on more favorable terms.

Implementing technical fixes to the Section 48A tax credit to enable carbon capture retrofits of existing power plants

Design flaws in the current 48A investment tax credit program have made it impossible for companies to access existing incentives to retrofit currently operating coal-fired power plants with carbon capture technology. Enacting proposed reforms to 48A to modify plant heat rate requirements for compatibility with operating carbon capture equipment and providing for direct pay would unlock approximately $2 billion in currently available funding for retrofits.

The bipartisan CCUS Tax Credit Amendments Act of 2021 (S. 986), as mentioned above, would implement these needed technical changes, while also making a direct pay option available for the 48A credit, in addition to the 45Q tax credit. Again, the Coalition urges the Committee to pass this pivotal bill, which enjoys bipartisan support from across the political spectrum in the Senate.

Conclusion

The groundbreaking provisions for deployment of carbon capture, direct air capture, carbon utilization and associated CO_2 transport and storage infrastructure in these bipartisan bills before Congress will help put America's energy, industrial and manufacturing sectors on track to reach net-zero emissions by 2050. Analyses by the Rhodium Group also reveal the potential for creating tens of thousands and hundreds of thousands of jobs and for hundreds of billions in investment from carbon capture[2] and direct air capture[3] deployment, respectively, if these technologies are deployed at levels needed to meet net-zero targets. At the same time, Congress will be ensuring the long-term viability of vital industries that provide millions of existing high-wage jobs, which represent the lifeblood of American workers, their families and communities, and regional economies.

The Carbon Capture Coalition appreciates the support of the Committee in advancing legislation to enable greater deployment of carbon management technologies to meet net-zero emissions reduction goals by midcentury. We look forward to working with the Committee on a bipartisan basis to advance the policy priorities outlined in this statement. Should you have any questions about the legislation or recommendations noted in this statement, please contact Madelyn Morrison, External Affairs Manager, Carbon Capture Coalition at mmorrison@carboncapture coalition.org.

[2] *https://rhg.com/research/state-ccs/*.
[3] *https://rhg.com/research/capturing-new-jobs-and-new-business/*.

CENTER FOR FISCAL EQUITY
14448 Parkvale Road, Suite 6
Rockville, MD 20853
fiscalequitycenter@yahoo.com

Statement of Michael G. Bindner

Chairman Wyden and Ranking Member Crapo, thank you for the opportunity to submit these comments for the record to the Committee on this topic.

On warming in general, there is no doubt that it is man-made. While there was a warm period around the first millennium, we came to it gradually. Industrialization may have ended what is called the Little Ice Age, but that warming is sudden and has dire consequences. We do not know that it will stop the way it did in the Middle Ages; indeed, it is not likely to, which makes these hearings vital.

Starting with the coasts, there will be sea level rise. Indeed, the flooding shown in Vice President Gore's latest film shows how bad it is getting. The wealthy don't seem to care, because they have flood insurance.

The most basic step to at least get wealthier taxpayers on board (including the upper-middle class) is to cap flood insurance benefits to a level where beach houses properties can no longer be insured. Even that small step could never be enacted. Too many donors have beach houses.

Our economic system is the problem. Until we move to something more cooperative, the well-off will turn their economic power into political power.

Without a technical solution, (like fusion, which Koch et al. are slow rolling) all the incentives in the world will not stop plutocrats from scuttling every attempt at regulating emissions. Historically, unless people start dying from the air, as they are in China and did in Pennsylvania from the smog, nothing gets done. The river had to be actually burning in Cleveland before anything was done. Expect no less, which is why the hurricanes are coming in handy now.

Polluters will only accept carbon taxes as an alternative to direct regulation. If we dropped fuel efficiency standards and imposed carbon taxes instead, I suspect that car makers and the energy industry would jump on board. Some level of regulation, like some level of social welfare, helps save business owners from themselves. One need only remember the smog that blanketed Beijing during their Olympics to see what happens from minimal regulation. China is now going all in on renewable energy. Will we learn the same lesson?

We have the capacity to do both. Regulations need to be ramped up AND Carbon Value-Added Taxes need to be enacted to fund infrastructure and research into technical solutions like Helium–3 fusion and electric cars which receive computer control and power from a covered roof deck—preferably one topped with grass.

I use the term carbon value-added tax (C–VAT) because energy prices are tax-inelastic. When energy is needed, it is purchased, especially for transportation. Unless gasoline taxes approach $4 per gallon, people simply fill up their SUV's and cope with the price changes. There is plenty of space to increase gas taxes before consumers change their behavior.

Because energy usage is inelastic, carbon usage must be included on receipts or invoices. It is the only way to assure consumers have the information to purchase responsibly.

The Fair Tax, the Green New Deal, Carbon Taxes, and Goods and Services (Credit Invoice) Taxes all assume some sort of subsidy to hold poor families harmless—some kind of rebate or prebate. Many even believe that levying such taxes could be a good way to increase household income to for poorer families, which would also produce economic growth. I agree that subsidizing families will increase growth, however I submit that the best way to do so is through either existing subsidies or wages.

Increasing the Child Tax Credit, making it permanently refundable and establishing a carbon VAT should all be elements of comprehensive tax reform. The first attachment offers the latest update to the Center for Fiscal Equity's proposal. Reform should be bipartisan so that it has staying power. One possible point of compromise is to end the requirement for all but the wealthiest to file income tax.

The nation has already taken steps on the journey to reform in passing the American Rescue Plan Act.

The *ARPA* has its pluses and its minuses. On the minus side, families who had adequate income during the pandemic now have money to blow. Instead of spending it they are using it to speculate. Masses of people are about to enter the bottom half of EFT and Crypto markets, which will allow the top tiers of the scheme (whose seed money was provided by the Ryan-Brady-Trump tax cuts) to get out.

On the plus side, the increased child tax credit and its new refundability will provide long-term economic security to families. The second essential step is to increase the minimum wage so that no one has to work for free or have a decreased standard of living without working by living solely on the CTC.

The minimum wage should be immediately increased to match the Republican offer of $10 per hour. To return wages to 1965 levels, which rewarded productivity gains, the wage should be increased over time to between $11 and $13 an hour, which is a nice range to compromise,

We should also make a commitment to also decrease what constitutes a full-time work week. 32 hours, with four 8 hour days or five 6.5 hour days would put more people to work at higher wages. Increased minimum wages are important given increases to the Child Tax Credit so that no one will attempt to simply live on what is paid to their children.

The current challenge in implementing a higher CTC is how to get the money to families immediately. Doing so through direct IRS payments cannot be a long-term solution.

There are two avenues to distribute money to families. The first is to add CTC benefits to unemployment, retirement, educational (TANF and college) and disability benefits. The CTC should be high enough to replace survivor's benefits for children.

The second is to distribute them with pay through employers. This can be done with long-term tax reform, but in the interim can be accomplished by having employers start increasing wages immediately to distribute the credit to workers and their families, allowing them to subtract these payments from their quarterly corporate or income tax bills.

Over the long haul, tax reform is necessary to cement these gains. Our tax reform plan is designed to provide adequate income and services to families (both with increased minimum wages and child tax credits) through employer-paid taxes, funding government services through a goods and services tax, separating out taxation of capital gains and income from income to an asset value-added tax and higher tier subtraction VAT collections on wage income up to the $330,000 level and above, with additional personal income taxation for incomes over $425,000.

The top rates for higher tier subtraction VAT, personal income taxes and asset VAT would all be set to the same rate, say 26%, so that forms of income are not manipulated to avoid taxation. It would also effectively raise taxes on salaried income to 52%, with capital incomes reinvested or investments funded by salary income adding an additional 26% of taxation. Spending money will also trigger taxation.

Adding the effect of lower tier subtraction VAT collection to taxation on business owners and the top marginal rate approaches 90%. Such taxes are meant to prevent payment of extreme salaries rather than maximizing revenue. This provides more wages to the rest of the population, especially to those who are not adequately compensated at lower income levels.

Reform allows a rebalancing of fiscal responsibilities. The federal child tax credit we propose, plus increases in the minimum wage to at least $12/hour may provide enough family income in most states. Other states would add additional support through a state subtraction VAT. Comprehensive reform will truly end welfare as we know it by giving families what they need for a decent living.

Please see a second attachment for an updated treatment of energy taxes as a whole, which was first submitted in 2012. Energy taxes can take three forms: infrastructure development, environmental sin taxes and subsidies to industry (and how to avoid them).

Thank you for this opportunity to share these ideas with the committee. As always, we are available to meet with members and staff or to provide direct testimony on any topic you wish.

Please be so kind as to distribute these comments to members and staff in both houses, with the invitation to acknowledge and discuss today's submission.

Attachment—Tax Reform, Center for Fiscal Equity, March 5, 2021

Individual payroll taxes. These are optional taxes for Old-Age and Survivors Insurance after age 60 for widows or 62 for retirees. We say optional because the collection of these taxes occurs if an income sensitive retirement income is deemed necessary for program acceptance. Higher incomes for most seniors would result if an employer contribution funded by the Subtraction VAT described below were credited on an equal dollar basis to all workers. If employee taxes are retained, the ceiling should be lowered to $85,000 to reduce benefits paid to wealthier individuals and a $16,000 floor should be established so that Earned Income Tax Credits are no longer needed. Subsidies for single workers should be abandoned in favor of radically higher minimum wages.

Wage Surtaxes. Individual income taxes on salaries, which exclude business taxes, above an individual standard deduction of $85,000 per year, will range from 6.5% to 26%. This tax will fund net interest on the debt (which will no longer be rolled over into new borrowing), redemption of the Social Security Trust Fund, strategic, sea and non-continental U.S. military deployments, veterans' health benefits as the result of battlefield injuries, including mental health and addiction and eventual debt reduction. Transferring OASDI employer funding from existing payroll taxes would increase the rate but would allow it to decline over time. So would peace.

Asset Value-Added Tax (A–VAT). A replacement for capital gains taxes, dividend taxes, and the estate tax. It will apply to asset sales, dividend distributions, exercised options, rental income, inherited and gifted assets and the profits from short sales. Tax payments for option exercises and inherited assets will be reset, with prior tax payments for that asset eliminated so that the seller gets no benefit from them. In this perspective, it is the owner's increase in value that is taxed.

As with any sale of liquid or real assets, sales to a qualified broad-based Employee Stock Ownership Plan will be tax free. These taxes will fund the same spending items as income or S–VAT surtaxes. This tax will end Tax Gap issues owed by high income individuals. A 26% rate is between the GOP 24% rate (including ACA–SM and Pease surtaxes) and the Democratic 28% rate. It's time to quit playing football with tax rates to attract side bets.

Subtraction Value-Added Tax (S–VAT). These are employer paid Net Business Receipts Taxes. S–VAT is a vehicle for tax benefits, including

- Health insurance or direct care, including veterans' health care for non-battlefield injuries and long-term care.
- Employer-paid educational costs in lieu of taxes are provided as either employee-directed contributions to the public or private unionized school of their choice or direct tuition payments for employee children or for workers (including ESL and remedial skills). Wages will be paid to students to meet opportunity costs.
- Most importantly, a refundable child tax credit at median income levels (with inflation adjustments) distributed with pay.

Subsistence level benefits force the poor into servile labor. Wages and benefits must be high enough to provide justice and human dignity. This allows the ending of state administered subsidy programs and discourages abortions, and as such enactment must be scored as a must pass in voting rankings by pro-life organizations (and feminist organizations as well). To assure child subsidies are distributed, S–VAT will not be border adjustable.

The S–VAT is also used for personal accounts in Social Security, provided that these accounts are insured through an insurance fund for all such accounts, that accounts go toward employee-ownership rather than for a subsidy for the investment industry. Both employers and employees must consent to a shift to these accounts, which will occur if corporate democracy in existing ESOPs is given a thorough test. So far it has not. S–VAT funded retirement accounts will be equal-dollar credited for every worker. They also have the advantage of drawing on both payroll and profit, making it less regressive.

A multi-tier S–VAT could replace income surtaxes in the same range. Some will use corporations to avoid these taxes, but that corporation would then pay all invoice and subtraction VAT payments (which would distribute tax benefits). Distributions from such corporations will be considered salary, not dividends.

Invoice Value-Added Tax (I–VAT). Border adjustable taxes will appear on purchase invoices. The rate varies according to what is being financed. If Medicare for

All does not contain offsets for employers who fund their own medical personnel or for personal retirement accounts, both of which would otherwise be funded by an S–VAT, then they would be funded by the I–VAT to take advantage of border adjustability. I–VAT also forces everyone, from the working poor to the beneficiaries of inherited wealth, to pay taxes and share in the cost of government. Enactment of both the A–VAT and I–VAT ends the need for capital gains and inheritance taxes (apart from any initial payout). This tax would take care of the low-income Tax Gap.

I–VAT will fund domestic discretionary spending, equal dollar employer OASI contributions, and non-nuclear, non-deployed military spending, possibly on a regional basis. Regional I–VAT would both require a constitutional amendment to change the requirement that all excises be national and to discourage unnecessary spending, especially when allocated for electoral reasons rather than program needs. The latter could also be funded by the asset VAT (decreasing the rate by from 19.5% to 13%).

As part of enactment, gross wages will be reduced to take into account the shift to S–VAT and I–VAT, however net income will be increased by the same percentage as the I–VAT. Adoption of S–VAT and I–VAT will replace pass-through and proprietary business and corporate income taxes.

Carbon Value-Added Tax (C–VAT). A Carbon tax with receipt visibility, which allows comparison shopping based on carbon content, even if it means a more expensive item with lower carbon is purchased. C–VAT would also replace fuel taxes. It will fund transportation costs, including mass transit, and research into alternative fuels (including fusion). This tax would not be border adjustable.

Summary

This plan can be summarized as a list of specific actions:

1. Increase the standard deduction to workers making salaried income of $425,001 and over, shifting business filing to a separate tax on employers and eliminating all credits and deductions—starting at 6.5%, going up to 26%, in $85,000 brackets.
2. Shift special rate taxes on capital income and gains from the income tax to an asset VAT. Expand the exclusion for sales to an ESOP to cooperatives and include sales of common and preferred stock. Mark option exercise and the first sale after inheritance, gift or donation to market.
3. End personal filing for incomes under $425,000.
4. Employers distribute the child tax credit with wages as an offset to their quarterly tax filing (ending annual filings).
5. Employers collect and pay lower tier income taxes, starting at $85,000 at 6.5%, with an increase to 13% for all salary payments over $170,000 going up 6.5% for every $85,000—up to $340,000.
6. Shift payment of HI, DI, SM (ACA) payroll taxes employee taxes to employers, remove caps on employer payroll taxes and credit them to workers on an equal dollar basis.
7. Employer paid taxes could as easily be called a subtraction VAT, abolishing corporate income taxes. These should not be zero rated at the border.
8. Expand current state/federal intergovernmental subtraction VAT to a full GST with limited exclusions (food would be taxed) and add a federal portion, which would also be collected by the states. Make these taxes zero rated at the border. Rate should be 19.5% and replace employer OASI contributions. Credit workers on an equal dollar basis.
9. Change employee OASI of 6.5% from $18,000 to $85,000 income.

Attachment—Energy Taxes

There are three aspects to consider regarding whether energy policy should be conducted through the tax code: energy taxes as transportation user fees; energy taxes as environmental sin taxes and energy tax policies as a subsidy for business. How to design provisions for a sustainable energy policy and tax reform will be discussed for each of these areas and we will address certain oversight questions on whether current tax provisions have been implemented efficiently and effectively.

Energy Taxes as Transportation User Fees

The most familiar energy tax is the excise tax on gasoline. It essentially functions as an automatic toll, but without the requirement for toll booths. As such, it has

the advantage of charging greater tolls on less fuel efficient cars and lower tolls on more efficient cars, all without requiring purchase of a EZ Pass or counting axles.

It is a highly efficient tax in this regard, although its effectiveness is limited because it has not kept pace with inflation. This could be corrected by shifting it from a uniform excise to a uniform percentage tax—however because the price of fuel varies by location, there may be constitutional problems with doing so. The only other option to increase this tax in order to overcome the nation's infrastructure deficit—which is appropriately funded with this tax—is to have the courage to increase it.

In times of high unemployment, such an increase would be a balm to economic growth, as it would put people back to work. Given the competitive nature of gas prices, there is some question as to whether such an increase would produce a penny for penny increase in gasoline prices. If the tax elasticity is more inelastic than elastic, the tax will be absorbed in the purchase price and be a levy on producers. If it is more elastic, it will be a levy on users and will impact congestion (and thus decrease air pollution and overall conservation).

For many citizens, either prospect is a win-win, given concerns over both climate change and energy industry profits. The only real question is one of the political courage to do what is necessary for American jobs and infrastructure—and that seems to be a very open question.

Energy taxes are currently levied through the private sector, rather than through toll booth employees, which from the taxpayer point of view is a savings as it externalizes the pension and benefit requirements associated with hiring such workers.

In the event that gasoline cars were replaced with electric cars, given either improvements in battery charging technology or in providing continuous supply through overhead wires, much in the same way that electric trains and buses receive power, any excise per kilowatt for the maintenance of roads could be collected in the same way—or the road system could be made part of a consortium with energy providers, car makers and road construction and maintenance contractors—effectively taking the government out of the loop except when eminent domain issues arise (assuming you believe such a tool should be used for private development, we at the Center believe that it should not be).

The electric option provides an alternative means to using natural gas, besides creating a gas fueling infrastructure, with natural gas power plants providing a more efficient conduit than millions of internal combustion engines. The electric option allows for the quick implementation of more futuristic fuels, like hydrogen, wind and even Helium3 fusion. Indeed, if private road companies become dominant under such a model, a very real demand for accelerated fusion research could arise, bypassing the current dependence on governmental funding.

Energy Taxes as Environmental Sin Taxes

Carbon Taxes, Cap and Trade and even the Gasoline Excise are effectively taxes on pollution or perceived pollution and as such, carry the flavor of sin taxes. As such, they put the government in the position of discouraging vice while at the same time trying to benefit from it. Our comments above as to whether the tax elasticity of the gasoline excise has an impact on congestion and pollution is applicable to this issue, although tax inelasticity will mute the effect of discouraging "sinful" behavior and instead force producers to internalize what would otherwise be considered externalities—provided of course that the proceeds from these taxes are used to ameliorate problems of both pollution (chest congestion) by paying for health care and traffic congestion in building more roads and making more public transit available—while funding energy research to ease the carbon footprint of modern civilization.

Oddly enough, this approach was once considered the conservative alternative to other more intrusive measures proposed by liberals, like imposing pollution controls on cars and factories or simply closing down source polluters. When those options are taken off the table, however, or are considered impractical, then the concept of environmental sin taxes becomes liberal and no action at all becomes the conservative position.

These use of environmental sin taxes is by nature much more efficient economically than pollution controls and probably also more efficient than allowing producers and consumers to benefit from externalities like pollution, congestion and asthma. As with transportation funding, such taxes are only effective if they actually provide adequate funding for amelioration or otherwise change consumer behavior. If the

politics of the day prevent taxes from actually accomplishing these objectives, then their effectiveness is diminished.

The short term political win of keeping taxes too low can only work for so long. Reality has a way of intruding, either because infrastructure crumbles, congestion becomes too high, children become ill with asthma (for full disclosure purposes, I suffered from this after moving down-wind as a child from an Ohio Edison coal plant) and sea levels rise—destroying vacation homes and the homes of those who support them—and if Edgar Cayce is to be believed—the states that are the heart of the Republican base.

The role of energy taxes as sin taxes are preserved in comprehensive tax reform only if they are preserved in addition to value added and net business receipts taxes. If there is no separate tax or higher rate for these activities, there is no sin tax effect and the "sin" is effectively forgiven with any amelioration programs funded by the whole of society rather than energy users.

Energy Tax Policies as a Subsidy for Business

There are quite a few ways in which energy tax policy subsidizes business. The most basic way is the assessment of adequate energy taxes, or taxes generally, to pay for government procurement of infrastructure and research. If tax reform does not include adequate revenue, the businesses which fulfill these contracts will be forced to either reduce staff or go out of business. Government spending stimulates the economy when more money is spent because taxes are raised and dedicated (or even earmarked) for these uses. Eliminating specific energy taxes in tax reform forces this work into competition with other government needs.

Let me be clear that the Center does not propose such a move. Our approach actually favors more, not less, identification of revenues with expenditures, reducing their fungibility, with the expectation that taxes increase when needs are greater and decrease when they are met, either through building in advance of need or finding an alternative private means of providing government services.

The more relevant case to the Committee's question is the existence of research and exploration subsidies as they exist inside of more general levies, such as the Corporate Income Tax. To the extent to which tax reform eliminates this tax and replaces it with reforms such as the Subtraction Value-Added Tax (which taxes both labor and profit), such subsidies are problematic, but not impossible to preserve.

This is one of the virtues of a separate S–VAT, rather than replacing the Corporate Income Tax with a VAT or a Fair Tax—which by their nature have no offsetting tax expenditures. The challenge arises, however, when the existence of such subsidies carry with them the impression that less well connected industries must pay higher taxes in order to preserve these tax subsidies. Worse is the perception, which would arise with their use in an SVAT, that such subsidies effectively result in lower wages across the economy. Such a perception, which has some basis in reality, would be certain death for any subsidy.

One must look deeper into the nature of these activities to determine whether a subsidy is justified, or even possible. If subsidized activities are purchased from another firm, the nature of credit invoice value-added taxes, carbon (receipt visible) value-added taxes and employer-paid subtraction value-added taxes alleviate the need for any subsidy at all, because the VAT paid implicit in the fees for research and exploration would simply be passed through to the next level on the supply chain and would be considered outside expenditures for SVAT calculation and therefore not taxable. If research and exploration is conducted in house, then the labor component of these activities would be taxed under both the IVAT and the SVAT, as they are currently taxed under personal income and payroll taxes now.

The only real issue is whether the profits or losses from these activities receive special tax treatment. Because profit and loss are not separately calculated under such taxes, which are essentially consumption taxes, the answer must be no. The ability to socialize losses and privatize profits through the SVAT would cease to exist with the tax it is replacing.

If society continues to value such subsidies, they would have to come as an offset to a carbon tax or cap and trade regime, if at all, as the excise tax for energy is essentially a retail sales tax and the industrial model under which the energy industry operates insulates the gasoline excise from the application of any research and exploration credits. If the energy companies were to change their model to end independent sales and distribution networks and treat all such franchisees as employees (with the attendant risk of unionization), then the subject subsidies could be pre-

served—provided that the related energy tax is increased so that the subsidy could actually operate—favoring those who participate in research and development and penalizing those who do not.

In other words, if big oil wants to keep this subsidy when there are no corporate income tax, it must buy up all its franchisees and allow the government to double the gasoline tax with a deduction at payment for research and exploration.

Without taxes, there can be no subsidy.

CITIZENS' CLIMATE LOBBY
1750 K St., NW, Suite 1100
Washington, DC 20006

Citizens' Climate Lobby (CCL) appreciates the opportunity to submit written testimony to the Senate Finance Committee for the April 27, 2021 hearing on "Climate Challenges: The Tax Code's Role in Creating American Jobs, Achieving Energy Independence, and Providing Consumers with Affordable, Clean Energy."

Citizens' Climate Lobby is a grassroots organization that trains and supports volunteers to build relationships with their elected representatives in order to influence climate policy. CCL's key purpose is to create political will for climate solutions while empowering individuals to exercise their personal and political power. CCL has over 180,000 supporters nationwide from every state and congressional district.

Summary

Citizens' Climate Lobby encourages Congress to put a price on greenhouse gas emissions as an effective and evidence-based approach to mitigating climate change. Congress has already developed impressive carbon pricing legislation that can quickly reduce greenhouse gas emissions and protect low income Americans including America's Clean Future Fund of 2021 (S. 685),[1] The American Opportunity Carbon Fee Act of 2019,[2] The Climate Action Rebate Act of 2019,[3] and The Energy Innovation and Carbon Dividend Act.[4] This last policy is a carbon fee and dividend approach supported by scientists, economists, and thousands of businesses, prominent individuals, faith groups, and local governments from both sides of the political aisle.[5]

We support this policy and encourage Congress to pass it because it would

- Create millions of jobs in a clean energy economy.
- Act quickly and efficiently to reduce emissions.
- Add higher quality jobs in the energy sector.
- Increase GDP on a net basis.
- Move the U.S. toward energy independence.
- Make clean, affordable energy available to Americans.
- Protect U.S. businesses in the transition to clean energy.
- Encourage global action on emissions reductions.
- Dramatically improve our health and save lives.
- Achieve emissions reductions without adding to the federal deficit.

Creating Quality American Jobs

Creating Jobs

A carbon price will create more U.S. jobs in the clean energy sector as we transition to a clean energy economy. To provide a few examples, relative to coal, generating energy from wind creates 1.5 times more jobs, from solar thermal creates 2 times more jobs, from photovoltaic solar creates 8 times more jobs, and energy efficiency efforts create 3.5 times more jobs per unit of energy.[6] Similarly, investing in clean

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[1] *https://www.congress.gov/bill/117th-congress/senate-bill/685.*
[2] *https://www.congress.gov/bill/116th-congress/senate-bill/1128.*
[3] *https://www.congress.gov/bill/116th-congress/senate-bill/2284.*
[4] *https://energyinnovationact.org/.*
[5] *https://energyinnovationact.org/supporters-overview/.*
[6] Wei, Max, et al. "Putting Renewables and Energy Efficiency to Work: How Many Jobs Can the Clean Energy Industry Generate in the U.S.?" *Energy Policy, vol.* 38, no. 2, 2010, pp. 919–931.

energy generates approximately 3.2 times more U.S. jobs than equivalent spending would generate in fossil fuels.[7]

A carbon price that returns revenue to citizens will bring job growth in other sectors beyond clean energy as well. British Columbia implemented a carbon price that returned revenues to citizens and demonstrated that over a 6 year period, job gains in labor-intensive sectors like health care outweighed job losses in energy intensive sectors like air travel.[8] A study of a carbon fee and dividend similar to the Energy Innovation and Carbon Dividend Act showed that the policy would create 2.8 million jobs above baseline over 20 years between clean energy jobs and local jobs in sectors such as healthcare and entertainment.[9] The clean energy economy provides more job opportunities in both the energy sector and the broader economy.

Quality Jobs

Transitioning to clean energy will not only create more jobs, but will create more quality jobs with higher wages and better benefits. On average in 2018 fossil fuel jobs earned $25/hr, wind and solar jobs earned $24/hr, nuclear jobs earned $46/hr, and jobs that applied to all forms of energy earned $28/hr.[10] The median hourly wages for clean energy jobs are 25% higher than the national median wage for all jobs. Further, clean energy jobs are more likely to come with health and retirement benefits than the rest of the private sector. And generally, unionization rates for clean energy jobs are slightly higher than the rest of the private sector.[11]

Energy jobs are naturally transitioning to clean energy jobs as clean energy employment (+6%) grew more than twice the national average (+2.7%) between 2017 and 2019 while employment in natural gas and coal have fallen −5.3% and ×7.1% respectively.[12] A carbon price would accelerate this trend of job creation in a sector that has higher than average wages and higher unionization rates. Many current energy occupations will also continue to thrive in a low-carbon energy environment. These would include installation and maintenance of expanded power grid infrastructure, pipeline installation and maintenance for CO_2 and/or hydrogen pipelines, refinery and process plant construction and operation in biorefineries, and the nuclear power utility workforce.

Achieving Energy Independence

Well designed climate policy can help the U.S. increase energy independence on its path to net-zero emissions. A study of the carbon fee and dividend approach using the Energy Innovation and Carbon Dividend Act of 2019 found that the policy would have virtually no effect on U.S. oil production and relatively small impact on U.S. natural gas production by 2030 while effectively reducing emissions.[13] This is possible because as U.S. fuel demand decreases as a result of the carbon price, the U.S. sources higher percentages of fuel locally and decreases imports.

Providing Consumers With Affordable, Clean Energy

Moving to Clean Energy

Carbon pricing is an effective way to move our economy toward clean energy sources. Modest carbon prices, as low as $7/ton by 2020, $22/ton by 2025, and $36/ton by 2030 can meet the same greenhouse gas emissions reductions that would be achieved by the regulatory approaches of the Clean Power Plan, Corporate Average Fuel Economy (CAFE) Standards, and Renewable Fuel Standards combined.[14] Reasonable carbon prices can put the U.S. clearly on the path to net-zero by 2050. A carbon price of about $34 to $64/ton by 2025 and $77 to $124/ton in 2030 will put

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[7] Pollin, Robert, et al. Department of Economics and Political Economy Research Institute (PERI), June 2009, *The Economic Benefits of Investing in Clean Energy.*

[8] Yamazaki, Akio. "Jobs and Climate Policy: Evidence from British Columbia's Revenue-Neutral Carbon Tax." *Journal of Environmental Economics and Management,* vol. 83, 25 April 2017, pp. 197–216.

[9] Nystrom, Scott, and Patrick Luckow. Regional Economic Models, Inc. (REMI) and Synapse Energy Economics, Inc. (Synapse), 2014, *The Economic, Climate, Fiscal, Power, and Demographic Impact of a National Fee-and-Dividend Carbon Tax.*

[10] "Occupational Employment Statistics." U.S. Bureau of Labor Statistics (May 2018).

[11] E2, ACORE, and CELI, October 2020, *Clean Jobs, Better Jobs: An Examination of Clean Energy Job Wages and Benefits.*

[12] E2, ACORE, and CELI, October 2020, *Clean Jobs, Better Jobs: An Examination of Clean Energy Job Wages and Benefits.*

[13] Kaufman, Dr. Noah, et al. Columbia Center on Global Energy Policy, 2019, *An Assessment of the Energy Innovation and Carbon Dividend Act.*

[14] Knittel, Christopher R. MIT Center for Energy and Environmental Policy Research, 2019, Knittel, Christopher R., *Diary of a Wimpy Carbon Tax: Carbon Taxes as Federal Climate Policy.*

us on the path to net-zero by 2050.[15] The carbon price targets set in the Energy Innovation and Carbon Dividend Act hit the center of these estimates.

Maintaining Affordable Energy

As the U.S. transitions to a healthier and more sustainable clean energy economy, there will be temporary increases in energy prices for consumers. It is critical to protect low income communities from increasing energy prices as we make this necessary transition. A carbon fee and dividend like the Energy Innovation and Carbon Dividend Act can effectively move the U.S. toward net-zero energy while protecting consumers by returning 100% of the revenue equally to American residents. Under this plan, 61% of households and 68% of individuals in the U.S. end up receiving more than enough in monthly carbon dividends to offset their increased costs. These benefits highly correlate with low income Americans with 97% of the lowest two economic quintiles benefiting or breaking even on increased energy costs.[16]

Preferred by Businesses

Carbon pricing is the preferred climate policy of many businesses. This approach lays out a predictable price for businesses to plan for. A carbon price does not set restrictions on specific businesses or select winners but applies the same incentive to innovate and reduce emissions evenly. See the following notable statements of support for carbon pricing:

- *U.S. Chamber of Commerce:* "The Chamber supports a market-based approach to accelerate GHG [greenhouse gas] emissions reductions across the U.S. economy. We believe that durable climate policy must be made by Congress, and that it should encourage innovation and investment to ensure significant emissions reductions, while avoiding economic harm for businesses, consumers and disadvantaged communities. This policy should include well designed market mechanisms that are transparent and not distorted by overlapping regulations. U.S. climate policy should recognize the urgent need for action, while maintaining the national and international competitiveness of U.S. industry and ensuring consistency with free enterprise and free trade principles."
- *Business Roundtable:*[17] "Business Roundtable believes corporations should lead by example, support sound public policies and drive the innovation needed to address climate change. To this end, the United States should adopt a more comprehensive, coordinated and market-based approach to reduce emissions. This approach must be pursued in a manner that ensures environmental effectiveness while fostering innovation, maintaining U.S. competitiveness, maximizing compliance flexibility and minimizing costs to business and society. International cooperation and diplomacy backed by a broadly supported U.S. policy will be the key to achieving the collective global action required to meet the scope of the challenge and position the U.S. economy for long-term success."
- *American Petroleum Institute (API):*[18] "API endorses an economy wide price on carbon, the most impactful policy for emissions reductions, but recognizes the prevalence of ongoing discussions regarding sector-specific policies, including a Clean Energy Standard (CES) focused on the electricity sector. API supports fuel- and technology-neutral approaches to addressing emissions in the electricity sector and believes that any CES under consideration should include natural gas and recognize and value the many benefits natural gas provides to an increasingly lower-carbon electricity grid."

Carbon Border Fee Adjustment

Protecting U.S. Businesses

Carbon prices paired with a carbon border fee adjustment will not disadvantage U.S. business in the world market. A carbon border fee adjustment may be imposed on covered fuels and "emissions-intensive trade-exposed" (EITE) goods[19] that cross our border in either direction; imported EITE goods from a country without an equivalent carbon price to the U.S. will pay a fee to make up the difference and American-made EITE products exported to such a country will receive a rebate for

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[15] Kaufman, Noah, et al. "A Near-Term to Net Zero Alternative to the Social Cost of Carbon for Setting Carbon Prices." *Nature Climate Change,* vol. 10, no. 11, 2020, pp. 1010–1014, doi:10.1038/s41558–020–0880–3.

[16] Ummel, Kevin. 2020, *Household Impact Study II (HIS2) The Impact of a Carbon Fee and Dividend Policy on the Finances of U.S. Households.*

[17] *https://www.businessroundtable.org/climate.*

[18] *https://www.api.org/climate.*

[19] "Legislation: Energy-Intensive, Trade-Exposed Industries." American Council for an Energy-Efficient Economy (accessed 21 May 2020).

the carbon fee. These goods include products like steel, aluminum, cement, glass, certain chemicals, and some agricultural products.[20]

Carbon border fee adjustments prevent the carbon fee from putting American businesses at a competitive disadvantage in global markets. It will also remove the incentive for businesses to relocate overseas to avoid the carbon fee.

Threats and Opportunities on International Coordination

The United States is currently falling behind as the only developed nation without a national carbon price.[21, 22] China, another influential economy, has launched an emissions trading scheme that lays the groundwork for phasing out carbon emissions.[23] Both the European Union (EU) and Canada—countries that account for a third of our international trade[24]—have enacted carbon prices and are discussing border carbon adjustments of their own.[25, 26]

The EU's recent announcement that they will enforce a carbon border adjustment mechanism in 2023 has already inspired meaningful action in other countries. Russia, reportedly worried about what an EU border carbon adjustment would mean for their trade relationship, announced a plan to monitor polluters by 2022 to serve as the basis of an emissions trading system.[27] The EU's announcement also inspired China to accelerate the deployment of their carbon market[28] because of their significant trade relationship. This is a convincing proof point that carbon border adjustments will play an important role in influencing global action on climate change.

The U.S. has the opportunity to enact a carbon price to not only avoid paying our trading partners border carbon adjustment fees, but to enact a carbon border fee adjustment that will leverage our trade relationships to encourage other countries to meet the ambition of our carbon price. Goods made in the U.S. are already 80% more carbon-efficient than the world average[29] meaning the U.S. holds a competitive advantage in a global market with an ambitious carbon price.

Quickly and Efficiently Reduce Emissions

Carbon pricing will quickly reduce emissions to put the U.S. on a path to net-zero emissions by 2050. Studies of the Energy Innovation and Carbon Dividend Act show that it would reduce U.S. emissions 50% relative to 2005 by 2030[30] and put us on a path to attain net-zero emissions by 2050.[31] Furthermore, carbon prices are less likely to be held up by judicial hurdles. Carbon fees are firmly grounded in Congress's constitutional "power to lay and collect taxes,"[32] making it resistant to court challenges similar to those that held up the Clean Power Plan.

Carbon pricing is an economically efficient way to reduce greenhouse gas emissions. In a comparison between regulations or a $42/ton carbon tax to achieve the same emissions reductions, using the carbon tax approach will best protect U.S. GDP. If a carbon tax is applied, by 2036 the annual GDP will be $420 billion higher ($100

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[20] Mares, J.W. and B.P. Flannery. "WTO-Compatible Methodologies to Determine Export Rebates and Import Charges for Products of Energy-Intensive, Trade-Exposed Industries, If There Is an Upstream Tax on Greenhouse Gases." Working Paper 18-19. Resources for the Future (Oct 2018).

[21] "Carbon Pricing Dashboard: Up-to-Date Overview of Carbon Pricing Initiatives." *Carbon Pricing Dashboard | Up-to-Date Overview of Carbon Pricing Initiatives,* World Bank.

[22] *World Economic Situation and Prospects,* United Nations, 2021, p. 125.

[23] Carpenter, Scott. "Toothless Initially, China's New Carbon Market Could Be Fearsome." *Forbes,* 2 March 2021.

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[27] Khrennikova, Dina. "Russian Lawmakers Back The Nation's First Ever Climate Law." *Bloomberg.com,* Bloomberg, 20 April 2021.

[28] Rathi, Akshat. "Carbon Restrictions Can Bend the Emissions Curve: Green Insight." *Bloomberg Law,* 27 April 2021.

[29] Rorke, Catrina, and Greg Bertelsen. Climate Leadership Council, September 2020, *America's Carbon Advantage.*

[30] Hafstead, Marc. "Carbon Pricing Calculator." *Carbon Pricing Calculator,* Resources for the Future, 10 August 2020, *www.rff.org/publications/data-tools/carbon-pricing-calculator/*.

[31] Kaufman, Noah, et al. "A Near-Term to Net Zero Alternative to the Social Cost of Carbon for Setting Carbon Prices." *Nature Climate Change,* vol. 10, no. 11, 2020, pp. 1010–1014, doi:10.1038/s41558–020–0880–3.

[32] Article I. Legal Information Institute (accessed 28 November 2020).

per month per U.S. household) than if the same emissions reductions were achieved by regulations.[33]

Increase GDP on a Net Basis

Continuing on our current climate change trajectory will have a negative impact on the U.S. GDP from changes including worsening agricultural productivity, mortality, crime, energy use, storm activity, and coastal inundation.[34] Reducing greenhouse gas emissions consistent with the Paris target of "well below 2°C" instead of continuing business-as-usual will result in the U.S. GDP being an estimated 2–4% higher in 2050.[35] A carbon fee and dividend policy would also maintain a higher U.S. GDP relative to a business-as-usual scenario through mid century and develop a far stronger GDP by 2100.[36]

Dramatically Improve Our Health and Save Lives

The impacts of climate change have been acknowledged as the major public health challenge of the century.[37] Burning fossil fuels harms our health directly by generating pollutants, and indirectly through release of greenhouse gases. Both the direct and indirect costs are often paid for by taxpayers. A policy consistent with 2°C would save an average of 90,000 U.S. lives a year over 50 years creating a health co-benefit value of $700 billion per year.[38]

Achieve Emissions Reductions without Adding to the Federal Deficit

Carbon pricing can not only quickly and efficiently reduce America's greenhouse gas emissions, but can do so without adding to the federal deficit. Assessing a fee on pollution generates revenue that can be used to aid the transition to a low carbon economy. The following recent bills demonstrate effective carbon prices and uses of revenue that protect vulnerable populations:

- *The Energy Innovation and Carbon Dividend Act*[39] is a revenue neutral carbon price that distributes all of the net proceeds equally back to citizens in carbon dividend payments. This legislation would reduce America's carbon pollution by 50% by 2030 and ensure that more than 60% of Americans, especially low income Americans, have their increased carbon costs offset.[40]
- *America's Clean Future Fund of 2021 (S. 685)*[41] allocates the majority of revenues to be used as rebates to American households to manage increased carbon costs. 25% of the funds are saved to be allocated between transition assistance programs for fossil fuel employees and the Climate Change Finance Corporation (C2FC), a federal agency the bill would establish to support clean energy research and development.
- *The American Opportunity Carbon Fee Act of 2019*[42] provides a tax credit to individuals to compensate for increased carbon cost. This bill targets assistance by providing Social Security and veterans' program beneficiaries and other retired and disabled Americans with an inflation-adjusted annual benefit and by delivering grants to states to support transition assistance.
- *The Climate Action Rebate Act of 2019*[42] distributes the majority of revenue back to American households in carbon dividend payments. 20% of revenues are reserved to fund infrastructure projects, 5% to research and development, and 5% to transition assistance.

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[41] *https://www.congress.gov/bill/117th-congress/senate-bill/685.*

[42] *https://www.congress.gov/bill/117th-congress/senate-bill/685.*

[42] *https://www.congress.gov/bill/117th-congress/senate-bill/685.*

FERMATA LLC (d/b/a FERMATA ENERGY)
1705 Lambs Road
Charlottesville, VA 22901

Chairman Wyden, Ranking Member Crapo, and Members of the Committee, my name is David Slutzky, and I am the Founder and CEO of Fermata LLC (d/b/a Fermata Energy). Fermata Energy designs, supplies, and operates technology that integrates electric vehicles with buildings and the electricity grid, turning electric vehicles into valuable storage assets that combat climate change, increase energy resilience, and reduce energy costs.

Today most electric vehicles have "one-way" charging. Their batteries can be charged with electricity from the grid or other power sources, but they cannot discharge that electricity back into homes, businesses or the grid. Electric vehicles that can send electricity back into homes, businesses and the electric grid help cut energy costs, improve energy resilience and fight climate change. However most electric vehicles and electric vehicle chargers are not equipped to do that today.

By helping to jumpstart the market for "bidirectional" electric vehicle charging (sometimes referred to as "vehicle-to-x," "V2X" or "V2G"), the federal government could build an American industry with good jobs and other enormous benefits for families and businesses. This technology can help protect against electric outages like what happened earlier this year in Texas. Bidirectional charging will speed deployment of solar and wind power by unlocking a vast new source of energy storage: the batteries already in electric vehicles. And it accelerates the deployment of electric vehicles by providing owners with a way to earn money with their parked cars and gives them a source of backup power.

As a V2X industry leader, we hope that our testimony will bring attention to the bidirectional charging and V2X services industry emerging in the United States. In addition to Fermata, companies such as Nuvve, Coritech, Rhombus, and Amply are pioneering bidirectional charging and V2X services technology in California, Colorado, and Delaware. At the same time, a growing number of U.S. automotive manufacturers, such as Ford, Rivian, Lucid, Blue Bird Corporation, Proterra, and Thomas Built are also incorporating bidirectional technology in their vehicles, creating jobs in Illinois, Michigan, Ohio, North Carolina, and Georgia. We believe that it's only a matter of time before bidirectional charging is the standard for electric vehicles.

Momentum for bidirectional charging is building. Many utilities are taking interest in V2X, launching pilots, research studies, programs, and industry partnerships to explore the potential of this technology. A U.S. bidirectional charging industry is starting to emerge, with more vehicle manufacturers offering models enabled for bidirectional power flows, UL-certified bidirectional chargers being manufactured and installed, and a growing number of projects demonstrating the technology's benefits.

Federal leadership could be transformational for bidirectional charging in the U.S., helping position the U.S. as a leader in this industry of the future. At present the federal solar and storage tax credit actually acts as a barrier to bidirectional EV charging, since it applies to stationary energy storage assets only. This creates an uneven playing field for the vast energy storage potential within electric vehicles. Widespread adoption of bidirectional charging will involve a number of market participants, including utilities, auto manufacturers, vehicles owners and building owners. Federal support would send a strong signal about the opportunities and public benefits of bidirectional charging, helping jumpstart the market.

PROPOSAL

We propose strengthening the electric vehicle charger tax credit to support bidirectional EV charging infrastructure.

- The IRS Section 30C alternative refueling property tax credit currently covers 30% of eligible costs (capital and installation) for electric vehicle charging equipment, up to a maximum of $1,000 for individuals and $30,000 for businesses. The credit expires December 31, 2021.
- IRS Section 30C should be amended to: 1) add "bidirectional electric vehicle charging equipment" to the list of alternative refueling property eligible for 30C tax credits, 2) increase the current tax credit ceilings for both individuals and businesses (as proposed in S.975) and 3) increase the tax credit percentage for bidirectional charging equipment from 30%, by an additional 20%, to allow for the increased cost of the equipment. The total credit would be up to a maximum of $3,333 for individuals and $200,000 for businesses, with an expiration date

of December 31, 2028. "Bidirectional electric vehicle charging equipment" would be defined as "equipment that allows an electric vehicle to charge and discharge electricity."

- To create thousands of new clean energy jobs and support U.S. manufacturing: Expand the Section 48C Qualifying Advanced Energy Project credit to include bidirectional electric vehicle charging equipment (in Section 48C(c)(1)(A)(i)(II)) and increase the overall credits available by $3B each year for the next five years.

BENEFITS

Bidirectional charging of electric vehicles will bring enormous benefits on a range of issues.

Job creation: The steps proposed here would create thousands of U.S. jobs and position the United States as the leader in a growing global industry. This includes jobs manufacturing bidirectional electric vehicle chargers and components as well as installing those chargers. U.S.-based manufacturing of bidirectional electric vehicle chargers and components is already underway, with facilities ready to expand quickly. Installation and maintenance of bidirectional electric vehicle chargers are jobs that can never be outsourced. Furthermore, by speeding adoption of solar and wind power with widespread, cost-effective energy storage, these steps would also contribute to job creation in the renewable energy industry. Expanding this tax credit would create American engineering, manufacturing, supply chain, and sales jobs in a nascent American industry and an emerging technology industry that is poised for rapid growth.

Lower Costs for Families and Businesses. Bidirectional charging turns electric vehicles into revenue-generating assets. With bidirectional charging, families and businesses can reduce—or in some cases, completely offset—the cost of owning of a vehicle. Parked vehicles could deliver real value for their owners for the first time. Families struggling to pay the bills and businesses looking to cut costs would both benefit. The benefits for disadvantaged communities would be especially strong, providing affordable mobility with clean vehicles that produce no air pollutants. Most EVs remain parked most of the day as an underutilized, untapped energy storage resource. Bidirectional charging technology harnesses this resource to lower the cost of EV ownership, leading to faster, more equitable EV adoption for low-income communities at risk of being "left behind."

The savings potential of bidirectional charging technology is enormous. In a recent case study by E Source—a leading research and advisory firm—a Fermata bidirectional charger paired with a Nissan LEAF in Virginia generated revenue sufficient to pay for more than 95% of the lease cost of a Nissan LEAF. In some parts of the United States (including California, Colorado, Indiana, Michigan and the Northeast), revenues from bidirectional charging could equal or exceed annual vehicle costs. It is important to recognize how impactful V2X can be to the total cost of ownership of an EV, making these vehicles more cost effective than internal combustion vehicles.

Affordable, Clean Transportation for Low-Income Communities:

Low-income communities benefit most from this technology:

- Many disadvantaged cannot afford personal transportation, let alone EVs. COVID–19 budget impacts to public transportation compound this problem enormously.
- Low-income options for cars are often limited to old vehicles, which while being less expensive to purchase, are not dependable and often end up costing more to service and repair than drivers can afford.
- Bidirectional EVs are the solution because they provide the lowest cost form of effective personal transportation.

Decarbonization of the Electric Grid and Vehicle Fleet: Bidirectional electric vehicles could provide a massive, decentralized source of energy storage, allowing utilities to integrate solar and wind power into electric grids far more rapidly and cheaply. With bidirectional chargers, for example, electric vehicles can charge when there is overgeneration of renewables (such as in the middle of a sunny day) and then supply stored energy back into the grid when renewable generation is low. Bidirectional charging also provides owners of electric vehicles with a new revenue source, helping cut the costs of electric vehicle ownership and speeding deployment

of electric vehicles. Bidirectional charging thus simultaneously promotes the transition to both a clean electric grid and clean vehicle fleet.

Energy Resilience and Grid Stability: Bidirectional electric vehicle charging can help families and businesses during electric outages, unlocking the potential of their electric vehicles to serve as backup generators. The technology also reduces the need for costly utility infrastructure upgrades by providing peak shaving, renewable energy optimization and ancillary services for grid operators and utilities. Bidirectional charging has the potential to generate significant value and cost-savings for utilities and grid operators by optimizing smart charging services and unlocking V2X value streams at the wholesale and retail level. By enabling electric vehicles to provide backup power to buildings and the grid, this next-generation of charging infrastructure will help families during electric outages, enhance grid resilience and protect the grid against disruptions such as from natural disasters.

Direct Benefits to the Federal Government: As the nation's largest vehicle owner, the federal government would benefit enormously from bidirectional charging. With bidirectional electric vehicles, the federal government could sell electricity from its vast fleet back to electric grids, earning revenue and cutting costs for taxpayers.

BIDIRECTIONAL CHARGING IS A TRIPLE WIN

- It protects families and businesses against electric outages like happened in Texas.
- It speeds deployment of solar and wind power, by unlocking a vast new source of energy storage.
- It speeds deployment of electric vehicles to all Americans, by providing owners with a way to earn money with their parked cars and source of backup power. (Bidirectional charging is an especially big win for low- and middle-income drivers, democratizing EV adoption by lowering costs.)

FERMATA ENERGY

Fermata Energy is one of a few American companies pioneering technology in the space of bidirectional or V2X charging. We are an inspiring story of American entrepreneurship and innovation. Founded in 2011, Fermata Energy is a vertically integrated company focused on V2X technology that includes all aspects needed for V2X operations: hardware development of chargers, network aggregation and operational software, and business operations for commercial interactions and monetization of V2X activities for customers.

Fermata is headquartered in Charlottesville, VA and has a hardware team based in Blacksburg, Virginia and a software team based in Raleigh, North Carolina. Other Fermata employees are based in New York, California, Maryland, and Texas. Fermata's existing V2G charger, the FE–15, is the first charger UL has certified in North America to the UL9741 bidirectional charger requirements. Fermata's existing units are manufactured by Fermata's contract manufacturer, Electronic Instrumentations Technology (EIT), in Danville, Virginia.

In addition to developing hardware and software required to perform V2X activities, Fermata Energy has spent nearly 10 years studying the value streams that V2X can unlock from an EV, which of these value streams are commercially viable today without regulatory intervention, and how to best monetize these value streams. Fermata has extensive experience with analyzing use cases, monetization mechanisms, and business models to maximize the benefits of V2X technologies. Fermata Energy's V2X solutions integrate not only proprietary hardware and software, but also a network of strategic partnerships. In 2018, Nissan North America announced that they chose Fermata Energy for a major V2G pilot project at their North American Headquarters.

Fermata already has several active V2X sites with utility partners and fleet customers across the U.S.. We currently have seven publicly announced projects across the U.S., and many more deployments with utility and fleet partners planned for 2021. Most notably, we have active commercial V2X deployments with the City of Boulder, Colorado; Green Mountain Power (an electric utility in Vermont); Roanoke Electric Cooperative (a rural electric cooperative in North Carolina); and Bigelow Tea Company. These sites are performing commercial V2B and V2G activities with EVs right now, earning thousands of dollars a year for our customers with just a few initial applications. At our utility sites, Fermata's systems are successfully performing demand response and Fermata plans to expand this technology to the utilities' customer base this year as well. In 2021, Fermata also plans to pilot other revenue-generating V2X applications with our next deployment partners.

As an industry leader, we are committed to our founding vision: accelerating the adoption of electric vehicles and accelerating the transition to a clean energy economy. We are a mission-driven organization, and we understand that the importance and potential of the bidirectional charging industry far outweighs any one organization or company. Educating consumers, utilities, industry, and policymakers about bidirectional charging is central to our mission.

CONCLUSION

We are at a critical tipping point as a nation, and globally, in our response to climate change. Natural disasters that threaten the reliability of the electric power grid and American lives are on the rise. The impacts of climate change are also intensifying. Rolling blackouts and brownouts in California and the Pacific Northwest, as well as the recent grid failure in Texas, are stark examples of this growing risk.

Now, more than ever, we must support and incentivize domestic technologies that can stem the tide of climate change and its adverse impacts. Bidirectional charging has proven potential to cut energy costs, improve energy resilience, and fight climate change. This new but growing segment of the electric vehicle charging industry provides cost effective solutions to rolling blackouts, peak reduction, and the transition to renewable energy. The electric grid and consumers need energy storage to meet evolving energy needs and to harden the grid against natural disasters. At the same time, EVs must be affordable to enable an equitable transition to a clean energy economy. Bidirectional charging sits at the intersection of these two major societal challenges, and offers a powerful solution to both.

This technology and growing American industry can provide major benefits to consumers, utilities, and the electric grid, all while delivering cost-savings and pollution mitigation to low-income communities that have often been underserved by the cleantech and renewable energy sector. The green energy space has seen tremendous growth over the past few decades; dozens of new, innovative, and disruptive technologies have flourished with the support of public investment. The bidirectional charging industry is similarly poised to provide tremendous benefits to American consumers, the energy industry, and the economy at large. With a jumpstart from a small change to the tax code, this emerging American technology and industry can deliver on its full promise.

Thank you for your time and consideration,

David Slutzky
CEO, Founder Fermata LLC

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA
1201 15th Street, NW, Suite 300
Washington, DC 20005
202–857–4722
Fax 202–857–4799
https://www.ipaa.org/

IPAA represents thousands of America's independent oil and natural gas producers. Our members are the primary producers of the nation's oil and natural gas and account for 83 percent of America's oil production and 90 percent of its natural gas output. These independent producers are a driving force in our economy and support roughly 4.5 million jobs in the United States. IPAA member companies are innovative leaders and broke the code to usher in the shale oil and natural gas revolution in the United States.

As the United States and the world struggle to rebound from the economic hardship caused by the COVID–19 pandemic, it is essential for America to continue to be a leader in energy development. All forms of energy will be needed in the coming years and natural gas and oil produced in the United States will be a key component of that energy mix. Oil and natural gas will not be the only energy source for the United States, but they will be essential to the American economy for years to come.

The choices the nation makes regarding its energy mix will have a huge impact on its economy and its international position. If America does not pursue a thoughtful energy policy, the nation will suffer economically. Unless demand for fossil energy changes dramatically, efforts to suppress U.S. oil and natural gas production will be counterproductive to the goals of addressing greenhouse gas emissions, increasing job growth and expanding America's impact around the globe. Energy is a geopolitical issue. For the last half-century, American foreign policy has been predi-

cated on the nation's vulnerability to oil and natural gas supply disruptions. The shale revolution turned the United States into an energy superpower, has enhanced American national security and created significant geopolitical advantages for this nation around the globe.

Additionally, natural gas production and use has created the cleanest air quality the nation has seen in two decades. The United States has become the envy of nations for its dedication to reliable, affordable, responsible energy production.

Independent producers recognize the need to manage their emissions, including methane emissions. Over the past several years, as methane regulations have been developed, IPAA has been active in trying to assure that the regulations are designed appropriately for the diverse elements of the industry, including the small business operations that dominate ownership of low producing wells.

However, a troubling undercurrent of effort to suppress American oil and natural gas production appears directed at numerous factors that affect production. Among these is a false claim of "tax subsidies" for oil and natural gas production that are, in fact, normal business deductions.

The Role of American Oil and Natural Gas

Despite the hyperbole of new energy sources displacing oil and natural gas, in reality, oil and natural gas supplied about 70 percent of America's energy in 2020 and is projected to supply about 70 percent in 2050. Internationally, oil and natural gas are about 50 percent of total energy consumption. These realities cannot be ignored and wished away. Oil and natural gas are a key component of the American economy—an economy that must grow for a strong nation to continue.

- They provide the fuels for the vast majority of the 275 million vehicles registered in the United States—vehicles that will be on the road for decades to come. Included among these are the millions of trucks that transported and delivered the key commodities that kept America functioning for the past year of the COVID pandemic.
- They provide fuel for the trains and the airplanes that are essential for interstate and international commerce.
- They fuel the vessels that transport America's exports and imports.
- Altogether, oil and natural gas provide 93 percent of transportation energy.
- They heat and cool America's homes and businesses, providing 95 percent of the energy needed.
- They generate American electricity; natural gas generates 40 percent of American electrical power.
- They produce the synthetic fibers, pharmaceuticals, medical supplies, computer and cell phone components, agricultural fertilizers and chemicals that are essential for a modern country.
- The provide revenues to state governments and the federal government to fund important programs ranging from education to land and water conservation.

While oil and natural gas greenhouse gas emissions must be managed, their use provides key environmental benefits. America's success in reducing its greenhouse gas emissions comes from its expanded use of natural gas. Internationally, expanded use of natural gas promises to help the world improve its greenhouse gas emissions. Meanwhile, cleaner American oil products like low sulfur diesel fuel provides lower income countries the opportunity to reduce their reliance on dirty fuels in their homes and huts that place severe risks on their health and to limit the devastation of their forests. The environment and public health challenges across the world are large and complex and failure to address fundamental health challenges limits nations' ability to address their greenhouse gas emissions.

Unfortunately, rather than recognize the key roles oil and natural gas play in the American economy, anti-oil and natural gas interests concoct elaborate fiction that American oil and natural gas companies somehow duped the American public into using its products. Realistically, demand for these products has driven the advanced economies of the world. Following World War II, Americans began the long sought recovery from the Great Depression. Their demand for vehicles, electricity, emerging new products and homes resulted in increasing the need for more and more oil and natural gas and their products. In fact, American demand exceeded the capacity of American oil and natural gas production. America had to import more and more oil and eventually turned to importing natural gas.

American oil dependency after 1970 led to fifty years of international security issues where America's foreign policy choices depended on its effect on oil supply. Two clear crises were oil embargoes in 1973 and 1979. By 2007, the United States was importing 65 percent of its oil supply. While much of it came from Canada and Mexico, significant amounts came from the Middle East where relationships were tenuous or hostile. The shale oil revolution changed international energy security dynamics significantly, positioning the United States more securely.

However, new efforts to suppress American oil and natural gas supply could reverse these important policy shifts. Demand drives the need for oil and natural gas supply. Crushing American supply will not reverse American demand. Instead, America will need to meet its energy demand by returning to imports. Global greenhouse gas emissions will not be reduced but American energy security will be threatened again like the fifty years following 1970.

Tax Issues

One path to reducing American oil and natural gas production involves restricting its capital investment. Because all oil and natural gas production declines—or depletes—over time, new production must replace the lost production. New wells must be drilled. Existing wells must be maintained even as their production diminishes. For independent producers, most of its capital comes through the well head. That is, the revenue it receives from selling its production becomes the capital it needs to drill and maintain wells. Clearly, tax policy then plays a significant role. Taxes remove capital.

Oil and natural gas tax policies will continue to draw attacks from those anti-oil and natural gas factions that want to cripple American production. Much of the rhetoric surrounding these attacks will hide behind the red herring of "tax subsidies for Big Oil" when the reality is that the tax provisions are not "subsidies" but normal business deductions. The impact of changing the provisions will fall on independent oil and natural gas producers, substantially on small businesses, and on royalty owners such as retirees, ranchers and farmers who own oil and natural gas mineral resources underlying their properties.

Two of the most targeted tax provisions are the treatment of intangible drilling and development costs (IDC) and percentage depletion.

Intangible Drilling Costs

Since 1913, a drilling and development costs deduction has been allowed as an ordinary and necessary business expense for those costs where there is no remaining equipment to value (salvage value) when an oil or natural gas well is completed. Because there is nothing tangible to value, these costs are generally called "intangible drilling costs" or IDCs. For the past 35 years, American tax policy has shortened the depreciation period for equipment to allow capital to be recovered and reinvested in new American projects. Like other rapid depreciation schedules in the tax code, the drilling cost deduction allows for investment capital to be immediately recovered and encourages its reinvestment. This is the same concept adopted as Bonus Depreciation in the 2017 Tax Reform Act. It is neither a "tax subsidy" nor a "loophole." For American independent producers expensing has resulted in facilitating reinvestment in new American projects at rates up to 150 percent of American cash flow.

Within the past 15 years the combination of advanced horizontal drilling techniques and sophisticated hydraulic fracturing opened the development of both shale gas and shale oil formations. Clearly, while America has been producing these resources for 150 years, today's production will reflect a vastly different onshore industry than in the past. Similarly, the industry will continue to advance its technology in the offshore where the challenges of deeper formations and deeper water depths have driven significant changes in the past twenty years. What is common to developing all of these resources is the need for capital. In 2017, independent producer capital expenditures were approximately $110 million.

Independent producers have a history of investing in America. Prior to the economic challenges the industry has faced in the past several years, assessments have concluded independents reinvesting up to 150 percent of their American cash flow back into new American projects. And, independents drill 91 percent of wells in the United States. The faster that producers recover the capital invested in projects, the faster it can be reinvested. For independent producers since 1913—at the inception of the tax code—drilling costs for the elements that are not a part of the final operating well could be deducted in the year they are incurred (expensed). These costs can be 60 to 90 percent of the development costs of a well—with shale wells on the

high end. Clearly, putting this capital back into new production means more jobs, more production and more federal and state taxes.

For example, independent producers influenced almost $1.2 trillion of sales activity in the United States during 2018. This, in turn, contributed about $573 billion or 2.8% of U.S. GDP and supported 4.5 million jobs (3.0% of non-agricultural employment). IHS Market estimates the independents initiated economic activity that generated over $101 billion in federal state and local taxes in 2018.

Percentage Depletion

Depletion, like depreciation, allows for the recovery of capital investment over time. Percentage depletion is used for most mineral resources including oil and natural gas. It is a tax deduction calculated by applying the allowable percentage to the gross income from a property. For oil and natural gas the allowable percentage is 15 percent.[1]

Depletion has been a part of the tax code since its inception. Initially, the only form of depletion was cost depletion; however, it limits depletion to the capital cost of a project. After World War I, Congress recognized that too many natural resources were being abandoned because of cost depletion limiting the economic viability of projects. Consequently, it began to allow forms of value depletion to be used as well. In 1926, it settled on percentage depletion.

Percentage depletion has changed over time. Current tax law limits the use of percentage depletion of oil and natural gas in several ways. First, the percentage depletion allowance may only be taken by independent producers and royalty owners and not by integrated oil companies. Second, depletion may only be claimed up to specific daily American production levels of 1,000 barrels of oil or 6,000 mcf of natural gas. Third, the net income limitation requires percentage depletion to be calculated on a property-by-property basis. It prohibits percentage depletion to the extent it exceeds the net income from a particular property. Fourth, the deduction is limited to 65% of net taxable income. Percentage depletion in excess of the 65 percent limit may be carried over to future years until it is fully utilized.

Despite these limitations, percentage depletion remains an important factor in the economics of American oil and natural gas production. Most independent producers do not exceed the 1000 barrel per day limitation. Yet, these producers are a significant component of America's oil and natural gas production. For example, they are the predominant operators of America's marginal wells. Over 85 percent of America's oil wells are marginal wells—producing less than 15 barrels per day, averaging about 2.5 barrels per day. Yet, these wells produce about 10 percent of American oil production. About 75 percent of American natural gas wells are marginal wells (averaging about 22 mcfd), producing approximately 10 percent of American natural gas. Marginal wells are unique to the United States; other countries shut down these small operations. Once shut down, they will never be opened again—it is too costly. Even keeping them operating is expensive—they must be periodically reworked, their produced water (around 9 of every 10 barrels produced) must be disposed properly, the electricity costs to run their pumps must be paid. The revenues retained by percentage depletion are essential to meet these costs. For larger wells, percentage depletion provides more revenues to be used to find new oil and natural gas in the United States.

In addition to independent producers, royalty owners can take percentage depletion on wells producing their mineral assets. Royalty owners can take percentage depletion on wells regardless of whether the producer is an independent or integrated company. One reason that percentage depletion draws attention is the revenue estimate associated with it; however, the revenue estimate never separates its evaluation between producers and royalty owners.

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[1] For marginal wells the allowable percentage is increased (from the general rate of 15 percent) by one percent for each whole dollar that the average price of crude oil for the immediately preceding calendar year is less than $20 per barrel. In no event may the rate of percentage depletion under this provision exceed 25 percent for any taxable year. The term "marginal production" for this purpose is domestic crude oil or domestic natural gas which is produced during any taxable year from a property which (1) is a stripper well property for the calendar year in which the taxable year begins, or (2) is a property substantially all of the production from which during such calendar year is heavy oil (*i.e.,* oil that has a weighted average gravity of 20 degrees API or less corrected to 60 degrees Fahrenheit). A stripper well property is any oil or gas property which produces a daily average of 15 or less equivalent barrels of oil and gas per producing oil or gas well on such property in the calendar year during which the taxpayer's taxable year begins.

Conclusion

Oil and natural gas will remain a key component of energy supply in the world for the foreseeable future. Their emissions will need to be managed, but no modern economy will function without them. This is clearly true in the United States where oil and natural gas contributes approximately 70 of the energy consumed in the country now and in 2050. Growth in other energy sectors will occur but more energy will be needed to maintain a robust American economy.

If new policies reduce American demand for oil and natural gas, production and imports will diminish. However, artificial politic efforts to suppress American supply will not reduce demand; it will only lead to a return to an import dependent energy structure with attendant energy security risks.

False attacks on "tax subsidies" targeting American oil and natural gas producers and royalty owners will reduce supply while hurting independent producers, particularly small businesses, and royalty owners. They will not reduce greenhouse gas emissions. The ultimate beneficiaries of these actions would be foreign national oil companies producing with less emissions management than those in the United States. Congress should oppose these adverse policies.

INDUSTRIAL ENERGY CONSUMERS OF AMERICA
1776 K Street, NW, Suite 720
Washington, DC 20006
Telephone (202) 223–1420
www.ieca-us.org

The Honorable Ron Wyden
Chairman
U.S. Senate
Committee on Finance
221 Dirksen Senate Office Building
Washington, DC 20510

Re: The "Clean Energy for America Act." Investment Tax Credit (ITC) for Electric Transmission Infrastructure

Dear Chairman Wyden:

Thank you for the introduction of the "Clean Energy for America Act." As some of the largest industrial electricity consumers in the U.S., we are concerned about Section 102, the Clean Electricity Investment Credit and the 30 percent Investment Tax Credit (ITC) for electric transmission facilities. The ITC is not needed and unless consumer safeguards are added, consumers will likely pay for hundreds of billions of dollars for electric transmission projects that are not needed or are overpriced, which substantially increases electric costs for all consumers. Manufacturing competitiveness and jobs will be impacted.

Electric transmission costs are manufacturing's highest increasing energy-related cost. As an example, in the last decade, PJM's transmission costs increased from $4.22 to $10.39 per megawatthour (Mwh), which is an increase of 145 percent. In the last 5 years, the costs increased from $7.69 to $10.39 per Mwh or 35 percent. Other RTOs and ISOs have similar cost increases.

The assumption that a financial incentive is necessary for companies to invest in electric transmission is not correct. Companies have easy access to low-cost capital for transmission projects. The major barrier to building-out the grid is the failure to implement planning and permitting processes. This is a matter that the Federal Energy Regulatory Commission (FERC) needs to address.

Electric transmission projects receive generous guarantee high return on equity (ROE) on capital for the life of the asset. State and federal wholesale electric market regulations award generous ROEs that range from 10 to 15 percent. These high ROEs are sufficient incentive to attract capital without an ITC. Most manufacturing business ROEs are in the single digits.

To meet national climate GHG emissions reduction goals, hundreds of billions of dollars of transmission projects would be needed. President Biden's "American Jobs Plan" calls for the buildout of at least 20 gigawatts of high-voltage capacity power lines. Princeton University's December 2020 study "Net Zero America" states that high-voltage transmission capacity will need to be expanded by roughly 60 percent at an estimated cost of $350 billion. We urge you to be prudent to protect consumers.

If you do proceed with the ITC, we would urge you to insert a provision which requires that all electric transmission projects that receive the ITC be competitively bid. The FERC can verify that when transmission projects are competitively bid, it reduces costs to consumers. To this point, several state utilities have used their influence over state policymakers to put in place Right of First Refusal (ROFRs) provisions that block competitive bidding of transmission projects, over the objections of consumers. Importantly, ROFRs exist in states with large wind and solar resources.

We encourage you to hold a hearing on this matter. Given the magnitude of the transmission spending that will be needed to achieve U.S. climate goals, unless this matter is handled correctly, consumers will be saddled with high electric prices for decades to come and manufacturing competitiveness will be impacted. We look forward to working with you on this matter.

Sincerely,

Paul N. Cicio
President and CEO

The Industrial Energy Consumers of America is a nonpartisan association of leading manufacturing companies with $1.1 trillion in annual sales, over 4,200 facilities nationwide, and with more than 1.8 million employees. It is an organization created to promote the interests of manufacturing companies through advocacy and collaboration for which the availability, use and cost of energy, power or feedstock play a significant role in their ability to compete in domestic and world markets. IECA membership represents a diverse set of industries including: chemicals, plastics, steel, iron ore, aluminum, paper, food processing, fertilizer, insulation, glass, industrial gases, pharmaceutical, building products, automotive, independent oil refining, and cement.

NATIONAL ASSOCIATION OF ROYALTY OWNERS, INC. (NARO)
7030 S. Yale Ave., Suite 404
Tulsa, OK 74136

Jack Fleet
Executive Director
jfleet@naro-us.org

My name is Jack Fleet, executive director of NARO. I appreciate the opportunity to provide testimony to the committee on this important topic.

This testimony is being provided to present NARO's concerns about legislation which has been proposed in Congress and would remove Percentage Depletion Allowance for oil and gas production. This action will be harmful to millions of middle-income American royalty owners and result in the loss of royalty payments, many of whom are retirees living on fixed incomes.

NARO shares concerns of the domestic energy community, in particular oil and natural gas, in the treatment of US government policy regarding stimulation of domestic energy production. To that end, my testimony is focused on the significant negative impact to royalty owners through the modification of removing Percentage Depletion Allowance from our Federal Tax Code. Percentage Depletion Allowance is the only tax deduction that many royalty owner takes on their royalty income.

Who is NARO?

The National Association of Royalty Owners is a volunteer led, member based, 501(c)6 and represents the concerns of an estimated 12.6 million royalty owners. Our mission is to support, advocate and educate for the empowerment of mineral and royalty owners. We were founded by Jim Stafford in 1980 to address the concern of Windfall Profit Tax on royalty owners. We have members in all 50 states.

The average NARO member is over 60 years old, widowed and receives less than $500 a month in royalties, which supplements their social security income.

Owners of producing mineral interest (royalty owners) are entitled to their proportionate share of production paid by royalty revenue. NARO holds to the claim the royalty owner's right of equity and fair play in accordance with lease contracts and law. To that end, royalty owners have the right to be heard in matters regarding oil and gas energy policy, proposed legislation or regulatory issues that would positively or adversely affect their interest.

NARO represents many royalty owners who do not have the wealth, time or resources of larger oil and gas or mineral companies and as a result, have a limited ability to make an impact and inform legislators of their concerns.

How many royalty owners are there?

Royalty owners come from all walks of life: ranchers, farmers, barbers, teachers, pharmacist, homemakers, factory workers, carpenters, retirees, widowers and just about every trade or profession in the United States. Our members are your constituents, they are diversified politically and belong to all political parties. Many of them, no doubt, voted for members of this committee and depend on you to represent them.

In 2013, NARO gave testimony to the United States House of Representatives Committee on Ways and Means and estimated nationally there were 8,440,755 royalty owners. Today, that number has grown to an estimated 12,600,000. The number of royalty owners is increasing due to fractionalization of mineral estates from generation to generation. Additionally, there is an increase in citizens buy minerals and royalties for the first time.

Today, we estimate the number of royalty owners in each state to be:

AK 20,400	AL 49,725	AR 382,500	AZ 216,750	CA 765,000
CO 981,750	CT 25,500	DC 25,500	DE 3,825	FL 242,250
GA 127,500	HI 12,495	IA 49,725	ID 53,550	IL 114,750
IN 40,800	KS 221,850	KY 16,575	LA 188,700	MA 45,900
MD 53,500	ME 8,288	MI 66,300	MN 71,400	MO 165,750
MS 58,650	MT 71,400	NC 100,725	ND 36,975	NE 29,325
NH 20,400	NJ 71,400	NM 242,250	NV 66,300	NY 191,250
OH 45,900	OK 2,537,250	OR 76,500	PA 18,500	RI 8,288
SC 33,150	SD 8,288	TN 89,250	TX 4,462,500	UT 58,650
WY 45,900				

These estimates are only those that are currently receiving royalties on producing mineral estates. However, there are many more mineral owners in all states that are not receiving royalties.

Percentage Depletion Allowance:

This tax allowance is not specific to the oil and natural gas Industry. In fact, many natural resource industries are allowed to take depletion allowance, such as Sulphur, Uranium, other rare earth minerals, ores, industrial grade crystals, gold, silver, copper, timber and coal to name a few. It should also be noted that small oil and gas operations that take advantage of percentage depletion allowance are capped at 15 barrels of oil per day per well. Many of these small operators produce 1–5 barrels of oil a day and have 11 employees on average.

Percentage Depletion is Not Cost Depletion:

Depletion represents the decreasing values of a limited reservoir of a non-renewable resource. Just as an assets value depreciates over time and thus the tax liability on that value changes accordingly. The non-renewable resource is diminished over time and the value of that resource depreciates.

Most large companies use cost depletion to calculate the cost/expense involved in extracting or mining of the natural resource and the reserve that remains after the extraction. The alternative to this complicated method is Percentage Depletion Allowance, which is much simpler to apply, especially for the average royalty owner.

The Percentage Depletion Allowance for oil and natural gas is 15%. The flat percentage makes calculating this allowance easy and has limits to benefit the middle-

income American royalty owner and has nothing to do with large companies. While Cost Depletion is very costly, complicated and, in most cases, impossible for the small royalty owner to determine. Contracts between the mineral or royalty owner and the operator do not provide for the details necessary for Cost Depletion to be determined.

The proposal to eliminate Percentage Depletion Allowance would not eliminate a "subsidy" to "Big Oil" but would hurt the small royalty owner, most assuredly constituents of the members of this committee. Subsidy is defined as a direct cash payment by the government to a person or business. While leaving Cost Depletion which the large oil and natural gas companies use untouched. Further, people that buy minerals, such as one family member who buys out another family member's interest, likely relied on the continued existence of percentage depletion in agreeing on the price.

Removing Percentage Depletion Allowance would also result in a tax increase for many royalty owners who make less than $400,000 per year. As mentioned earlier, the average NARO member's royalty income is $500 per month and supplements their social security and retirement income. Removing their Percentage Depletion Allowance would raise their annual taxable income and increase their tax burden, counter to President Biden's commitment to protect incomes of those below $400,000 a year.

Conclusion:

NARO stands strongly behind keeping Percentage Depletion Allowance and opposes efforts to eliminate it. Removing this allowance will put an added financial burden on the citizens that own these natural resources and hurt those that use their royalty income to supplement their social security and retirement. All of this, just as the economy and our citizens are starting to recover from the COVID pandemic.

I would like to conclude with an example of the impact royalty income means to a NARO member, Ms. Mosley of North Carolina with mineral and royalty interest in West Virginia.

"The royalty money supplements my small social security allowing me freedom from fear of poverty. And it allows me to donate to charities, including in the county where my minerals are (different from my residence). My cataract surgery with special replacement lenses was possible with the royalty money. President Biden has said that he will not raise taxes on incomes under $400,000. Well, mine is quite a lot less than that, and removal of the depletion deduction would certainly raise my taxes!"

Source: "The Need for Percentage Depletion Allowance for Mineral/Royalty Owners: How Tax Policy Can Simultaneously Affect the Equitable Treatment of Royalty Owner, and National Security" by NARO 2013.

NATIONAL ENERGY AND FUELS INSTITUTE
1629 K Street, NW
Washington, DC 20006
(202) 508–3645
www.nefi.com
@nefiaction

May 11, 2021

The Hon. Ron Wyden
Chair
U.S. Senate
Committee on Finance
219 Dirksen Senate Office Building
Washington, DC 20510

The Hon. Mike Crapo
Ranking Member
U.S. Senate
Committee on Finance
219 Dirksen Senate Office Building
Washington, DC 20510

Dear Chairman Wyden and Ranking Member Crapo:

We write in response to the hearing titled "Climate Challenges: The Tax Code's Role in Creating American Jobs, Achieving Energy Independence, and Providing Consumers with Affordable, Clean Energy," held on Thursday, April 27, 2021. The National Energy and Fuels Institute (NEFI) appreciates the opportunity to submit comments on behalf of America's liquid heating fuels industry.

NEFI has been a voice for small Main Street energy distributors and HVAC providers since 1942. Most are multi-generational family businesses that deliver a safe,

reliable, and efficient fuel for space and water heating applications. This fuel is commonly referred to as home heating oil, a catch-all term that includes various grades of fuel oil and kerosene. Our industry serves approximately 6.5 million homes and businesses nationwide.[1] This includes over five million homes and businesses throughout the Northeast and Mid-Atlantic regions, or 90% of the entire U.S. heating oil market.[2]

As the Chairman noted in his opening statement, the purpose of the hearing was to discuss the Clean Energy for America Act (CEAA), introduced on Wednesday, April 21, 2021. The CEAA eliminates around 40 temporary tax incentives and, according to the Chairman, "replac[es] them with emissions-based, technology-neutral credits to turbocharge investment in clean electricity, clean transportation and energy conservation."[3] Our comments focus on the CEAA and its potential effects on NEFI members and their consumers.

I. Renewable Fuel Incentives

The liquid heating fuels industry is committed to reducing greenhouse gas emissions (GHGs). At a 2019 summit organized by NEFI in Providence, Rhode Island, over 300 industry stakeholders approved a resolution that promises to deliver a net-zero-carbon liquid heating fuel to consumers by 2050. This commitment, known as the Providence Resolution, includes interim goals of a 15-percent reduction in GHGs by 2023 and at least a 40-percent reduction by 2030. These goals are largely consistent with President Biden's emission reduction targets and U.S. commitments under the Paris Climate Agreement.

Recent studies by IHS Markit and Kearney find the Providence Resolution's goals can be achieved through utilization of renewable fuels including biomass-based diesel and cellulosic fuels designed exclusively for thermal energy applications.[4] A 15-percent reduction in carbon emissions can be achieved with a 20-percent (or B20) blend of biodiesel and ultra-low sulfur heating fuel; and a 40-percent reduction can be achieved with a 50-percent (or B50) blend of the same.[5] Based on average annual consumption, around 2.5 billion gallons of biodiesel will be required annually to achieve a B50 blend industrywide. Additional volumes of biodiesel and other advanced biofuels, including those produced from cellulosic feedstocks, will enable delivery of a "net-zero" liquid heating fuel by 2050.

Blends of biodiesel derived from either soybean oil or recycled vegetable oils are in widespread use throughout the industry and have been embraced by consumers. Many retailers are now delivering biodiesel and heating oil blends of 20% (B20).[6] These fuels utilize existing storage and distribution infrastructure and, in most cases, can be used seamlessly in existing oil-fired appliances to deliver immediate GHG reductions at little to no additional cost to the end-user.[7] At the direction of Congress, the National Oilheat Research Alliance (NORA) is developing pathways to even higher biodiesel blends and high-performance cellulosic fuels designed exclusively for residential and commercial heating appliances.[8]

The successful adoption and widespread acceptance of renewable liquid heating fuels across our industry is due in large part to the biodiesel and renewable diesel

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[1] U.S. Census Bureau, *American Community Survey (ACS), Fuel Oil Use by Occupied Housing Units, Five-Year Avg. (2013–2017).* Percent (%) of homes is calculated as a percentage of total state occupied housing units.

[2] For this purpose, NEFI defines the "broader Northeast and Mid-Atlantic regions" to include New England, Delaware, Maryland, New Jersey, New York, North Carolina, Pennsylvania, West Virginia, Virginia, and the District of Columbia.

[3] U.S. Senate Committee on Finance, *Wyden, Colleagues Introduce Legislation to Overhaul Energy Tax Code, Create Jobs, Combat Climate Crisis,* April 21, 2021 [press release].

[4] *See* HIS Markit, *Heating Oil: Transitioning to Bioblends 2023–2050* (report prepared for the National Oilheat Research Alliance), August 13, 2020; and Kearney, *Roadmap to Success: Achieving a Net-Zero Carbon Future by 2050,* October 2020.

[5] Based on average biodiesel emissions data provided by the National Biodiesel Board (NBB).

[6] National Oilheat Research Alliance, *Survey on Mechanical Issues Related to Biodiesel Blending,* March 2017, p. 2.

[7] National Oilheat Research Alliance, *Developing a Renewable Biofuel Option for the Home Heating Oil Sector: A Report to Congress, State Governments and the Administrator of the Environmental Protection Agency,"* May 2015, p. 18.

[8] Congress revised the NORA statute in the 2014 Farm Bill to focus on the research and development of advanced biofuels. See Pub. L. 113–79, Section 12405(a). Cellulosic fuels being developed for thermal heating applications includes Ethyl Levulinate (EL), a high-performance renewable fuel derived from woody biomass, municipal solid waste, and other sustainable feedstocks. A study by Biofine Developments Northeast Inc. and EarthShift Labs shows EL to reduces emissions by over 100-percent when compared to conventional petroleum-based home heating oil.

blenders' tax credit (BTC). We commend Congress for reinstating the tax credit through December 31, 2022, thereby providing producers, marketers, and consumers alike with greater certainty and market stability. The BTC incentivizes fuel suppliers in the Northeast to invest in blending, storage, and delivery infrastructure to help meet growing demand for advanced biofuels in the residential and commercial energy sector.

Section 201 of the CEAA replaces the BTC and other renewable fuel incentives with a single "technology-neutral" incentive based on a fuel's lifecycle carbon emissions. Alternative fuels produced in the United States may receive a tax credit if their lifecycle emissions are reduced by at least 25%. Zero and net-negative emission fuels qualify for a maximum tax credit of $1.00 per gallon. Between now and 2030, renewable fuels must become increasingly cleaner to qualify for the credit. Further, the CEAA phases-out the incentive over five years once the U.S. Environmental Protection Agency and Department of Energy certify that the transportation sector emits 75% less carbon than 2021 levels.

NEFI is evaluating the specifics of Section 201 and its potential impact on continued growth of renewable liquid heating fuels, particularly in the Northeast. While we do not currently have a position on this proposal, we look forward to discussing the merits of performance-based policies based on life cycle emissions. An accurate measuring of carbon intensity must be established and applied universally for such policies to be successful.

II. Residential Energy Efficiency Incentives

In addition to reducing GHGs through cleaner drop-in fuels, significant gains can be made through increased building efficiency. Our industry has been a leader in this regard. Through more efficient appliances and cleaner burning fuels, the heating oil industry has reduced per home fuel consumption by more than 50% over 40 years.[9] Over the last ten years, our industry has embraced ultra-low sulfur (ULS) heating fuels, which are now in widespread use and have been mandated by state and local governments throughout the Northeast and Mid-Atlantic regions. ULS heating fuels burn as cleanly as natural gas, increase system efficiencies, reduce maintenance costs, and save consumers money.[10, 11]

Combining renewable liquid heating fuels with modern, efficient home heating appliances is the quickest and most cost-effective path to reducing residential GHG emissions *and* consumer energy bills. It also provides homeowners an affordable alternative to costly and inefficient heat pumps. A residential heat pump conversion is typically 3 to 6 times the cost of a high efficiency biofuel-compatible heating system, with conversions ranging up to $35,000 or more. Recent studies conclude that electric heat pumps and "cure-all" electrification policies unnecessarily burden lower-income households and vulnerable communities and perpetuate environmental and economic inequalities.[12] Alternatively, renewable fuels provide Americans on a fixed income with a "plug and play" solution to lower energy costs and an opportunity to make meaningful contributions in the battle against climate change.

Notably, heat pumps could quite literally leave consumers "out in the cold." They are known to perform very poorly in the field compared to their nameplate efficiency rating. This efficiency continuously degrades as temperatures drop below 40 degrees to the point of the equivalent of electric resistance heat.[13, 14] The increased load results in super-peaking situations that increase GHG emissions because many generators rely on fossil fuels to meet surging electricity demand. These peaking events strain the electric grid and can result in catastrophic power outages, as evidenced by the recent Texas power crisis.

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[9] Source: *www.oilheatamerica.com.*

[10] Batey, John E., et al., *Ultra Low Sulfur Home Heating Oil Demonstration Project: Summary Report,* Energy Research Center, Inc and Brookhaven National Laboratory and prepared for the New York State Energy Research and Development Authority (NYSERDA), September 2015.

[11] The National Oilheat Research Alliance estimates heating plant service cost savings for a typical homeowner for ULS fuel is around $50 per year and fuel efficiency improves about 2 percent.

[12] Acosta, Joel, *Study: Electrification is a Misguided Approach to Tackle Climate Change,* Energy In Depth, July 9, 2020, *www.energyindepth.org/study-electrification-is-a-misguided-approach-to-tackle-climate-change* (accessed May 11, 2021).

[13] Winkler, Jon, Ph.D., *Laboratory Test Report for Fujitsu 12RLS and Mitsubishi FE12NA Mini-Split Heat Pumps,* U.S. Department of Energy, September 2011.

[14] RDH Building Sciences, Inc., *BC Cold Climate Heat Pump Field Study (Project 21090.00),* November 9, 2020.

A total of 61% of all occupied housing units in the state rely on electric heat to stay warm each winter, according to the U.S. Census Bureau.[15] In response to record cold temperatures and snowfall this February, millions of Texans cranked up their electric heating systems, which proved more than the state's electric grid could handle.[16] While not the lone cause of the crisis, dependence on electric heat contributed to blackouts that resulted in $195 billion in economic damages and up to 200 deaths statewide, making it one of the costliest disasters in the Lone Star State's history.[17, 18]

Consider as well that refrigerants used in heat pump installations have a high global warming potential (GWP). R–410A, the most common refrigerant used in heat pumps, has a GWP that is 2,088 times that of carbon dioxide.[19] Heat pump refrigerant often leaks, resulting in reduced efficiency and poor performance. Leaks are so common that recharging refrigerant is necessary over the life of the heat pump. Further, next generation modern fluorinated refrigerants are now recommended for evaluation and phase-out by the European Commission due to even greater GWP than R–410A, as they degrade into the same substance that they were supposed to replace.[20]

We commend the committee for seeking an approach that allows Americans to choose heating fuels and technologies they deem safest for their families and the environment. Section 302 of the CEAA replaces the existing and relatively lackluster home energy efficiency tax credits with a more robust incentive. It provides a credit of 30% of the cost of a home efficiency improvement up to $500, with an overall annual limit of $1,500 for all home improvements. This is three times the benefit under existing law.

Homeowners may choose whether to upgrade an existing heating system, water heater, or air conditioner, or make improvements to envelope efficiency. This is not unlike the existing tax credit under Section 25C of the Internal Revenue Code. However, the existing tax credit needlessly restricts some of the most efficient renewable liquid heating fuel appliances from eligibility. This could result in a consumer switching to a fuel with a higher global warming potential just to be eligible for a tax credit.

The CEAA discussion draft defers from the existing tax credit in that it allows heating appliances to qualify if they meet or exceed requirements of the highest efficiency tier (not including any advanced tier) established by the Consortium for Energy Efficiency (CEE).[21] Unfortunately, the CEE does not address efficiencies for biofuel-compatible space and water heating systems.[22] We strongly recommend the CEAA include qualifying language for these systems to allow our consumers to improve the efficiency of their homes, reduce their energy costs, and help in the fight against climate change.

Specifically, we recommend qualifying criteria include *ENERGY STAR*® certified biofuel-compatible furnaces and heat and hot water boilers. Prescriptive measures can be taken to help ensure energy savings are much greater than identified by AFUE alone for heat and hot water boilers. First, boilers having two-inch or greater insulation on water jacketed surfaces, identifies a better performing class of heating

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[15] U.S. Census Bureau, *American Community Survey,* 2019, primary heat source by occupied housing unit.

[16] Traywick, Catherine, et al., *The Two Hours that Nearly Destroyed Texas' Electric Grid, Bloomberg Green,* February 20, 2021, *www.bloomberg.com/news/features/2021-02-20/texas-blackout-how-the-electrical-grid-failed* (accessed May 11, 2021).

[17] Ivanova, *Irina, Texas winter storm costs could top $200 billion—more than hurricanes Harvey and Ike,* CBS News, February 25, 2021, *www.cbsnews.com/news/texas-winter-storm-uri-costs* (accessed May 11, 2021).

[18] Despart, Zach, *Analysis reveals nearly 200 died in Texas cold storm and blackouts, almost double the official count,* April 1, 2021, *https://www.houstonchronicle.com/news/houston-texas/houston/article/texas-cold-storm-200-died-analysis-winter-freeze-16070470.php* (accessed May 11, 2021).

[19] Global Warming Potential (100 year), IPCC 4th Assessment Report, 2007.

[20] Garry, Michael, *EC Urged to Look at "Lifecycle GWP" of Alternatives to HFCs,* R744: CO2 Cooling Marketplace, May 7, 2021, *www.r744.com/ec-urged-to-look-at-lifecycle-gwp-of-hfc-alternatives* (accessed May 11, 2021).

[21] Section 320(c)(1)(A) of the CEAA discussion draft.

[22] Note that biofuel-compatible heating system or appliance is synonymous with liquid fuel-fired or oil-fired.

equipment.[23] Second, "tankless coil" boilers that have an internal heat exchanger to produce domestic hot water without a tank are inefficient and should be excluded. The CEAA should also include indirect water heaters and storage tanks with two-inch or greater insulation that are heated by a biofuel-compatible heat and hot water boiler.

III. Conclusion

We understand Congress is in the early stages of advancing clean energy tax reform. We applaud the Senate Finance Committee for taking this ambitious first step in evaluating how the tax code can be better leveraged to reduce GHG emissions, strengthen U.S. energy security, and reduce energy costs. NEFI stands ready to work with you to ensure the CEAA allows the renewable liquid heating fuels industry and its consumers to contribute to these goals and benefit from related tax incentives.

Please do not hesitate to reach out by phone (202) 508–3645 or by e-mail at sean.cota@nefi.com.

Thank you again.

Sincerely,

Sean O. Cota
President and CEO

NATURAL GAS VEHICLES FOR AMERICA
400 North Capitol Street, NW, Suite 450
Washington, DC 20001
ngvamerica.org

Hon. Ron Wyden
Chairman
U.S. Senate
Committee on Finance

Hon. Mike Crapo
Ranking Member
U.S. Senate
Committeeon Finance

Dear Chairman Wyden, Ranking Member Crapo, and Members of the Committee:

NGVAmerica, on behalf of our member companies, thanks you for your April 27 hearing focused on the role of the tax code in creating American jobs, enhancing our energy independence, and providing affordable clean energy. NGVAmerica and our members believe the tax code plays a crucial role in tackling our climate challenge and respectfully asks for an extension of key alternative fuel incentives in any climate-related tax legislation.

NGVAmerica is the national trade organization dedicated to the development of a growing, profitable, and sustainable market for vehicles and carriers powered by clean, affordable, and abundant geologic and renewable natural gas (RNG). Our roughly 200 member companies produce, distribute, and market natural gas and biomethane, domestically manufacture and service natural gas vehicles, engines, and equipment, and operate fleets powered by clean-burning gaseous fuels across North America.

NGVAmerica believes climate change is real, that we need immediate investment to clean and decarbonize heavy-duty transportation, and that renewable natural gas vehicles are an affordable, scalable, and immediate solution. In keeping with these beliefs, we ask that you consider the following policy recommendations aimed at cleaning emissions from transportation:

Policy Recommendations

- Extend for a minimum of five years the $0.50/gallon Alternative Fuels Tax Credit.
- Enact for a minimum of ten years a $1.00/gallon tax credit for renewable natural gas in transportation.
- Provide a two-year Federal Excise Tax holiday for clean trucks; permanently amend the Federal Excise Tax to provide a level-playing field for clean trucks.

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[23] Butcher, Thomas, *Performance of Integrated Hydronic Heating Systems,* Brookhaven National Laboratory prepared for the New York State Energy Research and Development Authority (NYSERDA) and the National Oilheat Research Alliance, December 2007.

- Amend the Waterways Fuel Tax to Remove the Disincentive for Liquefied Natural Gas (LNG).
- Level the Playing Field for Natural Gas Vehicles by Enacting a Tax Credit for Light, Medium, and Heavy Natural Gas Vehicles.

Background and Policy Justification

We are in the midst of an irreversible climate crisis and need to make a drastic impact on emissions in a short period of time. The transportation sector emits the largest share of the nation's greenhouse gases, and 57% of trucks on road today don't meet EPA's 2010 emissions standards.[1] We also have a clean air problem. More than 135 million people live in counties the American Lung Association awarded an "F" for either ozone or particle pollution in its 2021 State of the Air report.[2] The number one source of urban emissions is vehicles such as short-haul, long-haul, refuse, school and transit buses. These high polluting trucks are diesel trucks, but newer technology brings affordable, clean options offering a big impact when it comes to clean air. In fact, replacing 1 traditional diesel-burning heavy-duty truck with 1 new Ultra Low-NO_x natural gas heavy-duty truck is the emissions equivalent of removing 119 traditional combustion engine cars off our roads.[3]

Deploying cleaner technology, with help from key tax incentives, can reduce this significant source of GHGs and tailpipe emissions. The newest heavy-duty natural gas trucks are 90% cleaner than the EPA's current NO_x standard and 90% cleaner than the latest available diesel engine.[4] Fueling with natural gas reduces CO_2 and greenhouse gas emissions compared to comparable diesel. If fueling with LNG, the well-to-wheels GHG emissions reduction is 11%; fueling with CNG is a 17 reduction.[5] However, fueling with renewable natural gas (RNG) provides even greater CO_2 and greenhouse gas emission reductions, anywhere from 40 percent to greater than 500 percent on a well-to-wheels basis.[6] When it comes to carbon intensity, the California Air Resources Board's Low Carbon Fuel Standards Pathways certified carbon intensity values for RNG (Bio-LNG or Bio-CNG) as the lowest Energy Economy Ratio-Adjusted Carbon Intensity, as low as −532.74 CI.[7]

Simply put, heavy-duty vehicles fueled by natural gas give drastic, immediate tailpipe emissions reductions in the segment of the transportation sector that is dirtiest and hardest to electrify. When fueling these clean trucks and buses with renewable natural gas, tailpipe emissions reductions are paired with carbon neutral and carbon negative fuel.

Renewable Natural Gas (RNG), or biomethane (RNG) is produced by capturing methane wherever organic materials are present (*e.g.,* landfills, dairy farms, wastewater treatment facilities, and animal and crop waste systems). The United States has abundant sources of renewable natural gas that can be harnessed for RNG production, including 66.5 million tons per year of food waste, 17,000 wastewater facilities, 8,000 large farms and dairies, as well as 1,750 landfills.[8] Renewable natural gas production is steadily increasing to meet growing demand throughout the U.S.

Utilized in heavy-duty NGVs, RNG use as a transportation fuel has increased 267% over the past five years, eliminating 3.5 million tons of carbon dioxide equivalent (CO_2e) in 2020 alone.[9] In 2020, 53% of all on-road fuel used in natural gas vehicles was RNG, which is over 340 million gasoline gallon equivalents. In 2020, RNG as a Transportation Fuel lowered greenhouse gas emissions equivalent to removing 8,796,396,117 miles driven by the average passenger car. Despite the increased commitment from the NGV industry to reduce our carbon footprint and increase use of renewable fuels, the tax code and other market forces have made it difficult for additional NGVs to be deployed on road.

Unfortunately, low diesel prices, the increased expense to fleets for investment in cleaner-burning trucks, costs related to infrastructure, and inconsistent and retro-

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[1] *https://www.dieselforum.org/news/accelerating-turnover-to-new-technology-diesel-engines-increased-use-of-biobased-diesel-fuels-ensure-steady-progress-on-carbon-reduction-clean-air-gains.*

[2] *https://www.lung.org/research/sota/air-quality-facts.*

[3] Source: *https://greet.es.anl.gov/afleet_tool.*

[4] *https://www.ngvamerica.org/wp-content/uploads/2018/12/NGV-VW-HD-Trucks.pdf.*

[5] Source: NGVAmerica Emissions Whitepaper based on CARB LCFS. Numbers compared to diesel emissions (well-to-wheel).

[6] *https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities.*

[7] *https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities.*

[8] Source: Coalition for Renewable Natural Gas, 2017.

[9] *https://www.ngvamerica.org/wp-content/uploads/2019/04/RNG-Driving-Down-Emissions.pdf.*

active tax incentives for natural gas in transportation, the U.S. falls far behind other countries with regard to deploying these clean, domestic and renewably fueled vehicles. In 2020, 1.68% of new heavy freight truck sales were natural gas and just 0.73% of all new truck sales were natural gas.

This means that the transportation sector remains particularly dependent on petroleum-based diesel fuels, importing about 5 million barrels of crude oil a day and exacerbating America's reliance on foreign oil. While natural gas currently accounts for 30% of total energy consumption, it represents just 0.3% of energy consumed in the transportation sector.[10] Per the Department of Energy, "Petroleum comprised 92% of U.S. transportation energy use in 2018."[11]

As such, there remains a transformative opportunity to invest in switching more American fleets to domestically produced natural gas and renewable natural gas. Between unstable or rapidly increasing fuel prices, concerns over market manipulation by OPEC, and the role the global oil market plays in funding governments whose policies are hostile to U.S. interests, there are significant geopolitical reasons to pursue further energy independence.

While proponents of electric vehicles (EVs) insist that zero tailpipe emissions vehicles are the only way to fight on-road emissions, EVs have carbon-intensive component parts, are only as clean as the electricity that charges them, and Heavy-Duty EVs are unlikely to be scalable, affordable, and on road in the next decade. Additionally, with regard to vehicle replacement, as it currently stands, it would take more than 1 EV to replace an existing diesel vehicle, while natural gas offers a 1:1 replacement option.

Battery-electric and hybrid EVs are also particularly resource heavy when it comes to rare earth minerals. Batteries for these vehicles contain up to thirty pounds of rare earth minerals, and with the relatively short lifespan of these batteries, this mineral rich product will be manufactured more frequently than other vehicle components. This is critically important, as 85% of the world's rare earth minerals come from China. Continuing to invest in EVs for transportation would be to continue to invest in Chinese global leadership in rare earth minerals extraction and exportation. In fact, during 2012–2015, more than 70% of rare earth compounds and minerals imported by the U.S. came from China. This also leads to the possibility of price swings, as was the case in 2011, when the average price of certain rare earth minerals increased 750% as a result of China, who controlled 97% of global rare earth production, clamped down on trade. As America works to clean our transportation sector and maintain energy independence it's crucial to bear in mind that increased use of rare earth minerals for EV technology shifts export power and American dollars to China.

Fortunately, we have a domestically manufactured technology and domestically produced alternative fuel available for on-road heavy-duty use today. Natural gas vehicles, engines, component parts, along with fueling infrastructure such as compressors, cylinders, and machinery are developed and manufactured in the United States. An increase in NGV- and RNG-related manufacturing will bring about more American jobs and continue to move America toward energy independence. An industry study found that for a five-year extension of the Alternative Fuels Tax Credit (AFTC), the industry could expect, over the course of ten years, to see an additional $9.9 billion in economic growth, creation of 62,000 new middle-class jobs with an average salary of $52,000/year and $5.8 billion in additional private sector investment in infrastructure and equipment.

Use of the tax code to further deploy clean, domestically fueled vehicles powered by natural gas and RNG is a no-brainer. Credits such as the $0.50/gallon Alternative Fuels Tax Credit (AFTC) are needed to spur additional deployment of NGVs. Unfortunately, this credit has experienced very short-term and, in many instances, retroactive extensions and fleets interested in purchasing newer, more expensive technologies have not been able to plan for long-term investments or make purchase decisions with the ability to account for financial benefits from the credit. Another reason natural gas has failed to reach market saturation as a transportation fuel is that it has been competing on an uneven playing field. Electric vehicle technology and petroleum-based fuels have dominated American transportation for decades, receiving the lion's share of federal focus tax credits, and research and development

[10] Energy Information Administration (EIA) Annual Energy Outlook 2017, Table 2: Energy Consumption by Source and Sector, *https://www.eia.gov/outlooks/aeo/data/browser/#/?id=2-AEO2017&cases=ref2017&sourcekey=0.*

[11] *https://tedb.ornl.gov/wp-content/uploads/2019/03/Edition37_Full_Doc.pdf#page=176.*

funding. Biodiesel, for example, has received $1.00/gallon while clean fuels such as natural gas and RNG have received half that. As such, NGVs have not reached market penetration and continue to require support from the tax code in order to offset increased incremental cost of newer alternative fuel technologies. Providing incentives for natural gas fuel sales will make it more economically attractive to a larger percentage businesses and vehicle operators. As the natural gas industry grows and larger numbers of vehicles are produced, the first-cost or incremental cost of natural gas vehicles will come down because of economies of scale and competition. That process would be greatly accelerated by extending tax incentives and removing tax barriers that currently impede the growth of natural gas vehicle use.

When making a purchase decision, fleets consider fixed costs, running costs, fuel costs, maintenance costs, and other considerations, including their payback period. There remains a significant incremental cost on alternative fuel vehicles when compared to standard diesel vehicles. In fact, DOE has identified the desire to obtain an ambitious price reduction of $40,000 or more in order to spur more deployment, for the case of natural gas vehicles. Tax credits help in offsetting these costs and making the switch to a cleaner fuel not only more attractive, but economically feasible.

Further, a study conducted by the National Renewable Energy Laboratory (NREL) concluded: "As illustrated throughout this report, the economic environment for any particular fleet brought about by subsidies and tax credits can have a tremendous impact on project profitability, especially those projects that involve vehicle and fuel purchasing. Significant synergies result when tax credits are used in combination. When combined, the tax credits for station cost, vehicle purchase, and fuel purchase result in payback periods shorter than 4 years for each fleet [considered with VICE 2.0]."[12]

As such, we respectfully ask for the following changes to the Tax Code:

Extend for a Minimum of 5 Years the $0.50/Gallon Alternative Fuels Tax Credit

The Alternative Fuels Tax Credit (AFTC) is the single most effective mechanism for transitioning fleets to clean-burning natural gas. Unfortunately, the credit has been extended only for short periods of time and is often extended retroactively, with uncertainty negatively impacting fleet investment decisions. The credit was put in place as a mechanism to get vehicles of all duty weights to transition to alternative fuels. This credit performs as intended when given a sufficient prospective extension. Since enactment of the credit, we have seen increased deployment in alternative fuel vehicle technology, improved efficiency and reliability of alternative fuel vehicles, advancements in on-board fuel storage, fueling infrastructure components, and higher horsepower engines. Technology has matured, is reliable, and utilizes American manufacturing. Unfortunately, due to the short-term nature of the AFTC, fleets interested in purchasing newer, more expensive technology have not been able to plan for long-term investments or make purchase decisions with the ability to account for financial benefits from the credit. As such, NGVs and other eligible fuels have not reached market penetration and continue to need the credit as a way of offsetting increased incremental cost of newer alternative fuel technologies.

Enact for a Minimum of 10 Years a $1.00/Gallon Tax Credit for RNG in Transportation

Similar to the AFTC, NGVAmerica proposes creation of an RNG-specific transportation fuel credit worth $1.00/gallon. This amount will incentivize deployment of clean-burning NGVs and quicken the move to decarbonized on road fuels. This credit will also incentivize fleets who are already deploying NGVs to move to RNG, further reducing their carbon footprint.

Implementing a new RNG fueling credit creates a new economic driver unlocking millions of investment dollars in local economies and supporting hundreds of thousands of clean energy-sector jobs in construction, operations, maintenance, manufacturing, and engineering. This credit incentivizes capture of emissions for beneficial use and creates additional revenue streams in the agriculture sector, where RNG production also encourages carbon-responsible waste handling practices.

According to the World Bank, solid waste is expected to rise by 70% by 2050 if global status quo is maintained. Stimulating investments in RNG incentivizes businesses to capture this waste where it exists. RNG production results in increased

[12] *https://www.nrel.gov/docs/fy15osti/63707.pdf.*

gas collection at landfills, wastewater treatment plants, and agricultural waste streams while simultaneously benefiting communities that are disproportionately impacted by air, water, and odor pollution. Creation of a new on road credit for RNG provides dual environmental benefits, grows our economy, and continues expansion of clean energy infrastructure across the country.

Provide a 2-year Federal Excise Tax Holiday for Clean Trucks; Permanently Amend the Federal Excise Tax on Trucks to Provide a Level Playing Field for Trucks Powered by Natural Gas

The tax code currently imposes a 12% Federal Excise Tax (FET) on the sale of heavy-duty trucks, trailers and tractors. This tax is the highest federal excise tax on a percentage basis on any product. The FET is an onerous tax burden to customers who want to buy new, cleaner, and safer, more fuel-efficient trucks, and because it raises the capital cost of purchasing trucks, it therefore discourages new investment and new sales. The current tax treatment amplifies an inequity imposed on alternative fuel (NGV) trucks because these trucks include new technology and are sold in limited quantities, and, therefore have a much higher "first cost" or incremental cost than conventional trucks.

The tax acts as a penalty for alternative fuel trucks because the 12% rate is assessed on the base cost of the truck *and* on the incremental cost, unnecessarily adding to the already higher cost of these vehicles. The higher tax increases prices and extends the required payback period for these trucks and makes it harder for businesses to choose to purchase a natural gas truck. In order to spur purchases of cleaner trucks and further a thriving secondary clean-truck market, Congress should provide a two-year FET holiday and permanently resolve disparities in the FET for clean heavy-duty trucks. Both of these actions will also spur a burgeoning secondary market for clean trucks, which is one of the more challenging segments to turn over.

Amend the Waterways Fuel Tax to Remove the Disincentive for Liquefied Natural Gas

Liquefied Natural Gas (LNG) used to power marine vessels on the inland waterways is a burgeoning market. LNG produces significantly lower levels of toxic emissions than diesel fuel, including lower levels of carbon dioxide, nitrogen oxide and sulfur dioxide. Using LNG instead of diesel fuel also reduces pollution from particulate matter, specifically $PM_{2.5}$, known as exhaust soot. The use of other fuels such as heavy fuel oil (HFO) and marine fuel oil (MFO) result in particularly high levels of harmful exhaust emissions such as black carbon and CO_2 which are both major contributors to climate change. While CO_2, particulate matter, and black carbon are the dominant GHG emissions of concern for climate change, the combustion of diesel, HFO, and MFO in marine applications also leads to high levels of criteria air pollutants such as nitrogen oxide (NO_X), sulfur oxide (SO_X) that compromise human and ecosystem health. LNG, on the other hand, virtually eliminates many of these air pollutants and GHG emissions and is ready for large-scale deployment in all sectors of marine transportation today.

In 2014, a significant increase in the inland waterways tax on fuel used in marine transportation was enacted into law. Effective March 31, 2015, the inland waterways tax increased from 20 cents per gallon to 29 cents per gallon of diesel, LNG, or any other fuel used in marine transportation on the inland waterways. Unfortunately, a user of LNG in marine transportation now has to pay 50 cents in tax for the same amount of energy contained in a gallon of diesel fuel that is only taxed at 29 cents.

According to the Oak Ridge National Laboratory, diesel fuel has an energy content of 128,700 Btu per gallon (lower heating value) and LNG has an energy content of 74,700 Btu per gallon (lower heating value). Therefore, a gallon of LNG produces approximately 58 percent of the energy produced by a gallon of diesel fuel. On an energy equivalent basis, it takes about 1.7 gallons of LNG to provide the same amount of energy as a gallon diesel. This current tax treatment of LNG to power vessels on the inland waterways is a disincentive to investment in new LNG powered marine vessels and fueling locations. Congress should change the Inland Waterways Financing rate on LNG so that the tax is imposed on the energy content of a diesel gallon (known as a diesel gallon equivalent) rather than strictly on a per gallon basis. LNG has huge potential as a cheaper, cleaner, domestic energy source and the financing mechanism for the inland waterways system should not be putting its use at a disadvantage.

Level the Playing Field for Natural Gas Vehicles by Enacting a Tax Credit for Light, Medium, and Heavy Natural Gas Vehicles

The tax code currently provides a tax credit of up to $7,500 for the purchase of an electric vehicle (26 USC 30D). This incentive is available on the first 200,000 electric vehicles sold by a manufacturer and phases out shortly after this level is achieved. The credit is therefore worth in excess of $1.5 billion per manufacturer. The tax code does not provide a similar incentive for the purchase of natural gas vehicles.

The tax code should be amended to include a comparable credit for natural gas vehicles ($7,500 light-duty, $12,000 medium-duty, $25,000 heavy-duty) in order to encourage manufacturers to produce them and accelerate the sale of all classes of natural gas vehicles. This action is needed to create a level playing field for natural gas vehicles relative to electric vehicles and encourages the deployment of cleaner trucks, SUVs, and popular heavy light-duty vehicles not currently available electrified, affordably. Providing a tax incentive for the purchase of new natural gas vehicles would be an effective tool because it directly incentivizes businesses, fleets and individuals to invest in new, natural gas vehicles. Such an incentive would directly support all aspects of the natural gas vehicle industry value chain, from equipment suppliers, to vehicle manufactures, fuel sellers, station owners, and component producers.

Conclusion

NGVAmerica and our member companies believe these are a few crucial ways the tax code can fight climate change, create jobs, and continue our energy independence. Cleaning up the transportation sector as quickly as possible will have drastic clean air improvements and reduce our carbon footprint. Transitioning our fleet to domestic geologic and renewable natural gas ensures that our clean energy transition continues to employ American workers, increase American manufacturing, and enhance energy independence.

The tax code is key to this transition, and as such, we respectfully request that you enact and extend these key tax incentives to provide parity, predictability, and an incentive mechanism enabling fleets nationwide to make cleaner transportation investments.

For additional information concerning this statement, please contact NGVAmerica's Director, Federal Government Relations Allison Cunningham at acunningham@NGVAmerica.org or 202–824–7363.

Thank you for your consideration.

Sincerely,

Daniel J. Gage
President

NATIONAL STRIPPER WELL ASSOCIATION (NSWA)

Who is NSWA?

Founded in 1934, the NSWA is the only national association responsible for representing the interests of the nation's smallest, and yet most efficient and effective, oil and natural gas wells before Congress and the federal agencies. Learn more about NSWA at *www.nswa.us.*

Our mission is to ensure the critical needs and concerns of producers, owners, and operators of marginally-producing oil and gas wells are addressed regarding federal legislation and regulation. With members in 30 states, from California to West Virginia, NSWA is a viable and powerful voice for the American stripper well producer.

Our members are the small independent businessmen and women who own stripper wells producing 15 barrels of oil (equal to 90 Mcf of natural gas) or less per day. No large integrated oil and gas company is a member of NSWA.

Our members are the "family farmers" of the United States energy sector, with our typical member company employing 11 or fewer full-time employees.

Why Oil and Gas Matters to the Nation

Today, oil and gas operators are the lifeblood of the American economy.

The industry supplies nearly 70 percent of America's energy needs at a low cost for millions of families, as household energy costs have decreased 15 percent in the last

decade alone. It has given the United States enviable energy independence and, as a result, enhanced national security.

Production of oil and gas provides much-needed tax revenues for federal, state, and local governments to fund education, infrastructure projects, and helps to provide salaries for teachers and first responders.

Consider that the vast majority of the 275 million vehicles registered in the United States—vehicles that will be on the road for decades to come—are oil and gas powered. This includes the trucks that transported and delivered the key commodities that kept America functioning for the past year of the COVID pandemic. They provide fuel for the trains and the airplanes that are essential for interstate and international commerce. They fuel the vessels that transport America's exports and imports.

Yet, consider that *less than half the content of a barrel of oil goes towards gasoline,* as the industry produces critical products used for a wide array of everyday products: agricultural fertilizers, pharmaceuticals, medical supplies, a host of pivotal technologies, production of synthetic fibers in clothes and sportswear, medical supplies, computer and cell phone components, and chemicals that are essential for a modem country.

The industry also provides lubricants in wind turbines and uses hydrocarbon precursors for manufacturing of synthetic blade components that go into solar panels that require oil or natural gas.

The Importance of Percentage Depletion and IDC

For the reasons outlined above, continued economic incentives drawn from the tax code to allow small operators like our members to keep more of their own monies to run their businesses—monies often from the owner's pocket, not provide by banks, large corporations, or hedge funds—are vital to the economy, just now coming out of the COVID crisis. Two of those tax treatments, Percentage Depletion and IDC, are vital to NSWA.

IDC

Since 1913, a drilling-and-development-costs deduction has been allowed as an ordinary and necessary business expense for those costs where there is no remaining equipment to value (salvage value) when an oil or natural gas well is completed.

Because there is nothing tangible to value, these costs are generally called "intangible drilling costs" or IDC. For the past 35 years, American tax policy has shortened the depreciation period for equipment to allow capital to be recovered and reinvested in new American projects. Like other rapid depreciation schedules in the tax code, the drilling cost deduction allows for investment capital to be immediately recovered and encourages its reinvestment. This is the same concept adopted as Bonus Depreciation in the 2017 Tax Reform Act. It is neither a "tax subsidy" nor a "loophole." For American independent producers, expensing has resulted in facilitating reinvestment in new American projects at rates up to 150 percent of American cash flow.

The U.S. tax code is designed to levy taxes on net profits, not on dollars used for operational costs or capital expenditures. Every business since the inception of the tax code has used cost recovery provisions like IDC.

The expensing of IDC allows companies to recover costs such as labor, site preparation, equipment rentals, and other expenditures for which there is no salvage value. It is important to note that 80 percent of IDC are associated with labor costs. It is also important to note that the independent oil and gas industry, which accounts for 80 percent of our nation's oil production and 90 percent of its natural gas production, would be hit hardest by the elimination of this provision. IDC often represent 60 to 80 percent of total production costs and repealing them could result in the loss of over a quarter million jobs by 2023.

Percentage Depletion

Depletion, like depreciation, allows for the recovery of capital investment over time. Percentage depletion is used for most mineral resources, including oil and natural gas. It is a tax deduction calculated by applying the allowable percentage to the gross income from a property. For oil and natural gas, the allowable percentage is 15 percent.[1]

[1] For marginal wells, the allowable percentage is increased (from the general rate of 15 percent) by one percent for each whole dollar that the average price of crude oil for the immediately

Depletion has been a part of the tax code since its inception. Initially, the only form of depletion was cost depletion; however, it limits depletion to the capital cost of a project. After World War I, Congress recognized that too many natural resources were being abandoned because of cost depletion limiting the economic viability of projects. Consequently, it began to allow forms of value depletion to be used as well. In 1926, it settled on percentage depletion.

Percentage depletion has changed over time. Current tax law limits the use of percentage depletion of oil and natural gas in several ways. First, the percentage depletion allowance may only be taken by independent producers and royalty owners and not by integrated oil companies. Second, depletion may only be claimed up to specific daily American production levels of 1,000 barrels of oil or 6,000 Mcf of natural gas. Third, the net income limitation requires percentage depletion to be calculated on a property-by-property basis. It prohibits percentage depletion to the extent it exceeds the net income from a particular property. Fourth, the deduction is limited to 65% of net taxable income. Percentage depletion in excess of the 65 percent limit may be carried over to future years until it is fully utilized.

Despite these limitations, percentage depletion remains an important factor in the economics of American oil and natural gas production. Most independent producers do not exceed the 1,000 barrel per day limitation. Yet, these producers are a significant component of America's oil and natural gas production. For example, they are the predominant operators of America's marginal wells. Over 85 percent of America's oil wells are marginal wells—each producing less than 15 barrels per day, averaging about 2.5 barrels per day. Yet, these wells produce about 10 percent of American oil production. About 75 percent of American natural gas wells are marginal wells (averaging about 22 Mcfd), producing approximately 10 percent of American natural gas.

Marginal wells are unique to the United States; other countries shut down these small operations. Once shut down, they will never be opened again—it is too costly. Even keeping them operating is expensive—they must be periodically reworked, their produced water (around 9 of every 10 barrels produced) must be disposed properly, the electricity costs to run their pumps must be paid. Therefore, the revenues retained by percentage depletion are essential to meet these costs. For larger wells, percentage depletion provides more revenues to be used to find new oil and natural gas in the United States.

In addition to independent producers, royalty owners can take percentage depletion on wells producing their mineral assets. Royalty owners can take percentage depletion on wells regardless of whether the producer is an independent or integrated company. One reason that percentage depletion draws attention is the revenue estimate associated with it; however, the revenue estimate never separates its evaluation between producers and royalty owners.

The Economic Impact of Loss of Percentage Depletion

NSWA has commissioned a just-released independent economic study that outlines the impacts of eliminating percentage depletion over the next 15 years, both nationally and across the most directly impacted 18 states. From the study:

- Eliminating the percentage depletion allowance would have a large and increasing impact on the stripper well industry, the oil and natural gas sector, as well as the broader economy. The percentage depletion elimination case [in this study] assumes that the percentage depletion allowance would be eliminated as of 2022.
- The elimination of the percentage depletion allowance is projected to have a large and increasing impact on the number of producing stripper wells across

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preceding calendar year is less than $20 per barrel. In no event may the rate of percentage depletion under this provision exceed 25 percent for any taxable year. The term "marginal production" for this purpose is domestic crude oil or domestic natural gas which is produced during any taxable year from a property which (1) is a stripper well property for the calendar year in which the taxable year begins, or (2) is a property substantially all of the production from which during such calendar year is heavy oil (*i.e.,* oil that has a weighted average gravity of 20 degrees API or less corrected to 60 degrees Fahrenheit). A stripper well property is any oil or gas property which produces a daily average of 15 or less equivalent barrels of oil and gas per producing oil or gas well on such property in the calendar year during which the taxpayer's taxable year begins.

the 15-year (2021–2035) forecast period. On average,[2] the elimination of percentage depletion is projected to lead to an over 14 percent reduction in the number of producing stripper wells in the U.S.

- By the end of the forecast period in 2035, the number of producing stripper wells is projected to be over 167 thousand wells lower if the percentage depletion allowance was eliminated, with producing stripper wells projected at around 489 thousand compared to 656 thousand in the base case (an over 25 percent reduction).
- This study forecasts that in the Base Case—which assumes no change in law or policy—combined oil and natural gas production from stripper wells will average around 1.98 million barrels of oil equivalent a day between 2021–2035, the forecast period. In the Percentage Depletion Elimination Case—where legislation is enacted to eliminate it, production is projected to fall to an average of 1.68 million barrels of oil equivalent a day (an over 12 percent reduction). The impact of eliminating the percentage depletion allowance is projected to grow across the forecast period.
- For example, if percentage depletion was eliminated, by 2035, oil and natural gas production from stripper wells is projected to fall by over 26 percent, from over l .91 million barrels of oil equivalent a day in the Base Case to just over 1.42 million barrels of oil equivalent a day in the Percentage Depletion Elimination Case.
- If percentage depletion were eliminated, this study projects that over the 2021 to 2035 forecast period, oil and natural gas industry spending would be reduced by over $7.1 billion per year on average. By the end of the forecast period in 2035, *spending is projected to be reduced by over $9.1 billion dollars.* Over the full 15-year forecast period from 2021 to 2035, total spending is projected to be reduced by over $107 billion.
- Across the forecast period (2021–2035), projected average employment reductions are estimated at just under 84 thousand jobs per year. By 2035, projected reductions in employment are estimated to be just over 105 thousand jobs per year.
- Elimination of the percentage depletion allowance is projected to reduce annual contributions to GDP by an average of around $8.7 billion per year. By the end of the forecast period in 2035, reductions in GDP are projected to reach over $11 bill ion per year.
- Over the next 15 years, royalty payments are projected to decline by an average of around $640 million per year. By the end of 2035, royalty payments are projected to decline by over $935 million per year. Over the full 15-year period from 2021 to 2035, *total royalty payments are projected to be reduced by over $8.9 billion.*
- This study estimates that eliminating the percentage depletion allowance would lead to state government *revenue reductions of around $200 million per year* on average over the 2021 to 2035 forecast period. By the end of the forecast period, revenue reductions are projected to reach around $315 million annually in 2035.
- Across the 15-year forecast period, additional federal corporate taxes paid to the U.S. Treasury, due to the elimination of percentage depletion, are projected to average just over $450 million per year.
- Over the forecast period, as production is projected to decline due to the elimination of percentage depletion, the positive tax benefit of eliminating percentage depletion is projected to decline annually starting in 2025 ($560 million per year). By the end of the forecast period in 2035, projected additional revenues are expected to decline to around $385 million.

Conclusion

Eliminating or reducing the present-law percentage depletion deduction and IDC would significantly harm the competitiveness of the American economy.

In particular, independently owned stripper well operators—who are eligible for the deduction, unlike "Big Oil" companies due to the per day barrel limitation of oil pro-

[2] The averages calculated in this report are calculated across the full 15-year forecast period which includes one year (2021) where no impacts of eliminating percentage depletion are assumed to occur due to delays in implementation.

duced—would be particularly impacted. These stripper well operators provide approximately ten percent of U.S. oil and gas production, drawn from approximately 80 percent of the wells operating in the U.S., across 35 states.

Ending percentage depletion would mean the loss of tens of thousands of direct and indirect well paying jobs, especially in rural areas where small communities are dependent in ways big and small on operators and their employees.

In addition, the federal treasury would lose significant federal income tax revenue as well as the loss of state and local taxes and royalty revenues.

Also, over 12 million land and lease owners—across all 50 states—would lose royalty checks, in the event of the loss of percentage depletion, resulting in the loss of critical income to countless retirees on fixed incomes.

The combined impact of countless lost jobs and individual royalty payments at a time of an ongoing pandemic would be an especially cruel and callous act by Congress.

However, it's more than jobs. It's about maintaining real energy security for future generations.

Lest we forget how far we have come in our nation's drive for energy independence, a short history lesson is in order. American oil dependency after 1970 led to fifty years of international security issues where America's foreign policy choices depended on its effect on oil supply. Two clear crises were oil embargoes in 1973 and 1979.

By 2007, the United States was importing 65 percent of its oil supply. While much of it came from Canada and Mexico, significant amounts came from the Middle East where relationships were tenuous or hostile. The shale oil revolution changed international energy security dynamics significantly, positioning the United States today much more securely.

However, new efforts to suppress American oil and natural gas supply could reverse these important policy shifts. Demand drives the need for oil and natural gas supply. Crushing American supply will not reverse American demand. Instead, America will need to meet its energy demand by returning to imports. Global greenhouse gas emissions will not be reduced but American energy security will be threatened again like the fifty years following 1970.

So, short-sighted actions to undercut safe and environmentally sound oil and gas production through the elimination of tax treatments and deductions could easily lead to the rise in oil and gas imports being delivered via large tankers from foreign, less environmentally conscious, nations because eliminating percentage depletion will not curb demand. In addition, increased costs for commodities and higher prices for consumers will continue to rise, thereby imposing an unnecessary burden on the United States' economy.

In short, we cannot over-emphasize the importance of energy production to the people and economy of our nation.

For all these reasons, the percentage depletion deduction and IDC are vitally important to U.S. prosperity and must be retained.

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Clifton, VA 20124
(202) 347–8000
https://www.paperrecyclingcoalition.com/

U.S. Senate
Committee on Finance

Dear Chairman Wyden and Ranking Member Crapo:

The Paper Recycling Coalition (PRC) is pleased to submit this statement for inclusion in the Committee's hearing record. We look forward to serving as a resource to the Committee as it evaluates how the tax code can help address climate challenges, including advancing paper recycling as a climate solution.

Paper recycling has significant climate benefits, including the avoidance of methane emissions from landfills. Moreover, the manufacture of 100 percent recycled paperboard and containerboard has a net negative emissions profile. Yet federal tax policy

incentivizes the destruction of the recycled paper sector's raw material: recyclable paper. Specifically, section 45(c)(1)(G) of the tax code provides a tax credit for electricity produced from municipal solid waste (*i.e.,* waste-to-energy production). This policy has negatively impacted the paper recycling industry by incentivizing the burning of paper for energy recovery.

The PRC's comments submitted herein are in support of eliminating this economically destructive and environmentally harmful practice. A simple way to address this issue is by adopting the proposed section 45 modifications included in the "Protecting America's Paper for Recycling Act" (PAPER Act). The PAPER Act was introduced in both the 115th and 116th Congresses and is expected to be reintroduced this spring by Senators Stabenow, Carper, Boozman, Baldwin, and Cassidy.

About the Paper Recycling Coalition

The PRC's eight member companies represent the interests of the 100 percent recycled paperboard and containerboard industries. Our members operate 500 facilities in 45 states and support over 63,000 well-paid jobs with competitive benefits. PRC members manufacture 100 percent recycled paper products that are ubiquitous in American commerce, such as cereal and pizza boxes, tubes and cores, Amazon cartons, and other shipping containers and packaging critical to today's growing e-commerce economy.

The paperboard and containerboard manufacturing sectors are among the country's greatest economic and environmental success stories. The amount of used paper recovered for recycling has nearly doubled since 1990. In 2019, over 66 percent of all paper used by Americans was recovered to be recycled into new products, marking the tenth consecutive year with a rate above 60 percent.

As rates of paper recycling rise, they will compound the significant economic and employment benefits of paper recycling. In addition to the 63,000 direct jobs PRC members support, the sector influences another 615,000 jobs across the recycling supply chain (collection, processing, and manufacturing), totaling nearly 680,000 U.S. jobs.[1] The annual economic impact of the paper recycling supply chain amounts to a staggering $150 billion.[2]

The domestic paper recycling sector is primed to drive $4.1 billion into recovered fiber investment between 2018–2022. These investments will add 7 million tons of additional U.S. manufacturing capacity in the form of new mills, new paper machines, paper machine conversions and the re-starting of idle mills. In fact, according to at least one industry survey, over a dozen domestic recycling mills representing millions in new investments will be coming online between 2018 and 2021, much of it able to process mixed paper feedstocks that used to be exported to China.[3] Further, 5 out of the last 6 paper mills opened in the U.S. are 100% percent recycled. These facilities were planned and built without federal subsidies or intervention.

Paper recycling also delivers real environmental benefits for the American people. By recycling paper and turning it into new 100 percent recycled paper products, PRC members prevent it from being landfilled where it degrades, producing methane, a potent greenhouse gas. Further, even as the paper recycling sector has continued to add capacity in the form of new mills, machines, and related infrastructure, it has nevertheless improved its energy efficiency, resulting in reduced energy usage and reduced greenhouse gas emissions. In fact, the production of 100 percent recycled paperboard and containerboard products results in net negative greenhouse gas emissions.

The impressive economic and environmental benefits of paper recycling are directly tied to the availability of a clean and stable supply of recovered fiber collected for recycling. *For that reason, the PRC's mission is to promote recycling education and to prevent market-distorting government subsidies from diverting recyclable paper from the supply chain.* Diverting this feedstock from the circular economy to landfills or for waste-to-energy eliminates opportunities to recycle these materials and

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[1] *See* EPA, "Recycling Economic Information Report" (2016), *https://www.epa.gov/smm/recycling-economic-information-rei-report.*

[2] *See* EPA Smart Sectors, "Paper and Wood Products" (2020), *https://cfpub.epa.gov/wizards/smartsectors/woodpaper/#Chart;* ISRI, "The Economic Impact of the Scrap Recycling Industry in the United States—Paper" (2019), *https://www.isri.org/docs/default-source/engage_toolkits/paper-isri-recycling-economic-impact.pdf?sfvrsn=4.*

[3] *Scrap Magazine,* "Gearing Up" (July/August 2019).

turn them into valuable new products, such as 100 percent recycled paper and packaging products.

The Section 45 Credit for Municipal Solid Waste Creates the Wrong Incentive—Not to Reuse Recyclable Paper

It is the mission of the PRC to protect the supply of recyclable paper. That is why the PRC continues to have serious concerns about the section tax credit for electricity produced from WtE facilities. The provision provides an incentive to incinerate *any* municipal solid waste—including recyclable paper that has not been separated from the MSW stream. This dramatically reduces the amount of paper available for recycling, and in some cases leads to an erosion in the quality of the recyclable paper that is recovered. There simply is no sound policy justification for this approach.

Congress has made efforts to clarify that section 45 should not act as an incentive to burn recyclable paper. In 2012, as part of the enacted American Taxpayer Relief Act of 2012, Congress amended section 45 to limit the availability of the credit for the production of energy from municipal solid waste that includes paper that is commonly recycled and that has been segregated from other solid waste. This clarification was intended to ensure that the federal government does not incentivize the burning of paper that should be recycled.

Unfortunately, residual ambiguity in the law means that recyclable paper continues to be burned for energy production. Instead of separating paper from waste as Congress intended, in some cases paper continues to be commingled—or "mixed"—with waste for energy production purposes. As an added negative, commingling in many cases contaminates recyclable paper and leaves it unusable as a feedstock for recycled packaging and products.

The Section 45 Credit for Municipal Solid Waste Should Not be Extended Without Reform

In evaluating clean energy tax credits, the Committee should consider not only the original purpose of these policies but also any unintended consequences they create. The section 45 credit for WtE and other "clean" resources was conceived to incentivize the environmental and economic benefits of renewable energy. But those benefits are seriously undermined by the provision's subsidy for the burning of recyclable paper for energy production. Further, WtE presents sobering environmental justice concerns that are increasingly coming to light.[4]

If Congress continues to renew the section 45 credit for WtE facilities without modification, it will continue to provide an incentive for this counterproductive and harmful activity. Section 45 is thus a prototypical example of a tax policy that should not be continued without reform.

The PRC supports bipartisan legislation—the PAPER Act (S. 1396, 116th Cong.)—to clarify that the section 45 credit is not available for WtE facilities that burn commonly recycled paper that has been segregated from solid waste, *or that burn solid waste that has been mixed with garbage.* By eliminating the incentive to burn paper for electricity, the legislation better protects recyclable paper, thus coming closer to Congress' original intent for the provision.

The PAPER Act was previously sponsored by current Finance Committee members Senator Stabenow, Senator Cassidy, and Senator Carper. Senators Boozman and Baldwin were additional co-sponsors last Congress (as was former Senator Isakson). This same group of Senators plans to reintroduce the PAPER Act this spring. We urge the Committee to include this reform should it decide to extend the section 45(c)(1)(G) tax credit.

Ultimately, since section 45 provides an incentive for energy production and not recycling, the PRC does not support the continued extension of the tax credit for WtE facilities. If Congress does act to continue this incentive, it is essential to include the modifications reflected in the PAPER Act. This commonsense proposal is the only way to bring coherence to a policy that would otherwise prioritize energy production over recycling in contradiction to EPA's Waste Management Hierarchy.[5]

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[4] *Politico,* "Burning Trash is Good. The Law Says So" (February. 9, 2021), *https://www.politico.com/newsletters/the-long-game/2021/02/09/burning-trash-is-good-the-law-says-so-491693.*

[5] *https://www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy.*

In closing, we hope the Committee will take this opportunity to either eliminate the harmful WtE incentive entirely, or to modify it in a way that protects America's vibrant and growing recycling industry. We stand ready to work with you and your staff as you examine these issues.

Please do not hesitate to contact us with any questions, or if we can provide additional information about our industry or the negative effects caused by the section 45 WtE credit.

Sincerely,

Brian McPheely
Chairman, Paper Recycling Coalition, Inc.
Global CEO, Pratt Industries

Michael P. Doss
Vice Chairman, Paper Recycling Coalition, Inc.
President/CEO, Graphic Packaging Int'l, LLC

Terese Colling
President, Paper Recycling Coalition, Inc.

PERMIAN BASIN PETROLEUM ASSOCIATION
P.O. Box 132
Midland, TX 79701
https://pbpa.info/
432–684–6345

Who is PBPA

The PBPA is the largest regional oil and gas association in the United States. Since 1961, the PBPA has been the voice of the Permian Basin oil and gas industry. The PBPA's mission is to promote the safe and responsible development of our oil and gas resources while providing legislative, regulatory, and educational support services for the petroleum industry. The PBPA membership includes the smallest exploration and services companies as well as some of the largest companies with worldwide operations. The Permian Basin is the largest inland oil and gas reservoir and the most prolific oil and gas producing region in north America.

Benefits of Permian Supply for the Nation

Today, oil and natural gas operations are the lifeblood of the American economy.

The Permian is a Key Contributor . . .

The Permian Basin accounts for about 60% of oil production and 20% of natural gas production in the United States. In New Mexico, the industry accounts for roughly 134,000 jobs. In Texas, the industry account for roughly 400,000 jobs.

Nationally, the Permian Basin supplies America's energy needs at a low cost for millions of families, as household energy costs have decreased 15 percent in the last decade alone. It has given the United States enviable energy independence and, as a result, enhanced national security.

Production of oil and gas provides much-needed tax revenues for federal, state, and local governments to fund education, infrastructure projects, and helps to provide salaries for teachers and first responders.

In Texas, the oil and gas industry contributes over $13 billion annually to the state Treasury. In New Mexico, the industry contributes nearly $3 billion annually to the state in taxes and royalties. Specifically as to the Permian Basin, absent taxes and royalties paid on operations a family of three, on average, would either have to pay around $1,000 more in taxes every year in Texas and $1,500 more in New Mexico, or accept a lower amount of services from state and local governments.

In New Mexico, these revenues provide for one-third of the funding for schools, roads, public safety and healthcare. In Texas, local school districts received more than $2 billion in property taxes on oil and gas interests in 2020 and the Permanent School Fund and Permanent University Fund, which support Texas public education, together received over $1.7 billion from royalties paid on oil and gas production.

Consider that the vast majority of the 275 million vehicles registered in the United States—vehicles that will be on the road for decades to come are oil and gas powered. This includes the trucks that transported and delivered the key commodities that kept America functioning for the past year of the COVID pandemic. They provide fuel for the trains and the airplanes that are essential for interstate and inter-

national commerce. They fuel the vessels that transport America's exports and imports.

Yet, consider that **less than half the content of a barrel of oil goes towards gasoline,** as the industry produces products used to make 96% of everyday essential items, including: agricultural fertilizers, pharmaceuticals, shampoo, eye glasses and a host of pivotal technologies, production of synthetic fibers in clothes and sportswear, medical supplies, computer and cell phone components, and chemicals that are essential for a modern country.

Modern renewable technologies wouldn't exist without the utilization of hydrocarbons. The industry provides lubricants in wind turbines, hydrocarbon precursors are used for manufacturing of synthetic blades, and the raw earth materials that are essential in the electronic components of wind turbines and solar blades are mined, refined and created by machinery and equipment powered by hydrocarbons.

Reinvestment Is Key to a Continued Supply

As it is they are used extensively by renewable energy operations, the use of tax treatments—including target deductions—are important tools in the small and medium oil and gas operators' efforts to continue reliable and environmentally safe oil and gas production in the U.S. Key among them are IDC, percentage depletion and enhanced oil recovery.

IDC

Since 1913, a drilling and development costs deduction has been allowed as an ordinary and necessary business expense for those costs where there is no remaining equipment to value (salvage value) when an oil or natural gas well is completed.

Because there is nothing tangible to value, these costs are generally called "intangible drilling costs" or IDC. For the past 35 years, American tax policy has shortened the depreciation period for equipment to allow capital to be recovered and reinvested in new American projects. Like other rapid depreciation schedules in the tax code, the drilling cost deduction allows for investment capital to be immediately recovered and encourages its reinvestment. This is the same concept adopted as Bonus Depreciation in the 2017 Tax Reform Act. It is neither a "tax subsidy" nor a "loophole." For American independent producers expensing has resulted in facilitating reinvestment in new American projects at rates up to 150 percent of American cash flow.

Our tax code is designed to levy taxes on net profits, not on dollars used for operational costs or capital expenditures. Every business since the inception of the tax code, has used cost recovery provisions like IDC.

The expensing of IDC allow companies to recover costs such as labor, site preparation, equipment rentals, and other expenditures for which there is no salvage value. It is important to note that 80 percent of IDCs are associated with labor costs. It is also important to note that the independent oil and gas industry, which accounts for 80 percent of our nation's oil production and 90 percent of its natural gas production, would be hit hardest by the elimination of this provision. IDC often represent 60 to 80 percent of total production costs and repealing them could result in the loss of over a quarter million jobs by 2023.

Percentage Depletion

Depletion, like depreciation, allows for the recovery of capital investment over time. Percentage depletion is used for most mineral resources including oil and natural gas. It is a tax deduction calculated by applying the allowable percentage to the gross income from a property. For oil and natural gas the allowable percentage is 15 percent.[1]

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[1] For marginal wells, the allowable percentage is increased (from the general rate of 15 percent) by one percent for each whole dollar that the average price of crude oil for the immediately preceding calendar year is less than $20 per barrel. In no event may the rate of percentage depletion under this provision exceed 25 percent for any taxable year. The term "marginal production" for this purpose is domestic crude oil or domestic natural gas which is produced during any taxable year from a property which (1) is a stripper well property for the calendar year in which the taxable year begins, or (2) is a property substantially all of the production from which during such calendar year is heavy oil (*i.e.,* oil that has a weighted average gravity of 20 degrees API or less corrected to 60 degrees Fahrenheit). A stripper well property is any oil or gas property which produces a daily average of 15 or less equivalent barrels of oil and gas per producing oil or gas well on such property in the calendar year during which the taxpayer's taxable year begins.

Depletion has been a part of the tax code since its inception. Initially, the only form of depletion was cost depletion; however, it limits depletion to the capital cost of a project. After World War I, Congress recognized that too many natural resources were being abandoned because of cost depletion limiting the economic viability of projects. Consequently, it began to allow forms of value depletion to be used as well. In 1926, it settled on percentage depletion.

Percentage depletion has changed over time. Current tax law limits the use of percentage depletion of oil and natural gas in several ways. First, the percentage depletion allowance may only be taken by independent producers and royalty owners and not by integrated oil companies. Second, depletion may only be claimed up to specific daily American production levels of 1,000 barrels of oil or 6,000 mcf of natural gas. Third, the net income limitation requires percentage depletion to be calculated on a property-by-property basis. It prohibits percentage depletion to the extent it exceeds the net income from a particular property. Fourth, the deduction is limited to 65% of net taxable income. Percentage depletion in excess of the 65 percent limit may be carried over to future years until it is fully utilized.

Despite these limitations, percentage depletion remains an important factor in the economics of American oil and natural gas production. Most independent producers do not exceed the 1,000 barrel per day limitation. Yet, these producers are a significant component of America's oil and natural gas production. For example, they are the predominant operators of America's marginal wells. Over 85 percent of America's oil wells are marginal wells—producing less than 15 barrels per day, averaging about 2.5 barrels per day. Yet, these wells produce about 10 percent of American oil production. About 75 percent of American natural gas wells are marginal wells (averaging about 22 mcfd), producing approximately 10 percent of American natural gas.

Marginal wells are unique to the United States; other countries shut down these small operations. Once shut down, they will never be opened again—it is too costly. Even keeping them operating is expensive—they must be periodically reworked, their produced water (around 9 of every 10 barrels produced) must be disposed properly, the electricity costs to run their pumps must be paid. The revenues retained by percentage depletion are essential to meet these costs. For larger wells, percentage depletion provides more revenues to be used to find new oil and natural gas in the United States.

In addition to independent producers, royalty owners can take percentage depletion on wells producing their mineral assets. Royalty owners can take percentage depletion on wells regardless of whether the producer is an independent or integrated company. One reason that percentage depletion draws attention is the revenue estimate associated with it; however, the revenue estimate never separates its evaluation between producers and royalty owners.

Enhanced Oil Recovery

Various legislative proposals have called to preclude Enhanced Oil Recovery techniques from qualifying for the Section 45Q tax credit, a bipartisan provision to incentivize carbon capture and sequestration. American energy innovation has led to a reduction of greenhouse gas emissions by 30 percent in the last few decades and the oil and gas industry has led the charge in the research, development, and utilization of new carbon capture technologies. By allowing carbon sequestration for EOR, producers are simultaneously reducing emissions while also efficiently recovering more resources, leading to lower energy prices for consumers. It should be celebrated by those concerned about carbon emissions, and even by critics of the industry, that oil and gas producers are able to help Americans realize the benefits of affordable, efficient, and reliable energy, while making strides towards carbon neutral production. An industry that invests billions of dollars in this new technology must be encouraged to continue these game-changing developments, not punished.

Conclusion

Eliminating or reducing the present-law percentage suite of targeted tax deductions—**not subsidies, where the government gives direct cash payments to an industry**—which allow small to medium size operators like our members to keep more of their hard earned monies for continued safe and environmentally responsible energy production would greatly harm the U.S.' economic competitive disadvantage.

Most directly and immediately: the combined impact of countless lost jobs and federal, state, and local revenues at time of an ongoing pandemic would be an especially short sighted act by Congress.

However, it is more than jobs. It is about maintaining real energy security for future generations.

Lest we forget how far we have come in our nation's drive for energy independence, a short history lesson is in order. American oil dependency after 1970 led to fifty years of international security issues where America's foreign policy choices depended on its effect on oil supply. Two clear crises were oil embargoes in 1973 and 1979.

By 2007, the United States was importing 65 percent of its oil supply. While much of it came from Canada and Mexico, significant amounts came from the Middle East where relationships were tenuous or hostile. The shale oil revolution changed international energy security dynamics significantly, positioning the United States today much more securely.

However, new efforts to suppress American oil and natural gas supply could reverse these important policy shifts. Demand drives the need for oil and natural gas supply. Crushing American supply will not reverse American demand. Instead, America will need to meet its energy demand by returning to imports. Global greenhouse gas emissions will not be reduced, but will likely increase and American energy security will be threatened again like the fifty years following 1970.

Elimination of tax deductions discussed above could easily lead to a rise in oil and gas imports, while delivered via large tankers from foreign, less environmentally conscious, nations because eliminating percentage depletion or the other treatments will not curb demand.

In addition, increased costs for commodities and higher prices for consumers will continue to rise, thereby imposing an unnecessary burden on the United States' economy.

In short, we cannot over-emphasize the importance of energy production to the people and economy of our nation.

For all these reasons, the energy tax treatments discussed here are vitally important to U.S. prosperity, and must be retained.

Regards,

Ben Shepperd, President

RESOURCES FOR THE FUTURE

Emissions Projections for a Trio of Federal Climate Policies

New modeling by Resources for the Future shows that three prominent climate policy proposals, either in isolation or combined, do not reduce emissions enough to meet the Biden administration's new climate goals.

Issue Brief (21–02) by Wesley Look, Karen Palmer, Dallas Burtraw, Joshua Linn, Marc Hafstead, Maya Domeshek, Nicholas Roy, Kevin Rennert, Kenneth Gillingham, and Qinrui Xiahou.

This issue brief was published by Resources for the Future (RFF) in April.

With the Biden Administration's recent announcement of the American Jobs Plan and nationally determined contribution (NDC) under the Paris Agreement, and as Congress begins to seriously consider legislation to advance clean energy and cut greenhouse gas emissions, RFF researchers have been investigating environmental outcomes under various policy scenarios. In this issue brief, we provide a snapshot from this work—including estimates of energy-related CO_2 emissions and cost-effectiveness.

Policy Scenarios

We compare three prominent proposals being discussed by federal policymakers:

- A simplified version of the recently re-introduced Clean Energy for America Act (CEAA), which provides tax incentives for renewables, energy efficiency, electric vehicles and more.

- A Clean Electricity Standard (CES) based on the 2019 Smith-Lujan proposal, which stipulates a schedule for the decarbonization of the electricity sector
- An economy-wide carbon tax starting at $15 per ton and rising at 5 percent real per year (C$15).

We model energy-related US CO_2 emissions under each of these policies, various combinations thereof, and business-as-usual (BAU) assumptions. In our "All-in" scenario, we also include federal spending on electric vehicle charging infrastructure and residential building weatherization. Table 1 summarizes the policy scenarios included, with more detail in the appendix. Note: this analysis is calibrated to pre-COVID projections (see appendix), which yields conservative emissions estimates.

Table 1. Policy Scenarios Included in This Analysis

Abbreviation	Policy Scenario	Key Features
BAU	Business-as-usual/Reference case	Calibrated to AEO 2019 and 2020
CEAA	Clean Energy for America Act (CEAA)*	Clean electricity and energy storage tax credits, extension of 30D EV incentives, EE tax credits
CES	Clean Energy Standard (CES)	80% clean by 2032, with banking
C$15	Carbon tax	Starting price: $15, gr. rate: 5% real
CEAA+CES	Combined CEAA and CES	See above
All-in	C$15 + CEAA + CES + weatherization and EV charging infrastructure spending	See above

*This is an incomplete representation of the CEAA, see appendix for details.

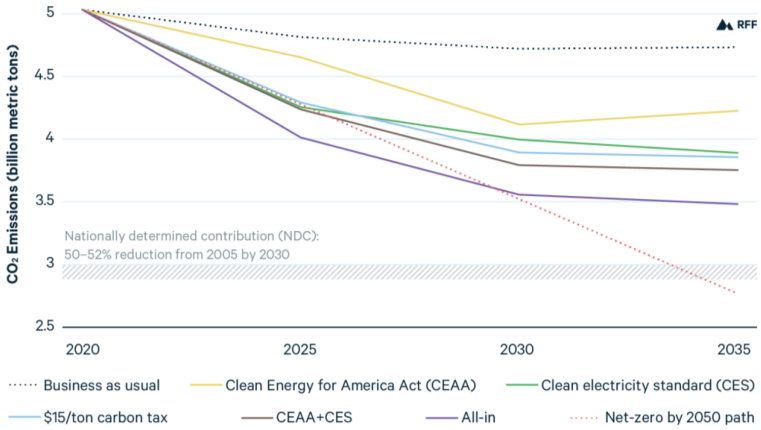
Energy-Related Emissions Estimates Under the Various Policy Scenarios

As shown in Figure 1, all policy scenarios make progress cutting emissions from BAU. Across the policy scenarios studied, estimates of economy-wide energy-related CO_2 reductions in 2030 range from roughly 10 to 25 percent from BAU and 30 to 40 percent from 2005 levels.

The CES and $15 carbon tax produce similar emissions trajectories through 2035, with steeper reductions than the CEAA early-on and after 2030. The CEAA and CES combined are an improvement over all individual policies, reducing emissions by approximately 37 percent from 2005 levels in 2030. The All-in scenario, which combines all three policies and federal spending on weatherization and EV charging is estimated to cut 2030 emissions by 41 percent from 2005.

While all scenarios make progress on emissions goals, none hit the NDC target of a 50-52 percent reduction from 2005 levels by 2030, indicating that additional policies and/or greater policy ambition are needed.

Figure 1. National CO_2 Emissions by Policy Scenario

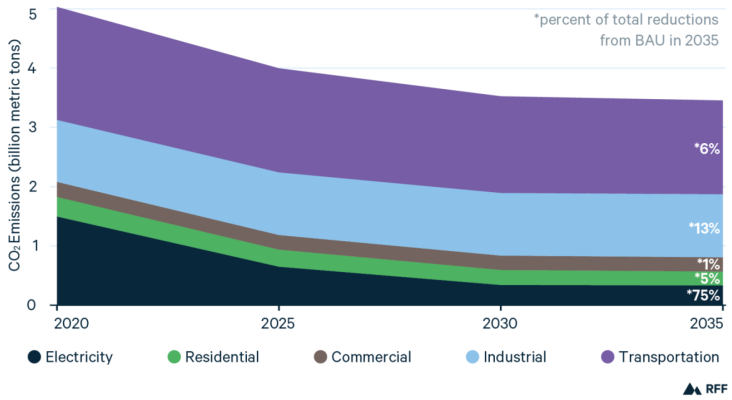


Additionally, none of the policy scenarios maintain a reduction path commensurate with what would be needed to reach net-zero by 2050 (as projected linearly from 2020), however a number of scenarios do maintain such a path through 2025 and one (All-in) through 2030. While not shown here, even if a CES were designed to achieve 100% clean by 2035 and combined with all the other policies we study, emissions would still not be on track to hit the midcentury target—policies that substantially cut emissions from sectors other than electricity will be needed as well.

One reason for misalignment with midcentury targets is that almost all policy scenarios hit a plateau around 2030. This is largely because these policies—even when combined—lose their effectiveness in the electricity sector over time (discussed below), and the vast majority of emissions reductions come from electricity through 2035.

Indeed, as shown in Figure 2, under the All-in scenario, about 75 percent of 2035 reductions from BAU come from electricity. The next greatest portion (13 percent) comes from the industrial sector, driven exclusively by the carbon tax. Reductions in the transportation sector are mostly driven by existing policy, which includes the national fuel economy/GHG standards for passenger vehicles and the Zero Emission Vehicle (ZEV) program, which sets sales targets for electric vehicles in California and 12 other states. New policy, particularly subsidies for electric vehicles, largely shifts costs of meeting the national standards and ZEV requirements from automakers and consumers to taxpayers, without substantially reducing national emissions—the All-in scenario only reduces 2035 emissions 6 percent below BAU (driven entirely by the carbon tax). With electricity emissions declining so much (in this and other scenarios), the major challenge going forward will be to reduce emissions from the transportation and industrial sectors—which, under All-in, represent nearly 80 percent of US energy-related CO_2 emissions in 2035.

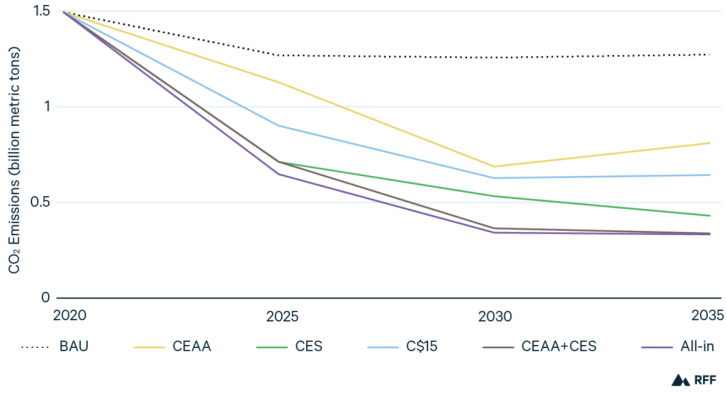
Figure 2. National CO_2 Emissions by Sector (All-in scenario)



In Figure 3, we take a closer look at the electricity sector. Of the individual policies, the CES reduces emissions most, both in the near- and long-term. And, because the CES and the CEAA together cut electricity emissions so significantly, the addition of the modest $15 carbon tax in the All-in scenario has little to no additional effect on electricity emissions.

None of the policy scenarios studied achieve the Biden goal of net-zero carbon electricity by 2035, but they make solid progress—between a 65 and 85 percent reduction in CO_2 emissions by 2035 (from 2005 levels).

Figure 3. Electric Power CO_2 Emissions by Policy Scenario



As mentioned above, all policies lose effectiveness over time in the electricity sector—indicated by flattening (and in some cases rising) curves after 2025. Why is this? Both the CES and the CEAA promote clean electricity, which primarily replaces coal in the early 2020s, and natural gas in the late 2020s and 2030s. This declining carbon intensity of the *replaced* electricity partially accounts for the decreasing emissions slopes. Additionally, by the 2030s, most renewables that are cheaper than natural gas (including tax credits) have been built; and the remaining gas in the system is either cheaper than renewables, or necessary for system balancing.

Post-2030, more stringent carbon pricing, richer tax credits, steeper CES requirements, or policies that target natural gas electricity emissions or promote clean firm

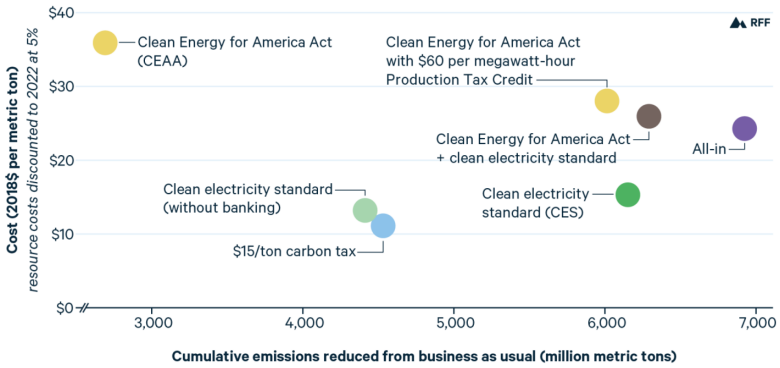
resources—such as energy storage—would be necessary to achieve the 100% clean goal by 2035.

Cost-Effectiveness of Policy Scenarios in Reducing Electricity Emissions

Considering electricity sector effects only, Figure 4 displays cost-effectiveness of the policy scenarios discussed above, along with two additional scenarios—one which assumes a higher tax credit for clean electricity (6 cents per kWh, or $60 per MWh), and a CES with no credit banking.

We measure cost-effectiveness as the change in total resource cost [1] from BAU (discounted over the 10-year budget window) divided by the cumulative emissions reduction from BAU. A lower number on the vertical axis indicates greater economic efficiency in achieving a given emissions reduction.

Figure 4. Cost-Effectiveness of Policy Scenarios (electricity sector effects only)



Policies that provide incentives to pursue numerous options for emissions reductions tend to be more cost-effective than narrowly targeted approaches. The CES is more cost-effective (and more effective at reducing emissions regardless of cost) than the CEAA because it applies to a broader set of clean generators, including existing nuclear, although it also gives credits to existing renewable resources that may not need further incentives to generate. It also provides some incentive to move from coal to natural gas by providing partial credits to efficient natural gas plants. The carbon tax is more cost-effective than the CEAA because it increases the market price of all emitting generation, whereas the CEAA simply changes the price of renewables constructed in 2022 or later. We also find the CEAA energy efficiency incentives to be inefficient at reducing emissions, but may be necessary to meet electrification and equity goals. When coupled with a carbon tax or CES, the CEAA amplifies emissions reductions and increases the cost per ton of achieving those reductions.

The CES performs comparably to a modest carbon price and, when credits are bankable, cumulative emissions are reduced by an additional 40 percent below BAU while only increasing the average cost by roughly $2 per ton. Enabling banking for any multipolicy scenario involving a CES also leads to greater reductions in emissions and relative costs. To achieve CES (with banking) levels of cost-effectiveness and emissions reductions using tax credits alone would require the CEAA's PTC to be raised by over 150 percent of its current level to $60/MWh.

Conclusion

The policy scenarios discussed in this brief produce reductions in energy-related CO_2 emissions between 10 to 25 percent from BAU—and 30 to 40 percent from 2005—by 2030. None of these scenarios achieve reductions commensurate with the recently announced 2030 NDC, the Biden administration 2035 target for electricity, or midcentury emissions targets identified by IPCC scientists to avoid potentially catastrophic climate change.

[1] Resource costs are the sum of electricity sector fuel costs, variable operations and maintenance costs, fixed operations and maintenance costs, and annualized capital costs.

One reason for this may be the fact that we calibrate our models to pre-COVID energy and emissions projections (see appendix), which produces conservative estimates in all years of our analysis. Uncertainty remains about the pace and shape of the economic recovery, as well as the extent to which COVID-induced behavior changes (*e.g.,* working from home) will persist even after society restabilizes, and how this may effect emissions in 2030 and 2035.

In any case, greater ambition under this suite of policies is one way to reduce emissions further—for example, by increasing tax credit and/or carbon price levels, or by designing a CES with a more stringent decarbonization path than the one we model here (as current approaches indeed propose).

Another approach would be to broaden the set of policy tools beyond what we study here (which we recognize is a small sample of the climate policy ideas being discussed in Washington). With electricity emissions declining 65–85 percent by 2035 (from 2005 levels) under the scenarios we study, leaders will need to devote attention to other sectors, including the transportation and industrial sectors which together account for 70–80 percent of emissions in 2035 under the scenarios we analyze.

Our research also indicates that policies which incentivize a diversity of decarbonization pathways tend to be more cost-effective than more narrowly targeted approaches.

While the policies we study may not achieve the administration's emissions goals, they represent a significant down payment on those goals, and they show that—with additional policy and refinements to existing approaches—these goals are within reach.

Appendix

In this appendix, we list key assumptions applied in our analysis (organized by reference and policy cases), and we provide brief descriptions of the models used.

Assumptions Regarding the Reference Case

Model reference case (or business-as-usual, BAU) assumptions are calibrated to EIA's Annual Energy Outlook (AEO) 2019 and 2020 reference cases. This means the models do not take into consideration the effects of COVID–19 on the economy or emissions (which are incorporated for the first time in AEO 2021). To give a rough sense of scale, pre-COVID BAU emissions projections are about 10 percent higher in 2020, and 3–4 percent higher in each of 2025, 2030 and 2035, compared to post-COVID projections.

Electricity and transportation models—AEO 2019

The electricity and light duty transportation models calibrate to AEO 2019. This implicitly includes the following major policy assumptions (think of these as policies included in the reference case):

- No Clean Power Plan.
- Obama CAFE standards still in effect.
- ZEV mandate in effect and federal plug-in vehicle tax credit (30D) phases out after manufacturers exceed 200,000 sales.

For assumptions about other policies assumed active in AEO 2019: *https://www.eia.gov/outlooks/archive/aeo19/assumptions/pdf/summary.pdf.*

For additional general AEO 2019 assumptions see: *https://www.eia.gov/outlooks/archive/aeo19/assumptions/*.

Economy-wide model—AEO 2020

The economy-wide model calibrates to AEO 2020. This implicitly includes the following major policy assumptions:

- No Clean Power Plan.
- Obama CAFE standards still in effect.
- ZEV mandate not in effect (Trump administration refusal to renew CAA Sec. 209 waiver)

For assumptions about other policies assumed active in AEO 2020: *https://www.eia.gov/outlooks/archive/aeo20/assumptions/pdf/summary.pdf.*

For additional general AEO 2020 assumptions see: *https://www.eia.gov/outlooks/archive/aeo20/assumptions/*.

Assumptions Regarding Modeled Policy Scenarios

Carbon Tax

- Policy start: January 1, 2023
- Starting tax rates: $15 per metric ton
- Real annual growth rate: 5%

Clean Energy for America Act (CEAA)

- Electricity generation PTC and ITC
  - Policy start: January 1, 2023
  - PTC
    - Qualifying Fuels: Wind, Solar, Hydro (Non-buildable), Nuclear (Non-buildable), Geothermal (Non-buildable), Biomass
    - Price: $24 (2020$)/MWh starting in 2023 (assumes full value of tax credit goes to generators, which may not be the case in the context of tax equity market transaction costs and mark-downs)
    - New plants qualify for 10 years of credits
  - ITC
    - Qualifying Fuels: Battery Storage
    - Price: 30% discount on capital costs beginning in 2023 (assumes full value of tax credit goes to generators, which may not be the case in the context of tax equity market transaction costs and mark-downs)
    - New plants qualify for 10 years of credits
- Energy efficiency tax credits
  - Policy start: January 1, 2022
  - New Homes
    - Whole-home energy reduction
    - 10% more efficient than IECC 2021 → $2,500
  - Home Improvements
    - Replacing heating and cooling systems
      - Min (30% of the replacement, $500) per appliance
      - Up to $800 for air source heat pumps and ductless mini-split heat pumps
      - Up to $10,000 for ground source heat pumps
  - New Commercial Buildings
    - 25% more efficient than ASHRAE 90.1-2016 -> $1.75/sqft
- Electric vehicle tax credits
  - Policy start: January 1, 2022 and ends December 31, 2031. Vehicle tax credits are available for all plug-in vehicle purchases, regardless of manufacturer's cumulative sales.

Clean Energy Standard (CES)

- Policy start: January 1, 2022
- Starting Requirement: 44% of national retail sales must be clean generation in 2022.
- 1st Segment: linear increase to 80% clean generation by 2032 (3.6% /year)
- 2nd Segment: linear increase to 100% clean generation by 2050 (1.11% per year)
- Benchmark Emission Rate: .4 metric tons / MWh (modeled as .44 short tons / MWh)
- Banking and no-banking scenarios considered

Other

- EV charging infrastructure spending is included in the All-in scenario. Spending assumptions: $1 billion per year from 2022 through 2031. Each charging station costs $50,000, and charging stations are allocated across regions according to the region's share in total new vehicle sales in 2018. The effect of charging stations on EV sales is calibrated based on regional trends from 2015–2018.
- Weatherization spending ($5 billion per year) is included in the All-in scenario.

Model Descriptions

The following models were used for this analysis. Results from each of these three models were combined to produce the estimates discussed above.

E3 Computable General Equilibrium (CGE) Model (Marc Hafstead)

The Goulder-Hafstead Energy-Environment-Economy E3 CGE Model is an economy-wide model of the United States with international trade. The model has two key features that distinguish it from most other CGE models. First, it combines a detailed description of domestic energy supply and demand with a detailed treatment of the US tax system, which allows for a careful examination of the interactions be-

tween climate and fiscal policies. Second, the model combines capital adjustment costs and perfect foresight to consider the dynamics of investment and disinvestment in response to climate policy. The current iteration of the model is benchmarked to 2018 data from the BEA and is carefully calibrated to both benchmark year data on energy use by fuel and sector from the EIA and EIA's AEO 2020 projections of energy use and GDP.

Haiku Electricity Sector Model (Karen Palmer, Dallas Burtraw, Maya Domeshek, Nick Roy)

The Haiku model is a detailed dynamic linear programming model of the US electricity sector. The model solves for investment and retirement of generation capacity over a 25-year horizon, with annual operation of the electricity system represented in eight time-blocks in each of three seasons (winter, summer and spring/fall). Electricity market equilibria are solved at the state level, allowing for state-level representations of environmental policies and regulatory practice, with interstate transmission capability calibrated to observed transactions in recent data. The model includes representations of existing power plants categorized by technology and fuel, and new options for investment in both fossil plants and various renewable options that capture costs and performance characteristics including resource availability by location and time block. Forecasted demand for electricity is fixed in any given model solution based on forecasts from EIA and is modified across scenarios to reflect the effects of policies such as vehicle electrification or increased investment in energy efficiency. The model solves for generation by model plant, costs and emissions of CO_2 based on fuel type and heat rates at emitting generators.

Energy Efficiency Model (Kenneth Gillingham, Qinrui Xiahou)

The energy efficiency modeling uses a back-of-the-envelope approach that accounts for four tax credits in the CEAA—those that apply to: new homes, home improvements, weatherization, and new commercial buildings.

For new homes and weatherization, the analysis is conducted at the climate zone level. The total energy saving is the weighted sum of the product of energy intensity savings, the number of new homes, the average floor area and participation rates. Energy intensity savings come from DOE's analyses of building codes; participation rates are estimated based on the energy efficiency distribution from the 2015 RECS Survey and existing WAP practice; and other parameters are acquired from the U.S. Census Bureau.

For home improvements, the calculations use empirical results on the effect of rebate policies on the sales share of Energy Star appliances. Along with efficiency improvement and sales data from the Energy Star website, the total energy saving is the sum of efficiency gains deriving from additional sales over major heating and cooling systems.

For commercial buildings, the parameters are collected and calibrated for each building type. The total energy saving aggregates the participation rates estimated based on the energy efficiency distribution from the 2012 CBECS Survey, the energy intensity savings from DOE's estimations, and the number of buildings and average floor area forecasted with historical data from EIA.

In all the analyses, it is assumed that savings for each energy type (natural gas, petroleum, electricity, etc.) are proportional to their shares of residential/commercial energy consumption at the national level.

Light-Duty Vehicle Model (Josh Linn)

The transportation model embeds a model of the new vehicle market in a representation of the on-road fleet of light-duty passenger vehicles. In the model of the new-vehicle market, vehicle manufacturers maximize profits by choosing the prices and fuel economy of their vehicles while complying with federal fuel economy/GHG standards and the ZEV program. Consumers in the model choose a vehicle that maximizes their own subjective well-being. All parameters of the model have been estimated or calibrated using a unique data set that is derived from survey data from approximately 1.5 million car-buying households from 2010–2018. For a given set of policy and fuel price assumptions, the model characterizes the equilibrium prices, sales, and GHG emissions rates of new vehicles by year and demographic group from 2017–2035.

Emissions of the on-road fleet are estimated from a model of the stock of light-duty vehicles. The stock evolves over time as new vehicles are purchased and older vehicles are scrapped. Utilization of each vehicle in the fleet depends on total national vehicle miles traveled (VMT), driving preferences of demographic groups, and fuel

costs of the vehicle relative to other vehicles. For each scenario, key inputs to the model include a) projected aggregate VMT and fuel prices from the 2019 AEO; b) sales and GHG emissions rates of new vehicles as described above; and c) scrappage rates. Emissions are calculated for each policy scenario and year from 2017–2035.

ZERO EMISSION TRANSPORTATION ASSOCIATION
659 C St., SE
Washington, DC 20003
(p) 703–328–8016
https://www.zeta2030.org/

May 11, 2021

The Honorable Ron Wyden
Chairman
U.S. Senate
Committee on Finance
Washington, DC 20510

The Honorable Mike Crapo
Ranking Member
U.S. Senate
Committee on Finance
Washington, DC 20510

Chairman Wyden, Ranking Member Crapo, and honorable members of the Committee, thank you for holding this hearing on these important issues and for providing the opportunity to provide this statement for the record.

The Zero Emission Transportation Association (ZETA) is a public interest non-profit of 55 member companies advocating for 100% electric vehicle (EV) sales by 2030. Our membership spans the entire EV supply chain and includes critical materials, charging companies, utilities, vehicle manufacturers, and battery recyclers.

We are dedicated to strengthening our nation's domestic EV industry to ensure the United States swiftly decarbonizes its transportation sector and maintains its edge in an increasingly competitive global auto market. At the start of this year, ZETA launched a comprehensive federal roadmap to achieve 100% electric vehicle sales by 2030.

ZETA's *Roadmap* to 2030 articulates the importance of strong incentives to electrify the transportation sector, provide benefits to consumers, create hundreds of thousands of 21st-century jobs, and drive down harmful emissions to improve public health while addressing climate change. A number of our recommendations rely on adapting the tax code to better serve the American consumer in order to drive domestic manufacturing and electrification in a swift and equitable manner.

ZETA views the tax code as the federal government's most powerful tool to invest in strong domestic manufacturing and drive deployment of electric vehicles. ZETA applauds the creative proposals put forth in both Chairman Wyden's Clean Energy for America Act and Ranking Member Crapo's Energy Sector Innovation Act that would peg clean energy incentives to concrete outcomes like emissions reduction and market penetration, rather than arbitrary expiration dates or caps as they have been to date.

We support the reforms to the plug-in electric vehicle tax credit and new incentives for commercial vehicles in the Clean Energy for America Act. While we support the spirit of the Energy Sector Innovation Act, especially the focus on the 48C Investment Tax Credit reform, we would like to see it include transportation technologies, especially for zero emission drivetrains and batteries.

We also support the bipartisan American Jobs in Energy Manufacturing Act led by Senators Manchin, Stabenow and Daines, that would incentivize domestic manufacturing of advanced energy technologies with targeted investment in rural communities across America that have suffered from a decline in manufacturing and traditional energy sector jobs. The important resources allocated to this fund will provide certainty and spur immediate manufacturing investment that otherwise may have been put off.

It is fiscally responsible to phase out subsidies for mature technologies with nearly 100 percent market saturation and reinvest the savings toward emerging sectors

with high returns on investment like clean energy—which is a category that should include advanced batteries and zero-emission vehicles.

We believe that the Clean Energy for America Act, the American Jobs in Energy Manufacturing Act, and the Energy Sector Innovation Act can complement each other with smart revisions. Together, they can accelerate the development of new, domestic clean energy technologies from early-stage emergence to commercial deployment. With some additional calibration they can begin creating new domestic manufacturing jobs and ensure America maintains its edge in this increasingly competitive global clean energy race of the 21st century.

Sincerely,

Joe Britton
Executive Director