

ENERGY TAX POLICY IN 2016 AND BEYOND

HEARING

BEFORE THE

COMMITTEE ON FINANCE

UNITED STATES SENATE

ONE HUNDRED FOURTEENTH CONGRESS

SECOND SESSION

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ENERGY TAX POLICY IN 2016 AND BEYOND

TUESDAY, JUNE 14, 2016

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

The hearing was convened, pursuant to notice, at 10:05 a.m., in room SD-215, Dirksen Senate Office Building, Hon. Orrin G. Hatch (chairman of the committee) presiding.

Present: Senators Grassley, Crapo, Enzi, Thune, Toomey, Scott, Wyden, Schumer, Stabenow, Cantwell, Menendez, Carper, Cardin, Bennet, and Casey.

Also present: Republican Staff: Chris Campbell, Staff Director; and Jim Lyons, Tax Counsel. Democratic Staff: Ryan Abraham, Senior Tax and Energy Counsel; Robert Andres, Tax and Economic Policy Adviser; Michael Evans, General Counsel; and Joshua Sheinkman, Staff Director.

Senator GRASSLEY [presiding]. In this short absence, I should say, of the chairman, his staff has asked if I would proceed, and we do it with the okay of the minority. Senator Wyden, as well, has said we should go ahead.

I do not have an opening statement. It is my job to introduce the witnesses, and then we will go to the testimony.

Our panel is a highly qualified group of witnesses. Thank you all for coming.

We will hear from Dr. Ben Zycher, the John G. Searle chair and resident scholar at AEI. Dr. Zycher specializes in energy and environmental policy, while simultaneously working as a senior fellow at Pacific Research Institute. He is a former senior economist at Rand; a former adjunct professor of economics at the University of California-Los Angeles, as well as the California State University-Channel Islands; and is a former senior economist at the Jet Propulsion Laboratory, California Institute of Technology. He has also served as Senior Staff Economist for the President's Council of Economic Advisers, where he also specialized in energy and environmental issues.

We will hear, following Dr. Zycher, from Mr. Steve Miller, CEO of Bulk Handling Systems. Mr. Miller has 25 years of experience in the management of recycling and manufacturing facilities. Mr. Miller has led Bulk Handling Systems since 2005.

Third, we will hear from Ms. Susan Kennedy, CEO of Advanced Microgrid Solutions. Ms. Kennedy has served for 2 decades in State and Federal Government, most recently as Chief of Staff for Governor Arnold Schwarzenegger, Cabinet Secretary and Deputy Chief

of Staff for Governor Gray Davis, and Communications Director for our colleague, Senator Feinstein.

Last, we will hear from the Honorable Karen A. Harbert, the president and chief executive officer of the U.S. Chamber of Commerce's Institute for 21st Century Energy. Ms. Harbert leads the Institute's effort to build support for energy action nationally and internationally through policy development, education, and advocacy. Ms. Harbert is the former Assistant Secretary for Policy and International Affairs at the U.S. Department of Energy.

The committee thanks you all for taking time from your busy schedules to be in attendance today.

I should ask Senator Wyden for his opening statement. As you can see, Senator Hatch asked me to proceed while he is on his way, I guess.

**OPENING STATEMENT OF HON. RON WYDEN,
A U.S. SENATOR FROM OREGON**

Senator WYDEN. I am looking forward, as always, to working with you, Mr. Chairman, and I appreciate it.

In my view, there are two parts to the energy debate today. The first is where energy policy needs to go in the long term, and I want it understood that I think it is time to take the energy provisions in the tax code and throw them in the trash can.

It is a mishmash, a crazy quilt of distorted incentives, and I think what we ought to be doing is substituting a very different approach, a tech-neutral approach that cuts the costs of these energy subsidies in half and promotes a clean energy economy.

I call it "more green for less green."

The second part of the energy debate is about creating the running room in the short term to make it possible to achieve that long-term goal that I just described.

Now, I am going to talk about both today, and we will start with the short term. At the end of last year, Democrats and Republicans came together and began to move away from the same-old same-old cycle of energy tax extenders.

Congress decided on a bipartisan basis that another weeks- or months-long renewal of the renewable energy tax incentives was not good enough. Incentives for wind and solar, which have grown to become major parts of America's energy portfolio, got 5 years of certainty, and other clean technologies got 2.

The result has been dramatic. New solar installations are projected to double this year, and, for the first time, new solar generation will exceed natural gas.

Now, in the short term, it is important to remember that there is leftover business that needs to be addressed. Certain renewable technologies were left out of last year's package: fuel cells, geothermal, and more. The clock is ticking down to another round of expirations at the end of this year.

For example, bipartisan legislation on waste-heat-to-energy that passed this committee was left out. The sooner Democrats and Republicans come together, take care of these energy extenders, and clear the decks, the sooner it will be possible to find a smarter, fresher approach to long-term energy policy.

So let me just wrap up with a few more quick comments about the long-term part of this debate.

In my view, the key to a long-term sustainable approach on energy policy is going technology-neutral. The system on the books today distorts energy markets, picks winners and losers, and especially holds back America's innovators. That ought to change, and that is why I put forward a tech-neutral plan that will be radically simpler and more efficient. Gone, as I indicated, will be today's Byzantine web of 44 separate energy tax breaks. In their place will be three long-term incentives built around clear goals, cleaner energy, cleaner transportation, and energy efficiency.

I especially appreciate so many of my colleagues being here from the other side of the aisle, both here and in the Energy Committee. I think some of my colleagues know I chaired the Energy Committee for a period of time. I have heard constant refrains about cutting subsidies. It is time to cut subsidies; we all ought to agree on cutting subsidies.

What my proposal does is, it cuts the amount of subsidies, \$125 billion every decade, in half. It is a market-oriented system. It, in my view, is going to unleash the innovators with big ideas.

Now, the Finance Committee is lucky to be joined today by the heads of two companies that are doing exciting work in the field of renewable energy. We are very pleased that Bulk Handling Systems is here. They are based on Eugene, OR. The waste Americans produce every day can be recycled and turned into energy. Even the trash trucks run on renewable fuel. Advanced Microgrid Solutions is at the forefront of a technology that has long been overlooked by our tax policies, and that is energy storage.

I began years and years ago to offer various energy storage proposals, because the fact is, the sun does not always shine and the wind does not always blow. So energy storage is a must.

In summary, these are the kind of 21st-century innovations that right now are disadvantaged by outdated policies or, in my view, just get ignored all together.

But with a tech-neutral policy, the unfair market distortions go away, the incentives will be predictable, and the goals will clear. The cleaner your energy, the cleaner your transportation fuel, the more efficient your home or office building, the larger the tax break. That goes for everyone. I hear some questions by colleagues who are concerned about the implications for fossil fuels. This applies to everyone.

A natural gas facility that invests in a highly efficient, next-gen turbine, or an oil company that sets out to make the clean transportation fuels of the future, both qualify for this fresh approach that I am describing.

The bottom line is that energy in America is being transformed. The threat posed by climate change grows every day. New technologies are being developed. Investors see enormous economic opportunity in renewable energy.

So it is time to play some catch-up ball and ensure that the energy tax policies, these outdated energy tax policies, keep up. It is time to stop clinging to yesteryear, like the naysayers who saw the first automobiles hit the road a century ago and said, "Hey, the horse is here to stay."

What is needed are policies to support those who are at the forefront and the innovators.

I look forward to hearing from our witnesses. I am very glad to hear that Eugene, OR is out in force at the witness table, and I look forward to their ideas on how to address both concerns: a smart, fresh energy approach for our long term, and dealing with these crucial tax extenders, which, in effect, give you a bridge to get to the long term.

Mr. Chairman, it sounds like you have gotten through the early morning of your day, and I look forward to working with you.

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

**OPENING STATEMENT OF HON. ORRIN G. HATCH, A U.S.
SENATOR FROM UTAH, CHAIRMAN, COMMITTEE ON FINANCE**

The CHAIRMAN. Well, thank you; same here.

This is not the first hearing we have had on these issues during my time on the Finance Committee, nor is it likely to be the last. Members on both sides of the aisle have a keen interest in this area, and for good reason. The energy-related provisions in our tax code impact a variety of industries throughout our economy and affect the lives and livelihood of the majority of all of our constituents.

It is, therefore, important that we continually examine these provisions to make sure we are getting things right and that resources do not go to waste.

I am really pleased that Senator Grassley opened this hearing for me, since I was detained.

I will start today's discussion by reiterating my overall position. Generally speaking, when it comes to energy policy, I have always said that we need an all-of-the-above approach. Unfortunately, not everyone shares this view.

For example, leaders in the current administration, including President Obama himself, have said that they are for an all-of-the-above approach, yet clearly, when it is time to draft policies, the administration seems far more interested in punishing the production and use of fossil fuels, even if it means higher energy costs for our hardworking taxpayers.

We see this across the board in the administration's environmental policies, its regulatory war on coal, its refusal to allow construction of the Keystone Pipeline, and what is more relevant to today's discussion, its tax policy proposals, which consistently include higher taxes at virtually all steps of the energy supply chain.

Whether it is an increased per-barrel tax on oil production or higher per-gallon taxes charged on gasoline at the pump, the Obama administration seems intent on raising the cost of producing or consuming energy from fossil fuels, even if it means increased hardships on middle-class and lower-income families.

More recently, the President proposed a \$10 per-barrel tax on oil, an idea that virtually all economists agree would directly result in higher energy prices for families and consumers. Of course, this proposal would also be harmful to American businesses, particularly those in the manufacturing sector that rely on fossil fuels.

The President and those who serve in his administration presumably know that this is the case. Yet, they are undeterred, and, quite frankly, these proposals are just the tip of the iceberg when it comes to the President's efforts, not to mention those of many of his supporters here in Congress, to use the tax code to further an ideological attack on American energy producers. This is, of course, not a surprise. After all, back when he was a candidate for president, then-Senator Obama said, in so many words, that the centerpiece of his energy policy, the so-called cap-and-trade proposal, would, quote, "necessarily" cause energy prices to, quote, "skyrocket."

The President's first Energy Secretary, before he was appointed, argued on the record in favor of purposefully raising gas prices to European levels. All of this is meant to serve an agenda focused on ideology and not on the day-to-day needs of the American people and is, quite simply, the opposite of what our country needs.

Instead of discouraging the domestic production of oil and gas, we should welcome it. By reducing our dependence on foreign oil, creating many high-paying jobs, and bringing down the cost of living for U.S. households, increased domestic energy production can protect our national security and provide greater economic stability.

The President's first major attempt to overhaul America's energy policy, the aforementioned cap-and-trade proposal, thankfully, failed to pass through Congress, even when the Democrats controlled the House and had a filibuster-proof majority in the Senate. Since then, proponents of this horribly misguided policy have tried to repackage cap-and-trade, instead calling it a, quote, "carbon tax."

As an aside, I have to say that when it comes to these "carbon tax" proposals, I am a little disappointed in my friends on the other side of the aisle. Typically, when they have a proposal they know is going to put the financial screws to the American people, they give it a more clever name. The so-called Affordable Care Act comes most immediately to mind.

However, with the various "carbon tax" proposals, my friends are telling the American people exactly what they will be getting: higher taxes in the form of increased energy costs and reduced wages relative to the cost of living.

In addition to increasing costs particularly on middle-class and lower-income earners, the President's energy tax policy also seems hyper-focused on picking winners and losers and handing over taxpayer resources to unproven ideas and technologies that far too often are completely unable to compete in the energy marketplace.

Do not get me wrong. I am all for promoting innovation and advancing alternative energy sources.

Like I said, I want an all-of-the-above approach. However, I do not believe we should be purposefully raising the cost of existing and proven energy sources and adding to the cost of doing business or raising a family in the U.S. in order to make alternative energy sources more attractive.

In addition, I have serious concerns about the way in which the administration has overseen the use of the subsidies it designed to promote alternative energy. Most notably, as chairman, I am cur-

rently investigating the administration of cash grants awarded under the section 1603 program and energy tax credits based on evidence from the Treasury Inspector General for Tax Administration and elsewhere that suggests possible misuse.

So far, \$25 billion has been awarded under the cash grant program since it was established in the so-called stimulus that passed in 2009. We need to know more about where those resources have gone.

Ultimately, the energy-related provisions in our tax code, like everything else, will have to be reconsidered as part of our ongoing tax reform efforts. In our attempt to make the tax code fairer, simpler, and more conducive to economic growth, I am willing to consider any reasonable alternatives. However, that is a long-term effort that will likely not bear fruit in the immediate future.

In the meantime, I think we need to work to ensure that our tax code is designed so that it does not punish the production of any viable energy source.

In the end, it is easy for politicians in Washington to sit in an ivory tower and say that people are not currently paying enough for their energy and they should pay more in order to further some ideological agenda. However, I think the vast majority of American workers and families would strongly disagree with that notion.

As always with these energy hearings, I expect that we will have a spirited discussion of all of these issues here today.

I think we have assembled a very good panel of witnesses to represent various viewpoints, and I look forward to hearing their views on these and other matters.*

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

The CHAIRMAN. With that, we will just turn to our first witness, and you can begin, sir.

**STATEMENT OF BENJAMIN ZYCHER, JOHN G. SEARLE CHAIR
AND RESIDENT SCHOLAR, AMERICAN ENTERPRISE INSTITUTE,
WASHINGTON, DC**

Dr. ZYCHER. Thank you, Mr. Chairman and distinguished members of this committee.

Since the early 1970s, there have been seven central rationales for energy tax policy and subsidy interventions prominent in the public discussion. All of them suffer from fundamental analytic weaknesses.

First, energy independence is irrelevant, particularly for energy forms traded in international markets. Changes in market conditions have identical price impacts on different economies, regardless of the degree of foreign dependence, an economic truth demonstrated by the historical evidence.

Second, the infant industry argument for subsidies in the early periods during which technologies are proven and scale and learning efficiencies are achieved is a non sequitur. Capital markets can sustain promising industries or technologies in their infancy, and, in the context of wind and solar power, there is little evidence that

*For more information, *see also*, "Present Law and Analysis of Energy-Related Tax Expenditures," Joint Committee on Taxation staff report, June 9, 2016 (JCX-46-16), <https://www.jct.gov/publications.html?func=startdown&id=4915>.

there exists additional learning or skill efficiencies remaining to be exploited in any event.

Third, there is no analytic evidence that renewable electricity suffers from a subsidy disadvantage relative to conventional energy sources. The data reported by the Energy Information Administration suggests the reverse strongly, and the central subsidies for conventional fuels that often are cited are not subsidies, defined properly, as a matter of economic analysis.

Fourth, with respect to the environmental externalities, wind and solar power create their own set of significant environmental problems. And even in terms of conventional pollutants and greenhouse gasses, the evidence suggests that they do not yield an advantage relative to conventional generation. This is the case, in particular, because of the up-and-down cycling of conventional units needed to back up renewable power systems due to their inherent unreliability. And those backup costs, which are economic externalities inflicted upon the economy, are substantially larger than the environmental costs of conventional power, even under extreme assumptions.

Fifth, the sustainability of resource depletion arguments for renewable subsidies make little sense analytically. The market rate of interest provides powerful incentives to conserve resources for future periods, and the sustainability rationale is inconsistent with the historical evidence in any event.

Sixth, the green jobs employment rationale for renewable subsidies makes no analytic sense at all. We cannot increase aggregate employment by making energy more expensive. Because resources are limited always and everywhere, a shift of resources into the production of politically favored power must reduce employment in other sectors, and the taxes needed to finance the subsidies cannot have favorable employment effects. Moreover, the historical evidence on the relationships among GDP employment and electricity consumption do not support the green jobs argument.

Finally, the newest environmental rationale for renewable subsidies, the effect of greenhouse gas emissions on prospective climate phenomena, is deeply problematic. In particular, the Obama administration estimate of the social cost of carbon is the single most dishonest exercise in political arithmetic that I have ever seen emerge from the Federal bureaucracy. It suffers from three central benefit-cost analytic flaws: the application of assumed benefits global rather than national, the failure to use an appropriate discount rate, and the inclusion of such co-benefits as particulate reductions in the calculation of benefits.

Moreover, the policies proposed to reduce emissions of greenhouse gasses would have temperature effects by the year 2100 trivial or immeasurable even at the international level. That is the straightforward prediction that we derive from the EPA's own climate model under assumptions highly favorable to the policy proposals, and that is what the EPA itself admits in its regulatory impact analyses.

I urge policymakers to adopt a straightforward operating assumption. The market allocation of resources in energy sectors is roughly efficient in the absence of two compelling conditions.

First, some set of factors clearly has distorted those allocational outcomes substantially. Second, government actions with high confidence will yield net improvements. Given the weak history of analytic rigor in the context of energy tax and subsidy policies, greatly increased modesty on the part of policymakers would prove advantageous.

Thank you again, Mr. Chairman. I will be very pleased to address any questions that you or your colleagues may have.

[The prepared statement of Dr. Zycher appears in the appendix.]

The CHAIRMAN. Thank you so much.

Mr. Miller?

**STATEMENT OF STEVE MILLER, CHIEF EXECUTIVE OFFICER,
BULK HANDLING SYSTEMS, EUGENE, OR**

Mr. MILLER. Thank you, Chairman Hatch, Ranking Member Wyden, and the rest of the committee. It is a pleasure to be here today.

My company is actually a group of four companies, with operations based in Eugene, OR and manufacturing operations in Oregon, Tennessee, and California. Together, our companies design, engineer, manufacture, and install systems that process municipal solid waste streams, extracting the value from what is thrown away and minimizing the amount that is sent to landfills. While our products are produced here in the United States and most of our business is domestic, we also operate globally and today are fulfilling orders on five continents.

One of our companies is focused on anaerobic digestion, or AD, technology. In this group, we build systems that convert organic waste into biogas, which is then used to produce either electricity or transportation fuel that would replace diesel in a waste truck fleet. In each of the systems, the resulting materials after biogas is extracted are organic solids, which we then turn into compost, and that material is then used in the agricultural sector to replenish soils and retain water.

So while I am here today to talk about anaerobic digestion, biomass, and tax credits that might be available, our systems do much more than simply produce renewable energy. They substantially increase diversion of material from landfills. They manage the production of methane from the breakdown of organic waste so that it is not released to the atmosphere.

We produce a base load electricity, as well as transportation fuels. And we produce organic compost to both replenish soils and retain water.

Despite the overall attractiveness of the products that we create, our development has been slowed due to the headwinds caused by pricing: low prices for electricity, low prices for natural gas, and low prices for oil. Since the renewable products that we produce compete with these fuels, we are challenged to provide our customers the economics that they need to fund projects.

So that really brings me to my central point. And while I appreciate the Senate's attentiveness to this issue and the policies that were adopted at the end of 2015, they simply do not do enough as it relates to the biomass sector.

To correct this, we really need two simple things. First and foremost is certainty of the credit, and second is parity with other renewable energy technologies so that we can attract the capital needed for these projects.

The way the current credits are structured, we do not achieve either of these outcomes. The Production Tax Credit and Investment Tax Credit for wind and solar received long-term extensions, while credits for the biomass industry were extended only to the end of 2016 and only applied to the renewable energy portion of the project. Since development of these projects takes several years, this makes the credit limited and really, today, of not much value.

Additionally, all of our systems are required to deal with the solid material and produce compost. Thus, the cost to build an AD system must necessarily also include the compost system capacity.

I think the intention of the credit is to provide value across the whole project, but the way it is now structured, it does not do so. To make it useful, it needs to include all of the necessary elements of a renewable energy system.

So, while the credit established for the biomass industry expires at the end of this year, the credits for wind and solar were extended for 5 years. This is on top of the many years that they have received these benefits. To develop our project and our process, we simply need a longer ramp-up time. And I would suggest that if Congress wants to support renewable energy in the biomass sector, these advantages should be removed.

In conclusion, I would ask you to consider the following. First, ensure parity across all renewable energy technologies. If wind and solar are given credits, then they should similarly apply to the biomass sector.

Second, extend the PTC for biogas technologies for 5 years, with no phase-out, and ensure that the legislation allows technologies to convert the PTC into an ITC.

Third, allow biogas to be used as a transportation fuel to obtain these credits, similar to if we were producing electricity.

Lastly, allow the credit to apply to the costs to develop the compost portion of the project so that we can use it in the entirety of the project.

Thank you again for the opportunity to speak today, and I hope you can help us develop this important industry.

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

The CHAIRMAN. Thank you, Mr. Miller.

Ms. Kennedy?

**STATEMENT OF SUSAN KENNEDY, CHIEF EXECUTIVE OFFICER
AND BOARD MEMBER, ADVANCED MICROGRID SOLUTIONS,
SAN FRANCISCO, CA**

Ms. KENNEDY. Mr. Chairman, Senator Wyden, committee members, thank you for inviting me to participate in today's hearing.

Advanced Microgrid Solutions is a company that finances, designs, installs, and manages advanced energy storage systems for commercial industrial customers, hospitals, and universities. We use best-in-class battery technology and advanced analytic software to manage demand to provide reliable backup power and optimize onsite resources, such as solar, wind, and fuel cells.

AMS designs energy storage projects for grid support. So we are building the first fleet of hybrid electric buildings in the world for Southern California Edison this year.

Prior to founding AMS, I was the Chief of Staff to Governor Arnold Schwarzenegger. I also served for several years on the California Public Utilities Commission that regulates investor-owned electric, gas, telecommunications, and water utilities. Before that, I served as cabinet secretary to another California Governor, Gray Davis, during the ugly days when California experienced rolling blackouts.

Watching California's economy drop to its knees during the energy crisis was a seminal experience for all Californians. We learned in a very painful way that the electric grid is the most critical of all critical infrastructure in the United States. It is the lifeblood of economic growth, providing the backbone for every vital sector: finance, health care, transportation, telecommunications, public safety.

Whether the grid is brought down by poor regulation, overheated transformers, squirrels, or wildfires, billions of dollars are lost and people die. The U.S. endures more blackouts today than any other developed nation, and the U.S. grid loses power 285-percent more today than it did in the 1980s, costing the economy between \$80 billion and \$150 billion per year.

The root causes of the increasing number of blackouts are aging infrastructure, the changing nature of supply and demand, extreme weather, and lack of investment in the distribution system.

The distribution system, the electric grid as a whole, was designed around the concept that energy cannot be stored. We move electrons by the millisecond to balance supply and demand, frequency, and voltage. There is more than \$0.5 trillion in redundancy built into the grid to manage fluctuations in power flow. And now, with more renewable generation on the grid, grid operators are having to build even more layers of redundancy into the grid in case a large cloud takes a solar field offline somewhere on the grid for even a few minutes.

Advanced energy storage will change everything about our electric grid. It is now possible to store energy at every level—at the consumer level, the distribution level, the transmission level—giving grid operators, utilities, businesses, and residential customers the tools to manage demand and cost-effectively store electricity when it is cheap and abundant for use when and where it is needed.

Advanced energy storage is the only technology that provides tools that reduce costs for consumers and provides multiple functions for grid operators, while simultaneously building layers of resiliency into the grid.

Energy storage is no longer an experimental technology. Because of advancements in lithium ion chemistry used in laptops, cell phones, and electric vehicles, grid-scale energy storage is now market-ready.

The need for investment in the distribution system to handle a dramatically changing electric grid is in the hundreds of billions of dollars each year. In 2014 alone, U.S. utilities spent more than \$100 billion maintaining the distribution system, and utilities na-

tionwide are going to need to spend close to \$1 trillion over the next decade to modernize and maintain the electric grid. Advanced energy storage will be the core technology at the foundation of a modern electric grid.

The grid was built by private-sector capital, and it will be private-sector capital that builds the electric grid of the 21st century. Federal tax policy is the single most important tool to attract investment in new technologies and scale them for commercial deployment. Whether you agree with targeted tax incentives or not, they are often the only tool government has to induce private-sector investment.

For most of the 20th century, energy tax policy served us well in promoting domestic oil and gas reserves and production. The solar ITC alone has induced a 6,500-percent growth in solar installations since its implementation in 2006. Today, directly resulting from the ITC, solar energy has reached grid parity and is available in the market today for under 3 cents a kilowatt hour.

Consistency in Federal tax policy is what is needed to fuel billions of dollars in investment in development and deployment of advanced energy storage, and until Congress reforms the entire tax code and passes a comprehensive tax policy aimed at the energy sector across all sectors, the primary tool for incentivizing private investment in our Nation's grid is the ITC. The single most important impactful measure the Federal Government can take to spur short-term deployment of advanced energy storage is to make it consistently available for all advanced technologies.

Congress has effectively used the ITC to change the electric grid, and now it must use that tool to secure the electric grid.

Thank you.

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

The CHAIRMAN. Thank you.

Ms. Harbert?

STATEMENT OF HON. KAREN ALDERMAN HARBERT, PRESIDENT AND CHIEF EXECUTIVE OFFICER, INSTITUTE FOR 21ST CENTURY ENERGY, U.S. CHAMBER OF COMMERCE, WASHINGTON, DC

Ms. HARBERT. Thank you, Chairman Hatch and Ranking Member Wyden and the entire committee, for including me in this hearing. I applaud you for this timely hearing, because the U.S. is really at an energy policy crossroads.

Much of our energy economy is governed by laws and regulations that are many decades old and not suited to our newfound abundance. Fiscal policy tends to be nimble, but even it can be outdated by today's energy abundance, which has changed so rapidly and is slated to continue.

So as we think about energy tax policy, it should not be considered in a vacuum. We should be looking at it in the context of much-needed comprehensive tax reform that lowers taxes for all businesses, shifts to a more internationally competitive system, reduces the cost of capital, and decreases complexity—and refrain from trying to tackle this on a piecemeal basis.

However, in looking at energy tax policy specifically, there are some tenets we think you should consider. First and foremost, it should be results-oriented and not proscriptive. We have not been overly successful in predicting technology success in the past and certainly did not predict today's energy abundance, and we certainly do not want to forestall the new technology surprises ahead of us.

Secondly, Congress should avoid taxing one industry in an effort to support another, and I will have more on that later.

Third, Federal energy policy must maximize all of our energy resources, which have allowed this country to industrialize, improve our quality of life, and develop those technologies that have allowed us to improve our environment. But today we see laws and regulations constraining access to resources, consideration of punitive taxes, and Byzantine regulations.

Fourth, Federal policy must look to the future and allow technology evolution and commercialization, and tax policy plays a very important role in that.

Fifth, we should be very wary of creating or distorting markets. And last, we must avoid unintended consequences. And an example of an unintended consequence is the well-intended Production Tax Credit of 1992, intended to expand wind and renewable technologies and diversify our portfolio. And to the extent that that was the purpose, it has been very successful, bringing wind from almost zero to almost 5 percent today.

However, it is now having a perverse consequence in that it is challenging the grid. With today's stagnating economy and excess electrons, grid operators are forcing generators to pay them to take their electrons.

For the wind operators, they can recoup their losses from the PTC. Coal and gas generators can either shut down or force themselves to pay the costs. The nuclear operators do not have that option.

So today we are actually causing today's only carbon emissions-free base-load power to be economically uncompetitive in places around the country. We have eight nuclear power plants that are today either closing or about to close, and 17 that are vulnerable because of this unintended consequence.

I want to go back to the one thing I said about not tearing down one industry to build another. Today, America is blessed with the huge asset of our abundant resources. We have more oil, gas, and coal than any other country. We are the largest producer of oil and natural gas in the world.

When you look at today, the U.S. derives 81 percent of its energy from either oil, natural gas, or coal. If we are going to increase taxes on those forms of energy, it will only serve to make foreign energy cheaper, increase imports into the United States, and export jobs and economic growth abroad.

By 2040, the picture does not look much different. The Energy Information Administration says we will still rely on those forms of energy for 78 to 80 percent of our energy needs. So in effect, raising taxes on those forms of energy will raise taxes on the entire economy.

This industry, the oil and gas industry, represents 8 percent of the U.S. GDP. So raising taxes on that amount of GDP will certainly reverberate throughout the entire economy and have an out-sized effect on growth.

This industry was also the industry that hired the most people throughout a recession. Today, even in the low-price environment, it supports 9 million well-paying jobs in every single one of our 50 States, and some of those will be jeopardized.

It also contributes a significant amount of government revenue. In 2015, this industry provided more than \$7.6 billion in government revenue through royalties, rents, and bonuses. That is on top of the \$300 trillion of Federal income and excise taxes it paid.

This industry pays an average tax rate of 44.5 percent. If we increase taxes on that industry, that significant component of our economy, there is no doubt that not only gasoline prices will go up, electricity prices will go up, commodity prices will go up, but we will be importing more energy from places that do not like us so much, and that certainly puts us at a disadvantage.

So let us not look too far into the past, with the Windfall Profits Tax that was put in place in the 1980s, which served to actually decrease domestic production by 8 percent and increase imports by 13 percent, which is why it was repealed 6 years later.

So in summary, let me just say that Federal tax policy can be a very potent energy policy tool, but it must be part of comprehensive tax reform. We have to be very sober about the unintended outcomes. We have to focus on results rather than picking technologies, and we must make sure that we can secure our energy future by growing our economy rather than letting others grow at our expense.

Thank you very much.

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

The CHAIRMAN. Thank you. We appreciate all the testimony here today.

Let me start with you, Dr. Zycher. A number of tax policy experts believe that the tax system should only be used to raise the revenue necessary to fund the Federal Government and not get involved in social engineering through the tax code.

Now, these experts suggest that energy policy should not be run through the tax code. As part of the tax reform exercise, this is one approach toward dealing with energy tax provisions.

Let us have your thoughts on such an approach to tax reform.

Dr. ZYCHER. Thank you, Mr. Chairman.

I think the general view among economists that you summarize is largely correct. Government makes efforts, sometimes justified, sometimes less so, to change resource allocation that would otherwise emerge from market competition, and the purpose of the tax system is to raise the necessary revenues to fund those spending activities in a way that minimizes economic distortions.

What you have called, in your question, social engineering through the tax code, I might change a little bit in terms of verbiage to call it distortionary effects of tax policies.

Those effects take two forms: one, distortions in resource allocation in the private sector that yield less productivity; and second,

a distortion in the signals that taxes send to policymakers with respect to the mix of public services that taxpayers prefer.

So I agree with you that one way to approach thinking about reform in this area would be to, gradually or in one bill, if that is even possible, eliminate or substantially reduce the use of tax policies to affect energy markets and to shift efforts to change resource allocation in energy markets from the tax side of the budget to the spending side of the budget.

The CHAIRMAN. Thank you.

Let me ask a question to Ms. Harbert first, and then again, back to you, Dr. Zycher.

What economic effect would a carbon tax have on U.S. workers, consumers, and businesses?

Ms. HARBERT. Well, I think we have seen the President come forward with a very specific proposal in the little over \$10 tax per barrel, which is, in effect, a carbon tax. So when you look at that, the immediate effect is, obviously, raising the price of gasoline, upon which every business and family depends, about a quarter for every gallon of gas you put in your tank.

But it is not limited to the gas tank, because our entire economy, the backbone of our entire economy, is based on fossil fuels. We are still going to be relying on them, according to EIA, into the middle part of this century to move things around this country, to move milk, move eggs, move our groceries, move all these things, and making the types of technologies and components for the advanced technologies of tomorrow.

So it would have a very serious effect on certainly the poor, the elderly, who pay more of their income into energy, but it would have a constraining effect on our overall economy.

The businesses in Europe that are moving to the United States because we have affordable electricity, affordable natural gas, would turn around and go back and go somewhere else.

So we will stifle investment here, stifle competitiveness, reduce our trade balance, and certainly provide attacks on every American family and business.

The CHAIRMAN. Dr. Zycher?

Dr. ZYCHER. I agree with most of those comments. A carbon tax or a per-barrel import fee applied also to domestic production or refining activities would have the effect of reducing GDP growth, reducing employment, and increasing the poverty rate, which is something that does not get mentioned, I think, often enough in the public discussion.

A carbon tax, in particular, would not yield any environmental benefits—we can discuss this later, if you would like. It would not yield any environmental benefits that would be measurable.

So I think from the social standpoint, it would be all cost and no benefit.

The CHAIRMAN. Dr. Zycher, I hope we are able to tackle tax reform in the near future. But regarding energy policy in tax reform, what do you think is the most important piece of advice for us to keep in mind as we try to do that?

Dr. ZYCHER. I think that the most important single message I would leave with you is that all, and I do mean all, of the traditional and modern rationalizations for Federal meddling through

the tax code and other policies in energy sectors are very, very weak analytically, and it really would be better for Congress to extract the Federal Government from energy markets, to the degree that it is possible.

The CHAIRMAN. Thank you.

Senator Wyden?

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

I want to start with you, Mr. Miller, and you, Ms. Kennedy, because I think it is striking. You both actually run companies. You are innovators, and I think it is particularly important, as Congress moves to what is the perpetual ritual of energy policy: we wait until the last minute.

There is this song-and-dance of tax extenders, and there are more than a dozen of them that are going to expire in December, and it is estimated that the Federal Government is going to spend more than \$125 billion over the next 3 decades on these provisions. So I continually hear from business people that this just defies common sense, because they do not have certainty and predictability.

What I have proposed—and more than 30 United States Senators are now on board on this—I have said, enough already, let us just throw the tax provisions, the energy tax provisions, in the trash can—there are more than 44 of them—and substitute the 44 for three: essentially clean power, clean transportation fuel, and energy efficiency.

It comes in at half the cost. I call it “more green for less green.” And my question to you is, would something like this be preferable to what we have because we get out of the business of picking winners and losers, remain neutral between clean energy technologies, and, best of all, cut the costs in half?

Ms. Kennedy, would this be better for you?

Mr. MILLER. Can I take that?

Senator WYDEN. You guys are like the Senate: you yield to each other. [Laughter.]

Mr. MILLER. Yes, it would be. Really, the key for us is certainty of the credit. In our case, each of the projects is financed independently, and so we need to really look at the economics of each thing independent of any other activity.

If we know those credits are going to be there and we can rely upon them, then we can fund the projects. And it is really that simple.

I will add the point that because, in this particular case, we are looking at an investment tax credit, we only will be able to benefit from it if we are earning income and paying taxes.

The simple truth of it is that there is no negative associated with it. If we do not build the project, well, then there is no tax credit and there are no taxes for anybody. So if this inspires or makes the economics work for a project, then it seems to me it is a plus all the way around.

Senator WYDEN. Ms. Kennedy?

Ms. KENNEDY. I agree. It would be beneficial to have a consistent, across-the-board clean energy tax policy that was technology-neutral and attracted investment for advanced technologies.

The danger is if it is drafted in a way that assumes you know what those advanced technologies are today, then in 2 years, it may not be suitable and it may not attract the kind of investment in technologies that are not commercially ready today, but they could be in 2 years.

Senator WYDEN. You raise an important point. The value of what has been proposed is, Congress finally gets out of picking winners and losers. Congress will not be in the business of, in effect, saying, “Oh, this technology sounds like a winner,” and that really is because Senator So-and-so is powerful and Senator So-and-so is not powerful.

It basically says, we are going to be tech-neutral and we are just going to have three priorities: clean energy, clean transportation fuels, and energy efficiency.

I appreciate your bringing it up, because getting away from picking winners and losers is the prerequisite to having a technology-neutral policy.

Now, one question for you, Mr. Miller, since we are so pleased about what you all are doing in Eugene.

Talk a little bit about the costs of uncertainty. What I am struck by when I am home is—and I was home for a big chunk of the last few weeks—business people tell me if you get out of picking winners and losers and just give me some certainty, I will go away happy. Then you all will have the debate about rates and all the rest.

But what are the costs of uncertainty given the groundbreaking work that you are doing, the innovation you have achieved?

Let me just wrap up by having you lay out the costs of uncertainty.

Mr. MILLER. I appreciate that. Obviously, for us, it means that nothing really happens. So if we cannot see what is going on in the future, we just cannot get the financing needed for these projects.

By way of example, we built, about a year and a half ago, a system that takes municipal solid waste and produces a transportation fuel; very low carbon—actually, a negative-carbon fuel that is used by a waste truck fleet. It is the first one in the world.

So that innovation just would not occur unless we knew that we could line up all of the resources needed to bring that project to bear.

Senator WYDEN. I am over my time. Thank you, Mr. Chairman.

The CHAIRMAN. Senator Grassley?

Senator GRASSLEY. I have had a longtime and deep interest in supporting homegrown energy production. I have authored and championed some of the most transformative energy incentives, including the wind Production Tax Credit, the biodiesel and biofuel tax incentives, and incentives for energy efficiency.

But I also and always have been taking the approach that our Nation needs energy from all sources. I truly support all-of-the-above energy policies, whereas I run into a lot of people who support everything above the ground but nothing below the ground, or the other way around: people supporting everything below the ground but nothing above the ground.

So I want you to know I support oil, gas, nuclear, hydropower, wind, solar, and biofuels. If it helps our economy grow and provides diversity and reliability, I am for it.

Now, what irritates me then is when experts criticize subsidies for one type of energy while disregarding market-distorting benefits provided to other sources, and nuclear is a prime example.

Ms. Harbert, in your testimony, you claim that the wind PTC is undercutting base-load power, notably nuclear. I disagree. It seems to me that nuclear is being harmed primarily by cheap natural gas, transmission congestion, and stagnant electricity demands, much more than the wind PTC.

In fact, if you take a close look at where most retiring nuclear energy plants are located, you will see that they are in places like Florida, Vermont, Massachusetts, New Jersey—places that have little or no wind energy generation. It seems to me that then you are trying to tear down renewable to elevate nuclear, which would contradict your testimony that we should not damage one technology to elevate another.

You further argue that Congress should be wary of creating or dislodging markets. Since 1957, nuclear energy has benefitted from more than \$70 billion in taxpayer-funded research and development and Price-Anderson liability insurance. You make no mention of these market distortions in your testimony.

So a simple question. Why the double standard? Given that that insurance premium is paid by plant operators or reduced, is Price-Anderson market-distorting?

Could nuclear energy be competitive in the United States without a Federal liability cap? The Nuclear Energy Commission has concluded that the liability limits constitute a subsidy. Would other energy sources, like wind, have become more competitive earlier if nuclear did not have the liability cap?

Ms. HARBERT. Senator, I appreciate the question, and I can say I am in violent agreement, and we are in violent agreement with you on a true all-of-the-above energy policy, because we will need all forms going forward, as demand here and around the world will continue to increase.

In regard to my specific comments on the Production Tax Credit, well-intended policy put in place in 1992 has been re-upped 10 times and has accomplished a huge increase in the very commodity that it was hoping to increase, which was also intended to diversify our grid.

What we worry about is—and because of the PTC, other State policies, and low natural gas prices; that is part of this equation—we then see a consequence of those policies and markets edging out 20 percent of our Nation's electricity, which is 60 percent of our emissions-free technology. Houston, we have a problem. We need to look at that and make sure—this was instituted in 1992; we are now well beyond that—what the effect is in the marketplace.

Senator GRASSLEY. You concentrate on Price-Anderson being a subsidy for nuclear.

Ms. HARBERT. Every single fuel source, as laid out in your great staff committee report, enjoys some sort of tax treatment, one way or another, whether it is wind, whether it is nuclear, whether it is

carbon capture, et cetera. There are different risks, and there are different tax treatments for those risks.

I am not singling out one. I am simply pointing out, as we take a fresh look at this, we need to look down the road so that we do not, by some imagination, disadvantage a really important resource for us down the road, because we are seeing those nuclear power plants close, and that is very unfortunate for the future of emissions-free electricity in this country.

Senator GRASSLEY. Dr. Zycher, do you believe that Price-Anderson for nuclear is essentially a market-distorting cost-reduction mechanism? Should not an analysis of the playing field include a nuclear subsidy?

Dr. ZYCHER. Well, that is two separate questions, Senator.

With respect to your first question, is the Price-Anderson liability limit a subsidy, the answer is “no,” regardless of the fact that it is quite widely misconstrued as one.

The Price-Anderson liability limit in a strict insurance market is a way of allocating liability in a way that minimizes the sum of accident costs and accident avoidance costs.

I do not know that \$400 million is the right number—that is a different question—but conceptually, the liability limit is correct.

Suppose you had an individual who at zero cost or very, very easily could move away from a nuclear power plant, thereby avoiding the adverse effects of a possible future accident, that individual should be induced to do that, because that individual, at a social cost very low or at zero, can avoid the cost of a future nuclear accident.

If you think through the analytics of a liability limit, that is what Price-Anderson does. It is not a subsidy, properly defined. It is a way of minimizing the sum of accident costs and accident avoidance costs, although, again, I do not know that \$400 million or whatever the number is now is the right number.

With respect to your broader question, it is certainly the case that most of what people call subsidies for nuclear power or the nuclear power industry have taken two forms: research and development subsidies of one kind or another, which are not limited to nuclear power—all industries get research and development tax credits and all the rest—and various forms of accelerated depreciation that are more important for the nuclear power sector because nuclear power is so capital-intensive.

Now, you can argue that that is a subsidy for nuclear power, but it is really a subsidy, or a tax preference I think is a better word, for all sectors, and the fact that nuclear power is more capital-intensive than other sectors is neither here nor there in terms of determining whether or not there is a distortion in Federal policies.

Let me make one more point. With respect to the all-of-the-above approach with respect to which there seems to be unanimity minus me in this room, which is a condition I am quite used to, I should add, really, we ought to be supporting all of the competitive.

If we are going to support all of the above or everything, then it does not matter what a given energy form costs, we are going to subsidize it, and I think that is really not a very useful way for policymakers to proceed.

We ought to let market prices determine which energy forms are competitive and let the market weed out the winners from the losers.

Thank you, Senator.

The CHAIRMAN. Senator Schumer?

Senator SCHUMER. Mr. Chairman, I would just ask—as you know, I care very much about fuel cells being left out of the section 48 package.

I do not have time to stay, but I would like to ask unanimous consent to put a statement in the record.

The CHAIRMAN. Without objection, that will be the case.

[The prepared statement of Senator Schumer appears in the appendix on p. 37.]

The CHAIRMAN. Senator Enzi?

Senator ENZI. Thank you, Mr. Chairman. Thank you for holding this hearing today.

I thank all of you for your testimony. All of it has been very helpful. I like some of the comments, like “we get whatever we are willing to pay for,” “we should not pick winners and losers,” and “we are holding back innovators.”

I know we have two innovators on the panel, and I appreciate the people who are actually doing work out there in the private sector.

Mr. Miller, I want to tell you about a company you might want to take a look at. That is one from Gillette, WY that works with fly ash and recycles it. They found that there is gold and platinum in fly ash and they are able to get 10 ounces out of a ton. And then they take the fly ash, and they process that into other products. So there is no fly ash problem anymore.

Mr. MILLER. I will be happy to look into that.

Senator ENZI. I will give you more information.

Ms. Kennedy, you mentioned that there are more blackouts in the United States than any other country and suggested that we need some targeted tax incentives.

I agree with you and hope that we can get the storage of energy solved. I can give a few examples in Wyoming where we have some people working on some different battery things that I would like to introduce you to.

Dr. Zycher, you said that we cannot increase employment by making energy more expensive.

Ms. Harbert, you mentioned that we are doing things to the base load. The base load is going to be important. But we also are not using the innovation that this country is known for.

I just saw a report last week where they found that they can inject CO₂ into basalt and it turns to rock, and it turns to rock much quicker than they ever expected; in fact, just 1 year or 2.

Of course, trees and plants absorb CO₂ and put out oxygen, and I was always concerned at the climate conferences that I went to that they would not allow the United States to count new trees that they planted as part of the solution.

But I have a kid in Wyoming who found a way to grow plants vertically. He puts these tubes on walls and the plants grow out this way, essentially.

I asked him how many of those he could put in a greenhouse, and he said, "Oh, I cannot; they would suffocate—not enough CO₂." So I have suggested that he look into a greenhouse next to a power plant to capture the CO₂ and the residual heat.

There are solutions out there, but we are not doing much for them.

There is a section 45Q tax credit, and that is to encourage people to capture CO₂ and also use it for other beneficial uses. In Wyoming, they are injecting that down into oil wells and getting 20 percent more oil out of the ground.

Unfortunately, that 45Q tax credit is capped at 75 million tons. If we have something we want to happen, why do we say "but you can only do it so much and then we want nothing to happen?"

Ms. Harbert, will extending the 45Q tax credit provide some financial certainty and effectiveness needed to drive private-sector innovation and investment in the commercial deployment of carbon capture in power plants and industrial facilities?

Ms. HARBERT. You raise one of the most important points, which is, the future of all of this lies at the base of technology in developing today's fuel sources and investing in those fuel sources of tomorrow.

When you look at carbon capture, we are going to have to find more ways, more effective ways, more affordable ways, to capture CO₂, and if we can do that by actually having it have a commercial purpose, like enhanced oil recovery, which then generates money for the government, that is sort of a trifecta, which is, it is developing technologies we need here and are needed all around the world, as the world is going to use more and more coal.

If we can be the leader in technology, deploy those technologies around the world, we are really leading on solutions, technology solutions, not picking winners and losers.

So that is an example of something we should be investing in that really makes a tremendous amount of sense for us here and around the world.

Senator ENZI. Thank you. I will have some specific questions for the others. I am an accountant. I like to work with the numbers. I have found that usually puts people to sleep, so I usually contain those to the written questions.

I do thank you for participating, and I have learned a lot, and it should be useful.

I yield back my time.

The CHAIRMAN. Thanks, Senator.

Senator Menendez?

Senator MENENDEZ. Thank you, Mr. Chairman. I appreciate your convening the hearing.

I think that the choices that we make in this committee have a significant role in determining the Nation's energy future, and I believe it is well past time for us to reconsider some of these choices.

First, the question of oil subsidies. In spite of low prices in oil, big oil is still making billions of dollars of profit, and the end-of-the-year tax deal gave them a \$500-billion fiscal stimulus in the form of ending the crude oil export ban.

So giving these same companies billions of dollars in tax breaks, to me, makes no financial sense, but that is exactly what we are

doing. So that is why I have introduced legislation called the Close Big Oil Tax Loopholes Act, which would end tax give-aways for the largest class of oil companies and would save taxpayers over \$20 billion, and I hope that we will get to consider that as part of any reform of our tax code.

Secondly, we need to provide an extension for the 13 clean energy tax credits that will expire at the end of this year. A number of these credits were, I am told, inadvertently left out of the tax bill that was passed last year, and my understanding is that there was a commitment made by the Majority Leader to correct this oversight in the first tax vehicle that moved this year. And while that did not happen, I am hopeful this commitment will ultimately be upheld.

I also hope we can avoid any talk of additional concessions to move these extenders forward, concessions that were already made as part of a larger package, and that agreement, I think, needs to be fully honored before we move on to additional negotiations.

Finally, we need to reconsider more broadly the way we handle our renewable energy tax credits. While all tax credits are permanent, in some cases going back 100 years, we have made our clean sources of energy choose between year-to-year uncertainty or a slightly longer extension period, with phase-out.

We should not be phasing out support for nascent industries that will help us build a clean energy economy of the future while continuing to subsidize fossil fuels of the past.

So I wanted to take advantage of the hearing, and, Mr. Chairman, I appreciate while you are here, hopefully, your consideration of some of those things.

I do have a quick question. Ms. Harbert, your testimony is comprehensive about what you see as the virtues of oil and gas, but I do not see anything in your statement about the costs. And in any ROI, we look at costs as well as the benefits.

There is nothing about the health impacts of continuing to burn fossil fuels; nothing about the economic and safety risks to our communities from oil spill or an oil train derailment; nothing about the threat of climate change.

Now, in your testimony before the Senate Foreign Relations Committee in 2014 and in a subsequent question that I submitted for the record, the Chamber's position on climate change, to me, was unclear.

So to clarify, does the U.S. Chamber of Commerce agree with the overwhelming scientific consensus that climate change is real and is caused by human activity?

Ms. HARBERT. Senator Menendez, thank you for the question. I am happy to be able to have this conversation once again with you and hopefully to clear up any muddy waters.

Senator MENENDEZ. So that would be either a "yes" or a "no." That would clear it up very concisely.

Ms. HARBERT. And very concisely, the climate is changing, has changed, will continue to change. Human activity is contributing to the changing climate.

That is where the conversation should begin, but normally, with people in the environmental community, that is where it ends.

We want to talk about the solutions to addressing our climate and technology, et cetera. When I talk to my friends in the environmental community, they want to shrink our toolbox in addressing climate change. They want to relegate it to just wind and solar.

We at the Chamber of Commerce believe in these businesses and want to see the development of advanced technologies and see those actually permeate the marketplace to address climate.

So those who want to put the Chamber of Commerce in the climate denier box are simply wrong.

Senator MENENDEZ. So then let me ask you. Why has the Chamber chosen to exclude any consideration of the risks associated with continual reliance on fossil fuels and climate change from this testimony? I never see in any of the Chamber's testimony any consideration of the risks. You would not do that in any other business enterprise. To the extent that we are making tax policy, it seems to me that we should be considering the risks.

Why is it that you do not include the risks in any of your testimony?

Ms. HARBERT. Every form of energy—every form of energy—has a risk. You also have to weigh the benefits, and if you look at the benefits of what fossil fuels have brought to our country—

Senator MENENDEZ. Even if any form of energy has a risk, you still do not mention the risks in any of them, and you certainly do not mention it with fossil fuels.

So I think it is intellectually misleading—I will leave it at that, not to be harsher—that there is no consideration of the down side.

So I hope we can get to a better place where the testimony is more balanced at the end of the day.

I appreciate, Ms. Kennedy, your Advanced Microgrid Solutions. We saw in New Jersey after Sandy that Princeton University was able to keep the lights on through its resiliency program, but large parts of the State could not, including our mass transit system. So I would love to hear from you—not now, because we have a vote—but I would love to hear from you on what type of tax policy could help us move in the right direction in that regard.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator. And to the panel, thanks so much. We appreciate having you here.

We are adjourned.

[Whereupon, at 11:15 a.m., the hearing was concluded.]

APPENDIX

ADDITIONAL MATERIAL SUBMITTED FOR THE RECORD

PREPARED STATEMENT OF HON. CHRISTOPHER A. COONS, A U.S. SENATOR FROM DELAWARE, AND HON. JERRY MORAN, A U.S. SENATOR FROM KANSAS

Thank you, Chairman Hatch and Ranking Member Wyden, for the opportunity to provide testimony for the record as a part of your oversight hearing on Federal energy tax policy on June 14, 2016. As you consider principles for energy tax reform, we are grateful for the chance to offer our perspective on a potentially powerful policy enhancement to the tax code that we believe could drive significant, new investment in clean and renewable energy. That legislation is the Master Limited Partnerships (MLP) Parity Act (S. 1656), which includes support from a bipartisan group of Senators.

The United States is experiencing a resurgence in domestic energy innovation, exploration, and production. With this growth, more Americans are going to work in the development of our country's vast natural resources, both traditional and renewable. There is little debate about America's potential to lead the world in clean energy development and deployment. We have unparalleled ingenuity. We are among the world's leaders in advanced clean energy technologies. But we many times struggle to deploy these innovations—and miss out on the very real economic and sustainability opportunities they represent—in part, because of the absence of a reliable source of financing. To advance, our technology needs a catalyst—the catalyst of a clearer, stronger regulatory and statutory structure that allows efficient access to long-term financing.

Today's energy market is largely defined by narrow profit margins and established technologies supported by low-cost, long-term financing. If clean and renewable sources of energy are to grow and compete in the American energy marketplace, and around the world as well, we have to make sure they are given a level playing field on which to operate.

The MLP Parity Act is a strikingly simple, bipartisan bill that modernizes a section of our tax code, harmonizing it with the “all-of-the-above” energy strategy that so many of us have endorsed as the blueprint for energy independence and our energy future. This is a clear opportunity for Congress to take action to level the playing field and give all sources of domestic energy—renewable and non-renewable alike—a fair shot at success.

The legislation is a powerful change to the Federal tax code that could unleash significant private capital into the energy market. It would level the playing field between traditional and new energy businesses by helping energy projects form MLPs, which combine the funding advantages of corporations and the tax advantages of partnerships.

By statute, MLPs are currently only available to investors in energy portfolios such as oil, natural gas, coal extraction, and pipeline projects. These projects get access to capital at a lower cost and are more liquid than traditional financing approaches to energy projects, making them highly effective at attracting private investment. Investors in renewable energy projects, however, have been explicitly prevented from forming MLPs, starving a growing portion of America's domestic energy sector of the capital it needs to build and grow.

Our MLP Parity Act would allow clean energy projects to utilize MLPs, a beneficial tax structure that taxes a project like a partnership—a pass through—but that trades its interests like a corporate stock, a C-corp. This allows access to the liquid-

ity of equity markets, prevents double taxation, and leaves more cash available for distribution back to investors. It is important to note that MLPs do not represent a “tax break” for those industries eligible for the MLP tax structure. Rather, MLPs are a tax simplification structure that concentrates tax at the investor level, and significantly broadens the potential investment base. For the last 30 years, MLPs have given the natural gas, oil, and coal industries access to private capital at a lower cost, something other capital-intensive projects badly need. This is a well-developed, well-established financing vehicle. There are now roughly 150 MLPs in existence with market capitalization of more than \$480 billion.

The extension of access to this financing vehicle to a very wide range of renewable energy sources, energy storage, energy efficiency, and other options has real potential to bring a significant wave of private capital off the sidelines and into the renewable energy marketplace. It would not only level the playing field, but would also increase access to low-cost capital for all energy sources in our marketplace. MLPs have aided in the construction and operation of much of our modern oil and gas infrastructure, most recently fueling the oil shale revolution. In 2012 alone, MLPs raised more than \$23 billion for eligible projects. That’s \$23 billion spent developing and modernizing the backbone of oil and gas infrastructure—\$23 billion spent on production, pipelines, gathering and storage facilities, and refineries. MLPs work and they should be diversified to support the rest of the rapidly growing energy sector.

Again, we are so thankful for the support of Senators Bennet, Collins, Gardner, Heinrich, King, Murkowski, and Stabenow for their tireless partnership in this effort and for working closely with us on this bill. Bipartisan, companion legislation has also been introduced in the House and is led by Congressman Ted Poe (R-TX) and Congressman Mike Thompson (D-CA).

In summary, access to low-cost financing will define our Nation’s energy future. It will determine how, when, and which energy sources emerge as the central players in the American energy marketplace in the long term. We believe it is up to us to ensure that our vast supply of clean energy is a vital part of that equation. Given this demand, we urge your support for the bipartisan, bicameral MLP Parity Act. Thank you.

PREPARED STATEMENT OF HON. KAREN ALDERMAN HARBERT, PRESIDENT AND CHIEF EXECUTIVE OFFICER, INSTITUTE FOR 21ST CENTURY ENERGY, U.S. CHAMBER OF COMMERCE

Thank you, Chairman Hatch, Ranking Member Wyden, and members of the committee. I am Karen Harbert, president and CEO of the Institute for 21st Century Energy (Institute), an affiliate of the U.S. Chamber of Commerce, the world’s largest business federation representing the interests of more than 3 million businesses of all sizes, sectors, and regions, as well as State and local chambers and industry associations, and dedicated to promoting, protecting, and defending America’s free enterprise system.

The mission of the Institute is to unify policymakers, regulators, business leaders, and the American public behind common sense energy strategy to help keep America secure, prosperous, and clean. In that regard we hope to be of service to this committee, this Congress as a whole, and the administration.

INTRODUCTION

The United States is at an energy policy crossroads. Much of our energy economy today is governed by laws and regulations that are many decades old and not suited to America’s new-found energy abundance. While fiscal policy tends to be relatively nimble when compared to other aspects of energy policy, it also frequently fails to keep pace with market developments and outlives its usefulness, necessitating frequent review. This is especially true given how rapidly and drastically our energy landscape has changed in the last decade, and how much change is expected in the future. I applaud the committee for holding this hearing and contemplating today’s energy tax policy and looking ahead to what it should look like in the future.

U.S. fiscal policy can aid in securing our energy future, but unintended consequences can also constrain economic growth, reduce economic and energy security, and weaken geo-political leverage.

FEDERAL ROLE

While a tradition of federalism rightly reserves much, if not most, energy policy decisions to the States, the Federal Government maintains a significant and growing role. When crafting energy policy of any stripe, however, it is important to determine what the Federal Government's underlying role should be. Because of energy's vitality to our economy and everyday lives, it's crucial for Congress to consider policy that benefits U.S. energy security and ensures all Americans have access to a reliable, affordable, and diverse energy supplies. Moreover, Federal energy policy must also enable our dynamic economy to maximize output, increase efficiencies, and promote, not hinder, economic growth and development. Additionally, Federal energy policy must look to the future and allow technological evolution and commercialization.

ENERGY SECURITY

To "provide for the common defense" is clearly one of the Federal Government's most fundamental and indisputable obligations. Securing America's energy future is a concomitant obligation. Not only are secure, reliable, and diverse energy supplies essential to our military, they are equally essential to our economic well-being. Energy security is sometime hard to define, which is why in 2011 the Energy Institute published our first annual *Index of U.S. Energy Security Risk* to create an objective and uniform method for quantifying risk to our energy security across nearly 40 metrics. Each annual installment provides a moving trend that shows whether our energy security risk is increasing or declining.

Reliance on energy imports is a central aspect of "energy insecurity," but it is certainly not the only measure. Inputs as varied as energy prices, efficiency, capacity, and even production of scientists and engineers are all important indicators of energy security. Most of these components are frequently overlooked when policy is formulated, to the detriment of the country. Our *Index* shows that the energy revolution has led to a sharp decrease in overall U.S. energy security risks. Indeed, just last week we released the international version of this index, and it shows how America, now ranked number 4 out of 25 other top energy users, has improved its standing since the "Shale Gale" first began to blow about a decade ago.

ECONOMIC GROWTH

Through both fiscal and monetary policy, the Federal Government can foster economic growth. Energy is the lifeblood of an economy. America's dominant energy resource base, the largest in the world, has provided the foundation for industrialization and dramatic improvements to our environment and our quality of life. In recent years, however, Federal energy policy has also hindered further economic growth by constraining accesses to energy resources, implementing punitive fiscal policies, and issuing Byzantine and oversized regulations. When considering future energy tax policy, it is important to ensure that it encourages economic growth rather than constrain it.

TECHNOLOGY DEVELOPMENT

Within the balance of federalism and private sector investment, the Federal Government's size and resources give it a unique role in shepherding and spurring energy technology development. Research, Development, and Demonstration has been, and should continue to be, a driving focus of Federal energy policy while tax and other policies need to continue to play a central role in breaking down barriers to commercialization.

RD&D

The United States continues to maintain some of the highest quality and important energy research and development laboratories in the world. While rooted in developing defense technologies, they have evolved to create or improve nearly every energy technology we use today. This role is as important today as ever. With a growing focus on public-private collaboration, the Department of Energy's National Laboratories must continue to be central to developing the energy technologies of tomorrow. While the U.S. is blessed with the largest energy resource base in the world, it is the technologies developed by the National Labs, the private sector, and academia that will ensure we are able to continue harnessing this resource to provide cheaper, cleaner, and more reliable energy for the country.

While the National Labs have a central and coordinating role, Federal tax policy provides a necessary tool in incentivizing private sector development of energy tech-

nology. Making the Research and Development Tax Credit permanent last year was an important and foundational step in lifting a private-sector barrier to developing the future energy technologies.

FISCAL POLICY

When considering tax policy more broadly, energy tax policy cannot be considered in a vacuum. All changes to the Internal Revenue Code must be considered in the context of much needed comprehensive tax reform, which ultimately must lower rates for all businesses, shift to a more internationally competitive system, reduce the cost of capital, and decrease complexity. While there could be new tax policy that would benefit the country's energy economy, we believe Congress should avoid undertaking tax reform on a piecemeal basis.

To the extent that Congress does tackle energy tax policy within the context of comprehensive tax reform, there are some tenets it should rely on. Foremost, it should be results oriented and not proscriptive. The Federal Government has a checkered history of technology development prediction. Who could have guessed how the emergence of hydraulic fracturing, horizontal drilling, and advanced seismic imaging would lead to the energy revolution now underway. It was not that long ago that "peak oil" was all the rage. No one's speaking about peak oil anymore, and all because of a technology revolution that took most analysts in and out of government by surprise. Who can say what technology surprises the future has in store? It is because we do not know that answer to that question that any energy tax policy must be technology neutral and focused on the underlying desired result.

Moreover, taxing one industry in an effort to support another is a recipe for higher prices, less economic growth, and diminished energy security. The U.S. greatly relies on energy diversity and attempting to tax one or more forms out of existence puts the country on a path to a much less secure energy future.

UNINTENDED CONSEQUENCES

All too often, the Federal Government has lacked the foresight to see the unintended consequences of well-intentioned policy. The section 45 Production Tax Credit (PTC) was first enacted in 1992 and designed to incentivize investment in electricity generation from wind and close-loop biomass. Originally set to last 7 years, it has since been extended 10 times. In 1992, it was not fully anticipated that many States would de-regulate their electricity markets in favor of greater competition.

One of the intents of the PTC was to diversify the U.S. generation portfolio and to increase renewable generation. To that end, the PTC has been successful. In conjunction with various State mandates, wind generation has increased from negligible net generation to nearly 200,000 gigawatt hours last year, bringing it from nothing to 4.7% of total U.S. net generation.

If the sole intent of the PTC is to incentivize more wind generation, then it has been successful. However, another justification for the PTC cited with increasing frequency is the desire to increase generation from emissions-free sources. In this respect, the PTC has produced an unintended consequence that is actually producing the opposite intent. While wind capacity has been growing rapidly because of the PTC and other incentives, U.S. electricity demand has been stagnating owing to the recent recession. In many electricity markets additional wind generation often creates gluts of electrons. Since the electricity grid must precisely balance supply with demand, it cannot accept more electricity than what is being used. When supply outstrips demand, prices actually go "negative," that is, the grid operator requires an electricity generator to pay it to take additional electrons, creating severe market dislocations.

In these cases of negative pricing, wind generators are often able to pay the grid operator to take wind-generated electricity. It is not often a business can pay its customers to take its products, but wind generators are able to recoup a profit on the back-end thanks to the PTC.

However, in pushing prices negative, every other generator also is forced to pay the grid to take their respective electrons or power down, but they are not made whole via the PTC. Not only does this harm other generators like coal and gas, but it specifically hurts nuclear.

Nuclear generation provides nearly 20% of total U.S. generation and the nuclear fleet operates in excess of a 90% capacity rate, by far the highest of all sources. More importantly in the context of the PTC, nuclear generation provides more than 60% of all emissions-free generation, making it the king of emissions-free energy.

Yet when prices go negative, nuclear generators have little choice but to pay the grid to take their generation because shutting down the reactor is a very complicated undertaking that could result in it going offline for several days to several weeks, something no nuclear facility can afford.

Even when prices are not negative, the PTC-induced wind generation is glutting many power markets, depressing wholesale power rates. While these lower wholesale rates rarely result in lower retail rates paid by end-users, they are artificially distorting some power markets and Regional Transmission Organizations (RTO) making a significant number of nuclear reactors much less competitive. According to the Nuclear Energy Institute, eight reactors have either closed or are scheduled to close, and up to 17 are vulnerable to premature closure. Nuclear plants have closed or are likely to close in Illinois, California, Massachusetts, New Jersey, New York, Vermont, and Wisconsin.

The average wind turbine being built today in the United States today is rated at about 2 megawatts, and typically a U.S. turbine operate about 32% of the time. Shutting down a 1 gigawatt reactor that operated at an industry-average capacity factor of 92% and replacing it with wind would require the construction some 1,450 wind turbines. But even then it is not a realistic comparison because the wind turbines produce electricity only under certain conditions whereas the power produced at a nuclear reactor is “base load” and available on demand. So in a practical sense, then, intermittent wind power cannot really “replace” nuclear power. Ultimately, the PTC is a leading contributor to these reactor closings, inherently reducing the net-generation from non-emitting sources, running counter to one of its primary intents.

MAKING MARKETS

When developing all energy policy, including tax policy, it is also important for the Federal Government to be wary of creating markets. If a technology or application is favored via policy, it has a tendency to crowd out competition, which disadvantages consumers and harms energy security. Congress should avoid policies that create or dislocate markets.

CONCESSIONARY FINANCING

While it lies beyond the jurisdiction of this committee, it is important to mention another tool the Federal Government can and should wield when designing energy policy. Concessionary financing has the potential to provide a necessary bridge to bring energy technology from the laboratory to the market. To be clear, the Federal Government should not look to create a market or select technologies for the country; the market will always do that more efficiently. However, by using existing and potentially new mechanisms, the Federal Government can help bridge the proverbial “valley of death,” that too often prevents markets from ever entertaining new technologies.

BREAKING DOWN REGULATORY BARRIERS

Similarly, another tool the Federal Government has used to unintentionally hamper technology development and investment in energy and infrastructure is the ever-increasing regulatory burden businesses must shoulder and navigate. Reforming both structural as well as specific regulatory regimes can be accomplished while maintaining the safeguards they were intended to establish. Without such reform, capital investment will continue to lag threatening our energy future.

ENERGY REALITY

Largest Resource Base

America’s energy resource base is truly one of its greatest assets. We currently are blessed with technically recoverable resources that at current consumption rates would supply 120 years of natural gas, 200 years of oil, and over 450 years of coal. That is energy we know where to find and can extract today with existing technology. Even more remarkable, the United States has in-place resources—energy we can find but have yet to develop technology to extract economically—that would provide over 580 years of natural gas, 530 years of oil, and over 9,800 years of coal.

According to the Congressional Research Service, the United States maintains the largest fossil energy resource base in the world. While Russia is a close second, every other country has less than half that of the United States. This plentiful and diverse resource base provides a tremendous competitive advantage as well as a much-needed safety net. Increasing taxes on energy production will only serve to

make foreign energy cheaper and increase imports into the United States, and export jobs and economic growth abroad.

FOSSIL BACKBONE

When contemplating the energy tax policy of the future, it is important to appreciate the energy disposition of today, as well as tomorrow. As we sit here today, the United States derives 81% of its energy needs from oil, natural gas, and coal. According to the Energy Information Administration's *Annual Energy Outlook 2016*, by 2040 we will still rely on these sources for 78% to 80% of our energy needs, that's even if the President's Clean Power Plan is implemented as written.

DON'T TEAR DOWN ONE TO BUILD ANOTHER

The overriding focus of any energy tax policy should be to avoid damaging one technology or industry in the pursuit of elevating another. The United States is blessed with an incredibly diverse energy portfolio, especially when compared to other countries. This diversity creates competition and thus lower prices for consumers. Diversity also insulates against supply disruption, which helps insulate consumers and businesses from price shocks. This predictability encourages greater capital investment from the private sector.

As the largest economy in the world, we must continue to rely on and encourage further diversity within our energy supply if we are to maintain that status. Fiscal policy that seeks to penalize one form of energy or energy production detracts from our diversity, decreasing competition and increasing prices and price volatility. This is detrimental to economic growth and energy security.

We need not look too far in our history to see the detrimental impacts of punitively taxing energy production. The Windfall Profits Tax (WPT) implemented in 1980 operated as an excise tax on domestically produced oil and provides a solid historical reference to judge the impacts of recently proposed new taxes and fees.

In 2006, the Congressional Research Service estimated that implementation of the WPT resulted in as much as an 8% decline in domestic crude production and as much as a 13% increase in imports. In 1986 imported oil as a share of total U.S. consumption jumped from 32% to 38% from the previous year. This 19% increase is one of the largest annual increases on record and one of the primary reasons the WPT was ultimately repealed in 1988.

Yet countless proposals included in each of the President's proposed budgets as well as dozen of bills proposed in Congress would create new taxes and fees while repealing several long-standing tax rules for companies that incur significant economic risk in exploring for oil and natural gas without any guarantee of cost recovery.

The elimination of these tax rules is not about "closing loopholes," as some have suggested. These provisions—which are similar to rules that apply to other industries and are not targeted for elimination—were specifically crafted by Congress to create and preserve American jobs and to increase the country's energy security by supporting greater domestic production. Thus, the new tax changes being proposed would disproportionately target one industry but harm the entire country.

Efforts to raise taxes on energy production foreshadow a less secure energy future. History has demonstrated that arbitrary tax increases that raise the costs of doing business in this country are counterproductive, forcing increased oil imports, significant job losses, and more expensive energy bills. These detrimental impacts are magnified at a time when the oil and gas industry is still suffering from its own success in producing more American oil and gas than anyone had ever predicted, causing a precipitous price decline. While this has marginally benefitted some sectors of the economy, it has resulted in an estimated 150,000 direct jobs lost in addition to another 50,000 to 100,000 indirect jobs.

The number of drilling rigs currently active has declined 78% percent since the end of 2014 to the lowest level in half a century. Taxing energy production is always bad policy, but doing it now is exponentially more so. Rather, energy tax policy should focus on achieving a targeted objective, while allowing the technologies or applications to compete in the market to fulfil that objective.

OIL AND GAS ARE THE COUNTRY'S ECONOMIC AND SECURITY LIFEBLOOD

Oil and natural gas not only provide a growing competitive advantage and are increasing U.S. energy security, but they also literally and figuratively lubricate our

economy. Taxing oil and natural gas serves to increase production costs domestically, making foreign production cheaper. Because oil is priced globally, taxing its production domestically will not impact global prices, and therefore have no impact on domestic consumption. Instead, increasing taxes on domestic oil production only changes where the oil we consume is produced. The less oil we produce for our own consumption, the fewer jobs will be created or supported, the less economic growth we will realize, the less government revenue will be collected, and the less leverage we will have geo-politically.

DENSEST, CHEAPEST, AND MOST PLENTIFUL

While wind has increased exponentially in the 2000s and continues to grow at a brisk pace and solar generation is now increasing very fast, together they are projected to provide less than 10% of U.S. primary energy consumption in 2040, even with the aid of the Clean Power Plan. This is not to say renewable energy is not important, but rather to demonstrate the size of the U.S. energy economy. It takes many decades of exponential growth to begin to truly impact our energy consumption ratios. Therefore, it is important to be tempered when estimating how impactful fiscal policy can be in advancing alternative energy sources. The simple reality is that fossil fuels are the most energy-dense, plentiful, and economical energy resources available.

JOBS

The oil and natural gas industry supports some 9 million jobs in the U.S. While many have been lost during the recent downturn, on average, they pay nearly double to U.S., median wage. During the energy renaissance of the last decade, areas of production have expanded from traditional places like Texas, Wyoming, and Utah to new hotbeds like Pennsylvania, Ohio, and Colorado, creating thousands of new, high-paying jobs. (It is fair to point out that even with these job losses, Bureau of Labor Statistics data show that employment in the oil and gas sector is still about 23% higher than it was at the end of 2007 while employment in the rest of the non-farm economy is just 5% higher. Clearly, the oil and gas sector has been, and continues to be, a bright spot in an otherwise dreary economic landscape.)

While we are cautiously optimistic that the labor market in the oil patch has stabilized, one of the quickest ways to create more pink slips is to raise taxes on oil and natural gas production.

ECONOMY

The oil and natural gas industry contributes 8% of U.S. GDP. Punitive taxes that further decrease capital investment from such a large share of the economy are likely to have an outsized effect on growth. While we will not appreciate the full extent of the damage for some time, the current and prolonged decline in oil and gas capital investment is clearly contributing to anemic economic growth.

GOVERNMENT REVENUE

In 2015, oil and natural gas production provided more than \$7.6 billion in government revenue through royalties, rents, and bonuses. This is in addition to the Federal income and excise taxes paid, which was estimated to total over \$300 trillion in 2012. The industry averaged a staggering 44.5% effective tax rate from 2008 to 2013. Increasing taxes on the oil and gas industry will result in higher production costs, less production, and ultimately less government revenue.

GEO-POLITICAL CONSIDERATIONS

Finally, while difficult to quantify, the import and export of oil and natural gas have a precipitous impact on the executive branch's ability to influence geo-political affairs abroad. Since 2006, U.S. oil imports have declined by nearly one-third. Imports from OPEC countries have declined 44% with crude from Nigeria, Algeria, and Libya having been nearly eliminated. Not only has then insulated U.S. consumers from price shocks created by supply disruptions around the world, but it also lifts constraints on U.S. foreign policy.

Indeed, the changing geo-political equation has been nothing short of astonishing. It was not all that long ago, in March 2012, that President Obama declared in his weekly address to the Nation, "But you and I both know that with only 2% of the world's oil reserves, we can't just drill our way to lower gas prices—not when we consume 20 percent of the world's oil." From the end of 2011, a few months before the president made that claim, to 2015, U.S. crude oil production jumped by 3.8 mil-

lion barrels per day, an astonishing two-thirds higher, with production from Texas, North Dakota, Oklahoma, and Colorado leading the way.

This rising output from North America (Canada, too, increased its oil output substantially—about 800,000 barrel per day—over this time period) came during a time of rising tensions in the Middle East, supply disruptions, and increasing demand from large emerging economies like China that normally would squeeze spare global oil production capacity and send prices sky-high. Because of greater North American production, that didn't happen. And while it is likely that we will see continued firming of oil prices over the next few months, it is unlikely that they will breach \$100 per barrel anytime soon simply because the U.S. oil and natural gas firms are so good at what they do. They are a national economic and geo-political asset.

The lifting of the ban on crude oil exports also will result in greater U.S. participation in global oil and natural gas markets on the supply side to limit the use of energy as a geopolitical weapon and smoothing out volatility. U.S. producers are now shipping domestically produced oil to Asia, Europe, South America, and Israel. Likewise, in 2016, domestic producers began shipping natural gas for the first time from the Continental United States, with shipments landing in Asia, South America, and soon to Europe. By providing an alternative source of oil and natural gas on the world market, U.S. producers are helping to deleverage energy states like Russia and Venezuela and thereby increasing U.S. foreign policy leverage.

However, increasing taxes on oil and natural gas production will quickly eliminate both of these advantages. If production costs increase domestically via higher taxes, domestic production will decline, hampering our export advantage and requiring increased imports that will increase our exposure to global uncertainty. Both will significantly harm U.S. geo-political leverage.

CONCLUSION

Federal tax policy can be a potent energy policy tool. If crafted as part of comprehensive reform, with a sober understanding of unpredictable outcomes, focused on discreet results while not selecting the technological path to that end, tax policy can help secure our energy future. Conversely, punitive taxes that ignore history and economic realities will severely harm the country's economy, energy security, and global standing.

QUESTIONS SUBMITTED FOR THE RECORD TO HON. KAREN ALDERMAN HARBERT

QUESTIONS SUBMITTED BY HON. DEAN HELLER

Question. Though geothermal and solar production is steadily increasing in the Silver State, natural gas is the primary fuel for power generation in my home state. In 2014, Nevada generated 63% of its electricity from natural gas. *That cheap base-load energy allows the state to also utilize renewable without decreasing reliability and increasing consumer costs.*

Answer. This last sentence (*in italic*) is incorrect. If the conventional base-load capacity allows for increased renewable generation without a reduction in reliability, then the conventional units must be cycled up and down depending on whether renewable power is available. That cycling increases the cost (and polluting characteristics) of the base-load generation. Moreover, the renewables themselves are high-cost, a reality not changed by the availability of inexpensive base-load power. The fact that the high cost of the renewable electricity can be hidden by averaging it with the low costs of the base-load generation does not “reduce costs”; it merely masks them. The assertion that “renewable” (sic) can be “utilize[d] . . . without . . . increasing consumer costs” is false unless we exclude the subsidies from the definition of “consumer costs,” an approach that is incorrect analytically.

Question. Additionally, Nevada is one of the world's largest sources of gold, producing over 80% of the gold mined domestically, and is the 2nd largest producer of silver in the United States. Domestic mining also utilizes this incentive.

Ms. Harbert, the Chamber members include many companies, including both mining and energy companies, that utilize the percentage depletion. What role does this tax incentive play in the economics of an individual mine or well?

Answer. The percentage depletion allowance essentially is a form of depreciation for the capital assets represented by extractive resource geologic formations; this tax treatment is available to all extractive industries. It may or may not be the case

that a particular legal depletion percentage is correct analytically—the allowance can result in a deduction in excess of the incurred capital costs—but the percentage depletion allowance as a method for the depreciation of an extractive capital asset conceptually is not a “subsidy.”

Question. If this tax incentive is eliminated, how would it affect future domestic natural resources development?

Answer. Because the depletion allowance is a form of depreciation, it is not a “tax incentive” defined properly. If such capital assets as natural resource formations are not allowed a reasonable depreciation schedule, then development would decline, other factors held constant, an effect the magnitude of which is difficult to determine in advance.

Question. What tax incentives are essential to ensuring our Nation continues to lead the world in natural resources development?

Answer. Tax policy should not have as a goal “ensuring our Nation continues to lead the world in natural resources development.” Such outcomes in resource allocation should be driven by market prices, at least as the processes and implications of market competition traditionally are envisioned at a normative level. Given that most natural resources traded in international markets cannot be “embargoed” with respect to a given nation, it is unlikely that a sound national security rationale can be specified for such tax incentives.

QUESTIONS SUBMITTED BY HON. MARK R. WARNER

Question. Ms. Harbert’s testimony notes that energy tax policy should be “results-oriented and not proscriptive,” that we as policymakers have not historically been good at predicting technological developments in the energy sector, and that there are often unintended consequences to well-intended energy policy. With that in mind, I am interested in the witnesses’ answers to the following questions.

How do we accomplish energy tax reform that successfully incentivizes companies to make meaningful investments toward energy efficiency while increasing our efficiency standards and also cutting down on abuse of energy tax credits?

Answer. I know of no sound argument to the effect that market prices yield too little investment in energy “efficiency,” a term that is misleading in any event in that such artificial “energy efficiency” driven by government policy is inconsistent with broader economic efficiency.

Question. How do we incorporate phase-outs to ensure that a particular energy tax credit does not outlive its useful life?

Answer. I know of no way to do this given that a current Congress cannot bind a future Congress. In any event, such energy tax credits do not have “useful” lives as a general condition because they are inefficient and thus waste resources. The only “phase-outs” that work are those not implemented in the first place.

PREPARED STATEMENT OF HON. ORRIN G. HATCH,
A U.S. SENATOR FROM UTAH

WASHINGTON—Senate Finance Committee Chairman Orrin Hatch (R-Utah) today delivered the following opening statement at a hearing to examine energy tax provisions:

I’d like to welcome everyone to this morning’s hearing on energy tax policy.

This isn’t the first hearing we’ve had on these issues during my time on the Finance Committee, nor is it likely to be a last. Members on both sides of the aisle have a keen interest in this area, and for good reason. The energy-related provisions in our tax code impact a variety of industries throughout our economy and affect the lives and livelihoods of the majority of all of our constituents.

It is, therefore, important that we continually examine these provisions to make sure we’re getting things right and that resources do not go to waste.

I’ll start today’s discussion by reiterating my overall position.

Generally speaking, when it comes to energy policy, I have always said that we need an all-of-the-above approach. Unfortunately, not everyone shares this view.

For example, leaders in the current administration, including President Obama himself, have said that they are for an all-of-the-above approach. Yet, clearly, when it's time to draft policies, the administration seems far more interested in punishing the production and use of fossil fuels, even if it means higher energy costs for hard-working taxpayers.

We see this across the board in the administration's environmental policies, its regulatory war on coal, its refusal to allow construction of the Keystone Pipeline, and, in what is more relevant to today's discussion, its tax policy proposals, which consistently include higher taxes at virtually all steps of the energy supply chain.

Whether it's an increased per-barrel tax on oil production or higher per-gallon taxes charged on gasoline at the pump, the Obama administration seems intent on raising the cost of producing or consuming energy from fossil fuels, even if it means increased hardships on middle-class and lower income families.

Most recently, the President proposed a \$10 per-barrel tax on oil, an idea that virtually all economists agree would directly result in higher energy prices for families and consumers. Of course, this proposal would also be harmful to American businesses, particularly those in the manufacturing sector, that rely on fossil fuels.

The President and those who serve in his administration presumably know that this is the case, yet they are undeterred. And, quite frankly, these proposals are just the tip of the iceberg when it comes to the President's efforts—not to mention those of many of his supporters here in Congress—to use the tax code to further an ideological attack on American energy producers.

This is, of course, not a surprise.

After all, back when he was a candidate for President, then-Senator Obama said in so many words that the centerpiece of his energy policy—the so-called cap-and-trade proposal—would “necessarily” cause energy prices to “skyrocket.”

And, the President's first Energy Secretary, before he was appointed, argued on the record in favor of purposefully raising gas prices to European levels.

All of this is meant to serve an agenda focused on ideology and not on the day-to-day needs of the American people and is, quite simply, the opposite of what our country needs.

Instead of discouraging the domestic production of oil and gas, we should welcome it. By reducing our dependence on foreign oil, creating many high-paying jobs, and bringing down the cost of living for U.S. households, increased domestic energy production can protect our national security and provide greater economic stability.

The President's first major attempt to overhaul America's energy policy—the aforementioned cap-and-trade proposal—thankfully failed to pass through Congress, even when the Democrats controlled the House and had a filibuster-proof majority in the Senate.

Since then, proponents of this horribly misguided policy have tried to repackage cap-and-trade, instead calling it a “carbon tax.”

As an aside, I have to say that, when it comes to these “carbon tax” proposals, I'm a little disappointed in my friends on the other side of the aisle. Typically, when they have a proposal that they know is going to put the financial screws to the American people, they give it a more clever name.

The so-called Affordable Care Act comes most immediately to mind.

However, with the various “carbon tax” proposals, my friends are telling the American people exactly what they'll be getting: higher taxes in the form of increased energy costs and reduced wages, relative to the cost of living.

In addition to increasing costs, particularly on middle-class and lower-income earners, the President's energy tax policy also seems hyper-focused on picking winners and losers and in handing over taxpayer resources to unproven ideas and technologies that, far too often, are completely unable to compete in the energy marketplace.

Don't get me wrong, I am all for promoting innovation and advancing alternative energy sources. Like I said, I want an all-of-the-above approach. However, I do not believe we should be purposefully raising the cost of existing and proven energy sources—and adding to the costs of doing business or raising a family in the United States—in order to make alternative energy sources more attractive.

In addition, I have serious concerns about the way in which the administration has overseen the use of the subsidies it designed to promote alternative energy. Most notably, as chairman, I am currently investigating the administration of cash grants awarded under the section 1603 program and energy tax credits based on evidence from the Treasury Inspector General for Tax Administration and elsewhere that suggests possible misuse. So far, \$25 billion has been awarded under the cash grant program since it was established in the so-called stimulus that passed in 2009. We need to know more about where those resources have gone.

Ultimately, the energy-related provisions in our tax code—like everything else—will have to be reconsidered as part of our ongoing tax reform efforts. In our attempts to make the tax code fairer, simpler, and more conducive to economic growth, I'm willing to consider any reasonable alternatives. However, that is a long-term effort that will likely not bear fruit in the immediate future. In the meantime, I think we need to work to ensure that our tax code is designed so that it does not punish the production of any viable energy source.

In the end, it is easy for politicians in Washington to sit in an ivory tower and say that people aren't currently paying enough for their energy and they should pay more in order to further some ideological agenda. However, I think the vast majority of American workers and families would strongly disagree with that notion.

As always with these energy hearings, I expect that we'll have a spirited discussion of all of these issues here today. I think we've assembled a very good panel of witnesses to represent various viewpoints, and I look forward to hearing their views on these and other matters.

PREPARED STATEMENT OF SUSAN KENNEDY, CHIEF EXECUTIVE OFFICER AND
BOARD MEMBER, ADVANCED MICROGRID SOLUTIONS

Mr. Chairman, Senator Wyden, and distinguished Committee members, thank you for inviting me to participate in today's hearing on energy tax policy, including the Investment Tax Credit (ITC) for advanced energy storage. My name is Susan Kennedy, and I am the CEO and founder of Advanced Microgrid Solutions (AMS). Prior to founding AMS, I served as Chief of Staff to Governor Arnold Schwarzenegger and was a Commissioner at the California Public Utilities Commission, which is the agency that regulates investor-owned utilities in California.

AMS finances, designs, installs, and manages advanced energy storage systems for businesses, utilities and government entities. Our systems are technology-agnostic and source-neutral. We use best-in-class technology and advanced analytics software to charge batteries when energy is plentiful and discharge them during peak demand hours. Advanced energy storage is the only resource that serves multiple grid functions including reducing customers' peak demand, providing them with reliable back-up power in case of grid outages, and optimizing intermittent and on-site generation. Of greater interest to this committee, however, are the myriad benefits that energy storage provides to the Nation's electrical system as a whole.

In Southern California, the decommissioning of the San Onofre Nuclear Power Plant in 2013 and last year's Aliso Canyon gas leak underscore the need to build a stronger, more resilient electrical grid. But this is far from a California issue—as this committee is well aware, energy security is a national concern. Natural disasters, cyber-security attacks, terrorism, and even human error can take down our electrical grid, threatening national security, public safety, and our economy. The U.S. Department of Energy has estimated the annual cost of power outages to be approximately \$150 billion. In 2012, Hurricane Sandy knocked out power for more than 8 million people, from North Carolina to Maine and as far west as Illinois and Wisconsin. Grid modernization is critical to promoting economic competitiveness and energy security.

As established in the Department of Energy's Quadrennial Energy Review, which was released in April 2015, distributed energy resources—including energy storage—play an important role in building a stronger, more resilient grid. For the first time, electric utilities are able to tap into energy stored by their own customers to inject stability and resiliency into the grid. When demand is high, storage can turn buildings into virtual power plants, providing immediate and secure grid support. Under the traditional model, electric utilities have peaker plants on spinning reserve to meet increased demand. Now, we can take entire city blocks off the grid for any length of time, reducing the need to invest in excess, redundant peaker plants. Storage systems also provide commercial and industrial facilities, as well as

government institutions, with “reservoirs” of back-up power, protecting against unexpected grid outages.

Energy storage is a \$528-million industry, and it is expanding at a rapid pace. Last year alone, the U.S. energy storage market grew by 243%. By 2021, it is expected to be worth \$2.9 billion, six times its current value. This rapid growth presents an important opportunity for investors, businesses, and the economy as a whole, but the storage market still faces significant barriers to widespread deployment. The costs of battery systems are dropping, but are still too prohibitive to make economic sense in most parts of the Nation. Improved Federal incentives are necessary to make energy storage more attractive to consumers and more affordable for investors, supporting the technological development that we need for scaled deployment of energy storage.

Federal tax policy is the single most important tool to attract investment in critical infrastructure, including the electric grid. For most of the 20th century, energy tax policies promoted domestic oil and gas reserves and production. After the 1970s, the focus shifted towards energy conservation and alternative energy sources. The solar ITC alone has helped annual solar installations grow by over 6,500% since its implementation in 2006. Providing targeted and efficient incentives for truly innovative, source neutral technologies like energy storage will spur competition and attract the private investment we need to build a more resilient and efficient grid, help control electricity usage and costs, and move towards energy security and independence.

Thank you again for the opportunity to discuss how we can use tax policy to unlock competition in the energy sector and build tomorrow’s grid. I look forward to working with the committee on initiatives that will further support U.S. leadership in energy storage.

PREPARED STATEMENT OF STEVE MILLER, CHIEF EXECUTIVE OFFICER,
BULK HANDLING SYSTEMS

Thank you, Chairman Hatch, Ranking Member Wyden, and the rest of the committee, for the honor of speaking today.

I am the CEO of Bulk Handling Systems and our subsidiaries, a group of four companies with more than 275 employees and operations in the States of Oregon, Tennessee, and California. The company was established in 1976, supplying conveying and sorting equipment mostly to the timber and wood products industry, and began exporting equipment in the early 1980s. During the late 1980s and 1990s, we pivoted to supply equipment to the quickly-growing recycling industry which makes up the bulk of our business today. Together our companies design, engineer, manufacture and install systems to extract and sort valuable commodities from municipal solid waste streams; maximizing value from what is thrown away and minimizing the amount of materials sent to landfill. The majority of our employees are engineers, welders, technicians and fabricators. We also outsource a significant amount of work locally to other metal fabricators and so are responsible for additional job creation by affiliated companies in our areas. Through anaerobic digestion technology, our Lafayette, California-based Zero Waste Energy, LLC transforms organic materials—such as source-separated organics, and yard waste and food waste separated from the municipal solid waste stream by our recycling equipment—into biogas that is used to produce electricity or compressed natural gas to fuel vehicles. The remaining solid organic material in our systems is used to produce nutrient-rich compost for agricultural use. In addition, our company is involved in the conversion of the remaining elements of the waste stream into an EPA-approved Engineered Fuel product out of waste, which is suitable for use by utilities to produce electricity as a clean burning supplement to coal. While our products are produced in the United States, we export our equipment around the world and today are fulfilling orders on five continents.

My focus today relates to the work that my company is doing to produce renewable energy and compost from the solid waste stream; and describe opportunities that changes in tax policy will have to accelerate our efforts. Through our anaerobic digestion process we create base-load renewable fuel and/or electricity from the large percentage of food waste and other organic materials in our waste stream that would otherwise decompose for years in a landfill, leaking methane and carbon dioxide into the atmosphere. We have successfully built projects that produce electricity and compressed natural gas (CNG) that is used to provide fuel for waste truck fleets

as a replacement for diesel. In each of our systems, the resulting solid material is turned into compost which is used to return nutrients to the soil and aid in water retention. In short, our anaerobic digestion systems substantially increase diversion of material from landfills, manage the production of methane from the breakdown of organic waste so that it is not released in the atmosphere, produce valuable base-load electricity and transportation fuels, and produce organic compost to both replenish soils and retain water in the agricultural sector. Despite the overall attractiveness of the products that we create, our development has been slowed by low prices for electricity, oil and natural gas. Since the renewable products that we produce compete with these fossil fuels, we have been challenged to provide our Customers the economics needed to fund projects.

Unlike wind and solar, anaerobic digestion produces electricity in all weather conditions, 24 hours a day, 7 days a week, and 365 days a year. Despite the significant advantages of our proven technology, it has been difficult to compete for scarce investment dollars against solar and wind. While I certainly appreciate the Senate's attentiveness toward renewable energy generally, the policies adopted at the end of 2015 do not do enough. For example, while the PTC and ITC for wind and solar received long-term extensions, biogas credits were extended to only the end of 2016 for the biomass industry and only applied to the renewable energy portion of the project. Since development of such a project takes several years, the early expiration of the credit makes the value extremely limited from a planning and development perspective. Additionally, all of our systems are required to produce compost as a byproduct of the renewable biogas production process. Thus, the cost to build an anaerobic digestion system must necessarily also include compost system capacity. While the intention of the credit is to provide value across the whole project, limiting the credit to only the energy portion and ignoring the compost element puts the renewable energy portion at risk. To make the credit useful, it needs to include all necessary elements of the renewable energy system. As such, we would ask you to consider the following:

- Extend the PTC for biogas technologies for 5 years with no phase-out;
- Give those technologies an equal credit to wind per kilowatt-hour;
- Ensure that the legislation that allows technologies to convert a PTC into an ITC is extended;
- Allow biogas that is used as transportation fuel to qualify for both the PTC and ITC—currently it only qualifies if used for electricity; and
- Include the cost to develop the compost and nutrient recovery technology portion of the renewable energy project. Extension of the credit to include compost technologies would significantly expand the development of waste to energy and compost facilities.

Your help will be impactful on many levels—including:

- Increasing diversion of material from landfills to a beneficial use;
- Reducing greenhouse gas emissions from organic wastes;
- Creating high-paying domestic jobs for companies like mine as well as our owner/operator customers;
- Increasing renewable fuel production;
- Increasing base-load renewable power generation; and
- Increasing nutrient-rich compost generation for agriculture.

I hope that you can help us develop this important domestic industry. Thank you again for the opportunity to speak here today.

QUESTIONS SUBMITTED FOR THE RECORD TO STEVE MILLER

QUESTION SUBMITTED BY HON. DEAN HELLER

Question. I strongly believe that tax reform, done the right way, can improve our fiscal picture. The recent certainty provided to the solar industry, through the investment tax credit, is projected to provide 180,000 more jobs over the next 5 years and over \$30 billion in investment annually in the economy because of this credit. Do you believe that the investment tax credit, section 48, would provide economic growth if scored dynamically?

Answer. Renewable energy projects by their very nature are capital-intensive and thus benefit from the application of section 45 Production Tax Credits and section 48 Investment Tax Credits which reduce the cost of project financing.

The ability to lower the cost of financing for biomass and anaerobic digestion projects over a reasonable and predictable timeframe will accelerate their deployment and increase the number of orders and contracts for specialized equipment and construction services in the United States.

While Bulk Handling Systems is not an expert on Federal budget dynamic scoring, we are confident that the acceleration of these projects, and the equipment and services they require for delivery, would create net positive economic benefits in the form of private company payroll growth, investment in U.S. plant and equipment and an increase in both corporate and individual income taxes.

For example, our Zero Waste Energy subsidiary provided the technology for the largest dry anaerobic digestion waste processing project in the world. This project generated nearly 300 direct skilled construction jobs including skilled pipe welders and electricians and approximately 50 advanced and high-paying manufacturing jobs for specialized equipment components and related engineering. We believe that the economic benefits related to this direct increase in jobs and payrolls would compare favorably with the ITC investment that Federal taxpayers made.

QUESTION SUBMITTED BY HON. MARK R. WARNER

Question. Ms. Harbert's testimony notes that energy tax policy should be "results-oriented and not proscriptive," that we as policymakers have not historically been good at predicting technological developments in the energy sector, and that there are often unintended consequences to well-intended energy policy. With that in mind, I am interested in the witnesses' answers to the following questions.

How do we accomplish energy tax reform that successfully incentivizes companies to make meaningful investments toward energy efficiency while increasing our efficiency standards and also cutting down on abuse of energy tax credits?

How do we incorporate phase-outs to ensure that a particular energy tax credit does not outlive its useful life?

Answer. Bulk Handling Systems is not involved with energy efficiency but supports the development technologies and standards that economically reduce energy consumption over time.

Concerning the phase-out of tax credits, biomass and anaerobic digestion are relatively new entrants to the U.S. renewable energy industry compared with solar and wind. Solar and wind technologies have benefited for years from Federal tax credits and received an additional 5-year extension at the end of 2015, signaling that the useful life of these credits for these technologies has not been reached. Conversely, biomass and anaerobic digestion, which provide critical base-load renewable electricity, only received a 1-year extension, yet these technologies are not as mature or established as solar and wind, in part because of the uncertainty of tax credits for our technologies. The playing field is not level across technologies.

As to the proscriptive nature of the credits, we agree that these should be removed. Our company recently built the first anaerobic digestion system to produce transportation fuels out of organic waste. The waste that was previously landfilled is now supplying 100% of the fuel needs of 15 trucks that collect waste each day. The tax code didn't contemplate our development of this new technology and so the project received none of the benefits that the ITC could have provided. The lack of the ITC credit limits the development of more projects and hampers our ability to more fully develop the technology. Had the code been written in a more general way which focused on the benefit alone, then we would be able to utilize it.

Bulk Handling System respectfully requests that biomass and anaerobic digestion technologies receive the same 5-year extension as the more mature solar and wind industries received. All renewable and energy efficiency technologies should be reviewed near the sunset of the extension in relationship to the cost of tax credits to the benefits provided in the form of diversified energy production and increases in U.S. jobs and capital investment.

QUESTION SUBMITTED BY HON. BENJAMIN L. CARDIN

Question. Mr. Miller, you lead a successful company that relies on a proven renewable energy technology well worth supporting.

The issues you are facing seem very much akin to those faced by two particular energy industries I support: industries targeted at promoting energy efficiency, and the nascent and growing offshore wind industry in the United States, like the one we have in Maryland.

A company in my home State will be building the first utility-scale offshore wind farm in the United States, producing 750 MW of clean, renewable energy by 2020. That company, and the developing offshore wind industry, need a stable and predictable tax code that recognizes the operational reality of the business.

Take extending the ITC in section 48 for offshore wind as an example. Similar to the issues raised in your testimony, the extension we were able to agree upon at the end of last year—extending the ITC for 5 years with a phase-down in years 3, 4, and 5—doesn't work for offshore wind. It may work for land-based wind, but the operational reality of offshore wind—its scale and development time frame—is much longer.

So we need to extend the ITC for offshore wind and do everything we can to bolster, support, and grow that industry just like we need to do the same for yours. Certainty is also key for encouraging investments in energy efficiency. Growing sectors of our economy, like energy efficient construction, offshore wind, and your renewable technologies and storage solutions, are very promising industries for economic development, job creation, and the use of clean energy.

In your view, would a more stable and predictable tax code across these and other energy technologies help to grow your businesses and your industries and strengthen the American economy?

Answer. Without question, a stable and predictable tax code that supports the development of important renewable energy and energy efficiency projects across a wide array of technology platforms would be most beneficial in terms of diversifying our carbon-neutral and carbon-negative energy supplies and creating high-paying jobs in construction, advanced manufacturing, and engineering.

To add an additional important point, Bulk Handling Systems is not only advocating for extensions of the PTC and ITC, but an enhancement to the ITC program to also provide biogas projects which produce Renewable Natural Gas (RNG) for transportation fuel to receive the same benefits as biogas projects which generate renewable electricity. The United States is making a historic transition to a natural gas fueled economy, and biogas projects can provide an important source of fuel that is both economically and environmentally viable. Since the RNGs generated replace diesel fuel, they are regarded as carbon-negative and the single most carbon-reducing renewable fuel made. Application of the PTC and ITC for these projects will greatly accelerate their development.

PREPARED STATEMENT OF HON. CHARLES E. SCHUMER,
A U.S. SENATOR FROM NEW YORK

Mr. Chairman, Ranking Member Wyden, thank you for holding this hearing today. Although we are talking about the long-term outlook for energy tax policy, I want to take a moment to focus our attention on an issue of immediate urgency.

As you know, the tax package agreed to at the end of last year extended the section 48 energy investment tax credit for 5 years, beginning on January 1, 2017, phased down to 26 percent in 2020 and 22 percent in 2021. However, through a drafting error, some technologies in section 48 were left out of that long-term extension. As a result, those technologies—including fuel cells, geothermal, hydropower, and biomass, among others—are set to expire at the end of this year.

Picking winners and losers was not our intention. The Majority Leader agreed with that sentiment and made a commitment to address the discrepancy early this year. Unfortunately, we've yet to place it on a moving legislative vehicle. The lack of certainty for these technologies is creating market distortions that will drive capital out of these technologies and toward those with longer-term incentives.

I think it's important that we support an all-of-the-above energy strategy, and ensuring new clean energy technologies have a seat at the table is a key component. Therefore, I would like to see us put the section 48 fix on the FAA extension that must move by mid-July, and I hope you will help me pursue that possibility, Mr. Chairman.

This is a noncontroversial, already agreed-to modification, and it should be processed expeditiously. If you don't take my word for it, just listen to Representatives Tom Reed (R-NY) and Pat Meehan (R-PA.), both Republican Ways and Means members, who are making the same request of their leadership. As Representative Meehan said to *Politico* just yesterday: "It's not as if there is new ground that needs to be broken. There was an agreement in the House and Senate on the principle, and we're simply looking for a vehicle to fix it."

PREPARED STATEMENT OF HON. RON WYDEN,
A U.S. SENATOR FROM OREGON

In my view, there are two parts to the energy debate today. First is where our energy policy needs to go in the long term—a tech-neutral approach that throws the current mishmash of incentives in the trash can, cuts their cost in half, and promotes a clean-energy economy. More green for less green. The second part of the debate is about creating the running room in the short term that makes it possible to achieve that goal for the future. I want to talk about both today, beginning with the short term.

At the end of last year, Democrats and Republicans came together and began to move away from the same old cycle of temporary tax extenders. Congress decided, on a bipartisan basis, that another weeks- or months-long renewal of the renewable energy incentives wasn't good enough. Incentives for wind and solar, which have grown to become major parts of the American energy portfolio, got 5 years of certainty, and other clean technologies got 2. And the result has been dramatic: new solar installations are projected to double this year and for the first time, new solar generation will exceed natural gas.

Here in the short term, let's remember that there's leftover business that needs to be addressed. Certain renewable technologies were left out of last year's package: fuel cells, geothermal, and more. The clock is ticking down to another round of expirations at the end of this year. For example, bipartisan legislation on waste-heat-to-energy that passed this committee last year was left out. The sooner Democrats and Republicans come together, take care of these energy extenders and clear the decks, the sooner we can turn to finding a smarter, fresh approach to energy tax policy.

That brings me to the long-term part of this debate. In my view, the key to a new approach on energy policy is going technology-neutral. The system on the books today distorts our energy markets, picks winners and losers, and holds innovators back. That ought to change, and that's why I've put forward a tech-neutral plan that will be radically simpler and more efficient. Gone will be today's web of 44 energy tax breaks. In their place will be three incentives built around simple, clear goals: cleaner energy, cleaner transportation, and energy efficiency. And the price tag of today's system—\$125 billion every decade—will be cut in half. It's a market-oriented system that will unleash innovators with big ideas.

The Finance Committee is lucky to be joined here today by the heads of two companies that are doing exciting things in the world of renewable energy. With the technology made by Bulk Handling Systems, which is based right in Eugene, Oregon, the waste Americans produce every day can be recycled and turned into energy. Even the trash trucks run on renewable fuel.

Advanced Microgrid Solutions is at the forefront of a technology that has long been overlooked by our tax policies, and that's energy storage. The fact is, the sun doesn't always shine and the wind doesn't always blow. So storage is a must-have.

These are the kinds of 21st-century innovations in energy that are either disadvantaged by our outdated policies, or ignored altogether. But with a tech-neutral policy, the unfair market distortions will go away, the incentives will be predictable, and the goals will be clear. The cleaner your energy, the cleaner your transportation fuel, the more efficient your home or office building, the bigger the tax break. That goes for everybody—even the natural gas facility that invests in a highly efficient, next-gen turbine, or an oil company that sets out to make the clean transportation fuels of the future.

The bottom line is that energy in this country is transforming. The threat posed by climate change is growing every day. New technologies are being developed. Innovators see enormous economic opportunity in renewable energy. Our energy tax policies have to keep up. Let's not cling to yesteryear like the naysayers who saw

the first automobiles hit the road a century ago and said, “No, the horse is here to stay.” Let’s put policies in place that support those who are at the forefront.

I want to thank our witnesses for being here today. I’m looking forward to a bipartisan discussion of how this committee can lead when it comes to ending the cycle of extenders, and adopting a smart, fresh approach to energy tax policy. Thank you, Chairman Hatch.

PREPARED STATEMENT OF BENJAMIN ZYCHER,* JOHN G. SEARLE CHAIR AND
RESIDENT SCHOLAR, AMERICAN ENTERPRISE INSTITUTE

FOUR DECADES OF SUBSIDY RATIONALES FOR UNCOMPETITIVE ENERGY

Summary

The modern rationales for energy subsidies have varied in prominence over the decades, but none has been broadly discredited in the public discussion despite the reality that each suffers from fundamental analytic weaknesses. The rationales can be summarized as follows:

- Energy “independence.”
- Support for infant industries.
- Leveling the subsidy playing field.
- Adverse external effects of conventional generation.
- Resource depletion or “sustainability.”
- Employment expansion through the creation of “green jobs.”
- The “social cost of carbon.”

Energy “independence”—the degree of self-sufficiency in terms of energy production—is irrelevant analytically, particularly in the case of such energy sources as petroleum traded in international markets, an economic truth demonstrated by the historical evidence on the effects of demand and supply shifts from the 1970s through the present.

Capital markets can sustain promising industries or technologies in their infancy—the early period during which technologies are proven and scale and learning efficiencies are achieved—so that the “infant industry” rationale for renewables subsidies is a non sequitur. Moreover, there is little evidence that there exist additional learning or scale cost reductions remaining to be exploited in wind and solar generation in any event.

There is no analytic evidence that renewables suffer from a subsidy imbalance relative to competing conventional energy technologies—the data suggest the reverse strongly—and the conventional “subsidies” that are purported to create a disadvantage for renewables are not “subsidies” defined properly as a matter of economic analysis.

Wind and solar power create their own set of environmental problems, and even in terms of conventional effluents and greenhouse gases, it is far from clear that they have an advantage relative to conventional generation, particularly because of the up-and-down cycling of conventional backup units needed to preserve system reliability in the face of the intermittency (unreliability) of renewable power. And those backup costs—an economic externality caused by the unreliability of renewable power—are substantially larger than the externality costs of conventional power even under extreme assumptions.

The “sustainability” or resource depletion arguments for renewables subsidies make little sense analytically—the market rate of interest provides powerful incentives to conserve resources for consumption during future periods—and are inconsistent with the historical evidence in any event.

Nor does the “green jobs” employment rationale for renewables subsidies make analytic sense, as a shift of resources into the production of politically favored power must reduce employment in other sectors—resources, after all, are limited always and everywhere—and the taxes needed to finance the subsidies cannot have salutary employment effects. Moreover, the historical evidence on the relationships among GDP, employment, and electricity consumption does not support the “green jobs” argument.

*John G. Searle Scholar, American Enterprise Institute. I thank Marlo Lewis, Alan Viard, and William Yeatman for useful suggestions; but any remaining errors or omissions are my responsibility. I can be reached at benjamin.zycher@aei.org; or at 202-862-4883.

The newest environmental rationale for renewables subsidies—the “social cost of carbon”—is an argument deeply flawed both conceptually and in terms of the quantitative estimates now underlying a large regulatory effort. In particular, the Obama administration estimate of the social cost of carbon suffers from three central benefit/cost analytic flaws: the application of (asserted) benefits global rather than national to the net benefit calculation; the failure to use an appropriate discount rate; and the addition of such “co-benefits” as particulate reductions to the net benefit calculation. Moreover, the policies being proposed to reduce emissions of greenhouse gases would have temperature effects trivial or unmeasurable even at the international level, under assumptions highly favorable to the policy proposals. More generally, the terms “carbon” and “carbon pollution” are political propaganda, as carbon dioxide and “carbon” are very different physical entities, particularly given that some minimum atmospheric concentration of the former is necessary for life itself.

It would be hugely productive for the U.S. economy writ large were policymakers to adopt a straightforward operating assumption: resource allocation in energy sectors driven by market prices is roughly efficient in the absence of two compelling conditions. First: it must be shown that some set of factors has distorted those allocational outcomes to a degree that is substantial. Second: it must be shown that government actions with high confidence will yield net improvements in aggregate economic outcomes. Given the weak history of analytic rigor and policy success in the context of energy subsidies, greatly increased modesty on the part of policymakers would prove highly advantageous.

I. Introduction: A Brief History of Modern U.S. Energy Subsidies

Congress passed and the President signed late last year the Consolidated Appropriations Act, 2016.¹ In the context of energy subsidies, the legislation renewed production tax credits for wind and other power technologies retroactively to January 1, 2015, with new expiration dates and phaseouts varying by technology.² Investment tax credits were extended for solar, fuel cell, small wind, geothermal, micro-turbines, and co-generation (“combined heat and power”) projects, with gradual phaseouts of these tax subsidies between 2019 and 2022.³ It borders on the implausible that this latest extension of such subsidies for uncompetitive electric power technologies will prove to be the last when the 2019–2022 Congressional sessions arrive, as a brief history of U.S. energy policy suggests strongly both in general and with respect to “renewable” and other unconventional energy sources in particular.⁴

In terms of the modern history of U.S. energy policy, we usefully can begin in the mid-1970s with the energy “crisis” and the perceived need to achieve an expansion of the supply and “independence” of U.S. energy production.⁵ This original rationale has been expanded greatly over time, with environmental and “sustainability” argu-

¹See the text of the legislation at <https://www.gpo.gov/fdsys/pkg/BILLS-114hr2029enr/pdf/BILLS-114hr2029enr.pdf>.

²The expiration of the wind production tax credit was extended to December 31, 2019, with a phase-down imposed for wind projects beginning construction after the end of 2016. Tax credits for other eligible technologies (geothermal, biomass, and others) were extended for projects beginning construction before 2017. See the Department of Energy summary at <http://energy.gov/savings/renewable-electricity-production-tax-credit-ptc>.

³See the Department of Energy summary at <http://energy.gov/savings/business-energy-investment-tax-credit-itc>.

⁴With respect to the fundamental economic inefficiency of “renewable” and other such unconventional energy sources, see Benjamin Zycher, *Renewable Electricity Generation: Economic Analysis and Outlook*, Washington: AEI Press, November 15, 2011, at <http://www.aei.org/publication/renewable-electricity-generation/>. Such energy is “unconventional” precisely because it is uneconomic, and thus uncompetitive. See also Robert Bryce, “Energy Policies and Electricity Prices: Cautionary Tales from the E.U.,” monograph, Manhattan Institute, March 2016, at <http://www.manhattan-institute.org/sites/default/files/R-RB-0316.pdf>; and Robert Bryce, “What Happens to an Economy When Forced to Use Renewable Energy?,” Manhattan Institute Issue Brief, May 4, 2016, at <http://www.manhattan-institute.org/sites/default/files/IB-RB-0516.pdf>.

⁵Useful discussions and information are provided by the Energy Information Administration (EIA), “Policies to Promote Non-hydro Renewable Energy in the United States and Selected Countries,” February 2005, at http://nrec.mn/data/uploads/Nom%20setguul%20xicheel/PV/nonhydrorenewablespaper_final.pdf; Fredric Beck and Eric Martinot, “Renewable Energy Policies and Barriers,” *Encyclopedia of Energy*, Vol. 5 (2004), pp. 365–383; EIA, “Renewable Energy 2000: Issues and Trends,” February 2001, at <http://pbadupws.nrc.gov/docs/ML0932/ML093280377.pdf>; Eric Martinot, Ryan Wisner, and Jan Hamrin, “Renewable Energy Policies and Markets in the United States,” at http://www.martinot.info/Martinot_et_al_CRS.pdf; and North Carolina State University, North Carolina Clean Energy Technology Center, *Database of State Incentives for Renewables and Efficiency*, at <http://www.dsireusa.org/>.

ments added to “energy independence”; but the early policy history begins with the dominant energy security concerns of that period. The 1978 National Energy Act (NEA) was focused for the most part on reducing dependence on foreign oil and on measures intended to increase conservation and efficiency in domestic energy consumption.⁶

As an aside, that overriding rationale was driven in substantial part by the perverse effects of the price and allocation controls imposed upon the energy sector during much of the 1970s.⁷ Market prices serve a number of economic functions, among them the imposition of discipline on consumption, and incentives for efficiency in the allocation of available supplies across competing uses. Such functions are crucial for achievement of the most productive use of supplies made more limited by supply disruptions, the central examples of which during the 1970s were the reduction in the output of crude oil by Arab OPEC during 1973–1975, and that caused by the Iranian revolution during 1978–1980.⁸ Prices suppressed artificially by regulatory fiat can perform those central economic functions far less effectively, and in particular encourage consumption that is inefficient and total demands that exceed the supplies available, and a misallocation of those available supplies across competing uses.

And so subsidies for conservation and efficiency during that period in part represented an attempt to achieve by government fiat the market discipline and allocational outcomes suppressed by price and allocation regulations. But government incentives to achieve the same outcomes engendered by market prices are weak, and in any event government cannot achieve market-driven patterns of resource use because decisionmaking processes centralized by government cannot replicate the information revealed by market competition and market prices.⁹ Instead, incentives for policymakers to use price and allocation regulation to bestow benefits upon favored constituencies are powerful. As an example, the allocation regulations imposed during the 1970s were based upon historical geographic consumption patterns; this meant that greater supplies than otherwise would have been the case went to rural areas, and lesser supplies to urban ones, an outcome that was predictable given the disproportionate political power enjoyed by less populated states in the U.S. Senate and in the electoral college, and because of the effects of gerrymandered congressional districts on the identity and policy preferences of the hypothetical median voter.¹⁰

The 1978 NEA included the Public Utility Regulatory Policies Act, intended ostensibly to increase conservation and efficiency in the electric utility sector. PURPA required electric utilities to purchase electricity from “qualifying facilities,” which were defined as electric power producers smaller than 80 MW (megawatts) in capacity using cogeneration processes or renewable technologies.¹¹ From an analytic

⁶This legislation comprised five statutes: The Energy Tax Act, The Natural Gas Policy Act, The National Energy Conservation Policy Act, The Power Plant and Industrial Fuel Use Act, and The Public Utility Regulatory Policies Act.

⁷See Benjamin Zycher, “Emergency Management,” in S. Fred Singer, ed., *Free Market Energy: The Way to Benefit Consumers*, New York: Universe Books, 1984, pp. 74–98. See also Benjamin Zycher, “In Defense of Price Gouging and Profiteering,” *The American*, August 7, 2014, at <http://www.aei.org/publication/in-defense-of-price-gouging-and-profiteering/>.

⁸See Benjamin Zycher, “OPEC,” in David R. Henderson, ed., *The Concise Encyclopedia of Economics*, Indianapolis: Liberty Fund, 2008, at <http://www.econlib.org/library/Enc/OPEC.html>. See also the historical production data reported by BP in the *Statistical Review of World Energy 2015*, at <http://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>.

⁹See Zycher, 2014, *op. cit.*, fn. 7 *supra*.

¹⁰See Zycher, 1984, *loc. cit.*, fn. 7 *supra*. See also Aaron Wildavsky, *The Politics of the Budgetary Process*, Boston: Little, Brown, and Co., 1964, esp. pp. 102–108; Nelson W. Polsby, et al., *Presidential Elections: Strategies and Structures of American Politics*, Lanham: Rowman and Littlefield, 2011, esp. ch. 2; Cary M. Atlas, et al., “Slicing the Federal Government Net Spending Pie: Who Wins, Who Loses, and Why,” *American Economic Review*, Vol. 85, No. 3 (June 1995), pp. 624–629; Frances E. Lee, “Senate Representation and Coalition Building in Distributive Politics,” *American Political Science Review*, Vol. 94, Issue 1 (March 2000), pp. 59–72; George Rabinowitz and Stuart Elaine Macdonald, “The Power of the States in U.S. Presidential Elections,” *American Political Science Review*, Vol. 80, Issue 1 (March 1986), pp. 65–87; Benjamin Zycher, “The Electoral College Does It Better,” *Los Angeles Times*, October 27, 2004, at <http://articles.latimes.com/2004/oct/27/opinion/oe-zycher27>; and Gary C. Jacobson and Jamie L. Carson, *The Politics of Congressional Elections*, Lanham: Rowman and Littlefield, 2016, esp. pp. 246–252.

¹¹Cogeneration facilities, now more commonly called “combined heat and power” (CHP) facilities, produce electricity and then capture the resulting heat for heating purposes. Under

standpoint, such purchase requirements are a tool with which to shift financing of renewables subsidies from the taxpayers writ large to the electricity market itself, as most State regulation of electricity prices bundles (or combines) lower- and higher-cost power into a single set of rates. This has the effect of subsidizing the producers of higher-cost power at the expense of consumers and the producers of lower-cost power. These implicit regulatory tax/expenditure transfers do not appear in government fiscal accounts. However, the very need for such implicit but sizeable subsidies, however financed, suggests, again, a fundamental competitiveness problem.

The 1978 NEA included also the Energy Tax Act, which gave an investment tax credit of 30 percent to residential consumers for solar and wind energy equipment, and a 10-percent investment tax credit to businesses installing solar, wind, geothermal, and ocean energy technologies. These tax credits ended in 1985.¹²

The 1992 Energy Policy Act created the production tax credit, set originally at 1.5 cents per kWh (kilowatt-hour) in 1993 dollars, adjusted for inflation, for some technologies, and 0.75 cents per kWh for others. The credit now is either 2.3 cents per kWh or 1.2 cents per kWh, respectively.¹³ This credit has had a somewhat erratic history, having expired and been extended several times; the most recent extensions were in February 2009, January 2013, December 2014, and December 2015.¹⁴

A number of other Federal policies encourage the use of renewable energy in electricity generation. Qualified investments are eligible for accelerated depreciation and bonus depreciation under the 2008 Energy Improvement and Extension Act (part of the Troubled Asset Relief Program),¹⁵ the 2009 legislation just noted, and the 2010 Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act. Certain rebates for renewable energy offered consumers by electric utilities are excluded from taxable income. Several other grant, subsidy, and loan programs are administered by various Federal agencies.¹⁶

Section II offers summary critiques of the shifting policy rationales commonly asserted in favor of energy subsidies. Section III discusses in greater detail the newest “social cost of carbon” externality rationale for renewables subsidies, as estimated by an interagency working group of the Obama administration;¹⁷ the attendant effects on temperatures in the year 2100 are discussed as a rough benefit/cost test. Finally, section IV offers some concluding observations.

II. Observations on the Expanding Rationales for Energy Subsidies

As noted above, the policy rationales for energy subsidies have expanded over time. What has not changed is their rather poor analytic quality; not one is con-

PURPA, utilities were required to purchase this power at “avoided cost,” the determination of which was left to the state regulatory authorities; but the upshot is that under this requirement higher-cost power is “bundled” with lower-cost power in the determination of cost-based electricity rates. This has the effect of increasing the demand for the higher-cost power. The Federal Energy Regulatory Commission took over the determination of avoided cost in 1995.

¹²Wind technologies were practical for only very small numbers of residential and business consumers, and the same proved true for geothermal and ocean technologies.

¹³See fn. 2 and fn. 3, *supra*. The production tax credit is 2.3 cents per kWh for wind, closed-loop biomass, and geothermal generation; and 1.2 cents per kWh for open-loop biomass, landfill gas, municipal solid waste, qualified hydroelectric, and marine and hydrokinetic power.

¹⁴Respectively, the 2009 American Recovery and Reinvestment Act, the 2012 American Taxpayer Relief Act, the 2014 Tax Increase Prevention Act, and, as noted above, the Consolidated Appropriations Act, 2016. The 2009 legislation allowed facilities that qualify for the production tax credit to choose instead to take either the Federal business energy investment credit or an equivalent cash grant. The latter two subsidies generally are 30 percent of eligible costs. Note that the investment tax credit/cash grant is based upon the capital cost of the renewable generation capacity, and thus is independent of the amount of electricity actually produced. With a few exceptions, facilities are eligible for the production tax credit for 10 years. For an earlier discussion of ongoing problems with implementation of these programs, see *Memorandum for the President*, from Carol Browner, Ron Klain, and Larry Summers, “Renewable Energy Loan Guarantees and Grants,” October 25, 2010, at http://www.politico.com/static/PPM182_101105_renewable_energy_memo.html.

¹⁵See <http://thomas.loc.gov/cgi-bin/query/z?c110:H.R.1424.enr.> [Note: Colon correct as part of the hyperlink.]

¹⁶Examples include renewable energy grants from the Treasury Department, various grant and loan guarantee programs from the Agriculture Department, and loan guarantee programs from the Energy Department. See North Carolina State University, *op. cit.*, fn. 5 *supra*.

¹⁷See “Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866,” Interagency Working Group on Social Cost of Carbon, revised July 2015, at <https://www.whitehouse.gov/sites/default/files/omb/inforeg/scc-td-final-july-2015.pdf>.

vincing, and the most prominent modern rationale—subsidies for renewable electricity (“clean energy”) as an adjunct of climate policy—is deeply flawed. The central arguments for energy subsidies can be categorized as follows:

- Energy “independence.”
- Support for infant industries.
- Leveling the subsidy playing field.
- Adverse external effects of conventional generation.
- Resource depletion or “sustainability.”
- Employment expansion through “green jobs.”
- The “social cost of carbon.”

Energy Independence. It still is asserted commonly that it was the 1973 Arab OPEC oil “embargo” that created the sharp price increases in 1973 and 1979, and the market dislocations experienced in the U.S. during that decade.¹⁸ In the wake of the 1970s experience, many have argued that explicit and implicit subsidies for domestic energy production would increase energy “independence” and thus insulate the U.S. economy from the effects of international supply disruptions.¹⁹

Those arguments were and remain largely incorrect. Since there can be only one world market for crude oil, a refusal to sell to a given buyer (*i.e.*, impose a higher price on that buyer only) cannot work, as market forces will reallocate oil so that prices are equal everywhere (adjusting for such minor complications as differential transport costs). The 1973 embargo aimed at the U.S., the Netherlands, and a few others had no effect at all: all the targeted nations obtained oil on the same terms as all other buyers, although the transport directions of the global oil trade changed because of the reallocation process. It was the production cutback by Arab OPEC that raised international prices; and it was the U.S. system of price and allocation controls that created the queues and other market distortions. Note that there was no embargo in 1979, but there was a production cutback in the wake of the Iranian revolution, and the U.S. again imposed price and allocation regulations. And, once again, there were queues and market distortions.²⁰

Furthermore, however counterintuitive it may seem, the degree of “dependence” on foreign sources of energy is irrelevant, except in the case in which a foreign supplier or foreign power can impose a physical supply restriction, perhaps through a naval blockade or a military threat to ocean transport through, say, a narrow strait. Russian pipeline delivery of natural gas to Europe is a related example. But in the general case, because the market for crude oil is international in nature, as noted above, nations that import all of their oil face the same prices as those that import none of their oil. The cases of Japan and the UK, respectively, illustrate this point nicely: changes in international prices, caused perhaps by supply disruptions, yield price changes in the two classes of economies that are equal, except for such minor factors as differences in exchange-rate effects and the like. Accordingly, the degree of energy “dependence” is irrelevant, the quest for energy “independence” is guaranteed to impose costs without offsetting benefits, and policy tools intended to increase such “independence” should be abandoned.

As an aside, many observers and commentators on the international oil market often refer to pricing and production behavior by “the OPEC cartel,” but that characterization is not correct.²¹ OPEC has never behaved like a cartel in the classic sense of allocating production shares so as to equate marginal production cost across producers. It is Saudi production that historically has determined world market prices simply because Saudi production and reserves have been so large. It is more useful analytically to view OPEC as one big producer determining the market price, and a number of smaller ones who accept that price and then try to find ways to erode it so as to garner bigger market shares for themselves. An example of such price shaving is an extension of credit for buyers beyond the usual 30 days. Games

¹⁸ See, *e.g.*, Greg Myre, “The 1973 Arab Oil Embargo: The Old Rules No Longer Apply,” NPR Parallels, October 16, 2013, at <http://www.npr.org/sections/parallels/2013/10/15/234771573/the-1973-arab-oil-embargo-the-old-rules-no-longer-apply>.

¹⁹ See, *e.g.*, the discussion of “Energy Security” presented by the Renewable Fuels Association at <http://www.ethanolrfa.org/issues/energy-security/>.

²⁰ See Zycher, 1984, *loc. cit.*, fn. 7 *supra*.

²¹ See, *e.g.*, Daniel Yergin, *The Prize: The Epic Quest for Oil, Money, and Power*, New York: Free Press, 1992, esp. pp. 718–724.

can be played also with the qualities of oil delivered, and with a number of other parameters.²²

The Infant Industry Argument. Many argue that new technologies—wind and solar power are good examples—often cannot compete with established ones because the available market at the beginning is too small for important scale economies to be exploited, and because the downward shifts in costs that might result from a learning process cannot be achieved without substantial expansion in capacity and production. Accordingly, policy support for expansion of the newcomers' share of the market is justified as a tool with which to allow the achievement of both scale and learning efficiencies.

The central problem with this argument is that the market for electric power already has several competing technologies, each of which began with a small market share virtually by definition. More generally, many industries employing competing technologies are characterized by the presence of scale economies and/or learning efficiencies; but market forces operating through domestic and international capital markets provide investment capital in anticipation of future cost savings and higher economic returns. Accordingly, the infant industry argument is a non sequitur: the market can foresee the potential for scale and learning efficiencies, and invest accordingly. This argument provides no efficiency rationale for subsidies or other policy support.²³

Leveling the Subsidy Playing Field. Another central argument made in favor of policy support for renewables is essentially a level-playing-field premise: because conventional generation ostensibly benefits from important tax preferences and other policy support, renewables cannot compete without similar treatment. A recent EIA analysis presents data from which Federal subsidies and support for a range of different energy types can be compared.²⁴ These data are presented in Table 1.²⁵

Table 1
FY 2013 Electricity and Non-Electricity Subsidies: Direct Outlays and Tax Expenditures
(year 2013 dollars)

Fuel/Technology	Electricity per mWh		Non-Electricity per quadrillion btu	
	Outlays	Tax Exp.	Outlays	Tax Exp.
Natural Gas, Petroleum Liquids	0.02	0.58	1.24	45.11
Coal (pulverized)	0.04	0.41	4.59	48.27
Hydroelectric	0.72	0.06	92.06	7.94
Biomass	1.03	0.15	492.70	68.27
Nuclear	0.05	1.41	n.a.	n.a.
Geothermal	13.00	1.29	1516.03	150.63
Wind	25.44	9.61	n.a.	n.a.
Solar	128.84	90.11	2501.14	1748.86

Source: Energy Information Administration, *op. cit.*, fn. 24 *supra*; and author computations. Computation of direct subsidies and tax expenditures for fuels used outside electric power sector assumes same proportions as for total subsidies.
n.a.: not applicable.

²² See Zycher, *op. cit.*, fn. 8 *supra*; and the Saudi historical production data for crude oil at <https://www.eia.gov/forecasts/steo/tables/?tableNumber=7#startcode=1997>.

²³ For a discussion of the data on scale and learning efficiencies for renewable electricity, see Zycher, *op. cit.*, fn. 4 *supra*.

²⁴ See U.S. Energy Information Administration, "Direct Federal Financial Interventions and Subsidies in Energy in Fiscal Year 2013," March 2015, at <http://www.eia.gov/analysis/requests/subsidy/pdf/subsidy.pdf>.

²⁵ Other things held constant, subsidies that affect the marginal (or incremental) cost of generation or the per-unit prices received by particular technologies are likely to affect market prices, even under standard rate-of-return regulation, and so might create a competitive disadvantage for other technologies not receiving equivalent treatment. An example is the per-unit production tax credit for renewable power. Other credits might improve profitability without affecting marginal costs or prices directly; investment tax credits for renewables are a good example. The latter would attract additional investment into the industry over time, thus perhaps affecting market prices, but that price effect would be felt by all producers regardless of which actually received the subsidy. At the same time, even such subsidies as the latter would serve to reduce or eliminate whatever competitive disadvantages confront renewables as a result of policies that purportedly support conventional generation.

With respect to energy sources used for electric generation, these data show that Federal subsidies and financial support, whether in the form of outlays or tax expenditures, are vastly higher for renewables than for conventional fuels used in power production, on a per-mWh basis. This reality holds *a fortiori* for wind and solar power, for which Federal financial support was higher than that for fossil fuels by approximate factors of 16 to 6,400. The same pattern holds for fuels used outside the power sector; on a per-btu basis, biomass, geothermal, and solar subsidies exceed those for conventional fuels by approximate factors ranging up to 2,000. Accordingly, it is clear that renewable power technologies are not at a competitive disadvantage because of average Federal subsidy outlays and tax expenditures received by conventional generation; quite the reverse is true.²⁶

A somewhat older calculation of marginal subsidies and support through tax expenditures has been reported by Metcalf, yielding estimates of effective marginal tax rates on investments in alternative electric generation technologies. Computation of such effective marginal tax rates incorporates the many subsidies and preferences that affect choices among those alternatives, and so offers a direct test of the degree to which Federal tax expenditures favor given technologies over others.²⁷ Table 2 summarizes his findings, which are for 2007.

Table 2
Metcalf Findings on Effective Marginal Tax Rates For Electric Generation Investment
(percent)

Technology	Current Law	No Tax Credits	Economic Depreciation
Coal (pulverized)	38.9	38.9	39.3
Gas	34.4	34.4	39.3
Nuclear	-99.5	32.4	-49.4
Solar Thermal	-244.7	12.8	-26.5
Wind	-163.8	12.8	-13.7

Source: Metcalf (2010), *op. cit.*, fn. 27, *supra*.
Note: Current law is as of 2007.

The three columns present the Metcalf calculations of effective marginal tax rates under 2007 law, under a regime without production and investment tax credits, and with economic depreciation assumed in place of accelerated depreciation, respectively.²⁸ Under 2007 law, solar thermal and wind generation investments received large net percentage marginal tax-expenditure subsidies (negative effective marginal tax rates) far larger than those enjoyed by nuclear investments; and coal and gas investments faced effective tax rates greater than zero. If the tax credits are assumed away, solar thermal and wind investments faced effective tax rates roughly one-third those of the other technologies. If economic depreciation replaces accelerated depreciation, nuclear investment enjoyed a negative effective marginal tax rate (tax subsidy) larger (in absolute value) than those for solar and wind investments; but coal and gas investments faced effective marginal tax rates of over 39 percent.

The Metcalf calculations of effective marginal tax rates under 2007 law suggest strongly that the “offsetting subsidy” rationale for Federal financial support of solar and wind investments is weak: coal and gas investments face positive effective marginal tax rates, and new nuclear investment does not seem to be a serious competi-

²⁶This is only part of the “subsidy” issue: we should examine also the relative subsidies or tax expenditures net of royalty and other such payments made to the Federal Government as compensation for the use of Federal land. I have made that computation for the Ivanpah thermal solar power facility in California; per million btu of energy produced, Ivanpah pays \$0.88 while oil and gas producers pay \$1.23. See Benjamin Zycher, “California’s New Solar Plant: Burning Up Taxpayer Money, Land, and Wildlife,” *The American*, May 21, 2014, at <http://www.aei.org/publication/californias-new-solar-plant-burning-up-taxpayer-money-land-and-wild-life/>.

²⁷See Gilbert E. Metcalf, “Investment in Energy Infrastructure and the Tax Code,” in Jeffrey R. Brown, ed., *Tax Policy and the Economy, Volume 24*, Chicago: University of Chicago Press Journals, 2010, pp. 1–33. See also Gilbert E. Metcalf, “Federal Tax Policy Towards Energy,” NBER Working Paper No. 12568, October 2006, at <http://www.nber.org/papers/w12568.pdf>; and Gilbert E. Metcalf, “Taxing Energy in the United States: Which Fuels Does the Tax Code Favor?,” Manhattan Institute Center for Energy Policy and the Environment, Report No. 4, January 2009, at http://www.manhattan-institute.org/html/eper_04.htm.

²⁸Metcalf uses an exponential depreciation rate rather than straight-line depreciation as an approximation of economic depreciation over the lives of given investments.

tive threat over the medium term.²⁹ Moreover, the effective subsidies enjoyed by solar and wind generation are far greater than those needed to level the playing field with respect to nuclear generation except under Metcalf's "economic depreciation" assumption.³⁰

Even given the substantially larger per-unit subsidies given unconventional energy, it is interesting to address briefly whether the central tax and other preferences given conventional energy are "subsidies" under a proper analytic definition.³¹ The percentage depletion allowance essentially is a form of depreciation for the capital assets represented by extractive resource geologic formations; this tax treatment is available to all extractive industries.³² It may or may not be the case that a particular legal depletion percentage is correct analytically—the allowance can result in a deduction in excess of the incurred capital costs—but the percentage depletion allowance as a method for the depreciation of an extractive capital asset conceptually is not a "subsidy."

The accelerated tax deduction for intangible drilling expenses allows expensing of labor and other drilling costs associated with exploration activities.³³ Since those costs are incurred in the creation of a capital asset, the basic analytics of income taxation require that such costs be capitalized and depreciated over time. This problem, however, does not represent a "subsidy" for conventional energy production, as this tax provision is very similar to the tax treatment of research and development costs in other industries. The allowed expensing of materials injected into declining wells so as to enhance extraction is appropriate, because the materials are consumed in the extraction process; they do not, therefore, help to create capital assets. Accordingly, this tax treatment is not a "subsidy."

The "section 199" deduction of 9 percent of income is a tax preference given almost all U.S. producers of goods (but not services). This deduction for producers of goods may or may not be sound tax policy, but it is not specific to conventional energy producers—which receive only a 6 percent deduction—and so it is not a "subsidy" for such producers relative to other producers of goods. To the extent that goods producers with significant physical stocks of capital face some prospect of price controls during future wars or other emergencies, this deduction may be efficient in terms of inducing an optimal level of investment in such industries during peacetime.³⁴

²⁹The last nuclear generation reactor to begin commercial operation is the Watts Bar-1 plant in Tennessee, on May 27, 1996. See EIA at <https://www.eia.gov/tools/faqs/faq.cfm?id=228&t=21>. The Tennessee Valley Authority has announced plans to bring Watts Bar-2 to commercial operation during the summer of 2016. See <https://www.tva.gov/Newsroom/Watts-Bar-2-Project>.

³⁰The playing field is biased in favor of renewables for two additional reasons, the first of which is the implicit subsidy for backup generation capacity and transmission costs. Such costs are a direct effect of investment in renewable capacity, but are spread across electricity consumption from all sources. The Federal Energy Regulatory Commission, in a recent case involving the Midwest Independent Transmission Operator, ruled that the transmission costs attributable to wind generation may be allocated to consumers regardless of the amount of wind power actually consumed by any given ratepayer. This ruling essentially spreads such costs across the entire grid; accordingly, the transmission costs attendant specifically upon wind generation are not reduced but instead are hidden somewhat from calculations of the marginal cost of wind power. See the FERC Conditional Order, Docket No. ER10-1791-000, December 16, 2010, at <http://www.ferc.gov/whats-new/comm-meet/2010/121610/E-1.pdf>. Second, public subsidies for renewable power, whether in the form of direct outlays or indirect tax preferences, impose costs upon the private sector larger than the subsidies themselves, because of the excess burden (or "deadweight losses") imposed by the tax system. Essentially, the private sector becomes smaller by more than a dollar when it is forced to send a dollar to the Federal Government. For a nontechnical discussion, see Martin A. Feldstein, "The Effect of Taxes on Efficiency and Growth," *Tax Notes*, May 8, 2006, pp. 679–684.

³¹See a list of such tax provisions prepared by the Joint Committee on Taxation at <https://www.jct.gov/publications.html?func=startdown&id=4415>.

³²Note that integrated oil companies—those that both produce and refine petroleum—are not allowed this tax benefit.

³³This deduction is reduced for integrated oil companies, which are allowed to expense 70 percent of such costs, with the remainder deducted over the ensuing 5 years.

³⁴The expectation (with some probability greater than zero) of future price controls would suppress investment below efficient levels because the presence of significant physical capital stocks specialized to specific production activities creates "quasi-rents" available for government to extract with price controls, without suppressing production in the short run. See Earl A. Thompson, "Taxation and National Defense," *Journal of Political Economy*, Vol. 82, No. 4 (July–August 1974), pp. 755–782; and Earl A. Thompson, "An Economic Basis for the 'National Defense Argument' for Aiding Certain Industries," *Journal of Political Economy*, Vol. 87, No. 1 (February 1979), pp. 1–30.

Finally, the foreign tax credit is a tax provision designed to avoid double taxation of U.S. firms operating both domestically and overseas. Whatever the issues inherent in the allocation of costs and revenues across operations in different geographic locales, or the possible classification of royalty payments as “income taxes,” the tax credit is not a “subsidy” in principle, although it is the case that the foreign tax credit treats foreign income taxes more generously than other foreign taxes and business costs.

Adverse External Effects of Conventional Generation. A negative “externality” is an adverse effect of economic activity the full costs of which are not borne by the parties engaging directly in the activity yielding the adverse effect. A simple example is the emission of effluents into the air as a byproduct of such industrial processes as power generation. There is no dispute that power generation with fossil fuels imposes adverse environmental effects due to the emission of carbon monoxide, sulfur oxides, nitrogen oxides, mercury, particulates, lead, and other effluents. Accordingly, the EPA and the States have established detailed programs for defining emission standards and for implementing attendant investment and enforcement programs.

If the negative externalities yielded by conventional generation are not internalized fully by current environmental policies—that is, if buyers and producers are not confronted with the full costs of the adverse environmental effects that they impose on others—then the costs of conventional generation as perceived by the market would be (artificially) lower than the true social costs. At the same time, the unreliable nature of wind and solar generation imposes a requirement for costly backup capacity. And so the question to be addressed is as follows: given the magnitude of those backup cost requirements—which are economic externalities imposed by renewables—as estimated in the technical literature, are the additional (or marginal) costs of backup capacity imposed by renewable generation sufficient to offset any artificial “externality” cost advantage enjoyed by conventional generation?³⁵

A number of analyses of the environmental externality costs of U.S. electricity generation were conducted during the 1980s and 1990s.³⁶ These studies differ somewhat in terms of methodology and focus, but offer a range of estimates useful in terms of the question addressed here. In summary: the estimated externality costs for coal range from 0.1 cents to 26.5 cents per kWh. For gas generation, the range is 0.1–10.2 cents per kWh. For oil, nuclear, and hydro generation, the respective ranges are 0.4–16.5 cents per kWh, 0–4.9 cents per kWh, and 0–2.1 cents per kWh.

The highest estimated figure for coal generation is 26.5 cents per kWh, or \$265 per mWh. A conservative estimate of the cost of backup capacity for existing wind and solar generation is about \$368 per mWh, or roughly 37 cents per kWh.³⁷ Accordingly, if all conventional generation were coal-fired, existing wind and solar capacity imposes a backup cost “externality” about 39 percent higher than the environmental externality costs of conventional generation under the implausible assumption that none of the conventional externalities have been internalized under current environmental policies.

³⁵Note that because renewable generation—wind and solar power—are unreliable, the conventional backup generation must be cycled up and down in coordination with the availability of the renewable generation. In particular for coal-fired generation, but also for gas combined-cycle backup generation, this means that the conventional assets cannot be operated as efficiently as would be the case were they not cycled up and down in response to wind or solar generation conditions. Inefficient operation—a higher heat rate, that is, more btu of energy input per mWh generated—is the necessary result of such cycling. A recent study of the attendant emissions effects for Colorado and Texas found that requirements for the use of wind power impose significant operating and capital costs because of cycling needs for backup generation—particularly coal plants—and actually exacerbate air pollution problems. See Bentek Energy LLC, *How Less Became More: Wind, Power and Unintended Consequences in the Colorado Energy Market*, April 16, 2010, at <http://docs.wind-watch.org/BENTEK-How-Less-Became-More.pdf>.

³⁶For a detailed discussion of that literature, see Zycher, *op. cit.*, fn. 4 *supra.*, at 41–46. Note that renewable power generation imposes its own set of problems, including noise, light flicker effects, deaths among possibly-large numbers of birds, pollution with heavy metals, consumption of large amounts of land with unsightly turbine farms or solar collection panels, and others. See Zycher, *op. cit.*, fn. 26 *supra.* Interestingly, new research finds that large-scale adoption of wind generation might cause an increase in surface temperatures. See C. Wang and R.G. Prinn, “Potential Climatic Impacts and Reliability of Very Large-Scale Wind Farms,” *Atmospheric Chemistry and Physics*, Vol. 10, No. 4 (2010), pp. 2052–2061, at <http://www.atmos-chem-phys.net/10/2053/2010/acp-10-2053-2010.pdf>.

³⁷See Zycher, *op. cit.*, fn. 4 *supra.*, at 26–31.

But in fact coal generation is about 33 percent of total U.S. generation; gas generation is about 33 percent, nuclear generation is about 20 percent, hydroelectric generation is about 6 percent, and renewables and other miscellaneous technologies make up the rest.³⁸ If we use those figures and the highest estimates by fuel type noted above to compute a weighted-average externality cost for nonrenewable generation, the externality cost per conventional kWh is about 13.2 cents, or \$132 per MWh. Relative to the backup cost “externality” (\$368 per MWh) imposed by wind and solar investments alone, those figures are sufficiently low to cast substantial doubt upon the externality argument for tax expenditures on renewables: current environmental regulation must internalize some substantial part of conventional externalities, and Federal and State subsidies, both explicit and implicit, and requirements for minimum market shares for renewables also have the effect of offsetting any artificial cost advantage enjoyed by conventional generation as a result of uninternalized externalities.

The environmental problems caused by renewable power are substantial—noise, flicker effects, wildlife destruction, heavy-metals pollution, etc.—but represent a topic outside the scope of the discussion here.³⁹ In any event, note that in terms of economic efficiency, subsidies in the form of direct outlays or tax expenditures for renewables intended to offset the (assumed) uninternalized external costs of conventional generation are a “second-best” policy at best. Such subsidies would reduce the (inefficient) competitive advantage of conventional generation yielded by the presence of some social costs not reflected in prices; but they would not improve the efficiency of costs or prices for conventional generation. And by biasing the perceived costs and prices of renewable generation downward, the subsidies would result in a total electricity market that would be too large. In short: the externality argument in favor of tax expenditures or policy support for renewable electricity generation is exceedingly weak, far more so than commonly assumed.

The Resource Depletion or “Sustainability” Argument. “Renewable” energy has no uniform definition; but the (assumed) finite physical quantity of such conventional energy sources as petroleum is the essential characteristic differentiating the two in most discussions.⁴⁰ In a word, conventional energy sources physically are (assumed to be) depletable; but that would not yield a depletion problem as an economic reality under market processes, as discussed below. In contrast, each sunrise and geographic temperature differential yields new supplies of sunlight and wind flows, a central component of “sustainability,” which perhaps is a concept broader than the depletion condition. Nonetheless, the definition of “sustainability” is highly elusive, as the Environmental Protection Agency discussion illustrates:

Sustainability is based on a simple principle: everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment. To pursue sustainability is to create and maintain the conditions under which humans and nature can exist in productive harmony to support present and future generations.⁴¹

This obviously is infantile blather, definitive proof that the EPA has no idea what “sustainability” means as an analytic concept. An international definition often cited is that from the *Report of the World Commission on Environment and Development: Our Common Future*:

Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs.⁴²

This definition also is useless, as “needs” whether present or future are undefined, the evaluation of the inexorable tradeoffs among such needs is ignored, again whether in the present or the future or across time periods and generations, the ef-

³⁸ See the EIA data at https://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmf_1_1 and at <https://www.eia.gov/tools/faqs/faq.cfm?id=427&t=3>.

³⁹ See fn. 36 *supra*.

⁴⁰ There is considerable discussion in the technical literature of non-biological sources of methane and petroleum. See James A. Kent, *Kent and Riegel's Handbook of Industrial Chemistry and Biotechnology*, 11th ed., New York: Springer, 2007, Ch. 20; and M. Ragheb, “Biogenic and Abiogenic Petroleum,” at <http://mragheb.com/NPRE%20402%20ME%20405%20Nuclear%20Power%20Engineering/Biogenic%20and%20Abiogenic%20Petroleum.pdf>. To the extent that conventional energy resources are produced non-biologically, the “depletion” assumption underlying the sustainability argument may be incorrect even descriptively.

⁴¹ See the EPA discussion at <https://www.epa.gov/sustainability/learn-about-sustainability#what>.

⁴² See <http://www.un-documents.net/our-common-future.pdf>.

fects of unknown but certain technological advances are not considered, *ad infinitum*.

In any event, the energy content of sunlight and wind is finite, regardless of whether new supplies of sunlight or wind flows emerge continually. They contain only so much convertible energy, which is not always available. Moreover, the same is true for the other resources—materials, land, etc.—upon which the conversion of such renewable energy into electricity depends. More fundamentally, the basic “sustainability” concept seems to be that without policy intervention, market forces will result in the depletion (or exhaustion) of a finite resource. Accordingly, subsidies and other support for renewable power generation are justified as tools with which to slow such depletion and to hasten the development of technologies that would provide alternatives for future generations.

That argument is deeply problematic. Putting aside the issue of whether government as an institution has incentives to adopt a time horizon longer than that relevant for the private sector, the profit motive provides incentives for the market to consider the long-run effects of current decisions. The market rate of interest is a price that links the interests of generations present and future. If a resource is being depleted, then its expected future price will rise, other things held constant. If that rate of price increase is greater than the market interest rate, then owners of the resource have incentives to reduce production today—by doing so they can sell the resource in the future and in effect earn a rate of return higher than the market rate of interest—thus raising prices today and reducing expected future prices. In equilibrium—again, other factors held constant—expected prices should rise at the market rate of interest.⁴³ Under market institutions, it is the market rate of interest, again, that ties the interests of the current and future generations by making it profitable currently to conserve some considerable volume of exhaustible resources for future consumption.⁴⁴ Because of the market rate of interest, market forces will never allow the depletion of a given resource.

Accordingly, the market has powerful incentives to conserve, that is, to shift the consumption of large volumes of finite (or depletable) resources into future periods. That is why, for example, not all crude oil was used up decades ago even though the market price of crude oil always was greater than zero, which is to say that using it would have yielded value. In short, the “sustainability” argument for policy support for renewable electricity depends crucially upon an assumption that the market conserves too little and that government has incentives to improve the allocation of exhaustible resources over time. That is a dual premise for which the underlying rationale is weak and with respect to which little persuasive evidence has been presented.⁴⁵

“Green Jobs”: Renewable Power as a Source of Expanded Employment. A common argument in support of expanded renewable power posits that policies (subsidies) in support of that goal will yield important benefits in the form of complementary employment growth in renewables sectors, and stronger demand in the labor market in the aggregate. Both of those premises are almost certainly incorrect.

The employment in renewables sectors created by renewables policies actually would be an economic cost rather than a benefit for the economy as a whole. Suppose that policy support for renewables (or for any other sector) were to have the effect of increasing the demand for, say, high-quality steel. That clearly would be a benefit for steel producers, or more broadly, for owners of inputs in steel production, including steel workers. But for the economy as a whole, the need for additional high-quality steel in an expanding renewable power sector would be an economic cost, as that steel (or the resources used to produce it) would not be available for use in other sectors. Similarly, the creation of “green jobs” as a side effect of renewables policies is a benefit for the workers hired (or for those whose wages rise

⁴³ In reality, the long-run prices of most exhaustible natural resources have declined (after adjusting for inflation), in large part because of (unexpected) technological advances in discovery, production, and use.

⁴⁴ Strictly speaking, it is not the price of the resource that should rise at the market rate of interest; instead, the total economic return to holding the resource for future use should equal the market rate of interest. That total economic return includes expected price changes and capital gains, expected cost savings, and the like. Current and expected prices are a reasonable first approximation of that total economic return.

⁴⁵ For a more detailed conceptual and empirical discussion of the market allocation of a depletable resource over time, see Benjamin Zycher, “World Oil Prices: Market Expectations, the House of Saud, and the Transient Effects of Supply Disruptions,” monograph, *aei.org*, June 2016, at <http://www.aei.org/wp-content/uploads/2016/06/World-Oil-Prices.pdf>.

with increased market competition for their services). But for the economy as a whole, that use of scarce labor is a cost because those workers no longer would be available for productive activity elsewhere.⁴⁶

More to the point, an expansion of the renewable electricity sector must mean a decline in some other sector(s), with an attendant reduction in resource use there; after all, resources in the aggregate are finite. If there exists substantial unemployment, and if labor demand in renewables is not highly specialized, a short-run increase in total employment might result. But in the long run—not necessarily a long period of time—such industrial policies cannot “create” employment; they can only shift it among economic sectors. In short, an expanding renewables sector must be accompanied by a decline in other sectors, whether relative or absolute, and creation of “green jobs” must be accompanied by a destruction of jobs elsewhere. Even if an expanding renewables sector is more labor-intensive (per unit of output) than the sectors that would decline as a result, it remains the case that the employment expansion would be a cost for the economy as a whole, and the aggregate result would be an economy smaller than otherwise would be the case.⁴⁷ There is no particular reason to believe that the employment gained as a result of the (hypothetically) greater labor intensiveness of renewables systematically would be greater than the employment lost because of the decline of other sectors, combined with the adverse employment effect of the smaller economy in the aggregate. There is in addition the adverse employment effect of the explicit or implicit taxes that must be imposed to finance the expansion of renewable power.

Because renewable electricity generation is more costly than conventional generation, policies driving a shift toward heavier reliance upon the former would increase aggregate electricity costs, and thus reduce electricity use below levels that would prevail otherwise.⁴⁸ The 2007 EIA projection of total U.S. electricity consumption in 2030 was about 5.17 million gigawatt-hours (gWh).⁴⁹ The latest EIA projection for 2030 is about 4.44 million gWh, a decline of about 14 percent.⁵⁰ The change presumably reflects some combination of assumptions about structural economic shifts, increased conservation, substitution of renewables for some conventional generation, and a projected price increase (in 2015 dollars) from about 9.3 cents per kWh to 11.6 cents, or almost 25 percent.⁵¹ Because, in the EIA projections, consumption of electric power in 2030 falls by that 14 percent between the 2007 and 2015 analyses, the projected price increase is likely to be due to increases in costs rather than strengthened demand conditions.

Accordingly, it would be surprising if that reduction in total U.S. electricity consumption failed to have some nontrivial employment effect. Figure 1 displays data on electricity consumption, and non-agricultural employment for the period 1973 through 2015.⁵²

⁴⁶ Considerable employment would be created if policies encouraged ditch-digging with shovels (or, in Milton Friedman’s famous example, spoons) rather than heavy equipment. Such employment obviously would be laughable, that is, an obvious economic burden. There is no analytic difference between this example and the “green jobs” rationale for renewables subsidies.

⁴⁷ Many advocates of renewables subsidies assert that solar and wind power are more labor-intensive than conventional generation. The assumption of greater labor intensity for renewable power production is dubious: the operation of solar or wind facilities does not employ large amounts of labor, and it is far from clear that construction of solar or wind facilities is more labor-intensive than construction of conventional generation facilities.

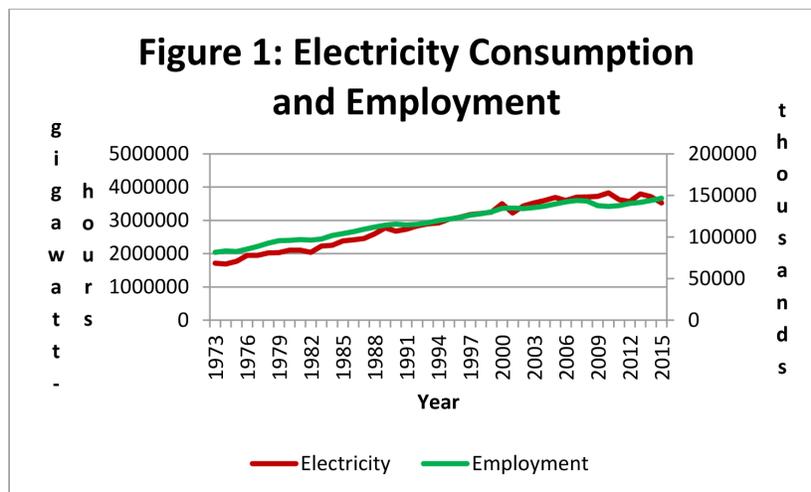
⁴⁸ See Zycher, *op. cit.*, fn. 4 *supra*.

⁴⁹ See EIA at http://www.eia.doe.gov/oiaf/archive/aeo07/aeoref_tab.html, at Table 2.

⁵⁰ See EIA at <http://www.eia.gov/forecasts/aeo/pdf/tbla8.pdf>.

⁵¹ The EIA 2007 price projection for electricity in 2030 was \$23.60 per million btu in year 2005 dollars, or about 8.1 cents per kWh at a conversion rate of 293 kWh per million btu (3413 btu per kWh); that is about 9.3 cents in year 2015 dollars. See EIA at http://www.eia.gov/oiaf/archive/aeo07/pdf/aeotab_3.pdf. The EIA projection in 2015 for 2030 was \$33.97 per million btu, or 11.6 cents per kWh, in year 2015 dollars. See EIA at <http://www.eia.gov/forecasts/aeo/data.cfm#summary> (Table 3). The deflators are derived from the Council of Economic Advisers, *Annual Report of the Council of Economic Advisers*, February 2016, Table B–3, at <https://www.whitehouse.gov/administration/eop/cea/economic-report-of-the-President/2016>.

⁵² For civilian employment, see the Bureau of Labor Statistics at <http://www.bls.gov/cps/tables.htm>. For electricity consumption, see EIA at <http://www.eia.gov/totalenergy/data/annual/index.cfm#electricity> (Table 8.9).



It is obvious from the aggregate trends that electricity use and labor employment are complements rather than substitutes; the simple correlation between the two series is 0.988, meaning, crudely, that a one-unit change in one tends to be observed with a 0.988 unit change in the other, in the same direction.

Correlation is not causation; but it is not plausible that an increase in electricity costs (or energy costs more broadly) would fail to have adverse effects on employment, if only by increasing the cost of using equipment and other such capital complementary with labor employment.⁵³ The determination (or refutation) of such economic relationships would require application (and statistical testing) of a conceptual model, a task outside the scope of the issues addressed here. But the data displayed in Figure 1 provide strong grounds to infer that the higher costs and reduced electricity consumption attendant upon expansion of renewable generation would reduce employment; at a minimum they provide strong grounds to question the common assertion that policies in support of expanded renewable electricity generation would yield increases in aggregate employment as a side effect, putting aside whether such increases would be a net economic benefit for the economy as a whole.

It certainly is possible that the historical relationship between employment and electricity consumption will change. Technological advances are certain to occur; but the prospective nature and effects of those shifts are difficult to predict.⁵⁴ The U.S. economy may evolve over time in ways yielding important changes in the relative sizes of industries and sectors, as it has continually over time; but, again, the direction of the attendant shifts in employment and electricity use is ambiguous.

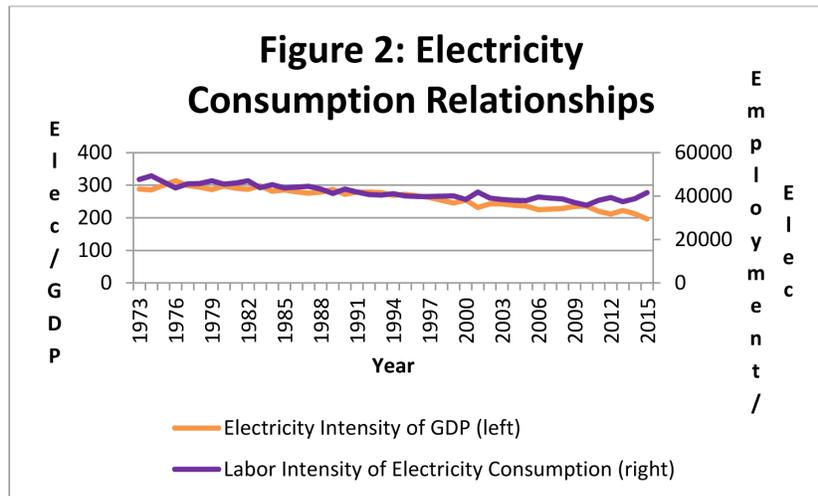
⁵³ It is important to keep clear the conceptual experiment under consideration. In the context here, we assume that government policies increase the substitution of renewable power in place of conventional electricity, and ask whether the aggregate data are consistent with the assertion that such “green” policies—explicitly an increase in energy costs (*see Zycher, op. cit.*, fn. 4 *supra*)—can be predicted to yield an increase in aggregate employment. This is very different from, say, the effects of an aggregate recession, which can be predicted to reduce both energy costs (prices) and employment more or less simultaneously. Similarly, an economic boom would increase both energy prices and employment, while an increase in energy supplies would reduce energy prices and increase employment. Note that aggregate employment in any of these scenarios might fall in the short run as market forces reallocate labor (and other resources) in response to changes in relative prices.

⁵⁴ Note that greater energy “efficiency” in any given activity can yield an increase in actual energy consumption, if the elasticity of energy demand with respect to the marginal cost of energy use is greater than one. If, for example, air conditioning were to become sufficiently “efficient” in terms of energy consumption per degree of cooling, it is possible that air conditioners would be run so much—or that so many additional air conditioners would be installed—that total energy consumption in space cooling would increase. A tax, on the other hand, whether explicit or implicit, increases the price of energy use, and so unambiguously reduces energy consumption.

But there exists no evidence with which to predict that a reduction in electricity consumption would yield an increase in employment. Like all geographic entities, the U.S. has certain long-term characteristics—climate, available resources, geographic location, trading partners, legal institutions, *ad infinitum*—that determine in substantial part the long-run comparative advantages of the economy in terms of economic activities and specialization. Figure 2 presents the historical paths of the electricity intensity of U.S. GDP (electricity consumption per dollar of output) and of the labor intensity of U.S. electricity consumption (employment per million gWh of power consumption).⁵⁵

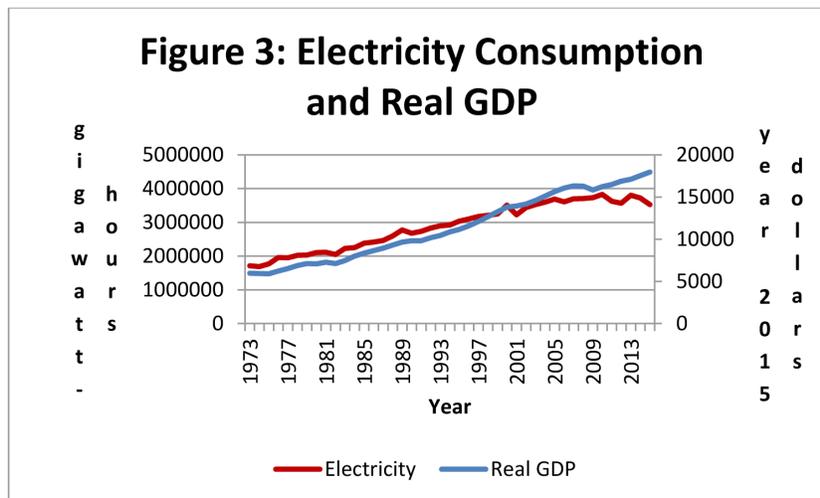
During 1973–2015, the electricity intensity of GDP has increased and declined over various years, but for the whole period has declined slightly at a compound annual rate of about 0.9 percent. The labor intensity of U.S. electricity consumption—in a sense, the employment “supported” by each increment of electricity consumption—has declined over the entire period at an annual compound rate of about 0.3 percent. This may be the result largely of changes in the composition of U.S. GDP (toward services), and perhaps the substantial increase in U.S. labor productivity in manufacturing.

But these data are not consistent with the premise that a reduction in electricity consumption driven by an increase in energy costs would yield an increase in aggregate employment; instead, they suggest the reverse strongly. In short, while the electricity/output and employment/electricity relationships may have declined over time, there is no evidence that they are unimportant in an absolute sense, and they are far from negative. An increase in the cost of electric power will reduce electricity consumption and employment, notwithstanding ubiquitous assertions about the “green jobs” attendant upon an expansion of wind and solar power.



Finally, Figure 3 presents the crude relationship between electricity consumption and real GDP; the simple correlation between these two parameters is 0.977 for 1973–2015. This relationship makes it difficult to believe that an artificial increase in electricity costs would fail to erode GDP growth and thus employment.

⁵⁵Sources: See BLS and EIA, *op. cit.*, fn. 52 *supra.*; and for GDP, Bureau of Economic Analysis at <http://www.bea.gov/national/index.htm#gdp>, Federal Reserve Bank of St. Louis at <https://research.stlouisfed.org/fred2/series/GDPDEF>, and author computations.



III. The “Social Cost of Carbon” Rationale for Renewables Subsidies

The newest application of the externality rationale is the “social cost of carbon” (SCC) analysis conducted by an interagency working group of the Obama administration.⁵⁶ The overall purpose of this estimate of the SCC is the application of benefit/cost analysis to policies proposed to mitigate the asserted effects of increasing atmospheric concentrations of greenhouse gases (GHG), that is, “climate” policies. The SCC analysis is deeply flawed, for three central reasons: the use of “global” benefits in the benefit/cost calculation, the failure to apply a 7 percent discount rate to the stream of (asserted) future benefits and costs, and the use of ozone and particulate reductions as “co-benefits” of climate policies.⁵⁷

Before turning to those analytic issues, it is important to note as an aside that carbon dioxide—the most important anthropogenic GHG—is not “carbon.” “Carbon” is soot, or in the language of environmental policy, particulates; carbon dioxide is a colorless, odorless GHG, a certain minimum atmospheric concentration of which is necessary for life itself. It is, therefore, not a “pollutant.” By far the most important GHG in terms of the radiative properties of the troposphere is water vapor; do the proponents of renewables subsidies believe that water vapor is a “pollutant?”⁵⁸ The “social cost of GHG” would be a wise replacement for “the social cost of carbon,” as the former has the virtue of scientific accuracy without assuming the answer to the underlying policy question. More generally, the terms “carbon” and “carbon pollution” are political propaganda, designed to end debate before it begins by shunting aside the central policy questions.

⁵⁶ See *op. cit.*, fn. 17, *supra*.

⁵⁷ Note that these three problems are independent of the climatology assumptions underlying the analysis of the costs of increasing atmospheric concentrations of GHG. Notwithstanding ubiquitous assertions that “the science is settled,” in reality it is not: the issue of the climate sensitivity of the atmosphere is hotly (!) debated, as noted below, and the existing body of evidence on temperature and other climate phenomena are not consistent with the argument that climate impacts both visible and serious already are visible. See Benjamin Zycher, “Paris in the Fall: COP-21 vs Climate Evidence,” *aei.org*, November 30, 2015, at <http://www.aei.org/publication/paris-in-the-fall-cop-21-vs-climate-evidence/>. How rising temperatures might affect such phenomena as weather patterns, ice sheet dynamics, sea levels, agriculture, *ad infinitum* simply is not known. Moreover, scientific “truth” is not majoritarian; it never can be “settled” because new evidence emerges constantly. These observations are not relevant to the benefit/cost critique presented here; but it is important to note that the *policy* issues raised by the GHG/climate question would remain difficult even if there existed both unanimity and certainty on the underlying *scientific* issues.

⁵⁸ That the dominant source of tropospheric water vapor by far is ocean evaporation, a natural process, is irrelevant. Volcanic eruptions also are natural, but no one would deny that the massive amounts of particulates, mercury, and other effluents emitted by volcanoes are pollutants.

With respect to the first of the three flaws in the SCC analysis by the Obama administration, Office of Management and Budget Circular A–4 is explicit: only the benefits and costs of regulations enjoyed or borne domestically are to be used in benefit/cost analysis.⁵⁹ International effects are to be reported separately. The reason for this is obvious: if domestic costs and global benefits are used in benefit/cost analysis, then the U.S. would be driven to bear all of the regulatory burdens for the entire world.⁶⁰ Not only would other economies have incentives to allow the United States to bear all of the attendant costs (that is, to engage in “free riding” on U.S. policies), it would be *economically efficient* for them to do so; if they were to reduce emissions further, global emissions would be lower than optimal, because the global marginal cost of emissions reductions would exceed the global marginal benefits.⁶¹ This also is inconsistent with the standard theory of efficient emissions reductions, under which the marginal cost of those reductions is equated across emitters. Accordingly, the global benefits orientation is inconsistent with the current objective, implicit but clear, under the Clean Power Plan of regionalizing emissions reductions, ostensibly to equate the marginal costs of reducing GHG emissions across States, but actually to force most States into regional cap-and-trade wealth transfer systems, the dominant feature of which would be payments from red States to blue ones.⁶²

OMB Circular A–4 requires also that Federal agencies apply both 3 percent and 7 percent discount rates to the streams of benefits and costs of proposed regulations in order to allow a comparison of the respective present values.⁶³ The Obama administration used 2.5 percent, 3 percent, and 5 percent discount rates, but not 7 percent. The reason for this is obvious: at 7 percent, the social cost of carbon becomes small or negative. In the DICE integrated assessment model, the social cost of carbon declines by 80 percent relative to the case of a 3 percent discount rate, from \$61.72 per ton to \$12.25. In the FUND model, the social cost of carbon for 2010–2050 at a 7 percent discount rate declines to approximately zero or becomes negative. In the 2015 IWG revision, the 2050 social cost of carbon is \$26 per ton at a 5 percent discount rate, \$69 at 3 percent, and \$95 at 2.5 percent. It is clear that the effect of changes in the assumed discount rate is very substantial, and the failure of the Obama administration to adhere to the requirements of OMB Circular A–4 is driven by imperatives heavily political rather than analytic.⁶⁴

⁵⁹ See Office of Management and Budget at https://www.whitehouse.gov/sites/default/files/omb/assets/regulatory_matters_pdf/a-4.pdf (p. 15): “. . . analysis should focus on benefits and costs that accrue to citizens and residents of the United States. Where you choose to evaluate a regulation that is likely to have effects beyond the borders of the United States, these effects should be reported separately.” See also https://www.whitehouse.gov/sites/default/files/omb/inforeg/regpol/circular-a-4_regulatory-impact-analysis-a-primer.pdf.

⁶⁰ In this case, U.S. policies would equate marginal domestic costs with marginal global benefits. In other words, the United States would reduce emissions of a given effluent to the point that such emissions would be optimal for the entire world, with only the United States bearing the costs. If U.S. benefit/cost analysis were to incorporate both global benefits and global costs, the enormous cost calculation would reduce the domestic political viability of any such U.S. policy, and the United States cannot enforce regulatory requirements on other nations in an effort to spread the costs. At the same time, if all nations were to adopt a global benefit approach, the efficient level of effluents would be achieved, but this ignores the individual incentives to obtain a free ride on the efforts of others, and so is not a reasonable underlying analytic assumption.

⁶¹ This problem is separate from the industry relocation incentives yielded by the adoption of such policies only by the United States. Note that in the 2010 Interagency Working Group analysis, the domestic SCC is about 7–23 percent of the global value, or about \$2–\$7 per ton of GHG emissions if we apply the 2015 IWG estimate of the SCC of \$31 for 2010. See the IWG 2010 analysis at <https://www.whitehouse.gov/sites/default/files/omb/inforeg/for-agencies/Social-Cost-of-Carbon-for-RIA.pdf> and the 2015 revision at *op. cit.*, fn. 17 *supra*.

⁶² See “Summary of Key Points’ in Testimony of Anne E. Smith, Ph.D. at a Hearing on EPA’s Final Clean Power Plan Rule by the Committee on Science, Space, and Technology,” United States House of Representatives, Washington, DC November 18, 2015, at <http://docs.house.gov/meetings/SY/SY00/20151118/104182/HHRG-114-SY00-Wstate-SmithA-20151118.pdf>.

⁶³ A–4 allows a 3 percent discount rate in addition to the 7 percent rate if a consumption displacement model is deemed appropriate. That obviously is not solely the case for climate policies, which would affect investment flows substantially; but A–4 (p. 34) requires the use of both 3 percent and 7 percent discount rates so as to account for both the consumption and investment effects of proposed regulations, and to allow for sensitivity analysis.

⁶⁴ For the DICE and FUND models, see, respectively, http://www.econ.yale.edu/~nordhaus/homepage/documents/DICE_Manual_103113r2.pdf and <http://www.fund-model.org/>. See Kevin D. Dayaratna and David Kreutzer, “Environment: Social Cost of Carbon Statistical Modeling Is Smoke and Mirrors,” *Natural Gas and Electricity*, Vol. 30, Issue 12 (July 2014), pp. 7–11; Kevin D. Dayaratna and David Kreutzer, “Loaded DICE: An EPA Model Not Ready for the Big Game,” Heritage Foundation Backgrounder #2860, November 21, 2013, at <http://www.heritage.org/research/reports/2013/11/loaded-dice-an-epa-model-not-ready-for-the-big-game>; and Kevin D.

Note that it is not appropriate to use a low discount rate as a means of increasing the weight given the interests of future generations. This is because future generations are interested not in receiving a bequest of, say, maximum environmental quality, but instead in an inheritance of the most valuable possible capital stock in all of its myriad dimensions, among all of which there are tradeoffs that cannot be avoided. Consider a *homo sapiens* baby borne in a cave some tens of thousands of years ago, in a world with a resource base virtually undiminished and environmental quality effectively untouched by mankind. That child at birth would have had a life expectancy on the order of 10 years; had it been able to choose, it is obvious that it willingly would have given up some resources and environmental quality in exchange for better housing, food, water, medical care, safety, *ad infinitum*.⁶⁵ That is, it is obvious that people willingly would choose to give up some environmental quality in exchange for a life both longer and wealthier.

Accordingly, the central interest of future generations is a bequest from previous generations of the most valuable possible capital stock, of which the resource base and environmental quality are two important dimensions among many, and among which there always are tradeoffs. That requires efficient resource allocation by the current generation. If regulatory and other policies implemented by the current generation yield less wealth currently and a smaller total capital stock for future generations, then, perhaps counterintuitively, some additional emissions of effluents would be preferred (efficient) from the viewpoint of those future generations.⁶⁶

The IWG benefit/cost analysis of the Clean Power Plan (CPP)—the central “climate” policy proposal from the Obama administration—includes “co-benefits” in the form of reductions in ozone and emissions of fine particulates. Indeed: these co-benefits in 2030 are half or more of the benefits (evaluated at a 3 percent discount rate) asserted for the CPP.⁶⁷ This “co-benefit” approach is deeply problematic because the Clean Air Act explicitly requires the EPA, upon making an “endangerment” finding for a given effluent, to promulgate a National Ambient Air Quality Standard that “protects the public health” with “an adequate margin of safety.”⁶⁸ Accordingly, it must be the case that the existing ozone and particulate standards fail to satisfy the requirements of the law, *or* the EPA is double- (or more) counting the benefits of reductions in ozone and fine particulates in its analysis of the CPP, *or* the CPP will reduce ozone and fine particulate emissions to levels that are inefficiently low, that is, to levels at which marginal costs exceed marginal benefits. *At least one of those three conditions must be true.* Note that the EPA uses the same assumed particulate reductions to justify the CPP, the new ozone rule,⁶⁹ the new particulate rule,⁷⁰ and the Utility Mercury and Air Toxics Standards.⁷¹ Note also that the IWG uses the assumed global benefits of reductions in GHG emissions as the basis for the SCC analysis, while the CPP net benefits in substantial part are

Dayaratna and David Kreutzer, “Unfounded FUND: Yet Another EPA Model Not Ready for the Big Game,” Heritage Foundation Backgrounder #2897, at <http://www.heritage.org/research/reports/2014/04/unfounded-fund-yet-another-epa-model-not-ready-for-the-big-game>. Another problem is presented by the reality that the economic costs of climate policies—increased energy costs and attendant effects—are substantially more certain than the benefits, that is, the future impacts of those policies in terms of temperatures and other such phenomena as storms and sea levels. This means that the assumed benefit stream of such policies over time should be subjected to a state-options analysis, or at a minimum to a crude application of a discount rate higher than that applied to the cost stream. See, e.g., Daniel A. Graham, “Cost-Benefit Analysis Under Uncertainty,” *American Economic Review*, Vol. 71, No. 4 (September 1981), pp. 715–725.

⁶⁵The source for this life expectancy estimate is a telephone discussion February 16, 2011 with Professor Gail Kennedy, Department of Anthropology, University of California–Los Angeles. Note here the implicit normative assumption that the “interests” of any individual or group are those that they would define for themselves or, more important, reveal through choice behavior.

⁶⁶The capital stock includes both tangible capital and such intangibles as the rule of law, the stock of knowledge, culture, and the like. Greater wealth for the current generation yielded by resource consumption yields conditions allowing the expansion of other dimensions of the capital stock defined broadly.

⁶⁷This is true for both the “rate-based” and “mass-based” regulatory approaches of the CPP. In the regulatory impact analysis for the CPP, the “climate” and “air quality” benefits of the CPP can be compared only with the 3 percent discount rate, because EPA does not provide that direct comparison for other discount rates, interestingly enough. See Tables ES–9 and ES–10 in Environmental Protection Agency, *Regulatory Impact Analysis for the Clean Power Plan Final Rule*, October 23, 2015, at <https://www.epa.gov/sites/production/files/2015-08/documents/cpp-final-rule-ria.pdf>.

⁶⁸See the relevant language at <https://www.law.cornell.edu/uscode/text/42/7409>.

⁶⁹See EPA at <https://www.gpo.gov/fdsys/pkg/FR-2015-10-26/pdf/2015-26594.pdf>.

⁷⁰See EPA at <https://www.gpo.gov/fdsys/pkg/FR-2015-03-23/pdf/2015-06138.pdf>.

⁷¹See EPA at <https://www3.epa.gov/mats/pdfs/20160317fr.pdf>.

created by assumed reductions in ozone and fine particulates, which are domestic pollutants, as just discussed. This is an inconsistency that has gone largely unnoticed in the Washington policy community.

It is important to note that even in the context of the climate model used by the EPA,⁷² the future temperature effects of U.S. and international climate policies are small at most and trivial for the most part. The Obama administration Climate Action Plan calls for a 17-percent reduction below 2005 levels in U.S. GHG emissions by 2020.⁷³ In addition, the U.S.-China Joint Announcement on Climate Change calls for an additional 10-percent reduction by the U.S. by 2025.⁷⁴ The 17-percent reduction would reduce temperatures by the year 2100 by $15/1000$ of a degree. The additional 10-percent reduction yields another $1/100$ of a degree. Given that the standard deviation of the temperature record is about 0.1 degrees, these effects would be too small even to be measured, let alone to affect sea levels and cyclones and all the rest.⁷⁵ If we assume an additional 20 percent emissions cut by China by 2030, that adds 0.2 degrees; and another 0.2 degrees if we assume a 30 percent emissions cut by the rest of the industrialized world, by 2030. If we assume also a 20 percent reduction by the less-developed world by 2030, temperatures would be reduced by another $1/10$ of a degree. The total: a bit more than 0.5 degrees.

Note that these model predictions use underlying parameters highly favorable to the policies under examination, that is, assumptions that increase the predicted effects of the policies. The most important is a “climate sensitivity” (the temperature effect in 2100 of a doubling of GHG concentrations) assumption of 4.5 degrees, a number 50 percent greater than the median adopted by the Intergovernmental Panel on Climate Change in its latest assessment report.⁷⁶ And even the latter is about 40 percent higher than the median of the estimates published in the recent peer-reviewed literature.⁷⁷

For obvious reasons, these trivial temperature benefits of “climate” policies have not been publicized extensively. EPA has published such an estimate in its regulatory rule for GHG emissions and fuel efficiency standards for medium- and heavy-duty engines and vehicles, and it is revealing:⁷⁸

The results of the analysis, summarized in Table VII–37, demonstrate that relative to the reference case, by 2100 . . . global mean temperature is estimated to be reduced by 0.0026 to 0.0065 °C, and sea-level rise is projected to be reduced by approximately 0.023 to 0.057 cm. . . .

EPA then states that “the projected reductions in atmospheric CO₂, global mean temperature, sea level rise, and ocean pH are meaningful in the context of this action.” And so we arrive at the benefit/cost conclusion:

[We] estimate that the proposed standards would result in net economic benefits exceeding \$100 billion, making this a highly beneficial rule.

Can anyone believe that a temperature effect by 2100 measured in $10/1000$ of a degree, or sea-level effects measured in thousandths of a centimeter could yield over \$100 billion in net economic benefits?⁷⁹ This conclusion is possible only because of

⁷²This model was developed at the National Center for Atmospheric Research, with funding provided by the EPA. See <http://www.cgd.ucar.edu/cas/wigley/magic/>.

⁷³See https://www.whitehouse.gov/sites/default/files/docs/cap_progress_report_final_w_cover.pdf.

⁷⁴See <https://www.whitehouse.gov/the-press-office/2014/11/11/us-china-joint-announcement-climate-change>. See also Benjamin Zycher, “Observations on the U.S.-China Climate Announcement,” *The Hill*, November 14, 2014, at <http://thehill.com/blogs/pundits-blog/energy-environment/224076-observations-on-the-us-china-climate-announcement>; and Benjamin Zycher, “The U.S.-China Climate Agreement Hangover,” *The Hill*, December 8, 2014, at <http://thehill.com/blogs/pundits-blog/energy-environment/226272-the-us-china-climate-agreement-hangover>.

⁷⁵See Judith Curry’s analysis at <https://judithcurry.com/2015/11/06/hiatus-controversy-show-me-the-data/>.

⁷⁶See the summary of the recent peer-reviewed evidence presented by Patrick J. Michaels and Paul C. Knappenberger at <http://www.cato.org/blog/collection-evidence-low-climate-sensitivity-continues-grow>. See the IPCC 5th Assessment Report at <https://www.ipcc.ch/report/ar5/>.

⁷⁷On the recent estimates in the peer-reviewed literature, see <https://judithcurry.com/2015/11/30/how-sensitive-is-global-temperature-to-cumulative-co2-emissions/#more-20572>, <https://judithcurry.com/2015/03/23/climate-sensitivity-lopping-off-the-fat-tail/>, and Michaels and Knappenberger, *op. cit.*, fn. 76 *supra*.

⁷⁸See <https://www.regulations.gov/#/documentDetail;D=EPA-HQ-OAR-2014-0827-0002>.

⁷⁹Marlo Lewis, et al. provide a detailed analysis of the fuel efficiency standards for medium- and heavy-duty engines and vehicles at <http://www.globalwarming.org/wp-content/uploads/2015/10/Marlo-Lewis-Competitive-Enterprise-Institute-and-Free-Market-Allies-Comment-Letter-on-Phase-2-EPA-NHTSA-greenhouse-gas-fuel-economy-HDV-rule-Oct-1-2015-Final.docx.pdf>.

the assumptions and approach underlying the SCC analysis; as discussed above, they are deeply problematic.

In short: the climate change/GHG emissions/“social cost of carbon” rationale for renewables subsidies is fatally flawed analytically, and should be reformed in a serious fashion by policymakers.

IV. Concluding Observations

From “energy independence” through the “social cost of carbon,” the modern rationales for energy subsidies have varied in prominence over the decades, but none has been broadly discredited in the public discussion despite the reality that each suffers from fundamental analytic weaknesses.

Energy “independence”—the degree of self-sufficiency in terms of energy production—is irrelevant analytically, particularly in the case of such energy sources as petroleum traded in international markets, an economic truth demonstrated by the historical evidence on the effects of demand and supply shifts from the 1970s through the present.

Capital markets can sustain promising industries or technologies in their infancy—the early period during which technologies are proven and scale and learning efficiencies are achieved—so that the “infant industry” rationale for renewables subsidies is a *non sequitur*. Moreover, there is little evidence that there exist additional learning or scale cost reductions remaining to be exploited in wind and solar generation in any event.

There is no analytic evidence that renewables suffer from a subsidy imbalance relative to competing conventional energy technologies—the data suggest the reverse strongly—and the conventional “subsidies” that are purported to create a disadvantage for renewables are not “subsidies” defined properly as a matter of economic analysis.

Wind and solar power create their own set of environmental problems, and even in terms of conventional effluents and GHG it is far from clear that they have an advantage relative to conventional generation, particularly because of the up-and-down cycling of conventional backup units needed to preserve system reliability in the face of the intermittency (unreliability) of renewable power. And those backup costs—an economic externality caused by the unreliability of renewable power—are substantially larger than the externality costs of conventional power even under extreme assumptions.

The “sustainability” or resource depletion arguments for renewables subsidies make little sense analytically—the market rate of interest provides powerful incentives to conserve resources for consumption during future periods—and are inconsistent with the historical evidence in any event.

Nor does the “green jobs” employment rationale for renewables subsidies make analytic sense, as a resource shift into the production of politically favored power must reduce employment in other sectors—resources, after all, are limited always and everywhere—and the taxes needed to finance the subsidies cannot have salutary employment effects. Moreover, the historical evidence on the relationships among GDP, employment, and electricity consumption does not support the “green jobs” argument.

The newest environmental rationale for renewables subsidies—the SCC—is an argument deeply flawed both conceptually and in terms of the quantitative estimates now underlying a large regulatory effort. Moreover, the policies being proposed to reduce emissions of greenhouse gases would have temperature effects trivial or unmeasurable even at the international level, under assumptions highly favorable to the policy proposals. More generally, the terms “carbon” and “carbon pollution” are political propaganda, as carbon dioxide and “carbon” are very different physical entities, particularly given that some minimum atmospheric concentration of the former is necessary for life itself.

It would be hugely productive for the U.S. economy writ large were policymakers to adopt a straightforward operating assumption: resource allocation in energy sectors driven by market prices is roughly efficient in the absence of two compelling conditions. First: it must be shown that some set of factors has distorted those allocational outcomes to a degree that is substantial. Second: it must be shown that government actions with high confidence will yield net improvements in aggregate economic outcomes. Given the weak history of analytic rigor and policy success in the context of energy subsidies, greatly increased modesty on the part of policymakers would prove highly advantageous.

QUESTIONS SUBMITTED FOR THE RECORD TO BENJAMIN ZYCHER

QUESTIONS SUBMITTED BY HON. DEAN HELLER

Question. Though geothermal and solar production is steadily increasing in the Silver State, natural gas is the primary fuel for power generation in my home State. In 2014, Nevada generated 63% of its electricity from natural gas. That cheap base-load energy allows the State to also utilize renewable without decreasing reliability and increasing consumer costs.

Answer. This last sentence is incorrect. If the conventional base-load capacity allows for increased renewable generation without a reduction in reliability, then the conventional units must be cycled up and down depending on whether renewable power is available. That cycling increases the cost (and polluting characteristics) of the base-load generation. Moreover, the renewables themselves are high-cost, a reality not changed by the availability of inexpensive base-load power. The fact that the high cost of the renewable electricity can be hidden by averaging it with the low costs of the base-load generation does not “reduce costs”; it merely masks them. The assertion that “renewable” can be “utilize[d] . . . without . . . increasing consumer costs” is false unless we exclude the subsidies from the definition of “consumer costs,” an approach that is incorrect analytically.

Question. What tax incentives are essential to ensuring our Nation continues to lead the world in natural resources development?

Answer. Tax policy should not have as a goal “ensuring our Nation continues to lead the world in natural resources development.” Such outcomes in resource allocation should be driven by market prices, at least as the processes and implications of market competition traditionally are envisioned at a normative level. Given that most natural resources traded in international markets cannot be “embargoed” with respect to a given nation, it is unlikely that a sound national security rationale can be specified for such tax incentives.

 QUESTIONS SUBMITTED BY HON. MARK R. WARNER

Question. Ms. Harbert’s testimony notes that energy tax policy should be “results-oriented and not proscriptive,” that we as policymakers have not historically been good at predicting technological developments in the energy sector, and that there are often unintended consequences to well-intended energy policy. With that in mind, I am interested in your answers to the following questions.

How do we accomplish energy tax reform that successfully incentivizes companies to make meaningful investments toward energy efficiency while increasing our efficiency standards and also cutting down on abuse of energy tax credits?

Answer. I know of no sound argument to the effect that market prices yield too little investment in energy “efficiency,” a term that is misleading in any event in that such artificial “energy efficiency” driven by government policy is inconsistent with broader economic efficiency.

Question. How do we incorporate phase-outs to ensure that a particular energy tax credit does not outlive its useful life?

Answer. I know of no way to do this given that a current Congress cannot bind a future Congress. In any event, such energy tax credits do not have “useful” lives as a general condition because they are inefficient, and thus waste resources. The only “phase-outs” that work are those not implemented in the first place.

COMMUNICATIONS

ADVANCED BIOFUELS BUSINESS COUNCIL ET AL.

Chairman Hatch, Ranking Member Wyden, members of the committee, thank you for holding the Senate Finance Committee hearing on “Energy Tax Policy in 2016 and Beyond.” This hearing comes at a critical time for the advanced and cellulosic biofuels industry.

Because of your leadership, a suite of critical advanced biofuels tax incentives were extended last December in the “Protecting Americans From Tax Hikes Act of 2015.” Unfortunately, these provisions are already set to expire at the end of 2016, jeopardizing the long-term investment necessary for advanced biofuels. As the committee examines tax provisions related to energy in the United States, we hope members recognize the value of the advanced biofuels industry to our Nation’s energy security, economy, and environment.

Since 2009, the advanced and cellulosic biofuels industry has invested billions of dollars to build first-of-a-kind demonstration and commercial-scale biorefineries across the country. As a result, five commercial scale cellulosic biorefineries with a combined capacity of more than 50 million gallons within the United States are now online. Additionally, in part as a result of the biodiesel, renewable diesel, and renewable aviation fuel tax incentive, advanced biofuel use in America has grown from roughly 112 million gallons in 2005 when the tax incentive was first implemented to nearly 2.1 billion gallons last year. In fact, many truck stops and retail stations across the country today sell diesel blends containing 10 percent to 20 percent biodiesel. This is not just helping to create a new American energy industry, it is significantly reducing pollution while strengthening our energy security by diversifying our fuel sources.

Tax incentives for cellulosic and advanced biofuels, have helped move projects to commercial production by attracting investment and reducing the cost of production, and have played a significant role in the growth of the industry. Unfortunately, the economic recession at the beginning of the decade, the challenges of scaling up new cellulosic technologies, and policy instability (such as the uncertainty regarding the long term availability of the tax incentives) have hampered the development of commercial scale advanced cellulosic biorefineries in the United States. As a result advanced and cellulosic biofuels today account for only a small fraction of the U.S. transportation fuel market. While companies and investors are increasingly looking for locations overseas or have simply put projects on hold indefinitely.

Tax incentives for cellulosic and advanced biofuels like biodiesel have been successful; however, the incentives has expired repeatedly in recent years and is slated to lapse yet again at the end of 2016. This cycle of uncertainty surrounding these incentives has severely disrupted the growth and development of all of the U.S. advanced and cellulosic biofuel industry. Manufacturing of advanced biofuels is a difficult and capital-intensive enterprise, and advanced biofuel remains a young, developing industry. As a group, this sector needs predictable federal tax policy to continue to attract investment, build infrastructure and continue growing so that it can compete with incumbent industries that have long received favorable tax preferences. When compared to other major fuels such as gasoline, diesel and conventional biofuels, advanced biofuels are at a fundamentally different stage of development.

Allowing advanced biofuels tax incentives to expire this year would significantly limit the growth in the domestic advanced and cellulosic biofuels industry and undermine all the positive contributions the industry has made to national security, the economy, and the environment to date. Development of biofuels reduces our de-

pendence on foreign oil, lessens costs at the pumps for consumers, and lowers greenhouse gas emissions. About one-fourth of the petroleum we consume is still imported from other countries, and about 45 percent of the crude oil processed by U.S. refineries in 2015 was imported from foreign countries. Over the past 10 years the biofuels industry has displaced nearly 1.9 billion barrels of foreign oil by replacing fossil fuels with homegrown biofuels. This has saved consumers an average of one dollar a gallon at the pump. The use of biofuels has also led to a reduction in U.S. transportation-related carbon emissions of 590 million metric tons over the past decade—an equivalent of removing more than 124 million cars from the road.

Ensuring further growth in the advanced biofuels industry will require additional support and greater policy certainty going forward. As such, we encourage the Committee to advance a multi-year extension of advanced biofuel tax provisions—the Second Generation Biofuel Producer Tax Credit, the Special Depreciation Allowance for Second Generation Biofuel Plant Property, the Biodiesel and Renewable Diesel Fuels Credit, and the Alternative Fuel Vehicle Refueling Property—as a part of any energy tax package.

Motor fuel markets are not free markets. The oil industry receives permanent federal subsidies and tax breaks that give incumbents a market advantage over renewable fuels if not remedied by the counter balancing incentives described above. Temporary extensions are not enough to create parity, but they help bridge the gap to comprehensive energy tax reform. Therefore, we urge the committee to reject any effort to phase out advanced biofuel tax incentives. The Second Generation Biofuel Producer Credit and associated depreciation provisions have never been enacted for a sufficient length of time to allow investors to depend upon their existence once the facilities are eventually placed in service. Ending these tax credits on an arbitrary date in the near term would be premature, and will hamper the utilization of these incentives for an industry where financing and constructing new facilities takes on average 5 to 6 years.

As leaders in a critical innovation sector in the United States, we are well aware of the financial constraints facing this country. However, the United States' global competitors are offering tax incentives for advanced biofuels and are attracting construction of new facilities. Extending these tax incentives for advanced biofuels ahead of the expiration date will avoid creating uncertainty for investors and companies trying to raise capital. We look forward to working with you on this important matter.

Advanced Biofuels Business Council	Algae Biomass Organization	Biotechnology Innovation Organization
Growth Energy	National Biodiesel Board	Renewable Fuels Association

ALLIANCE FOR INDUSTRIAL EFFICIENCY
2101 Wilson Boulevard, Suite 550
Arlington, VA 22201

June 24, 2016

The Honorable Orrin Hatch (R-UT)
Chairman
Senate Finance Committee
104 Hart Office Building
Washington, DC 20510

The Honorable Ron Wyden (D-OR)
Ranking Member
Senate Finance Committee
221 Dirksen Senate Office Building
Washington, DC 2051

Dear Chairman Hatch and Ranking Member Wyden:

The Alliance for Industrial Efficiency (hereinafter, "The Alliance") appreciates the opportunity to comment on the Senate Finance Committee Hearing on Energy Tax Policy. The Alliance is a diverse coalition that includes representatives from the business, environmental, labor and contractor communities, and has members in every state. We are committed to enhancing manufacturing competitiveness and reducing emissions through industrial energy efficiency, particularly through the use of clean and efficient power generating systems, such as combined heat and power (CHP) and waste heat to power (WHP). We write now to urge the Senate Finance Committee to support policies that would help advance the deployment of these important clean-energy technologies.

We commend the Committee for holding a hearing on energy tax policy on June 14, 2016. We recognize the importance of providing opportunities for both sides of the aisle to present their ideas to improve the tax code as it relates to energy issues. Our comments recommend that the Committee extend and strengthen the Section 48 clean-energy tax credits as soon as possible, which would promote deployment of CHP and WHP technologies. The existing Section 48 tax credit must also be expanded to include waste heat to power, as reflected in S. 913, which the Finance Committee approved unanimously this winter. We also support Ranking Member Wyden's technology-neutral clean energy tax incentive proposal (S. 2089), and look forward to working with Senator Wyden to help advance this proposal when comprehensive tax reform moves forward.

I. CHP and WHP offer economic, reliability, and environmental benefits

CHP and WHP are proven and effective energy resources that can help address current and future global energy needs and enhance manufacturing competitiveness while reducing environmental impacts. By generating both heat and electricity from a single fuel source, CHP dramatically lowers emissions and increases overall fuel efficiency—allowing utilities and companies to effectively “get more with less.” CHP can operate using more than 70 percent of fuel inputs. As a consequence, CHP can produce electricity with roughly one-quarter the emissions of an existing coal power plant. WHP can generate electricity with no additional fuel and no incremental emissions. Due to its scale, a single CHP or WHP investment can achieve significant emission reductions.

Investment in CHP and WHP systems stimulate the local economy both directly and indirectly. By dramatically reducing electric power demand (and related energy costs) for industrial sources, CHP can directly make U.S. manufacturing more competitive. For instance, the ArcelorMittal steel facility in East Chicago, Indiana, reports \$20 million in annual energy savings from its CHP facility. The company found that these cost savings made the plant's steel more competitive by effectively lowering the production cost by approximately \$5 per ton.¹ Further, industrial companies with CHP, such as ArcelorMittal, can use the money they save on energy to expand production and employment. Such savings are already being realized at thousands of locations nationwide (though, as noted below, the opportunity is far greater).

CHP and WHP projects create direct jobs in manufacturing, engineering, installation, operations, and maintenance, which in turn, increase the economic competitiveness of companies that install the systems and receive the energy savings benefits. Individuals employed as a result of CHP and WHP installations are able to spend their income on goods and services within their local communities, while businesses and consumers can reinvest the money these systems save them on their energy bills into other goods and services as well. For example, businesses may reinvest savings to support facility expansion or other capital projects or to hire and/or retain workers. This activity creates and retains jobs and induces economic growth in local communities.²

A 2013 Natural Resources Defense Council issue paper states that each gigawatt of installed CHP capacity may be reasonably expected to create and maintain between 2,000 and 3,000 full-time equivalent jobs throughout the lifetime of the system. These jobs would be in manufacturing, construction, operations and maintenance, as well as indirect jobs from redirection of industrial energy expenditures and the spending of commercial and residential energy bill savings on other goods and services.³

What's more, because CHP projects can operate independently of the grid, these projects can increase the reliability of our power sector, by ensuring that manufacturers, universities and hospitals “keep the lights on” during extreme weather

¹ Center for Clean Air Policy, July 2013, “White Paper: Combined Heat and Power for Industrial Revitalization: Policy Solutions to Overcome Barriers and Foster Greater Deployment,” at 10 (http://ccap.org/assets/White-Paper_Combined-Heat-and-Power-for-Industrial-Revitalization_CCAP_July-20131.pdf).

² Natural Resources Defense Council, April 2013, “Combined Heat and Power Systems: Improving the Energy Efficiency of Our Manufacturing Plants, Buildings, and Other Facilities,” at 6 (<http://www.nrdc.org/energy/files/combined-heat-power-ip.pdf>).

³ *Id.*

events that can compromise the electric grid.⁴ As a testament to the power resiliency of CHP systems, during both Hurricane Katrina in 2005 and Hurricane Sandy in 2012, facilities with CHP continued to have access to power and thermal amenities, including several hospitals that were able to continue serving patients.⁵ As Senator Menendez (D–NJ) alluded to during his questions at the June 16 hearing,⁶ while more than 8-million residents in the Mid-Atlantic lost power during Hurricane Sandy in October 2012, CHP systems helped several large energy users—New York University, Long Island’s South Oaks Hospital, Co-op City in the Bronx and New Jersey’s Bergen County Utilities Authority—stay warm and bright.⁷ These islands of power acted as places of refuge for emergency workers, displaced people, and evacuated patients from medical facilities without power.⁸

Across the country, nearly 83 gigawatts of CHP capacity exist at more than 4,400 industrial and commercial facilities, representing over 12 percent of annual U.S. power generation.⁹ However, significant potential remains. In fact, this spring (March 2016), the Department of Energy (DOE) published a new report finding that there is an estimated 149 gigawatts of remaining on-site technical potential for CHP and WHP¹⁰ within the United States.¹¹ Realizing this potential would create jobs in the design, construction, installation and maintenance of equipment; reduce fuel use and energy costs; and lower greenhouse gas emissions.

Unfortunately, CHP and WHP deployment to date fall far short of this technical potential. Despite the substantial long-term economic benefits, projects require a significant up-front investment with a multi-year payback period. CHP capital costs, range from \$1,200 to \$4,000 per kilowatt depending on technology, size and site conditions.¹² CHP system owners report payback periods ranging from 1.5 years to 12 years, with a large number of opportunities anticipating payback between 5 to 10 years.¹³

Financial incentives for CHP and WHP can help reduce the initial cost for these projects, shrinking the payback period. It is imperative that appropriate incentives exist for CHP and WHP to support widespread deployment and realize the full suite of CHP and WHP’s economic, reliability, and environmental benefits. Fortunately, policy solutions with strong bipartisan support allow this.

II. The Alliance urges the Senate Finance Committee to extend Section 48 tax credits

As you know, in December 2015, Congress extended the ITC for solar technologies through 2021 (providing a 5-year extension with “start of construction” language). The credit for the non-solar Section 48 technologies, including CHP, was not similarly extended and will expire at the end of this year. At the June 16 Senate Finance Committee Energy Tax Policy hearing, Ranking Member Wyden noted the

⁴U.S. Department of Energy, U.S. Department of Housing and Urban Development, U.S. Environmental Protection Agency, September 2013, “Guide to Using Combined Heat and Power for Enhancing Reliability and Resiliency in Buildings,” (https://portal.hud.gov/hudportal/documents/huddoc?id=energy_chp_for_rc.pdf).

⁵NRDC, *supra* note 2.

⁶United States Senate Committee on Finance, June 14, 2016, “Hearing on Energy Tax Policy in 2016 and Beyond.” (“We saw in New Jersey after Sandy that Princeton University was able to keep the lights on through its resiliency program, but large parts of the state did not, including our mass transit system.”)

⁷Pentland, William, October 31, 2012, “Lessons From Where the Lights Stayed on During Sandy,” *Forbes* (<http://www.forbes.com/sites/williampentland/2012/10/31/where-the-lights-stayed-on-during-hurricane-sandy/#efe1e20731b3>).

⁸*See, e.g.*, U.S. EPA, June 18, 2014, 79 Fed. Reg. 34830, 34899, “Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units” (noting that CHP “reduce[s] demand for centrally generated power and thus relieve[s] pressure on the grid.”)

⁹U.S. Department of Energy, March 2016, “Combined Heat and Power (CHP) Technical Potential in the United States,” at 5 (<http://energy.gov/sites/prod/files/2016/04/30/CHP%20Technical%20Potential%20Study%203-31-2016%20Final.pdf>).

¹⁰Includes traditional topping cycle CHP, WHP (sometimes referred to as bottoming cycle CHP), and district energy.

¹¹U.S. DOE, *supra* note 9.

¹²U.S. EPA, September 2014, “Catalog of CHP Technologies,” at Table 2–4 (reporting capital costs ranging from \$1,200 to \$4,300/kW—small microturbine on the small side, large gas turbine on the high side of range—dependent on prime mover and size) (http://www.epa.gov/chp/documents/catalog_chptech_full.pdf).

¹³AGA, May 2013, “The Opportunity for CHP in the United States,” at Table ES–1 (reporting approximately 35 GW of projects with a payback between 5 to 10 years compared to 6.4 GW with a payback of less than 5 years given current technology costs and electricity prices), (https://www.aga.org/sites/default/files/sites/default/files/media/the_opportunity_for_chp_in_the_united_states_-_final_report_0_.pdf).

urgent need to extend the clean-energy tax incentives that expire at the end of this year, as well as to enact the bill the Finance Committee approved that includes WHP in the investment tax credit (ITC). At the hearing, Senator Menendez also expressed support for extending the expiring investment tax credits. We are very grateful for Senator Wyden's and Menendez's leadership on this issue.

The Alliance strongly supports an extension of the existing Section 48 tax credit, which is needed to encourage continued growth of the clean-energy economy. By extending the ITC for all Section 48 technologies, Congress would help improve the energy efficiency and competitiveness of America's manufacturing sector, and enhance the country's energy independence and security.

The Alliance further encourages Congress to clarify that the existing Section 48 ITC for CHP includes WHP. In February 2016, the Senate Finance Committee approved bipartisan legislation making a technical correction to Section 48 and clarified that WHP is a qualifying technology (S. 913). We applaud this action by the Committee. S. 913 addresses the unique attributes of WHP that distinguish it from CHP, and provides critical parity with other power sources eligible for the ITC.

By expanding the Section 48 tax credit to WHP (as reflected in S. 913), Congress would reduce the cost of WHP technologies, diversify our nation's energy mix, create on-site power while lowering fuel use and emissions, and promote enhanced competition among all of our nation's energy sources. We therefore urge Congress to include this simple clarification in any energy tax legislation this year.

III. The Alliance urges the Senate Finance Committee to adopt Ranking Member Wyden's technology-neutral clean energy tax incentive proposal

Ranking Member Wyden's technology-neutral clean energy tax incentive proposal (the "American Energy Innovation Act," S. 2089, Title V) would eliminate the current 44 separate energy tax breaks and would instead establish three long-term incentives built around energy-efficiency, clean energy, and clean transportation goals. This proposal would simplify energy tax policy and would provide parity and flexibility among clean-energy technologies, including CHP and WHP. We support this approach and look forward to working with Senator Wyden to help advance it when the Senate addresses comprehensive tax reform.

In conclusion, the Alliance encourages the Congress to swiftly enact the extension of the Section 48 investment tax credit and clarify that WHP is also eligible for the investment tax credit. We also ask that the Committee include Ranking Member Wyden's technology-neutral clean-energy tax incentive proposal as part of its future tax reform agenda. We are extremely grateful for Senator Wyden's continued leadership on these issues.

CHP and WHP provide scalable, cost-effective approaches to increasing manufacturing competitiveness, enhancing electric reliability, and reducing emissions. Unfortunately, limitations in existing tax policy has prevented manufacturers from realizing these benefits. We look forward to working with the Senate Finance Committee to explore policy options to help realize the full potential of CHP and WHP.

Thank you for the opportunity to comment.

Sincerely,

Jennifer Kefer
Executive Director
Alliance for Industrial Efficiency

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The American Public Power Association (APPA) appreciates the opportunity to submit this statement for the record in relation to the Senate Committee on Finance June 14, 2016, hearing on "Energy Tax Policy in 2016 and Beyond."

As the Committee knows, energy-related provisions in the tax code generally come in the form of tax credits and accelerated cost-recovery and depletion provisions.¹ Public power utilities are generally only indirectly affected by these provisions, though public power utilities can issue New Clean Renewable Energy Bonds (New CREBs). These provisions generally are intended to encourage investments. However, the tax code also imposes more stringent private use rules for electric energy-related investments financed with municipal bonds, serving to discourage certain types of energy-related investments by public power utilities. That said, for public power utilities, the single most important provision of the code is the tax exemption for municipal bond interest.

Background

APPA is the national service organization representing the interests of over 2,000 municipal and other state and locally owned, not-for-profit electric utilities throughout the United States (all but Hawaii) referred to collectively as “public power utilities.” These utilities deliver electricity to one of every seven electricity consumers (approximately 48 million people). Public power utilities serve some of the nation’s largest cities, but the vast majority of APPA’s members serve communities with populations of 10,000 people or less.

Public power utilities are diverse in structure. Some are vertically integrated, *i.e.*, they own electric power generation, high-voltage transmission, and lower-voltage distribution facilities. Others own distribution resources, but rely on third-party providers to generate and/or transmit the electric power they use. Finally, some public power utilities have been formed to serve as wholesale providers of power to other public power utilities.

For a variety of reasons—including private-use restrictions on tax-exempt municipal bond financing—public power utilities, on average, sell more electric power than they generate. While public power utilities serve about 14.5 percent of the nation’s homes and business (roughly 22 million electric meters total), these utilities generate about 9.9 percent of the nation’s power (more than 400 million megawatt hours every year).

Municipal Bonds

Since their establishment in the late 19th century, public power utilities have largely relied on municipal bonds to cost effectively raise capital needed to build generation, transmission, and distribution facilities that serve their communities. These projects require substantial up-front commitments of capital, but also tend to have long useful lives. Bonds are a responsible way to finance these costs and repay them over time. This allows the investments to be made and ensures that those customers who are benefiting from the investment are paying for it through their rates. In the last decade, nearly 1,400 power-related municipal bonds providing roughly \$110 billion in new money financing were issued.

This is especially important since state and local governmental entities—including public power utilities—have limited means to raise funds for their communities’ capital needs. They cannot issue stock and a local bank loan is rarely an option given the size of the investments required. Moreover, they generally do not use, or even accrue, accumulated cash surpluses in part because doing so would require rate payers to pay the cost of investments from which they may never benefit. Conversely, municipal bonds allow issuers to build long-term projects financed up-front by investors and the debt for which is repaid by residents over the useful life of that investment.

Interest on municipal bonds is exempt from federal taxation,² and has been since the creation of the federal income tax in 1913.³ In contrast to other “tax expenditures,” however, the federal tax exemption of municipal bond interest is part of a trade-off—state and local governments are likewise prohibited from taxing interest on federal debt.⁴ While congressional agencies largely ignore this reciprocal arrange-

¹ There is also an exception from corporate taxation for certain publicly traded partnerships, the tax expenditure value of which is comparable to other significant energy-tax provisions.

² I.R.C. § 103(a).

³ Revenue Act of 1913, 38 Stat. 114 (October 3, 1913).

⁴ 31 U.S.C. § 3124(a).

ment when discussing taxation of municipal bonds, the state and local tax exemption has been well-guarded and maintained by Congress.⁵

Likewise, Congress has honed the original exemption from federal tax for municipal bonds, limiting the entities that can issue tax-exempt bonds, the purposes for which the bonds may be issued, and the investment of bond proceeds. Specifically, these laws seek to prevent state and local governments from issuing bonds which finance a facility serving a private activity—rather than financing a facility serving a general public purpose. Generally, if more than 10 percent of a bond finances a private activity and more than 10 percent of the repayment of the bond is tied to revenues from that private activity, then the bond does not qualify as a government purpose bond, but is a “private activity bond,” which is subject to federal income tax.⁶

However, private use rules for power-related bonds are stricter, in effect a “negative tax expenditure” relative to the commonly applied private-use rules. This additional private use limit is just 5 percent for any power output facility for which the private use will exceed \$15 million. In addition, only up to \$15 million in private use is permitted for all issuances for any one project.⁷

Furthermore, Internal Revenue Service (IRS) implementation of these private-use rules prevent issuers from using tax-exempt bonds to build facilities large enough to meet not just current needs, but future needs. These rules treat near-term excess generation sold outside a public-power utility’s customer base as “private use” even if that excess generation capacity will be needed to meet increased customer demand in the future. Additionally, private use rules severely limit the ability of municipal utilities to acquire existing privately-owned, power-related assets with tax-exempt municipal bonds.⁸

Private Activity Bonds

As discussed above, a municipal bond that exceeds private use limits is considered a private activity bond and, generally, is subject to federal tax. However, a private activity bond can be exempt (in whole or in part) from federal tax if it is used to finance certain specific types of qualified facilities or activities. A qualified facility can include an airport, dock, wharf, mass-transit facility, multi-family housing, or solid waste disposal facility. A qualified facility (or activity) can also be a facility furnishing local electric energy⁹ or an environmental enhancement of a hydro-electric facility.¹⁰ The definition of “local electric energy” is very narrow—applying only to facilities furnishing electric energy to either: (a) a city and one contiguous county or (b) two contiguous counties.¹¹ Likewise, environmental enhancements to hydro-electric facilities are a small portion of the investments made by public power utilities nationally. Given these narrow constraints, power-related qualified facility private activity bonds are relatively rare. For example, in 2015, of 183 power-related municipal bonds totaling \$17.5 billion just two totaling \$49 million were private activity bonds.¹²

Energy-Related Tax Provisions

By Joint Committee on Taxation (JCT) estimate, the bulk of the tax value of energy tax expenditures come in the form of tax credits for renewable power investments and production (worth \$4.5 billion annually), accelerated cost recovery for oil and gas operations (worth \$3.1 billion annually), and an exemption from corporate taxation for publicly traded partnerships owning certain energy facilities, generally oil and gas pipelines (worth \$1.2 billion annually).¹³

As not-for-profit entities, public power utilities cannot directly benefit from these provisions. To begin to provide comparable incentives to invest in renewable power, in 1992 Congress authorized Renewable Energy Production Incentives (REPI) for public power and cooperative utilities. Congress, however, provided little funding for

⁵ See, e.g., Pub. L. No. 97–258 § 3124, 96 Stat. 945 (September 13, 1982); Pub. L. No. 86–346 § 105, 73 Stat. 622 (September 22, 1959); Public Debt Acts of 1941, Pub. L. No. 77–7 § 3, 55 Stat. 8 (February 19, 1941).

⁶ I.R.C. § 141(b)(2).

⁷ I.R.C. § 141(b)(4).

⁸ I.R.C. § 141(d).

⁹ I.R.C. § 142(a)(8).

¹⁰ I.R.C. § 142(a)(12).

¹¹ I.R.C. § 142(f).

¹² Bond Buyer, “The Bond Buyer/Thomson Reuters 2016 Yearbook” (2016).

¹³ Joint Committee on Taxation, “Estimates of Federal Tax Expenditures for Fiscal Years 2015–2019,” JCX–141R–15 (December 7, 2015).

the program—just \$54 million to pay \$329 million in REPI credits earned by public power and cooperative utilities—and stopped funding REPI entirely after 2009.

Congress took a different tack in the Energy Policy Act of 2005 (EPAct05)¹⁴ with the creation of Clean Renewable Energy Bonds (CREBS), which have since been replaced by New CREBs. Under current rules, qualified issuers of New CREBs included public power utilities, states and towns, and cooperative electric utilities. Interest paid on a New CREB is taxable, but the bondholder receives a tax credit. The tax credit is calculated by Treasury at the date of bond issuance and set at 70 percent of the level necessary to allow the bond to be issued at the same interest rate as if the bond had been issued as a tax-exempt bond.

Alternatively, the issuer may elect to receive the tax credit as a direct payment from the federal government (with the credit calculated the same as if the bond were issued as a tax credit bond). A total of \$2.4 billion in New CREBs may be issued, split evenly between public power utilities, rural electric cooperatives, and state and local governmental entities that are not public power utilities.

As of March 2015, public power utilities have issued a total of roughly \$283 million in New CREBs. By way of comparison, public power utilities typically finance \$9 billion in new projects every year with traditional municipal bonds.¹⁵ And according to JCT tax expenditure estimates, CREB and New CREB tax credits and direct payments are worth roughly \$100 million annually.¹⁶

As discussed above, CREBs and New CREBs were an attempt to provide direct benefits to not-for-profit utilities making targeted energy investments. However, as a tax credit bond, CREBs were exceedingly unpopular and New CREBs have been hamstrung by: a burdensome application process; a low cap on bond volume; and a process that provided bond volume allocations of a fraction of the amounts being sought. Additionally, public power utilities that issued New CREBs as direct payment bonds continue to face penalties, with federal budget sequestration cutting otherwise authorized payments since 2013—sequestration cuts that are now scheduled to continue through 2025.

The IRS announced in February 2015 new procedures for receiving an allocation of New CREB bond volume—*i.e.*, to secure the right to issue a New CREB—including \$527 million in New CREB bond volume available to public power utilities.¹⁷ Data is not publicly available, but many of the same issues hamstringing New CREBs in the past will continue to hamstring them in the future.

APPA has long said that if Congress wants to incentivize energy investments, it provide comparable incentives to all utility sectors—including not-for-profit entities, which collectively provide power to roughly 27 percent of the nation's electric power customers. For example, EPAct05 created the IRC § 45J advanced nuclear production tax credit to offset the first-of-a-kind risk of the first 6,000 megawatts of new nuclear generating capacity built after 2005, but placed in service prior to 2021. Since then, construction has begun on four nuclear reactors in Georgia and South Carolina—the first new reactors built in the United States since the 1970s. Additional projects, including the first of a new generation of small modular reactors, are moving through the licensing process at the Nuclear Regulatory Commission, and will be ready for commercial deployment in the first half of the next decade.

Nonetheless, the pace of new nuclear plant construction has not been as rapid as Congress had hoped in 2005, meaning credits for 1,600 megawatts of new nuclear power will be stranded by the 2020 placed-in-service deadline. Additionally, those plants which are under construction have required involvement of investor-owned utilities, electric cooperatives, and public power utilities. These new nuclear plants now being developed will provide needed baseload electricity; create tens of thousands of new jobs during construction and operation of the plants and through the entire nuclear supply chain; and reduce the electric power industry's carbon dioxide emissions. However, public power utilities investing in these new plants will not receive the production tax credit. Allowing the credit to be transferred from public-power utilities and extending the placed-in-service date beyond 2020 would directly benefit utilities that are making the investments Congress sought to encourage in EPAct05 and encourage further such investments.

¹⁴Energy Policy Act of 2005, Pub. L. No. 109–58 § 1303, 119 Stat. 991 (codified as I.R.C. § 54) (August 8, 2005).

¹⁵Bond Buyer, “The Bond Buyer/Thomson Reuters 2016 Yearbook” (2016); Bond Buyer, “The Bond Buyer/Thomson Reuters 2011 Yearbook” (2011).

¹⁶Joint Committee on Taxation, *supra* note 13.

¹⁷I.R.S. Notice 2015–12 (February 3, 2015).

Defense of, and Improvements to, Municipal Bonds

Modifying the advanced nuclear PTC is a small step Congress could take to accomplish the goals set in EPAct05, and allowing public power issuance of New CREBs is of benefit to the utilities that can receive an allocation. However, for public power utilities, the single most important step Congress could take to encourage energy-related investments would be to stop talking about taxing municipal bonds and start talking about ways to improve the rules surrounding municipal bonds. Every municipal bond issued includes an official statement warning that the tax treatment of municipal bonds could be changed by Congress at any time. The premium that investors demand as a result of this risk is not insignificant. Conversely, this risk premium could be reduced to nearly nothing if policymakers would clearly state their intention not to tax municipal bonds. Savings on new projects would be immediate, reducing electric power rates for customers, or allowing larger investments in needed new infrastructure.

Additionally, Congress could undertake to improve the current-law tax treatment of municipal bonds. APPA supports a recent proposal to repeal the 5 percent unrelated or disproportionate private business use test (Section 141(b)(3) of the Code) to simplify the private business use test applicable to governmental bonds. This test involves vague factual determinations which can lead to a reduction in the otherwise permitted 10 percent private business use participation to 5 percent. We agree with the Treasury Department that the 5-percent test creates undue complexity and should be repealed.¹⁸ We also agree that the “10 percent private business limit generally represents a sufficient and workable threshold for governmental bond status”¹⁹ and would, as a result, recommend that other unnecessary addenda to the 10 percent limit also be reconsidered.

Likewise, Code Section 141(b)(4) provides for a \$15 million private business use/payments limitation on certain output facilities which are part of the same project. The per-project limitation is a punitive rule that singles out governmentally owned electric output facilities from other bond financed governmental owned assets and systems. Accordingly, we support the repeal of this provision. At a time in which additional electric output and smart-grid transmission and distribution facilities are needed to meet a rising energy needs, the repeal of this per-project limitation would provide needed operational flexibility.

Similarly, Code Section 141(b)(5) provides for a maximum \$15 million private business use/payments limitation on all tax-exempt governmental bonds unless volume cap is allocated to such excess under Section 146 of the Code. This \$15 million limitation, like the \$15 million per-project limitation of Section 141(b)(4), creates undue complexity for municipal issuers and interferes with a policy goal of creating a bright line 10 percent private business use test. We support its repeal.

APPA would also support a revision in the tax treatment of capital contributions by public power utilities to investor-owned utilities (IOUs) to build facilities (e.g., interconnections and associated facilities, transformers, circuits, etc.) to serve the public power utility’s retail demand (“load”). Under current law, these payments are treated as taxable “contributions-in-aid of construction” to the IOU.²⁰ Because the JOU traditionally requires the municipal utility to “gross up” its contribution, the cost of the investment is effectively increased by as much as 35 percent.

Finally, we support the recent proposal to simplify the arbitrage investment restrictions applicable to tax exempt bonds under Code Section 148. We fully agree with Treasury²¹ that the investment yield and arbitrage rebate restrictions are duplicative and that these dual restrictions create an unnecessary compliance burden for state and local governments.

Conclusion

The federal income tax includes a variety of provisions intended to encourage energy-related investments. Almost none are of direct benefit to public power utilities, although public power utilities have made limited use of New Clean Renewable Energy Bonds. Conversely, there remain substantial impediments to energy-related investments in rules governing tax-exempt municipal bonds. If Congress is seeking

¹⁸ U.S. Department of the Treasury, “General Explanations of the Administration’s Fiscal Year 2016 Revenue Proposals” at 273 (February 2, 2015).

¹⁹ *Id.*

²⁰ I.R.C. § 118(b).

²¹ U.S. Department of the Treasury, *supra* note 17, at 270.

to encourage needed investment in energy infrastructure—of all sorts—it should update the treatment of such investments when financed by municipal bonds and, at the very least, remove the threat of a tax on municipal bonds.

We thank you for your time.

For more information, please contact John Godfrey, Senior Government Relations Director, American Public Power Association, 202-467-2929, jgodfrey@publicpower.org.

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June 28, 2016

The Honorable Orrin G. Hatch
Chairman
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The Honorable Ron Wyden
Ranking Member
Senate Finance Committee
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RE: Statement for the Hearing Record: “Energy Tax Policy in 2016 and Beyond”—June 14, 2016

The Biomass Thermal Energy Council (BTEC) appreciates the opportunity to share our perspective on federal energy tax policy in the context of comprehensive tax reform. BTEC is an association of biomass fuel producers, forest landowners, appliance manufacturers, combined heat and power project developers, thermal energy utilities, district energy system operators, supply chain companies, universities, agencies and non-profit organizations. Collectively, our diverse membership of businesses and organizations views biomass thermal energy as a proven, renewable, responsible, clean and energy-efficient pathway to meeting America’s energy needs.

Biomass thermal energy investments provide immediate value for industries, businesses and communities. Examples of biomass thermal projects and technologies include heating of homes, businesses, schools, hospitals, commercial and industrial buildings; district heating of campuses, densely developed commercial and industrial parks; neighborhoods and city centers; domestic hot water for large consumers such as laundries; and industrial process heat for companies in food processing, metallurgy, and pharmaceuticals, and combined heat and power projects that produce both heat and electricity for consumers. However, our nation’s tax code, which has long played a key role in shaping and influencing national energy policy, misses a clear opportunity to capture this technology’s full benefits. In the renewable energy arena, the code features numerous incentives for most renewable energy technologies in residential, commercial and industrial installations. In fact, analysis provided by the Joint Committee on Taxation lists 80 separate energy-related tax provisions in existing law. Unfortunately, none of these incentives extends to high efficiency biomass thermal energy, despite the fact that biomass thermal energy fulfills the same public policy objectives as other renewable energy sources. Our tax code recognizes solar thermal and geothermal technologies (*e.g.*, section 250 and section 48), but not technology that produces heat from renewable biomass. This is an example of the policy “picking winners and losers” within narrow classes of technology. Accordingly, the Committee has a clear opportunity to cover this gap, and thereby unlock biomass thermal’s benefits, through fair tax code treatment.

We believe that comprehensive tax reform should embrace energy pathway neutrality without picking winners and losers in the manner in which renewable energy is delivered. BTEC welcomes the Committee’s renewed effort to streamline portions of the tax code dedicated to energy production and eliminate those provisions that no longer have merit. Moreover, we strongly endorse tax reform efforts that provide a level playing field for competing energy technologies and support the concept of technology neutrality.

Thermal energy is also derived from solar and geothermal sources. As noted above, thermal energy comprises roughly one-third of our nation’s energy consumption. Despite this fact, energy policy to promote renewable energy has focused entirely on transportation fuels such as ethanol and biodiesel, and electricity from hydro, wind, solar, geothermal, and biomass. These fuels and technologies have received support

from the federal government for many years in the form of production and investment tax credits, accelerated depreciation, research and development funding, direct project grants, and renewable energy credits. The 2005 Energy Policy Act, the 2007 Energy Independence and Security Act, and the 2009 American Recovery and Reinvestment Act boosted support for these technologies in many areas. BTEC believes that efforts to comprehensively reform the tax code provide the ideal opportunity to rectify this oversight and provide incentives for which all renewable thermal energy providers can compete on an equal basis.

Tax incentives will help deliver across a broad spectrum of public policy goals inclusive of jobs growth, energy security and healthy communities. In particular, the proper incentives in this area catalyze markets for high efficiency systems that can create jobs and local economic development from a widely available renewable domestic energy resource, reduce American dependence on energy imports and lower fossil fuel-based greenhouse gas emissions. Tax policy that supports biomass thermal energy will provide the highest possible return for the country in terms of reductions in fossil fuel imports and jobs created. It is estimated that 1,580 jobs will be created for every 5,500 homes that are converted from heating oil to biomass.ⁱ Biomass has also accounted for 40 percent of the renewable energy jobs in Germany, more than wind, solar or liquid fuels.ⁱⁱ State-side, both Maine, through Efficiency Maine's Home Energy Savings Program, and Massachusetts through the Commonwealth Woodstove Change-Out have launched rebate programsⁱⁱⁱ to reduce high home fuel costs through biomass heating systems.

Despite some progress at the state level in promoting biomass thermal systems, obstacles to wider adoption remain; tax code adjustments could help surmount these barriers and right-size markets. Because of the relatively small market penetration of new advanced biomass thermal systems, today's systems are often more expensive compared to fossil-fueled units. In fact, installed systems can cost two to three times as much as a similarly sized oil or gas system. Fuel transport logistics have yet to reach critical mass with few customers spread over large geographic areas, thus increasing the unit cost of fuel distribution. Incentives are necessary to enable biomass thermal technology to be more competitive in the market near term. In time, with increasing market penetration, these incentives can be scaled down or eliminated. As an example, in Europe, there is a thriving biomass heating business employing tens of thousands of people—the supply of these fuels continues to be cost competitive, without government subsidies. Crafted correctly, incentives can support innovation while attracting private capital that will drive long term economic growth.

BTEC is a strong supporter of the Biomass Thermal Utilization Act of 2015 (S. 727). The bill, known as the BTU Act, would qualify highly efficiency thermal energy from biomass for investment tax credits under section 48 and section 250. The spirit of this proposal is to simply level the playing field so that thermal renewable energy providers are treated equally with those producing liquid fuels, electricity and thermal energy from solar and geothermal. **Our request to the Committee is to keep this principle—technology and pathway neutrality—as a guide post as you continue to craft energy tax reform legislation.**

Conclusion

Biomass thermal energy fulfills the same public policy objectives that are the basis and justification for renewable energy tax incentives. These include:

- Strengthen local economic development and job creation through domestic production of fuels, system installation and service, and fuel distribution for many parts of the country that have neither natural gas nor oil;
- Strengthen energy security by reducing consumption of foreign fossil fuel-based energy, thereby increasing America's energy independence;
- Increase efficiency of utilization for equivalent energy output, as compared to biomass electric generation and cellulosic biofuels;
- Improve the nation's health through reducing emissions of certain air pollutants such as sulfur dioxides, PM 2.5, and mercury, as compared to fossil fuels; and
- Reduce emissions of greenhouse gases due to the low carbon intensity or near carbon neutrality of biomass.

ⁱ http://biomassthermal.org/pdf/Strauss_BTU_Act.pdf

ⁱⁱ <http://www.renewableenergyworld.com/rea/news/article/2008/04/renewable-energy-jobs-soar-in-germany-52089>

ⁱⁱⁱ <http://www.energymaine.com/at-home/home-energy-savings-program/hesp-incentives/> and <http://www.masscec.com/programs/commonwealth-woodstove-change-out>

The current fiscal environment necessitates that taxpayer dollars be deployed in a manner that maximizes return on investment. BTEC believes that investment in biomass thermal technologies achieve not only optimal efficiency and job creation throughout the country, but also deliver across a portfolio of public policy priorities and national needs. For these reasons, this investment should be a critical component of your energy tax reform efforts. We look forward to working with the Committee as it continues to engage this critical issue.

Respectfully submitted,

Jeff Serfass
Executive Director, Biomass Thermal Energy Council

BIOTECHNOLOGY INNOVATION ORGANIZATION (BIO)

Introduction

The Biotechnology Innovation Organization (BIO) is pleased to submit testimony to the U.S. Senate Finance Committee hearing on “Energy Tax Policy in 2016 and Beyond.”

BIO is the world’s largest trade association representing biotechnology companies, academic institutions, state biotechnology centers and related organizations across the United States and in more than 30 other nations. BIO members are involved in the research and development of innovative healthcare, agricultural, industrial and environmental biotechnology products.

BIO’s Industrial and Environmental Section represents over 75 companies leading the development of new technologies for producing conventional and advanced biofuels, renewable chemicals, and biobased products. Through the application of industrial biotechnology, BIO members are improving conventional biofuel processes, enabling advanced and cellulosic biofuel production technologies, a new generation of innovative renewable chemicals and biobased products produced from biomass, and speeding the development of new purpose grown energy and renewable chemical crops.

BIO applauds the Committee for holding this hearing delving into the important issue of tax provisions related to energy in the United States. By developing and implementing the right policies, tax incentives can be powerful policy mechanisms, particularly in growing the U.S. biobased economy through the production of advanced biofuels, renewable chemicals, and biobased products. Helping achieve our nation’s energy security, economy, and environmental goals.

Sustained supportive tax policy is very important to emerging technologies that have not yet achieved commercial scale, and should be targeted at those technologies with the greatest potential to create the jobs, economic growth, energy security and environmental benefits we seek as a nation. Emerging technologies in advanced biofuels, renewable chemicals, and biobased products have tremendous potential to address the nation’s challenges and are ready for commercial deployment, but face a very challenging capital environment for first-of-a-kind biorefinery construction. We urge you to extend and enhance provisions that support the scale-up of these important technologies.

Biofuels

Since 2009, the advanced biofuels industry has invested billions of dollars to build first-of-a-kind demonstration and commercial-scale biorefineries across the country. Despite the challenges associated with developing new technologies, as of 2015 there were five commercial scale cellulosic biorefineries with a combined capacity of more than 50 million gallons within the United States. Unfortunately, policy instability undermines certainty and predictability for investors and other market participants. The year-to-year nature of tax incentives for advanced and cellulosic biofuels make it difficult for the industry to take advantage of these tax incentives, which have help move these projects to commercial production by attracting investment and reducing the cost of production.

The development of advanced and cellulosic biofuels is a difficult and capital-intensive enterprise. Despite the recent successes of bringing commercial-scale facilities, this is a new and developing industry. However, there are great benefits to developing these technologies. Over the past 10-years the biofuels industry has displaced nearly 1.9 billion barrels of foreign oil by replacing fossil fuels with homegrown biofuels. This has saved consumers an average of \$1 a gallon at the pump. The use

of biofuels has also led to a reduction in U.S. transportation-related carbon emissions of 590 million metric tons over the past decade—an equivalent of removing more than 124 million cars from the road. Even with these benefits, in order to grow and compete with incumbent industries that have long received favorable tax preferences this sector needs predictable federal tax policy to continue to attract investment.

BIO encourages the Committee to advance a multi-year extension of advanced biofuel tax provisions—the Second Generation Biofuel Producer Tax Credit, the Special Depreciation Allowance for Second Generation Biofuel Plant Property, the Biodiesel and Renewable Diesel Fuels Credit, and the Alternative Fuel Vehicle Refueling Property—as a part of any energy tax package. BIO also requests the Committee reject the creation of a phase-out for the renewable energy incentives. The PTC and associated depreciation provisions have never been enacted for a sufficient length of time to allow investors to depend upon their existence once the facilities are eventually placed in service. Ending the tax credits on an arbitrary date in the near term will hamper the utilization of these incentives for an industry where financing and constructing new facilities takes on average 5 to 6 years.

New tax incentives can grow robust biobased innovation economy which will create high value careers and new income streams for American farmers and rural communities, revitalize domestic manufacturing jobs, lessen our dependence on fossil fuels, and reduce greenhouse gas emissions.

Renewable Chemical and Biobased Products

Renewable chemicals and biobased products offer similar opportunities. A recent report estimates that the global sustainable chemical industry will grow to \$1 trillion, which provides an important opportunity for U.S. job and export growth. Currently, the industry is estimated to be only 7 percent of its future projected size. U.S. companies traditionally make-up about 19 percent of the traditional global chemical industry. If U.S. companies capture the same percentage of the sustainable chemical industry as it grows to \$1 trillion, BIO anticipates 237,000 direct U.S. jobs and a trade surplus within the chemical sector.¹

Renewable chemicals and biobased products derived from renewable biomass represent a historic opportunity for revitalization of U.S. chemical manufacturing. The U.S. has the potential to become the world leader in renewable chemicals and biobased product manufacturing, as we are currently home to most of the world's advanced renewable chemicals technology and intellectual property and have access to a wide range of sustainably produced renewable biomass. An investment in renewable chemicals will pay strong dividends in the future of U.S. chemical manufacturing while advancing the goals of quality domestic job creation and domestic advanced manufacturing, improved trade balance, and maintaining U.S. leadership in clean energy and manufacturing technologies.

The shift to renewable biomass feedstocks from traditional fossil feedstocks increases energy efficiency, reduces costs and reduces reliance for foreign oil. Volatile crude oil prices create an unstable price structure for traditional fossil-based chemicals and resulting products. Renewable chemicals can be cost competitive and maintain stable pricing, allowing businesses to plan for the long-term and pass savings to consumers. Renewable chemical processes can also prevent pollution before it ever occurs and remediate existing pollution, improving pollution in the environment. For example, many renewable chemicals are carbon negative on a lifecycle basis, sequestering atmospheric carbon within the chemical/product itself. The World Wildlife Fund (WWF) recently concluded that these industrial biotechnologies have the potential to save up to 2.5 billion tons of carbon dioxide equivalent emissions per year by 2030.

To realize the full potential of the domestic renewable chemicals industry, existing renewable energy, manufacturing, or environmental tax incentive regimes should be opened to renewable chemicals. Renewable chemicals and biobased plastics represent an important technology platform for reducing reliance on petroleum, creating U.S. jobs, increasing energy security, and reducing greenhouse gas emissions. By providing a federal income tax credit for domestically produced renewable chemicals, Congress can create domestic jobs and other economic activity, and can help secure America's leadership in the important arena of green chemistry. Like current

¹*Biobased Chemicals and Products: A New Driver of U.S. Economic Development and Green Jobs*, BIO, available at: http://www.bio.org/sites/default/files/20100310_biobased_chemicals.pdf.

law for renewable electricity production credits, the credits would be general business credits available for a limited period per facility. Industrial biotechnology enables the production of renewable chemicals and biobased products from biomass, and the total displacement of fossil fuel products can be accelerated with an investment or production tax credit. The Renewable Chemicals Act of 2015, S. 2271, and House companion H.R. 3390, offers a strong model for implementation of this proposal.

Conclusion

BIO supports the efforts underway to update, level-set and innovate the U.S. tax code, particularly as it applies to innovation sectors such as advanced biofuels, renewable chemicals and biobased products. To truly achieve energy security, the U.S. must develop biorefineries that produce alternatives to all of the products made from each barrel of oil. The provisions above are essential ingredients in any effort to accelerate the commercialization of advanced biofuels, renewable chemicals and biobased products. We ask that you include these provisions in any energy, advanced manufacturing, or environmental tax package.

Thank you.

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June 15, 2016

The Honorable Orrin Hatch
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The Honorable Ron Wyden
Ranking Member
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RE: Section 179D Tax Deduction for Energy Efficient Buildings

Dear Chairman Hatch and Ranking Member Wyden:

As the Committee considers the future of energy tax policy, I write you on behalf of Boland Trane Services, Inc. to urge a multiyear extension of the Section 179D tax deduction for energy efficient commercial and multifamily buildings, with the bipartisan refinements to the provision included in S. 1946, the Tax Relief Extension Act of 2015. Section 179D is scheduled to expire on December 31, 2016, and certainty about this important tax policy's future is critical. On behalf of Boland Trane Services, Inc. I respectfully request that Section 179D be addressed as part of the first moving vehicle.

Boland Trane supports the Committee's efforts to reform the tax code, and believes any reform must reflect the important relationship between the reduction of energy consumption and tax policy. Of particular importance to Boland Trane is the continuation of the Section 179D deduction for commercial energy efficient property, which delivers demonstrated and widespread benefits to the U.S. economy.

Section 179D provides a tax deduction to help offset some of the high costs of energy efficient components and systems for commercial and larger multifamily buildings. The 179D deduction has leveraged billions of dollars in private capital, resulted in the energy-efficient construction of thousands of buildings, and created and preserved hundreds of thousands of jobs. It has lowered demands on the power grid, moved our country closer to energy independence, and reduced carbon emissions.

Reducing energy consumption through public policy initiatives, like the 1790 tax deduction for efficient lighting, HVAC, and building envelope improvements, is and should remain a critical element of our nation's energy strategy. Tax incentives promoting energy efficiency, such as Section 179D, generate the greatest impact in terms of value to the taxpayer and are a critical tool in advancing the country's energy conservation and security goals.

The Section 179D deduction enables accelerated cost recovery (depreciation) of energy efficiency investments made by commercial building owners, and assists de-

signers of efficiency systems to develop advanced technologies that reduce energy waste. It does not reward the taxpayer simply for making an investment; rather, the deduction requires the achievement of verifiable reductions in energy usage. In its rules implementing this section of the code, the Internal Revenue Service requires inspection and testing of the energy efficiency (EE) project by qualified individuals to ensure the project qualifies for the deduction.

Section 179D advances our nation's energy policy priorities in a prudent and cost-effective manner:

- **Economic Value:** Utilizing the §179D deduction creates additional economic value for building owners and has contributed to the increased use of energy efficient building design strategies resulting in the retrofit of energy inefficient aging buildings, many with significant deferred maintenance problems. In addition, the dollars saved on energy costs by businesses through efficiency improvements can be reinvested in areas that produce greater economic activity.
- **Job Creation:** Section 179D serves as an engine of economic growth that generates job creation in a variety of industry sectors. The incremental energy efficiency projects enabled by the availability of this tax deduction create and sustain more jobs in the construction, engineering, manufacturing, and design sectors and reduce the need for investment in new energy supplies and production.
- **Encourages Efficiency Improvements to Building Stock:** The §179D deduction encourages energy efficiency improvements to aging building stock, which otherwise may be neglected, by allowing for accelerated cost recovery of energy efficiency investments. Without §179D, energy efficiency retrofits are depreciated over a longer period of time as capital expenses. The acceleration of energy efficient building design and retrofits of inefficient aging buildings generates deep savings in building energy costs, significantly reduces energy demand, and lowers the emissions of greenhouse gases—all of which benefit the nation's energy security and clean energy priorities. In terms of value, efficiency is a far more cost effective means of meeting energy demand than is the generation of a new unit of energy.
- **Technology Driver:** The §179D deduction rewards achievement of significant energy savings regardless of the technology used to achieve those savings and places a premium on implementation of more sophisticated technologies. The incentive supports the modernization of aging U.S. building stock and enhances the overall performance of our nation's building infrastructure.

Repealing the tax incentive for energy efficient commercial property undermines the significant advancements made to date in modernizing our nation's building stock. In fact, the expiration of the deduction in December 2014, despite its retroactive reinstatement in December 2015, resulted in tremendous uncertainty on the part of commercial building owners, as well as the energy services companies and other industry providers whose businesses are directly tied to developing and implementing efficiency retrofits. Additionally, removing the only incentive that provides accelerated treatment for commercial efficiency property could result in a strong disincentive to invest in efficiency improvements. The tax code allows commercial businesses the ability to immediately deduct money spent on energy consumption (utility bills) as an ordinary and necessary business expense, while without Section 179D the cost of efficiency improvements would be depreciated over many years. This asymmetry in the tax code is successfully addressed through the 179D deduction. Eliminating the 179D provision brings back the economic bias in favor of higher energy costs created by, in many cases, the wasteful use of energy that could have been avoided through the use of energy efficient technologies.

In short, Boland Trane Services, Inc. strongly believes Section 179D should remain a permanent component of a reformed tax code. Importantly, Section 179D complements the goals of tax reform by delivering economic growth, job creation, and enhanced economic competitiveness. If near-term enactment of comprehensive tax reform is not expected to be forthcoming, we strongly support an immediate, multi-year extension of Section 179D. An extension of Section 179D will provide needed certainty to the commercial and government building markets as well as the energy services company industry, and retain in the tax code the provision directed specifically at stimulating energy savings through investments in efficiency retrofits in the commercial building sector. Any discussion of energy tax policy is incomplete without a robust consideration of energy efficiency, and prudent and effective efficiency incentives—such as Section 179D—belong permanently in a reformed tax code.

Sincerely,

Sean Boland
Vice President

BUSINESS COUNCIL FOR SUSTAINABLE ENERGY (BCSE)
805 15th Street, NW, Suite 708
Washington, DC 20005
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The Business Council for Sustainable Energy urges Congress to quickly move forward to enact legislation to provide durable tax policy promoting clean energy. Current law provides a mix of tax incentives for production of clean energy and investment in plant property to a variety of technologies. The inconsistent level of the current incentives, the duration of the provisions, and the definitions of the technologies, however, do not reflect a comprehensive energy policy. While the Congress made significant inroads on tax policy at the end of 2015, much remains to be done in this important sector.

BCSE is a coalition of companies and trade associations from the energy efficiency, natural gas and renewable energy sectors, and also includes independent electric power producers, investor-owned utilities, public power, and commercial end users. Founded in 1992, the Council advocates for policies that expand the use of commercially available clean energy technologies, products and services. The coalition's diverse business membership is united around the continued revitalization of the economy and the creation of a secure and reliable energy future in America.

The 2016 spending bill enacted at the end of 2015 included a 5-year extension of the Production Tax Credit (PTC) for wind power and a 5 year extension of the Investment Tax Credit (ITC) for solar, with gradual ramp-down of these credits. BCSE is pleased that the solar and wind sectors received a long-term extension of these credits, as well as language that will enable them to be used when construction on a project starts. Having stable tax policy for these industries is providing predictable market conditions, which enables them to grow, reduce costs and attract investment.

Additionally, the Protecting American Taxpayers and Homeowners (PATH) Act, enacted at the end of 2015, extended incentives for energy efficiency to December 31, 2016. However, incentives for the non-wind and non-solar technologies that currently access the PTC and ITC will expire on December 31, 2016, if Congress does not take action. These technologies include: combined heat and power, microturbines, fuel cells, small wind, biomass, geothermal, landfill gas, waste to energy, hydropower, marine and hydrokinetic.

In order to maintain a diverse portfolio of beneficial clean energy technologies it is critical that Congress formulate and enact the stable, long-term tax policy framework that will support the deployment and use of clean energy technologies in a meaningful way. Energy tax incentives should be established in such a way that the tax benefits are provided to all qualifying technologies in accordance with the energy, environmental and other public benefits they generate. Additionally, it is important that any such changes establish a sufficient duration to provide investors with the confidence they need to proceed with major investments.

BCSE looks forward to working with Congress to achieve this objective.

For further information or questions, please contact Lisa Jacobson, President, Business Council for Sustainable Energy at ljacobson@bcse.org.

CAPITAL REVIEW GROUP (CRG)
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Phoenix, AZ 85016
877-666-5539
<http://CapitalReviewGroup.com>

Dear Chairman Hatch and Ranking Member Wyden:

We are writing to you today in regards to the Committee on Finance Hearing titled "Energy Tax Policy in 2016 and Beyond." As you seek ways to grow our economy and create jobs, we strongly urge a multi-year extension of the § 179D tax deduction for energy-efficient commercial and multifamily buildings at the earliest opportunity before it expires on December 31, 2016.

Our company, Capital Review Group, is a specialized tax consulting firm with 10 employees. Through our unique combination of expertise in facility engineering and tax accounting, we help clients such as architects, engineers, and commercial building owners reduce their tax burdens. The §179D deduction is one of the most beneficial incentives for our clients and the communities in which they are located. In our years of helping clients claim this deduction, we have consistently seen it serve as a powerful motivator for businesses to implement sustainable design. Given the typically expansive size of commercial buildings, energy-efficient upgrades like those incentivized by the §179D deduction can lead to a drastic reduction in energy consumption. While benefitting the environment and advancing our nation's energy security, the §179D deduction also generates substantial savings that taxpayers may reinvest in their businesses, thus bolstering their local economies.

As you know, 179D directly supports two national priorities: Job Creation and Energy Independence. Section 179D was introduced into the tax code with the Energy Policy Act of 2005. It has been extended four times and will expire on December 31, 2016. Since the inception of 179D, it has assisted thousands of building owners and tenants in retaining jobs and increasing profitability; it has also increased job creation in the trades, where energy efficiency retrofits create large numbers of high paying jobs for a labor pool that was particularly impacted by the economic downturn. At the same time, 179D helps reduce our nation's dependence on foreign oil, thereby increasing America's energy security.

Jobs

Energy efficiency projects require enormous skilled and semi-skilled work forces. By cost-justifying projects, EPAAct therefore plays a direct role in supporting a major source of employment in our state.

Lighting retrofits require lighting designers, laborers to remove and dispose existing fixtures, distribution centers to store the new lighting material, laborers to stage the new material near the job site and electricians to install the new fixtures.

HVAC retrofits require engineers for project system design, substantial U.S. manufacturing activity (most HVAC equipment is heavy and made in the U.S.), U.S. steel procurement and HVAC mechanics to install.

The building envelope involves a wide variety of manufactured and workshop materials including roofs, walls, windows, doors, foundations and insulation. In addition to the labor required to create these products, large numbers of roofers, carpenters, installers and laborers are needed to handle the material and incorporate it into a building.

In addition, reduced building expenses allow for the retention of jobs on the building owners' end.

Energy Security

Our nation's goal of becoming energy independent cannot be achieved through domestic oil and natural gas production alone. Energy Efficiency is an untapped natural resource. Commercial Buildings represent 20% of our nation's energy use. "Drilling" for building energy efficiency is the least costly natural resource we have. For building owners, the up-front cost of retrofitting is expensive, but with utility and government assistance working together with building owners, energy use reductions between 20% and 50% can be obtained.

Commercial building energy efficiency is a critical way by which utilities can meet newly established national guidelines for carbon emission reductions. By improving the cost benefit equation of an energy efficiency retrofit, Section 1790 thereby plays an important role in helping utilities comply with national policy while simultaneously reducing the need for the construction of costly new power plants.

Looking Ahead

Today, taxpayers and industry understand how to prospectively use 1790 to achieve the greatest possible energy reduction far better than they did 8 years ago. This extension will empower our country to realize major energy efficiency gains and will not represent a material cost to Treasury. With the use of dynamic scoring the efficiency gains will increase taxable income over time for commercial building owners, and thereby reducing Treasury's losses from accelerating the depreciation. The tax collected from added profits obtained through energy savings quickly outweighs the foregone tax revenue created by 1790.

Conclusion

Section 1790 supports a key investment in the American economy: energy efficiency. Energy efficiency is a force-multiplying investment that saves energy, saves money, and sustains and creates American jobs. Comprehensive energy efficiency upgrades drastically improve the reliability and performance of the nation's building stock, while reducing demand on our energy supply. We urge you to include multi-year extension of EAct 1790 in upcoming legislation.

Sincerely,

Capital Review Group

THE CENTER FOR FISCAL EQUITY

14448 Parkvale Road
Rockville, Maryland 20853

Comments for the Record by Michael Bindner

Chairman Hatch and Ranking Member Wyden, thank you for the opportunity to submit our comments on this topic. Our comments are largely a restatement of those provided in December of 2012 on the same topic, with updating as appropriate. As usual, our comments are based on our four-part tax reform plan, which is as follows:

- A Value Added Tax (VAT) to fund domestic military spending and domestic discretionary spending with a rate between 10% and 13%, which makes sure very American pays something.
- Personal income surtaxes on joint and widowed filers with net annual incomes of \$100,000 and single filers earning \$50,000 per year to fund net interest payments, debt retirement and overseas and strategic military spending and other international spending, with graduated rates between 5% and 25% in either 5% or 10% increments. Heirs would also pay taxes on distributions from estates, but not the assets themselves, with distributions from sales to a qualified ESOP continuing to be exempt.
- Employee contributions to Old-Age and Survivors Insurance (OASI) with a lower income cap, which allows for lower payment levels to wealthier retirees without making bend points more progressive.
- A VAT-like Net Business Receipts Tax (NBRT), essentially a subtraction VAT with additional tax expenditures for family support, health care and the private delivery of governmental services, to fund entitlement spending and replace income tax filing for most people (including people who file without paying), the corporate income tax, business tax filing through individual income taxes and the employer contribution to OASI, all payroll taxes for hospital insurance, disability insurance, unemployment insurance and survivors under age 60.

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 this time 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 pro-

ducers. 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 busses 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.

In the event of comprehensive tax reform, the excise for fuel would be either a component of or an addition to any broad based Value Added or VAT-like Net Business Receipts Tax. The excise should not disappear into such a general tax, as doing so would have the effect of forcing all businesses to fund transportation on an equal percentage, regardless of their use of such infrastructure. Of course, like a VAT, any gasoline excise would be accounted for using the credit receipt method, so that cascading taxes would not occur, as they do now with this excise functioning as hidden levy.

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.

Oddly enough, because the Center does not mention carbon taxes or cap and trade in our standard proposal, liberal commentators on Daily Kos criticize its lack and assume we don’t believe in them at all. This is far from the case, as our proposals say nothing about replacing such taxes with our proposed VAT and NBRT. Our proposal is to replace low and mid-rate income taxes, corporate income taxes and non-OASI payroll taxes with these revenues. We simply don’t touch the question of any other excise. This shows how much the fortunes of energy taxes have changed since Vice President Gore suggested their inclusion in President Clinton’s tax proposals.

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 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 Net Business Receipts 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 Net Business Receipts Tax, 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 very justified 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 a business receipts tax, 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 both a VAT and an NBRT 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 NBRT 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 VAT and the NBRT, 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 NBRT 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 preserved—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 is 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.

The last subsidy issue involves the use of a Value Added Tax as an oil import fee. If the VAT replaces some percentage of current employee and investor income taxes, domestically produced energy products become more competitive on the world market, provided that the VAT is border adjustable, which it would be. For example, if Alaska crude is shipped to Japan for refining and use or western low-sulfur coal is shipped to China, it would be cheaper than the same product shipped under today's tax system.

The NBRT would not be border adjustable because it is designed to pay for entitlement costs which benefit employees and their families directly, so that it is appropriate for the foreign beneficiaries of their labor to fund these costs. Additionally, the ultimate goal of enacting the NBRT is to include tax expenditures to encourage employers to fund activities now provided by the government—from subsidies for children to retiree health care to education to support for adult literacy. Allowing this tax to be zero-rated at the border removes the incentive to use these subsidies, keeping government services in business and requiring higher taxation to support the governmental infrastructure to arrange these services—like the Committee on Finance.

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.

COALITION TO EXTEND AND IMPROVE THE 179D TAX DEDUCTION
FOR ENERGY EFFICIENT BUILDINGS

June 13, 2016

The Honorable Orrin Hatch
Chairman
Committee on Finance
U.S. Senate
219 Dirksen Senate Office Building
Washington, DC 20510

The Honorable Ron Wyden
Ranking Member
Committee on Finance
U.S. Senate
219 Dirksen Senate Office Building
Washington, DC 20510

Dear Chairman Hatch and Ranking Member Wyden:

As the Committee considers the future of energy tax policy, we write to urge a multi-year extension of the Section 1790 tax deduction for energy efficient commercial and multifamily buildings, with the bipartisan refinements to the provision included in S. 1946, the Tax Relief Extension Act of 2015. Section 1790 is scheduled to expire on December 31, 2016 and certainty about this important tax policy's future is critical. We respectfully request that Section 179D be addressed as part of the first moving vehicle.

Our organizations and companies represent a broad spectrum of the U.S. economy. They include real estate, manufacturing, architecture, contracting, engineering, building services, financing, labor, education, environmental and energy efficiency advocates. We represent many small businesses that drive and sustain American job growth.

Section 179D provides a tax deduction to help offset some of the high costs of energy efficient components and systems for commercial and larger multifamily buildings. The 179D deduction has leveraged billions of dollars in private capital, resulted in the energy-efficient construction of thousands of buildings, and created and preserved hundreds of thousands of jobs. It has lowered demands on the power grid, moved our country closer to energy independence, and reduced carbon emissions.

The bipartisan, broadly-supported amendments proposed to Section 179D as part of S. 1946 would strengthen it by allowing tribal governments and non-profits to allocate the deduction to designers. Having been approved by the Senate Finance Committee twice, these common-sense modifications have been carefully analyzed, thoroughly vetted, and should be enacted.

We also favor improvements to the 179D deduction to better enable retrofits for buildings owned and managed by private sector owners, and encourage that any ex-

tenders package incorporate the common sense, technology neutral, and performance based provisions, such as those offered by Senators Cardin, Feinstein, and Schatz in title I of S. 2189 filed last Congress.

These provisions provide a sound policy bridge to comprehensive tax reform efforts, as Section 179D is fully consistent with reform priorities. In particular, by allowing businesses to accelerate cost recovery, Section 179D stimulates greater capital investment. This dynamic is an engine of economic growth for communities across the country.

We strongly urge Congress to ensure that Section 179D continues to drive growth and innovation by extending this important provision at the earliest possible opportunity before its expiration on December 31, 2016 and by making the refinements proposed in S. 1946. Thank you for your consideration and leadership on this important issue.

Sincerely,

ABM Industries	Acuity Brands	Advanced Energy Economy
Air Barrier Association of America	Air Conditioning Contractors of America	Air-Conditioning, Heating, and Refrigeration Institute
Alliance for Industrial Efficiency	Alliance to Save Energy	Alliantgroup, LLC
Ameresco	American Council for an Energy-Efficient Economy	American Council of Engineering Companies
American Gaming Association	American Gas Association	American Institute of Architects
American Public Gas Association	American Resort Development Association	American Society of Interior Designers (ASID)
APPA—Leadership in Educational Facilities	Appraisal Institute	ASHRAE
Associated General Contractors of America	Big Ass Solutions	BLUE Energy Group
Brady Services Inc.	Building Owners and Managers Association (BOMA) International	CCIM Institute
Chestnut Hill South, LLC	Concord Energy Strategies	Consolidated Edison Solutions
Consolidated Energy Solutions	D Squared Tax Strategies	Eaton
Energy Future Coalition	Energy Systems Group	Energy Tax Savers, Inc.
Environmental Defense Fund	Franklin Construction, LLC	Green Business Certification Inc.
Green Light National	Howard J. Moore Company Inc.	Independent Electrical Contractors
Ingersoll Rand	Insulation Contractors Association of America	Institute for Market Transformation (IMT)
Institute of Real Estate Management	International Council of Shopping Centers	International Union of Painters and Allied Trades
Johnson Controls, Inc.	KeyStone Energy	Legrand
Lexicon Lighting Technologies	LightPro Software, LLC	LuNex Lighting
McKinstry Essention, LLC	Mechanical Contractors Association of America (MCAA)	Metrus Energy, Inc.
Micromega Systems, Inc.	Mix Avenue, LLC	NAIOP, the Commercial Real Estate Development Association
North American Insulation Manufacturers Association	National Apartment Association	National Association of College and University Business Officers
National Association of Electrical Distributors	National Association of Energy Service Companies (NAESCO)	National Association of Home Builders
National Association of Real Estate Investment Trusts	National Association of REALTORS®	National Association of State Energy Officials (NASEO)
National Electrical Contractors Association (NECA)	National Electrical Manufacturers Association (NEMA)	National Leased Housing Association (NLHA)
National Multifamily Housing Council	National Roofing Contractors Association	Natural Resources Defense Council
North Haven Health and Racquet, LLC	OpTerra Energy Services	Osram Sylvania

Owens Corning	Pathfinder Engineers and Architects	Plumbing-Heating-Cooling Contractors—National Association
PMH Associates, Inc.	Polyisocyanurate Insulation Manufacturers Association	PowerDown Holdings, Inc.
PowerDown Lighting Systems, Inc.	Rampart Partners LLC	RB+B Architects, Inc.
Real Estate Board of New York	Sheet Metal and Air Conditioning Contractors' National Association	Sheet Metal Workers' International Association, a division of S.M.A.R.T. (International Association of Sheet Metal, Air, Rail and Transportation Workers)
Saybrook Point Inn, LLC	Saybrook Point Marina, LLC	Sierra Club
Society of Industrial and Office REALTORS®	Sustainable Performance Solutions	TecnerG, LLC
TerraLUX	The Real Estate Roundtable	Trio Electric
Tri-State Light & Energy, Inc.	U.S. Green Building Council	Window and Door Manufacturers Association

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June 13, 2016

Senate Committee on Finance
Dirksen Senate Office Bldg.
Washington, DC 20510-6200

RE: Section 179D Energy Efficient Commercial Buildings Deduction Should Be Extended

Dear Chairman Hatch and Ranking Member Wyden:

We are writing to you today in regards to the Committee on Finance Hearing titled "Energy Tax Policy in 2016 and Beyond." As you seek ways to grow our economy and create jobs, we strongly urge a multi-year extension of the Section 179D tax deduction for energy efficient commercial and multifamily buildings at the earliest opportunity before it expires on December 31, 2016.

Our company, Concord Engineering Group, Inc., is a full service engineering and energy consulting firm specializing in energy efficiency, LEED certified sustainable building design, power plant design and transmission and distribution electrical design. Our firm is heavily involved in distributed generation and combined heat and power, as well as energy efficient system design using heating and air conditioning (HVAC), lighting, plumbing and fire protection systems. We service the public and not-for-profit sector primarily. As a small business with 80 employees we have been able to monetize many projects using Section 179D. This has been a catalyst for public sector interest in energy efficiency since it allows the engineering and consulting fees to be supplemented by the tax deductions.

Extending the deduction to not-for-profits is critical to enticing hospitals and other healthcare institutions to embrace energy efficiency. By including not-for-profit institutions, engineering companies like ours who specialize in this type of work can better justify the expense of working in a volatile and sometimes unfriendly work place where lowest cost often justifies the design and the lowest fee gets the job. Too often the lowest fee is not the most efficient design.

As you know, 179D directly supports two national priorities: Job Creation and Energy Independence. 179D was introduced into the tax code with the Energy Policy Act of 2005. It has been extended four times and will expire on December 31, 2016. Since the inception of 179D, it has assisted thousands of building owners and tenants in retaining jobs and increasing profitability; it has also increased job creation in the trades, where energy efficiency retrofits create large numbers of high paying jobs for a labor pool that was particularly impacted by the economic downturn. At

the same time, 179D helps reduce our nation's dependence on foreign oil, thereby increasing America's energy security.

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Commercial building energy efficiency is a critical way by which utilities can meet newly established national guidelines for carbon emission reductions. By improving the cost benefit equation of an energy efficiency retrofit, Section 179D thereby plays an important role in helping utilities comply with national policy while simultaneously reducing the need for the construction of costly new power plants.

Looking Ahead

Today, taxpayers and industry understand how to prospectively use 179D to achieve the greatest possible energy reduction far better than they did 8 years ago. This extension will empower our country to realize major energy efficiency gains and will not represent a material cost to Treasury. With the use of dynamic scoring the efficiency gains will increase taxable income over time for commercial building owners, and thereby reducing Treasury's losses from accelerating the depreciation. The tax collected from added profits obtained through energy savings quickly outweigh the foregone tax revenue created by 1790.

Conclusion

Section 179D supports a key investment in the American economy: energy efficiency. Energy efficiency is a force-multi plying investment that saves energy, saves money, and sustains and creates American jobs. Comprehensive energy efficiency upgrades drastically improve the reliability and performance of the nation's building stock, while reducing demand on our energy supply. We urge you to include multi-year extension of EPAct 179D in upcoming legislation.

Sincerely,
Concord Engineering
Michael Fischette, CEO

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June 14, 2016

Senate Committee on Finance
Dirksen Senate Office Bldg.
Washington, DC 20510-6200

RE: Section 179D Energy Efficient Commercial Buildings Deduction Should Be Extended

Dear Chairman Hatch and Ranking Member Wyden:

We are writing to you today in regards to the Committee on Finance Hearing titled “Energy Tax Policy in 2016 and Beyond.” As you seek ways to grow our economy and create jobs, we strongly urge a multi-year extension of the Section 179D tax deduction for energy efficient commercial and multifamily buildings at the earliest opportunity before it expires on December 31, 2016.

Our company, Controlled Air, Inc. founded in 1980, is a family-owned and operated heating, ventilation, air conditioning and temperature controls company. We have approximately 80 employees. We have always been on the forefront of technology, bringing sophisticated and energy efficient solutions to the challenges of today’s complex application. We receive a substantial number of high efficiency generated projects *i.e.*, Cogeneration, etc. due in part of Sec 179D. Controlled Air and our customers would be deeply affected if EPAct 179D is not extended.

As you know, 179D directly supports two national priorities: Job Creation and Energy Independence. Section 179D was introduced into the tax code with the Energy Policy Act of 2005. It has been extended four times and will expire on December 31, 2016. Since the inception of 179D, it has assisted thousands of building owners and tenants in retaining jobs and increasing profitability; it has also increased job creation in the trades, where energy efficiency retrofits create large numbers of high paying jobs for a labor pool that was particularly impacted by the economic downturn. At the same time, 179D helps reduce our nation’s dependence on foreign oil, thereby increasing America’s energy security.

Jobs

Energy efficiency projects require enormous skilled and semi-skilled work forces. By cost-justifying projects, EPAct therefore plays a direct role in supporting a major source of employment in our state.

Lighting retrofits require lighting designers, laborers to remove and dispose existing fixtures, distribution centers to store the new lighting material, laborers to stage the new material near the job site and electricians to install the new fixtures.

HVAC retrofits require engineers for project system design, substantial U.S. manufacturing activity (most HVAC equipment is heavy and made in the U.S.), U.S. steel procurement and HVAC mechanics to install.

The building envelope involves a wide variety of manufactured and workshop materials including roofs, walls, windows, doors, foundations and insulation. In addition to the labor required to create these products, large numbers of roofers, carpenters, installers and laborers are needed to handle the material and incorporate it into a building.

In addition, reduced building expenses allow for the retention of jobs on the building owners’ end.

Energy Security

Our nation’s goal of becoming energy independent cannot be achieved through domestic oil and natural gas production alone. Energy Efficiency is an untapped natural resource. Commercial Buildings represent 20% of our nation’s energy use. “Drilling” for building energy efficiency is the least costly natural resource we have. For building owners, the up-front cost of retrofitting is expensive, but with utility and government assistance working together with building owners, energy use reductions between 20% and 50% can be obtained.

Commercial building energy efficiency is a critical way by which utilities can meet newly established national guidelines for carbon emission reductions. By improving the cost benefit equation of an energy efficiency retrofit, Section 179D thereby plays an important role in helping utilities comply with national policy while simultaneously reducing the need for the construction of costly new power plants.

Looking Ahead

Today, taxpayers and industry understand how to prospectively use 179D to achieve the greatest possible energy reduction far better than they did 8 years ago.

This extension will empower our country to realize major energy efficiency gains and will not represent a material cost to Treasury. With the use of dynamic scoring the efficiency gains will increase taxable income over time for commercial building owners, and thereby reducing Treasury's losses from accelerating the depreciation. The tax collected from added profits obtained through energy savings quickly outweigh the foregone tax revenue created by 179D.

Conclusion

Section 179D supports a key investment in the American economy: energy efficiency. Energy efficiency is a force-multiplying investment that saves energy, saves money, and sustains and creates American jobs. Comprehensive energy efficiency upgrades drastically improve the reliability and performance of the nation's building stock, while reducing demand on our energy supply. We urge you to include multi-year extension of EAct 179D in upcoming legislation.

Sincerely,

Vincent Chiochio, President

ELECTRIC DRIVE TRANSPORTATION ASSOCIATION (EDTA)

STATEMENT OF GENEVIEVE CULLEN, PRESIDENT

The Electric Drive Transportation Association (EDTA) is the cross-industry trade association promoting the advancement of electric drive technology and electrified transportation. Our members represent the entire value chain of electric drive, including vehicle manufacturers, battery and component manufacturers, utilities and energy companies, and smart grid and charging infrastructure developers. Collectively, we are committed to realizing the economic, national security, and environmental benefits of replacing oil with hybrid, plug-in hybrid, battery, and fuel cell electric vehicles.

Oil provides 93% of the energy used for transportation in the United States. Around one-third of the oil we use is imported, costing our economy roughly \$192 billion annually. Even with reduced imports, our energy and economic security continue to be threatened by oil dependence. Our transportation sector is fueled almost wholly by a single commodity whose price is set by the global market and whose availability is subject to significant geopolitical uncertainty. As the Department of Energy (DOE) documents, the majority of the world's oil reserves are concentrated in the Middle East; approximately 73% of those reserves are controlled by the Organization of the Petroleum Exporting Countries (OPEC) members.

On a microeconomic level, by using electricity as an alternative fuel source, American families can benefit from significant savings and be insulated from volatile petroleum fuel prices that rise and fall with the world oil market. Even when the price at the pump is relatively low, electricity costs are lower—and more stable. On average, driving on electricity costs the equivalent of a dollar per gallon of gasoline.

As part of a portfolio of policies promoting fuel diversity, tax incentives for electric drive vehicles and infrastructure accelerate innovation and investment in technologies that strengthen our economy, reduce our vulnerability to volatile global markets, and provide sustainable transportation alternatives.

In addition, the emerging electric drive value chain is creating jobs in research, development and manufacturing of advanced components and vehicles, recharging and refueling infrastructure, and consumer services.

The incentives also advance national and regional efforts to establish energy and environmental security through fuel diversity. According to the National Research Council, reducing greenhouse gas emissions from light-duty vehicles by 80% by 2050 can best be achieved with strategies that lead to the large-scale commercialization of zero-emission vehicles—both hydrogen fuel cell vehicles (FCVs) and plug-in electric vehicles (PEVs). The same study estimated that the public and private benefits resulting from the large-scale deployment of FCVs and PEVs would exceed the costs by an order of magnitude.¹

¹Zero Emission MAP: The Effect of Monetary Incentives on Sales of Advanced Clean Cars in the United States: Summary of the Evidence by Gustavo Collantes and Anthony Eggert, University of California–Davis, September 1, 2014.

Eight states have signed a Memorandum of Understanding to deploy 3.3 million Zero-Emission Vehicles by 2025. Federal investment incentives reduce the initial costs of advanced technologies and help new industries to achieve economies of scale that lead to the large-scale commercialization needed to achieve these goals.

A comprehensive tax reform effort should include tax policies that grow U.S. competitiveness and enhance our energy and environmental security. In the interim, it is critically important to extend the incentives that are currently promoting investment in emerging transportation technologies.

Extending the Section 30C Alternative Fuel Vehicle Refueling Property Credit.

To promote growth in the electric vehicle market, electric vehicle infrastructure must expand as well. This technology-neutral credit helps individuals and businesses invest in the refueling/recharging infrastructure that supports electric, fuel cell, and other alternative fuel vehicle needs.

The federal infrastructure credit is an effective, low-cost incentive that supports investment in electric drive and other alternative fuel vehicles. Plug-in electric drive vehicles entered the market in December 2010, with sales growing to a cumulative total approaching half of a million on the road today. In the same time period, charging stations open to the public have grown to almost 14,000 charging stations, with more than 33,000 charging outlets, in the United States.²

This is a strong start, but the industry is still in its infancy, and hurdles for new technology in this segment are high. A multi-year extension of the credit would provide the necessary certainty to reinforce private investment across the electric and alternative fuel markets, growing investment in vehicles and technology and speeding the establishment of integrated alternative transportation systems.

Extending the Section 30B Incentive for Fuel Cell Electric Vehicles.

Fuel cells utilize hydrogen to produce electricity. FCEVs are zero-emission vehicles—they produce no tailpipe pollution except water vapor. In addition, compared to internal combustion vehicles, FCEVs greatly reduce greenhouse gas carbon emissions even when accounting for the full hydrogen fuel lifecycle. When using hydrogen generated from solar or wind electrolysis, total lifecycle CO₂ emissions are eliminated completely. FCEVs are up to three times more efficient than conventional vehicles, and when natural gas is used as a source for hydrogen, FCEVs are the most efficient way to use this abundant domestic resource in cars.

Electric drive vehicles, including FCEVs, are critical to meeting national and state clean transportation imperatives. Many of the world's leading automotive companies will begin mass production of FCEVs in the next couple of years, with Hyundai and Toyota already in the California market and Honda poised to enter the market in the fourth quarter of this year. As is often the case with breakthrough technologies, fuel cell vehicles have an initial cost hurdle. Mitigating this through a purchase incentive helps consumers acquire more efficient, cleaner running cars and encourages industry to invest in the supply chain.

The Section 30B credit, however, expires at the end of 2016—just as the fuel cell vehicle market is being established and as multiple companies are making market entry plans. The credit is a performance-based incentive for an advanced technology that is necessary to meet our goals for reducing petroleum dependence and fostering zero-emission transportation. Extending the credit, on the terms upon which manufacturers have relied, will help these advanced vehicle technologies establish a foothold in the market and provide additional clean vehicle options to consumers.

We look forward to working with this committee on comprehensive reform of the tax code. In the interim, we urge you to ensure the critical policies that support energy and economic security are maintained through expedited action on extenders legislation.

We thank you for the opportunity to submit our testimony and for your consideration.

²DOE station locator.

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Statement of Karl Gawell, Executive Director

Mr. Chairman, Ranking Member Wyden, and Members of the Committee, the Geothermal Energy Association is pleased to be able to submit this statement on the subject of “Energy Tax Policy in 2016 and Beyond.”

U.S. energy tax policy over the last several decades has attempted to address concerns over energy supply, the environment and national security by providing incentives for the production of renewable energy, energy efficiency, conservation and alternative energy production. In addition, tax incentives for the domestic production of fossil fuel also promote energy security by attempting to reduce the nation’s reliance on imported energy sources. The effect of these policies reduces our dependence on foreign oil, has also diversified our nation’s energy portfolio and helped our nation to become more energy independent.

It is important, however, that such incentives do not discriminate between renewable technologies and encourage growth for all proven sources of renewable energy.

Geothermal power was left out when Congress passed longer-term tax incentive legislation as part of the PATH Act of 2015. This was an unfortunate oversight for the Nation’s energy future. Developing our Nation’s geothermal potential is an investment in learning how to tap an enormous resource. To achieve stable growth in the geothermal industry, long-term, predictable incentives are needed to spur innovation, allow fair competition and boost new geothermal power growth.

New geothermal power plants that commence construction by December 31, 2016 can qualify for the Production Tax Credit or a 30% Investment Tax Credit. Geothermal power seeks parity under Section 48 with solar, whose 30% ITC was extended for 5 years with start of construction beginning by the end of 2019 and then phasing out through 2023. Without a leveling of this playing field for renewables, geothermal cannot compete fairly with solar and wind.

Utility-scale geothermal power generation has historically been part of the Section 48 Investment Tax Credit (“ITC”) along with solar. The Energy Policy Act of 2005 expanded the renewable technologies that were eligible for tax credits, and made them available to both new solar and geothermal facilities through either a 30% ITC or a 1.8 cent/kWhr Production Tax Credit (“PTC”). In 2009, ARRA eliminated this distinction by providing geothermal developers with the option of claiming a 30% ITC and having it paid in cash, in lieu of the Section 45 Production Tax Credit. During this time, many developers found that utilization of the 30% ITC was preferable to the PTC.

Both types of credits helped spur growth and innovation in the U.S. geothermal power industry:

- From 2006 to 2014, 34 geothermal power projects were completed in the United States, adding 678 MW of new capacity to the grid and growing the national industry by about 20%. This involved about \$3 billion in new investment, bringing economic development to rural areas of the West.
- This period of growth also spurred innovation. The years 2006 to 2014 saw the installation of a new advanced technology flash plant, the first triple flash plants, a new solar/geothermal hybrid plant, binary (ORC) power plants utilizing new, more efficient technology with non-carbon based working fluids, distributed power generation with building heating system, and co-produced power from oil/gas wells.
- From 2006–2014 the number of states producing geothermal power doubled. Alaska, California, Hawaii, Idaho, Nevada, New Mexico, North Dakota, Oregon and Utah are all geothermal power producers today.

In 2009, Congress also extended the credit for new solar facilities by 8 years to accommodate their long lead-times. Unfortunately, it did not provide the same time extension to utility-scale geothermal power plants. Instead, geothermal tax credits were extended in several short interval time periods over this period. Because geothermal facilities can take 5–7 years from beginning of drilling to commercial production, the effectiveness of the geothermal tax credits in the most recent years has

been limited because of the uncertainty created by the short tax credit extensions that have been enacted.

Extending geothermal power the 30% ITC on the same terms as solar will stimulate new development by providing a longer-term incentive with a gradual phase out. This will have many benefits, including:

Jobs: In addition to producing many drilling and construction jobs, geothermal power plants employ more permanent, on-site, full-time employees per unit produced than other renewable generation sources—about 2.13 persons per MW in the U.S. And in addition, consume more supplies and materials that increase the indirect jobs associated with geothermal power plants.

Economy Boost: In the U.S., over the course of 30 to 50 years an average 20 MW facility will pay nearly \$6.3 to \$11 million dollars in property taxes plus \$12 to \$22 million in annual royalties. Seventy-five percent of these royalties (\$9.2 to \$16.6M) go directly back to the state and county. Geothermal power plants are often located in rural, economically challenged areas and provide a significant economic input to the community.

Locally Produced: Geothermal power can offset electricity currently imported, keeping jobs and benefits in local communities.

Near-Zero Emissions: Binary geothermal plants—the most common in the U.S.—produce near-zero emissions.

Small Footprint: Geothermal has among the smallest surface land footprint per kilowatt (kW) of any power generation technology.

Baseload Reliability: Geothermal power provides consistent electricity throughout the day and year—continuous baseload power and flexible power to support the needs of variable renewable energy resources, such as wind and solar. No high cost backup or firming power is needed. Geothermal also provides the most efficient use of existing transmission infrastructure and provides grid stability.

Sustainable Investment: Energy resource decisions made now for sources of electric power have 40–50 year consequences, or longer. Using renewables like geothermal resources avoids “price spikes” inherent in fuel resource markets. Geothermal energy is an investment in stable, predictable costs. Investing in geothermal power now, pays off for decades to come.

The PATH Act extended Section 48’s 30% Investment Tax Credit for solar technologies beginning construction by 2019 and phasing out through 2023. Geothermal often competes with solar, particularly in states that have adopted renewable portfolio standards (RPS). Congress did not intend to legislate solar as the marketplace winner, which we are concerned may be the result if the current ITC imbalance is not addressed. Thus we urge the Committee to support parity between solar and geothermal. It would be fair, would engender healthy competition, and would continue to encourage innovation in these technologies.

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Senate Committee on Finance
Dirksen Senate Office Bldg.
Washington, DC 20510-6200

June 14, 2016

Dear Representative:

We are writing to you today in regards to the Subcommittee on Tax Policy’s recent member day hearing on tax legislation. We applaud the commitment voiced by Chairman Brady at the hearing to return to a regular order process for consideration of improvements to the tax code. As you seek ways to grow our economy and create jobs, we strongly urge a multi-year extension of the Section 179D tax deduction for energy efficient commercial and multifamily buildings at the earliest opportunity before it expires on December 31, 2016.

Our Company, Havtech Inc, an applied HVAC manufacturer's representative and engineering/energy conservation firm, with over 130 employees in the state of Maryland has been heavily involved in the reduction of energy consumption in many public facilities. These facilities consist mainly of public schools where our company, through energy saving recommendations, and use of energy saving equipment/systems, has been able to assist the state and counties with significant reduced operating costs, large energy consumption reductions, and large decreases in carbon footprint. The 179D program has been instrumental in allowing us to offer the public school systems extremely competitive energy solutions that would not have been possible otherwise. Without the 179D program at least 70–80 percent of the projects we have done would not have been economically viable. Significant projects that Havtech has seen through completion with great success for the 179D program include North East High School, Watkins Mill High School, and Diamond Elementary School—in the state of Maryland.

As you know, 179D directly supports two national priorities: Job Creation and Energy Independence. Section 179D was introduced into the tax code with the Energy Policy Act of 2005. It has been extended four times and will expire on December 31, 2016. Since the inception of 179D, it has assisted thousands of building owners and tenants in retaining jobs and increasing profitability; it has also increased job creation in the trades, where energy efficiency retrofits create large numbers of high paying jobs for a labor pool that was particularly impacted by the economic downturn. At the same time, 179D helps reduce our nation's dependence on foreign oil, thereby increasing America's energy security.

Jobs

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Energy Security

Our nation's goal of becoming energy independent cannot be achieved through domestic oil and natural gas production alone. Energy Efficiency is an untapped natural resource. Commercial buildings represent 20% of our nation's energy use. "Drilling" for building energy efficiency is the least costly natural resource we have. For building owners, the up-front cost of retrofitting is expensive, but with utility and government assistance working together with building owners, energy use reductions between 20% and 50% can be obtained.

Commercial building energy efficiency is a critical way by which utilities can meet newly established national guidelines for carbon emission reductions. By improving the cost benefit equation of an energy efficiency retrofit, Section 179D thereby plays an important role in helping utilities comply with national policy while simultaneously reducing the need for the construction of costly new power plants.

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Conclusion

Section 179D supports a key investment in the American economy: energy efficiency. Energy efficiency is a force-multiplying investment that saves energy, saves money, and sustains and creates American jobs. Comprehensive energy efficiency upgrades drastically improve the reliability and performance of the nation's building stock, while reducing demand on our energy supply. We urge you to include multi-year extension of EAct 179D in upcoming legislation.

Sincerely,

Norm Long, PE
President

HEARTH, PATIO, AND BARBECUE ASSOCIATION (HPBA)

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June 28, 2016

Senate Committee on Finance
Dirksen Senate Office Bldg.
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The Honorable Orrin Hatch
Chairman
Committee on Finance
U.S. Senate

The Honorable Ron Wyden
Ranking Member
Committee on Finance
U.S. Senate

Chairman Hatch and Ranking Member Wyden:

As the trade association representing manufacturers, retailers, distributors, and servicers of wood and pellet stoves and inserts, in addition to other sectors of the hearth, patio and barbecue industries, we are writing to urge your support for an extension of the residential energy efficiency 25(C) tax credit that will expire December 31, 2016. More specifically, we support the provision for energy efficient building property that provides a \$300 dollar-for-dollar credit for purchasing, among other products, biomass-fueled stoves that are at least 75 percent efficient. There is an inherent up-front cost to purchasing a new biomass stove, but there also exists a long-term gain for homeowners and communities.

This federal tax credit incentivizes consumers to make energy-conscious purchases that they otherwise may not have made. Furthermore, in light of new Environmental Protection Agency (EPA) regulations for new residential wood heaters, the first new regulations for this product category in over 20 years, this credit supports an industry that is making significant adjustments to their businesses and investing in R&D to comply with new testing and performance requirements. A stable, reliable tax credit for biomass stoves would help struggling small businesses make their products more marketable to a customer base that very badly needs such an incentive to even walk through the front door.

The on-again-off-again nature of this credit has made it very difficult for manufacturers and retailers to market the credit's availability to their customers. As such, the tax credit has frequently acted less like an incentive and more like a happy accident for those who were made aware of the credit after having already made a qualifying purchase. Only in 2009 and 2012 was the credit extended both retroactively and forward for the next fiscal year. With stability in this part of the tax code, more consumers, most of which are middle-class households, would actually be incentivized to make a qualifying purchase which is the purpose of a tax credit. In addition, the credit is particularly useful in areas of the country that are encouraging residents to change out an older, non-EPA-certified stove for a new EPA-certified stove in order to help meet air quality standards for particulate emissions. This is especially prominent in the areas of Logan, UT and Lakeview, OR as well as other regions of the U.S. with similar topographical features.

The Sec. 25(C) tax credit, first established by the Energy Policy Act of 2005, saw the addition of the provision for efficient biomass stoves upon passage of the Emergency Economic Stabilization Act of 2008. The American Recovery and Reinvest-

ment Act of 2009 (the “Stimulus Bill”) increased the credit amount from \$300 to \$1,500 making it a more robust credit for American taxpayers. Internal Revenue Service (IRS) data indicates that taxpayers reported spending \$25.1 billion in 2009 and \$26 billion in 2010 on remodeling costs associated with both qualified energy efficiency improvements and residential energy property costs.^{1,2} For small businesses, which make up the vast majority of this industry, that translates into more sales, service jobs, and satisfied customers—three key factors for growing a small business.

For tax years 2009 through 2012, over 92 percent of households that claimed the credit had an adjusted gross income (AGI) under \$200,000 and two-thirds of the households claiming the credit had an AGI of under \$100,000. During the same period of time, about 40 percent of households that claimed the credit had an AGI of under \$75,000.³ Clearly an incentive for middle class families, the credit helps reduce homeowners’ energy use, lowering their utility bills and increasing their home’s value.

The tax credit for purchasing a qualifying biomass stove has the potential to not only help U.S. taxpayers make an up-front purchase for a long term investment, but also to help a well-seasoned industry that is addressing the multitude of challenges that come with a new regulation. Some may argue that energy tax credits only serve to artificially support fledgling industries. That is not the case with the biomass stove industry. Manufacturers and retailers of wood and pellet stoves are almost all small businesses that are proud of the long tradition of their company and role in the development of the biomass stove industry. Today’s EPA-certified stoves are highly efficient, clean burning, are up to 50 percent more energy efficient than stoves made before 1990, and can use $\frac{1}{3}$ less wood for the same heat.⁴ The biomass stove industry and the EPA both strongly agree that the investment in a new EPA-certified stove is well worth the cost and adoption of these new technologies would be accelerated with the existence of a strong, stable biomass stove tax credit.

We urge you to renew the biomass stove tax credit, part of Sec. 25(C), as you consider tax policy reform and means by which to make energy tax credits more effective and beneficial for U.S. taxpayers. Thank you for your consideration of our request and we hope to be a resource to you and your staff as these discussions continue.

Sincerely,

Ryan Carroll
Director, Government Affairs

HEAT IS POWER ASSOCIATION (HiP)
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The Honorable Orrin Hatch
Chairman
Senate Committee on Finance
Washington, DC 20510

The Honorable Ron Wyden
Ranking Member
Senate Committee on Finance
Washington, DC 20510

June 24, 2016

Dear Chairman Hatch and Ranking Member Wyden:

The Heat is Power Association (HiP) appreciates this opportunity to provide comment on the Senate energy tax policy hearing held on June 14, 2016. HiP is the

¹ IRS Statistics of Income (SOI) Tax Stats—Individual Income Tax Returns, Line Item Estimates. 2009 (p. 128, line 4), 2010 (p. 130, line 4). Downloaded from: <https://www.irs.gov/uac/soi-tax-stats-individual-income-tax-returns-line-item-estimates>.

² The Sec. 25(C) tax credit, referred to by the IRS on IRS form 5695 as “Residential Energy Credits,” is comprised of two provisions: the first, for “qualified energy efficiency improvements,” and the second for “residential energy property costs.” The biomass stove tax credit is part of the latter.

³ IRS, SOI Tax Stats—Individual Statistical Tables by Size of Adjusted Gross Income. Table 3.3: All Returns: Tax Liability, Tax Credits, and Tax Payments. Years 2009, 2010, 2011, 2012. Downloaded from: <https://www.irs.gov/uac/soi-tax-stats-individual-statistical-tables-by-size-of-adjusted-gross-income>.

⁴ Environmental Protection Agency. Burn Wise Energy Efficiency. Accessed June 23, 2016 from <https://www.epa.gov/burnwise/burn-wise-energy-efficiency>.

U.S. trade association for the waste heat to power (WHP) industry. WHP captures heat that would otherwise be vented into the atmosphere from industrial processes and uses it to generate electricity with no additional fuel, combustion, or emissions. As such, WHP turns waste heat into a resource for clean electricity generation and an economic driver for global competitiveness. WHP can also help address critical public policy objectives related to increasing industrial efficiency and reducing emissions of greenhouse gases and criteria pollutants.

We applaud the Senate Finance Committee's approval last year of bipartisan legislation (S. 913) that clarifies that WHP is a qualifying technology in Section 48 of the IRC. S. 913 will diversify our nation's energy mix, create on site power while lowering fuel use and emissions, promote enhanced competition among all of our nation's energy sources, and reduce the cost of WHP technologies. We hope you will continue to support such measures and we urge Congress to include this clarification in any additional energy tax legislation this year.

In addition, we support Ranking Member Wyden's technology-neutral clean energy tax incentive proposal (S. 2089) and stand ready to work with Senator Wyden and others to help advance this proposal as Congress considers comprehensive tax reform.

Thank you for your attention to this request. We look forward to working with you to bring the many benefits of WHP to the nation's clean power generation mix.

Sincerely,

Susan Brodie
Executive Director

LARGE PUBLIC POWER COUNCIL (LPPC)
1050 Thomas Jefferson Street, NW
Washington, DC 20007

The Large Public Power Council ("LPPC") submits this statement for the record of the June 14, 2016 hearing held by the Senate Committee on Finance related to energy tax policy and, in particular, regarding tax incentives for renewable energy. LPPC's members have long been in the forefront of the development and use of renewable energy resources, despite the fact that, in contrast to investor-owned utilities, there has never been an effective federal incentive for renewable energy projects directly benefiting public power. As further described below, we urge Congress to enact an incentive for renewable energy investment by public power.

LPPC is an organization comprised of 26 of the nation's largest community-owned power utilities. LPPC member utilities own and operate more than 86,000 megawatts of generation capacity and over 35,000 circuit miles of high voltage transmission lines. LPPC's members serve more than 30 million Americans.

The members of LPPC, like other State and local governments, rely on tax-exempt financing to obtain long-term financing of their energy infrastructure projects, including renewable energy projects, and the availability of tax-exempt financing remains critical to LPPC. However, as the Committee is aware, the Internal Revenue Code has long contained much more generous and effective investment tax credits ("ITC") and production tax credits ("PTC") for renewable energy projects. Although structured as a credit against taxes, these programs are, in substance, direct subsidies to eligible recipients. As governmental entities, LPPC's members are not eligible to receive the subsidies provided by the ITC and PTC except through the use of arrangements in which another entity owns the renewable energy project and sells the electricity through a power purchase agreement ("PPA") to a public power system at a price that reflects a portion of the federal subsidy. The remainder of the federal subsidy from the ITC and PTC is retained by the owner of the project (or a tax credit investor). These PPA arrangements are relatively complex and, more importantly, result in a portion of the federal subsidy not being used to support the renewable energy projects. This inefficiency costs the federal government revenue and means that public power systems are receiving a lesser federal subsidy than investor-owned utilities.

LPPC believes that Congress should enhance the existing tools that it has previously created to provide a direct, more efficient federal subsidy to public power. There is simply no reason to provide investor-owned utilities with incentives for renewable energy at levels substantially above those provided to public power.

LPPC suggests that the simplest method to accomplish this goal would be to make the PTC and ITC refundable tax credits. Although Congress has generally not favored refundable business tax credits, they have been used at times, including in the Section 1603 grant program for renewable energy that was enacted in 2009. A program of direct grants or a refundable tax credit for which public power systems are eligible would be an effective and efficient federal subsidy for renewable energy.

In lieu of direct grant or refundable tax credit programs, another option would be to provide for the expanded use of the direct payment bonds feature that exists under current law. For example, the new clean renewable energy bond program (“CREBs”) provides public power (and electric cooperatives) with the ability to issue taxable bonds to fund renewable energy projects and then receive cash payments from the IRS based on the interest due on those bonds. The federal payment under the CREBs program is set at a level designed to provide a subsidy comparable to that provided under the ITC and PTC programs. Although CREBs could provide the effective subsidy for renewable energy for which LPPC has been advocating, the program contains a limitation on the amount of CREBs that may be issued by public power and cooperatives, which largely defeats the purpose of the program. Stated simply, the volume cap has meant that only a tiny fraction of the cost of public powers’ renewable energy facilities can be funded in this manner, making the existing CREBs program of very limited value. The volume cap on CREBs should be eliminated, just as there is no cap on the amount of PTCs or ITCs available to investor-owned utilities.

We note that in 2015, the Democratic members of the Committee proposed the creation of “clean energy bonds.” This proposal would create a tax credit bond with a direct payment feature that would make that program similar to CREBs. Unfortunately, the subsidy contained in the proposal, equal to 28 percent of the amount of the interest paid on the bonds, would make this program of limited value. The risk that this subsidy would be reduced by sequestration is a further concern with this program. If, however, the subsidy rule under this program was set at 70 percent of the interest paid on the bonds, as the CREBs program is, it would be an effective mechanism for public power to finance renewable energy projects.

In lieu of a tax credit bond program, another option would be to make the PTC and ITC refundable tax credits. Although Congress has generally not favored refundable business tax credits, they have been used at times, including in the Section 1603 grant program for renewable energy that was enacted in 2009. A program of direct grants or a refundable tax credit for which public power systems are eligible would be an effective and efficient federal subsidy for renewable energy.

LPPC recognizes the importance of renewable energy to America’s future. Although we have suggested certain mechanisms to provide comparable tax incentives to LPPC’s members, we are eager to work with the Committee to create a tax incentive for public power that is comparable to the incentives provided to investor-owned utilities.

LPPC appreciates the opportunity to provide input to the Committee on energy tax issues.

MDR SPECIALTY DISTRIBUTION

RE: Section 179D Energy Efficient Commercial Buildings Deduction Should Be Extended

Dear Chairman Hatch and Ranking Member Wyden:

We are writing to you today in regards to the Committee on Finance Hearing titled “Energy Tax Policy in 2016 and Beyond.” As you seek ways to grow our economy and create jobs, we strongly urge a multi-year extension of the Section 179D tax deduction for energy efficient commercial and multifamily buildings at the earliest opportunity before it expires on December 31, 2016.

Our Company, MDR Specialty Distribution has a warehouse and office space with over 62,000 square feet. We are working to become more efficient by replacing all our lighting with LED fixtures. We are located in Virginia and have 20 employees. By having 179D available to us it will ease the burden of the original outlay to complete the job.

As you know, 179D directly supports two national priorities: Job Creation and Energy Independence. Section 179D was introduced into the tax code with the Energy

Policy Act of 2005. It has been extended four times and will expire on December 31, 2016. Since the inception of 179D, it has assisted thousands of building owners and tenants in retaining jobs and increasing profitability; it has also increased job creation in the trades, where energy efficiency retrofits create large numbers of high paying jobs for a labor pool that was particularly impacted by the economic downturn. At the same time, 179D helps reduce our nation's dependence on foreign oil, thereby increasing America's energy security.

Jobs

Energy efficiency projects require enormous skilled and semi-skilled work forces. By cost-justifying projects, EAct therefore plays a direct role in supporting a major source of employment in our state.

Lighting retrofits require lighting designers, laborers to remove and dispose existing fixtures, distribution centers to store the new lighting material, laborers to stage the new material near the job site and electricians to install the new fixtures.

HVAC retrofits require engineers for project system design, substantial U.S. manufacturing activity (most HVAC equipment is heavy and made in the U.S.), U.S. steel procurement and HVAC mechanics to install.

The building envelope involves a wide variety of manufactured and workshop materials including roofs, walls, windows, doors, foundations and insulation. In addition to the labor required to create these products, large numbers of roofers, carpenters, installers and laborers are needed to handle the material and incorporate it into a building.

In addition, reduced building expenses allow for the retention of jobs on the building owners' end.

Energy Security

Our nation's goal of becoming energy independent cannot be achieved through domestic oil and natural gas production alone. Energy Efficiency is an untapped natural resource. Commercial Buildings represent 20% of our nation's energy use. "Drilling" for building energy efficiency is the least costly natural resource we have. For building owners, the up-front cost of retrofitting is expensive, but with utility and government assistance working together with building owners, energy use reductions between 20% and 50% can be obtained.

Commercial building energy efficiency is a critical way by which utilities can meet newly established national guidelines for carbon emission reductions. By improving the cost benefit equation of an energy efficiency retrofit, Section 179D thereby plays an important role in helping utilities comply with national policy while simultaneously reducing the need for the construction of costly new power plants.

Looking Ahead

Today, taxpayers and industry understand how to prospectively use 179D to achieve the greatest possible energy reduction far better than they did 8 years ago. This extension will empower our country to realize major energy efficiency gains and will not represent a material cost to Treasury. With the use of dynamic scoring the efficiency gains will increase taxable income over time for commercial building owners, and thereby reducing Treasury's losses from accelerating the depreciation. The tax collected from added profits obtained through energy savings quickly outweigh the foregone tax revenue created by 179D.

Conclusion

Section 179D supports a key investment in the American economy: energy efficiency. Energy efficiency is a force-multiplying investment that saves energy, saves money, and sustains and creates American jobs. Comprehensive energy efficiency upgrades drastically improve the reliability and performance of the nation's building stock, while reducing demand on our energy supply. We urge you to include multi-year extension of EAct 179D in upcoming legislation.

Sincerely,

Herbert A. Toms III
President

NATIONAL BIODIESEL BOARD (NBB)

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Senate Committee on Finance
 Dirksen Senate Office Bldg.
 Washington, DC 20510-6200

We appreciate the opportunity to submit a written statement to the Senate Finance Committee for the record of the June 14, 2016 hearing titled, “Energy Tax Policy in 2016 and Beyond.”

The National Biodiesel Board (NBB) is the U.S. trade association representing the biodiesel and renewable diesel industries. Biodiesel and renewable diesel are renewable, low-carbon diesel replacement fuels made from a variety of fats and oils, including recycled cooking oil, animal fats and plant oils such as soybean oil and canola oil. The EPA has determined, based on the performance requirements established by the Energy Independence and Security Act, that biodiesel qualifies as an “Advanced Biofuel” under the Renewable Fuel Standard (RFS), meaning it reduces greenhouse gas emissions by at least 50 percent, according to EPA analysis, when compared to petroleum diesel. Biodiesel is the only commercial-scale fuel sold and produced across the United States to achieve this designation. The fuel meets a strict fuel specification set forth by ASTM International, the official U.S. fuel-certification organization, and it is primarily used in blends of 5 percent to 20 percent. Biodiesel does not require special fuel pumps or engine modifications.

With biodiesel plants in nearly every state in the country, the biodiesel tax incentive is proven to create jobs and economic activity nationwide—not just at biodiesel refineries but also in agriculture, manufacturing, rendering, transportation, and other associated industries. Biodiesel plants are a primary economic engine in many rural communities. The incentive is also lowering fuel prices for American consumers, particularly in the diesel market that powers much of the nation’s commerce.

In part as a result of the tax incentive, biodiesel use in America has grown from roughly 112 million gallons in 2005 when the tax incentive was first implemented to nearly 2.1 billion gallons last year. Many truck stops and retail stations across the country today sell diesel blends containing 10 percent to 20 percent biodiesel. This is not just helping to create a new American energy industry, it is significantly reducing pollution while strengthening our energy security by diversifying our fuel sources. Biodiesel also accounts for the vast majority of Advanced Biofuel being delivered under the RFS today.

Despite its success, the incentive has expired repeatedly in recent years and is slated to lapse yet again at the end of 2016. This cycle of uncertainty surrounding the incentive has severely disrupted the growth and development of the U.S. biodiesel industry.

Biodiesel manufacturing is a difficult and capital-intensive enterprise, and biodiesel remains a young, developing industry. It needs predictable federal tax policy to continue to attract investment, build infrastructure and continue growing so that it can compete with incumbent industries that have long received favorable tax preferences. When compared to other major fuels such as gasoline, diesel and ethanol, biodiesel is at a fundamentally different stage of development.

The loss of this tax incentive, even temporarily, effectively amounts to a tax increase on the industry that has invested billions in production and to consumers who purchase diesel fuel. It would hamper growth and stunt investment in an industry that is helping to lead U.S. innovation toward a cleaner, more diversified domestic fuel supply.

On behalf of producers across the country and thousands of employees in the industry, NBB is calling on Congress to act quickly in adopting a seamless, long-term extension of the biodiesel tax credit that provides the stability and incentive necessary to drive growth and investment.

Additionally, we would like to again take this opportunity to convey our industry's united support for reforming the incentive into a domestic production credit that stimulates American jobs and manufacturing.

As you know, this Committee approved this cost-saving reform in 2015 without objection. Senators recognized that we should not be spending hundreds of millions of dollars annually to support foreign fuel production, and that U.S. tax policy should instead be aimed at developing U.S. production and jobs.

Unfortunately, the reform was not included in the final tax extenders legislation Congress passed late last year. Since then, new government data show the problem has only grown in scale. According to year-end EPA figures for 2015, biodiesel imports to the U.S. skyrocketed last year to a record of 670 million gallons, roughly one-third of the U.S. market. Under the current blender's structure of the tax incentive, each of these gallons—simply by being blended in the U.S.—was eligible for the \$1-per-gallon credit.

Spending more than \$600 million annually to stimulate foreign fuel production was clearly not the intent of Congress in creating this incentive. This is a loophole that should be closed, and according to the Joint Committee on Taxation, doing so would save the Treasury some \$90 million as imports are reduced and domestic production rises.

Not only is it the right thing to do for taxpayers, but it would restore fair competition for American biodiesel producers. Under the current system, foreign biodiesel producers are receiving subsidies in their country of origin and then shopping their fuel to the U.S. to access the U.S. incentive. This double dipping of incentives gives them a tremendous cost advantage—creating a situation where a U.S. tax incentive that was specifically intended to stimulate American biodiesel production is helping give foreign companies a competitive edge over their American counterparts.

According to a recent economic study, every 100 million gallons of U.S. biodiesel production supports roughly 3,200 jobs. The tax incentive should be structured in a way that gives American companies a fair chance at creating those jobs here in the U.S. With more than 1.5 billion gallons of unused production capacity standing ready to be deployed nationwide, the U.S. industry is poised to grow and hire with the right policy.

Again, thank you for the opportunity to submit comments on this matter. Please don't hesitate to call us at (202) 737-8801 with questions.

Sincerely,

Anne Steckel
Vice President, Federal Affairs

NATIONAL HYDROPOWER ASSOCIATION (NHA)
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On behalf of the members of the National Hydropower Association (NHA), we appreciate this opportunity to submit comments to the Senate Finance Committee for the record regarding its June 14, 2016 hearing on energy tax policy and how the tax code affects the energy industry, particularly with respect to hydropower project development, and what policies have the most merit as the Congress looks forward towards tax reform.

We look forward to working with the Committee and the Congress on approaches that can achieve the goals of tax reform while also continuing to support the expansion of U.S. hydropower resources.

The National Hydropower Association is a nonprofit national association dedicated to promoting the growth of clean, affordable U.S. hydropower, which includes conventional hydropower, pumped storage, marine and hydrokinetic (MHK), as well as conduit projects. NHA represents more than 220 companies from Fortune 500 corporations to family-owned small businesses. Our members include both public and investor-owned utilities, independent power producers, developers, manufacturers, environmental and engineering consultants, attorneys, and public policy, outreach, and education professionals. NHA members are involved in projects throughout the United States, including both federal and non-federal hydroelectric facilities. NHA

members own and operate the majority of the non-federal hydropower generating facilities in the United States.

Hydroelectric power is the nation's single largest source of renewable electricity, generating close to 50% of renewable power in the U.S. In addition to its clean energy profile, hydropower projects provide a number of additional benefits, such as integrating and firming power from other intermittent electricity sources, flood control, irrigation, water supply, recreation and more.

Though a tremendous existing resource, hydropower has substantial potential to grow. Of the 80,000 dams in the United States, only 3% have power generating facilities. The rest were originally built for the other purposes outlined above. However, new studies and reports have demonstrated new project opportunities throughout the hydropower sector including, adding new generation equipment to existing non-powered dams and other water infrastructure, upgrades and efficiency increases at existing hydropower facilities, pumped storage, conduit and marine energy projects, and even new stream reach deployments. Sustainable hydropower projects can be built to access this vast untapped hydropower capacity if the Congress provides the right market signals through smart and balanced tax policies.

Most Members of Congress say that they are for an "all of the above" energy policy and that the tax code should not be choosing winners and losers in the nation's energy mix—NHA agrees. However, that is currently not the case and has not been for many years. Although hydropower was made eligible for the section 45 production tax credit (PTC) in 2005 and MHK in 2008, the applicable credit rate for our technologies, as well as other baseload renewable resources, has been only 50% of the tax credit rate provided to wind facilities. There was, and continues to be no policy basis for this differential, which was based solely on revenue concerns at the time.

This credit rate differential has placed the hydropower industry at a very significant competitive disadvantage over the past decade in responding to state-level solicitations for renewable electricity contracts in states with renewable energy portfolio standards. Efforts to equalize the credit rate over the past decade have also been stymied—largely because the germaneness test applied to tax extenders bill in recent years generally made policy changes out of order.

Last year's PATH Act further exacerbated the competitive imbalance between incentives for wind and solar and other renewables, including hydropower. While the PTC for hydropower, MHK and other 50% credit rate technologies was extended only through the end of 2016, the section 45 PTC for electricity produced from wind facilities was extended through the end of 2019.

The 30% investment tax credit (ITC) for both residential solar energy property (sec. 250) and business solar energy property (sec. 48) was extended through the end of 2019. In addition, the placed-in-service requirement for solar property under sec. 48 was replaced by a "beginning of construction" rule and the permanent 10% ITC will be retained.

This incentive imbalance will have a dramatic negative impact on investment in hydropower over the coming decades. The Energy Information Administration's Annual Energy Outlook 2016 Early Release¹ estimates that with the Administration's Clean Power Plan (CPP) in place, in combination with the long-term extension of the wind credit, wind generation will grow by nearly 150% over the period from 2015–2040. Examining the impact of the tax credits alone, wind will still grow by 110% over the same period. Solar generation will grow by nearly twelvefold over the period between 2015–2040 if the CPP remains in place or by ninefold due to the incentives alone.

On the other hand, EIA estimates that electricity from baseload renewables (hydropower and others) will remain relatively flat in comparison. The EIA report indicates that wind and solar capacity additions are driven by tax credit extensions and declining costs in both the CPP and no CPP case estimates.² This disparity for hydropower and the other baseload renewables is exacerbated further by the much longer development timelines the industries face—timelines that have also negatively impacted the ability to use the tax credits.

¹ U.S. Energy Information Administration, "Annual Energy Outlook 2016 Early Release: Annotated Summary of Two Cases," May 17, 2016, p. 30.

² *Ibid.*, p. 28.

We strongly support the efforts of Ranking Member Ron Wyden and his Democratic colleagues on the Committee to develop long-term technology neutral incentives for alt renewable energy sources in the context of tax reform. In the meantime, at a minimum, we believe it is only fair and appropriate to extend the PTC (and the election to take the ITC in lieu of the PTC) for hydropower and other non-wind PTC technologies through 2019.

Given the extraordinary potential for expansion of hydropower deployment and job creation, NHA also supports these common-sense energy incentive reforms:

Increasing the Production Tax Credit Rate. Throughout the history of the PTC program, hydropower and marine energy have received only half the credit rate available to other renewable energy sources. There was, and continues to be, no tax or energy policy justification for placing hydropower at such a competitive disadvantage. Increasing the tax credit for hydropower will create a burst of investment and unlock the huge job and energy potential of this technology.

Clean Renewable Energy Bonds (CREBs) Program. A significant portion of hydropower projects in the U.S. are owned by public power providers, electric cooperatives and state and local governments. CREBs, first created in 2005, were a very effective tool that helped these entities to grow America's hydropower resources, with little cost to the taxpayer. NHA supports extending the CREBs program.

Allowing Pumped Storage to Qualify for the Investment Tax Credit and Clean Renewable Energy Bonds (CREBs) Program. Expanding our nation's energy storage capacity is essential to ensuring a secure and stable grid as well as integrating more renewable energy—and today, pumped storage technology is the only cost-effective, large-scale energy storage method. Currently, there are no incentives for energy storage project development, including pumped storage, which hinders deployment and further innovation. NHA supports an ITC and CREBs eligibility for all energy storage technologies, which will help drive pumped storage projects and help America deploy an even wider array of clean, renewable power across the grid.

Preserving Tax-Exempt Financing for Municipalities. State and local governments and governmental entities, including public power utilities, have utilized municipal bonds as a financing tool for new infrastructure projects, including hydroelectric and other renewable energy projects. Historically, interest paid on municipal bonds is exempt from federal tax, which allows these entities to issue bonds at reasonable rates and assists in meeting their capital needs. NHA, on behalf of our public power utilities, believes the interest exclusion should be preserved. To do otherwise, would impose higher borrowing costs that will limit investment in critical infrastructure, including energy infrastructure like hydropower projects.

Once again, NHA appreciates this opportunity to discuss the importance of continued federal tax policy to the hydropower sector as a means to support project deployment.

NATIONAL PROPANE GAS ASSOCIATION (NPGA)

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Chairman Hatch and Ranking Member Wyden:

On behalf of the National Propane Gas Association (NPGA), I commend the Senate Finance Committee for holding this hearing, "Energy Tax Policy in 2016 and Beyond." I submit these comments for the record, and appreciate the opportunity to discuss several sections of the tax code that have greatly helped propane gain acceptance as an alternative vehicle fuel.

NPGA is the national voice for the odorized propane gas industry. NPGA's nearly 3,000 member companies—the majority of which are small, family-owned businesses—fuel homes, businesses, and vehicles in all 50 states and territories. But, it is propane's use as a *vehicle fuel* that has grown tremendously due to two important tax incentives: **The Alternative Fuel Tax Credit and the Alternative Fuel Vehicle Refueling Property Credit.**

Unfortunately, these two provisions are slated to expire at the end of 2016. As the Committee discusses the merits of renewable and alternative energy tax incentives, I ask that you consider a long-term extension of these important credits.

Assisted by the demand generated by these two tax credits, technological innovation has created new and efficient uses for propane. This has been particularly true in vehicle technologies. Fleets around the country have increasingly turned to propane-fueled vehicles as an alternative to traditional gas and diesel vehicles. They are choosing propane for a variety of reasons, such as improved environmental and health benefits when compared to conventional fuels. For example, propane engines produce 12% less CO₂ emissions, 20% less NO_x emissions, and 60% less CO emissions than gasoline engines. They also produce 80% less smog-producing hydrocarbon emissions than diesel engines.

These environmental and health benefits have encouraged the adoption of propane in a key marketplace—school buses. In addition to cleaner air, propane-powered buses are 50% quieter than their diesel counterparts. Transporting our nation's students in cleaner, quieter buses has been a positive development in school districts around the country.

Increased adoption of propane vehicles not only benefits the environment, but it also allows American companies to utilize a domestically produced fuel. Propane production—80% of which is a product of natural gas processing—is soaring as part of the boom in American natural gas and crude oil production. In fact, the United States is now a net exporter of propane, and domestic sources of propane are capable of handling 100% of our country's demand.

Accordingly, the increased use of propane as a vehicle fuel is helping create American jobs, making the United States more energy independent, and leading to the deployment of more environmentally friendly vehicles. **Without the Alternative Fuel Tax Credit and the Alternative Fuel Vehicle Refueling Property Credit, these successes would have been dramatically more limited.**

The **Alternative Fuel Credit** has served as the deciding factor for many companies who were on the fence about adopting an alternative fuel. The 50 cents-per-gasoline gallon equivalent of propane has supported many fleets' decision to make the switch to propane. Unfortunately, uncertainty about the future of the credit has limited its effectiveness. Enacting into law a long-term extension of the Alternative Fuel Credit would help maximize propane's potential utilization as a vehicle fuel.

The **Alternative Fuel Vehicle Refueling Property Credit** has worked in conjunction with the Alternative Fuel Credit to spur growth in the propane industry. Since our country's energy refueling infrastructure is predominantly dedicated to conventional fuels, it has been instrumental in helping build a network of propane refueling stations. Additionally, it has incentivized fleets to have their own centralized refueling infrastructure onsite by reducing the initial costs of installation.

Again, thank you for holding this important hearing on energy related tax incentives. Thank you for allowing me to submit these comments for the record, and I look forward to discussing a long-term extension of these important credits with the Committee.

Sincerely,

Richard Roldan
President and Chief Executive Officer

THE PEW CHARITABLE TRUSTS
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The Honorable Orrin G. Hatch
Chairman
Committee on Finance
219 Dirksen Senate Office Building
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The Honorable Ron Wyden
Ranking Member
Committee on Finance
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Washington, DC 20510

June 27, 2016

Dear Chairman Hatch and Ranking Member Wyden:

Thank you for your leadership in initiating a discussion of the direction and scope of U.S. energy tax policy. On behalf of the Pew Clean Energy Initiative, I urge your consideration and adoption of tax provisions that will help strengthen our nation's position in the burgeoning clean energy marketplace and our energy security.

Historically, tax policy has played a central role in encouraging U.S. energy innovation, production, deployment and trade. Some incentives have been in place for more than a century, encouraging the maturation of fossil resources, including coal, oil, and natural gas. Subsidies also helped spur the development of the nuclear industry in the United States. In recent years, tax incentives have advanced alternative energy sources like solar, wind, geothermal, fuel cells, and biomass. As a result, the country has a range of power options that make our electricity system more resilient, reliable, and affordable.

It is in our national interest to continue developing innovative technologies in order to remain competitive in the global energy economy. According to the International Energy Agency, electricity generation from renewables will surpass that from natural gas and double the amount derived from nuclear this year, becoming the second most important global energy source. Over a longer timeframe, Pew research projects that worldwide electric generating capacity from renewable sources will grow nearly sixfold by 2030. Companies and countries are turning to these resources because they enhance energy security, protect the environment, and grow new industries.

Clean energy represents a significant economic opportunity for U.S. innovators, entrepreneurs, manufacturers, project developers and investors. In 2014, \$310 billion was invested worldwide in clean energy goods and services, growing almost 17 percent from 2013. By 2030, renewables will attract approximately \$5 billion annually—or more than 65 percent of private investment in global power generation. Unfortunately, U.S. competitiveness in the sector is only as certain as our policies.

The Pew Clean Energy Initiative has undertaken research and worked closely with industry to understand the challenges that businesses are facing and how these impact the United States' competitive position. Time and again, experts have cited policy uncertainty as the overriding impediment to clean energy investment and progress by businesses and investors. The inconsistent nature of U.S. tax incentives makes it challenging for our companies to develop the supply chains and business models they need to succeed and for investors to have the assurance they require to deploy capital. Our annual research tracking clean energy investment and deployment trends clearly demonstrates that policy matters. Those countries with consistent, long-term energy and tax policies are most likely to attract private investment.

We urge you to consider several key principles and tax initiatives in the short term in order to strengthen the United States' ability to capitalize on the emerging domestic and international clean energy markets in the long term:

First, reinforce existing incentives for clean energy technologies.

The Production Tax Credit and Investment Tax Credit, commonly referred to as the PTC and ITC respectively, have been cornerstones of U.S. energy policy for much of the past decade. These credits have helped stimulate investment, deployment, and manufacture of renewable and efficient products and processes, thereby driving down technology costs and encouraging deployment.

The Fiscal Year 2016 Consolidated and Further Continuing Appropriations Act, H.R. 2029, provided extensions of tax incentives for wind and solar power, to the exclusion of several other clean and efficient energy technologies that currently qualify under the ITC and are set to expire at the end of this year. These technologies also have a place in the future of the U.S. power generation mix and should be supported through policy.

The omnibus phased out the PTC for wind, under Section 45 of the Internal Revenue Code, over a period of 5 years. The bill also phased out the 30 percent ITC for solar power, both under the Section 48 investment tax credit and Section 25D residential incentive. However, the omnibus bill did not extend incentives for other technologies listed in Section 48, such as combined heat and power (CHP), fuel cells, geothermal, microturbines and small wind property. Nor did it provide extensions for non-solar technologies in Section 25D, such as fuel cells, geothermal heat pumps and small wind property.

I urge you to act immediately to extend the ITC across the board and establish parallel tax treatment for the excluded technologies. These incentives are critical for reducing costs, allowing greater competition among all of our nation's energy sources, creating jobs, and diversifying our nation's energy mix.

Additionally we recommend that efficient industrial energy systems receive incentives that are on par with other clean and efficient systems accessing the ITC.

We must harness technologies that encourage power generation efficiency and resiliency, reduce pollution, and enhance productivity. Combined heat and power and waste heat to power (WHP) systems capture the wasted thermal output usually released into the atmosphere and use it to heat nearby buildings and/or to generate additional electricity. These units are typically fueled with natural gas, biomass, waste, wood, and sometimes coal. CHP and WHP systems can provide base load electricity generation with at least double the efficiency compared to typical grid power. If located on-site at a manufacturing facility, hospital, school, or residential building, these systems can also improve resiliency against power outages.

The ITC, as currently constructed, offers narrow capacity limits for CHP systems, disqualifying many worthy projects. We recommend that the ITC or any comparable credits in the future increase the credit from 10 to 30 percent of the capital costs of a project, increase the project cap from the first 15 megawatts (MW) of the project to the first 25 MW, and eliminate the system-wide capacity cap. CHP currently supplies more than 82.7 gigawatts (GW), or 12%, of the nation's electricity capacity and, according to a Department of Energy study, there are 240.6 GW of additional capacity from this technology, almost three times the amount of capacity that is currently operational.

Furthermore, WHP installations that could monetize 10 GW of clean electricity, heating, and cooling capabilities are excluded from the current definition of qualifying technologies for the ITC. In early 2015, the Senate Finance Committee approved S. 913, a bill championed by Senators Dean Heller and Tom Carper, as part of a package of tax policies. These provisions would have resolved this technical oversight. Unfortunately, it was not included with most of the rest of the package in the omnibus that became law. Since there is no fuel used in capturing waste heat, this technology should be included in future tax incentives at the same rate as other renewable and efficient competitors.

Additionally, the bipartisan POWER Act (S. 1516/H.R. 2657) would give CHP technologies parity with other clean and efficient power sources, remove restrictions that limit the full use of this efficient resource, and include WHP as a qualifying technology under the ITC. We urge you to include this measure as part of any legislation aimed at improving the U.S. tax system.

Finally, we recommend expanding Master Limited Partnerships (MLPs), to clean energy technologies.

A wide variety of economic, regulatory, and legal barriers favor incumbent technologies. These barriers threaten the ability of new companies to gain a competitive foothold, diminish consumer choice, and inflate the prices of emerging technologies. Government tax policy should help break down barriers to competition. Expanding MLPs to clean energy technologies is a critical way to create greater parity in the tax code among energy resources.

MLPs are business structures that allow taxation at the stakeholder instead of corporate level and provide greater access to low-cost capital. They are a proven mechanism for leveraging financing for the traditional power sector, having attracted more than \$450 billion of investment to fossil fuel projects in the U.S. over the last 30 years. However, clean energy systems do not have access to these incentives, placing them at a financial disadvantage. Congress should pass the bi-partisan MLP Parity Act (H.R. 2883) to extend MLPs to a broad suite of energy technologies, thereby allowing them to access a larger pool of private capital.

As Congress considers future, long-term energy tax policies, we encourage the Finance Committee to adopt provisions that promote domestic innovation and support promising new industries. A technology-neutral approach to the tax code can ensure that clean, efficient, and resilient inventions have access to the same or similar tax treatment as those that currently exist today.

As the global demand for clean energy continues to rise, it is imperative that the U.S. maintain its leadership position by providing tax policies that help drive-down costs and ensure long-term certainty for the industry.

Thank you again for the opportunity to provide a statement for the record. We hope these recommendations give context to your work and demonstrate that the tax initiatives Congress adopts will shape America's economic, environmental, and energy future for many years and decades to come. We look forward to working with you

as Congress considers policy measures that will improve the U.S. tax system for the energy industry.

Sincerely,

Phyllis Cuttino
Director, Clean Energy Initiative

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June 13, 2016

RE: Section 179D Energy Efficient Commercial Buildings Deduction Should be Extended

Dear Chairman Hatch and Ranking Member Wyden:

We are writing to you today in regards to the Committee on Finance Hearing titled "Energy Tax Policy in 2016 and Beyond." As you seek ways to grow our economy and create jobs, we strongly urge a multi-year extension of the Section 179D tax deduction for energy efficient commercial and multi-family buildings at the earliest opportunity before it expires on December 31, 2015.

Our company, PMH Associates, Inc. of Moorestown, New Jersey, employees 19 people. Fifty-eight percent of our recent sales activity is generated by companies applying for this energy tax credit. As you can see, the success of our company and the livelihood of 19 families, is tied to the ability for companies to initiate energy efficiencies.

As you know, 179D directly supports two national priorities: Job Creation and Energy Independence. Section 179D was introduced into the tax code with the Energy Policy Act of 2005. It has been extended four times and will expire on December 31, 2016. Since the inception of 179D, it has assisted thousands of building owners and tenants in retaining jobs and increasing profitability; it has also increased job creation in the trades, where energy efficiency retrofits create large numbers of high paying jobs for a labor pool that was particularly impacted by the economic downturn. At the same time, 179D helps reduce our nation's dependence on foreign oil, thereby increasing America's energy security.

JOBS

Energy efficiency projects require enormous skilled a semi-skilled work forces. By cost-justifying projects, EPAct therefore plays a direct role in supporting a major source of employment in our state.

Lighting retrofits require lighting designers, laborers to remove and dispose existing fixtures, distribution centers to store the new lighting material, laborers to stage the new material near the job site and electricians to install the new fixtures.

HVAC retrofits require engineers for project system design, substantial U.S. manufacturing activity (most HVAC equipment is heavy and made in the USA), U.S. steel procurement and HVAC mechanics to install.

The building envelope involves a wide variety of manufactured and workshop materials including roofs, walls, windows, doors, foundations, and insulation. In addition to the labor required to create these products, large numbers of roofers, carpenters, installers, and laborers are needed to handle the material and incorporate it into a building.

In addition, reduced building expenses allow for the retention of jobs on the building owners' end.

ENERGY SECURITY

Our nation's goal of becoming energy independent cannot be achieved through domestic oil and natural gas production alone. Energy efficiency is an untapped natural resource. Commercial Buildings represent 20% of our nation's energy use. "Drilling" for building energy efficiency is the least costly natural resource we have. For building owners, the up-front cost of retrofitting is expensive, but with utility and government assistance working together with building owners, energy use reductions between 20% and 50% can be obtained.

Commercial building energy efficiency is a critical way by which utilities can meet newly established national guidelines for carbon emission reductions. By improving the cost benefit equation of an energy efficiency retrofit, Section 179D thereby plays an important role in helping utilities comply with national policy while simultaneously reducing the need for the construction of costly new power plants.

LOOKING AHEAD

Today, taxpayers and industry understand how to prospectively use 179D to achieve the greatest possible energy reduction far better than they did 10 years ago. This extension will empower our country to realize major efficiency gains and will not represent a material cost to Treasury. With the use of dynamic scoring, the efficiency gains will increase taxable income over time for commercial building owners, and thereby reducing Treasury's losses from accelerating the depreciation. The tax collected from added profits obtained through energy savings quickly outweigh the foregone tax revenue created by 179D.

CONCLUSION

Section 179D supports a key investment in the American economy; energy efficiency. Energy efficiency is a force-multiplying investment that saves energy, saves money, and sustains and creates American jobs. Comprehensive energy efficiency upgrades drastically improve the reliability and performance of the nation's building stock, while reducing demand on our energy supply. We urge you to include multi-year extension of EPAct 179D in upcoming legislation.

Sincerely,

Peter M. Honeyford, President
phoneyford@pmh-associates.com

RSC ARCHITECTS
3 University Plaza Drive, Suite 600
Hackensack, NJ 07601
t: 201-941-3040
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June 14, 2016

Senate Committee on Finance
Dirksen Senate Office Building
Washington, DC 20510-6200

RE: Section 179D Energy Efficient Commercial Buildings Deduction Should Be Extended

Dear Chairman Hatch and Ranking Member Wyden:

We are writing to you today in regards to the Committee on Finance Hearing titled "Energy Tax Policy in 2016 and Beyond." As you seek ways to grow our economy and create jobs, we strongly urge a multi-year extension of the Section 179D tax deduction for energy efficient commercial and multifamily buildings at the earliest opportunity before it expires on December 31, 2016.

Our Company is a full-service, 36-person architectural firm that has been providing programming, planning, external and interior design, and construction administration for the last 44 years. The firm has been employing sustainable materials and designs into all of our projects since its inception in 1971. An example is our LEED certified North Hudson Community College North Campus facility. The energy savings realized on this facility will benefit the taxpayers for years to come and reduce our energy requirements.

As you know, 179D directly supports two national priorities: Job Creation and Energy Independence. Section 179D was introduced into the tax code with the Energy Policy Act of 2005. It has been extended four times and will expire on December 31, 2016. Since the inception of 179D, it has assisted thousands of building owners and tenants in retaining jobs and increasing profitability; it has also increased job creation in the trades, where energy efficiency retrofits create large numbers of high paying jobs for a labor pool that was particularly impacted by the economic downturn. At the same time, 179D helps reduce our nation's dependence on foreign oil, thereby increasing America's energy security.

Jobs

Energy efficiency projects require enormous skilled and semi-skilled work forces. By cost justifying projects, EPAct therefore plays a direct role in supporting a major source of employment in our state.

Lighting retrofits require lighting designers, laborers to remove and dispose existing fixtures, distribution centers to store the new lighting material, laborers to stage the new material near the job site and electricians to install the new fixtures.

HVAC retrofits require engineers for project system design, substantial U.S. manufacturing activity (most HVAC equipment is heavy and made in the U.S.), U.S. steel procurement and HVAC mechanics to install.

The building envelope involves a wide variety of manufactured and workshop materials including roofs, walls, windows, doors, foundations and insulation. In addition to the labor required to create these products, large numbers of roofers, carpenters, installers and laborers are needed to handle the material and incorporate it into a building.

In addition, reduced building expenses allow for the retention of jobs on the building owners' end.

Energy Security

Our nation's goal of becoming energy independent cannot be achieved through domestic oil and natural gas production alone. Energy Efficiency is an untapped natural resource. Commercial Buildings represent 20% of our nation's energy use "Drilling" for building energy efficiency is the least costly natural resource we have. For building owners, the up-front cost of retrofitting is expensive, but with utility and government assistance working together with building owners, energy use reductions between 20% and 50% can be obtained.

Commercial building energy efficiency is a critical way by which utilities can meet newly established national guidelines for carbon emission reductions. By improving the cost benefit equation of an energy efficiency retrofit, Section 179D thereby plays an important role in helping utilities comply with national policy while simultaneously reducing the need for the construction of costly new power plants.

Looking Ahead

Today, taxpayers and industry understand how to prospectively use 179D to achieve the greatest possible energy reduction far better than they did 8 years ago. This extension will empower our country to realize major energy efficiency gains and will not represent a material cost to Treasury. With the use of dynamic scoring the efficiency gains will increase taxable income over time for commercial building owners, and thereby reducing Treasury's losses from accelerating the depreciation. The tax collected from added profits obtained through energy savings quickly outweigh the foregone tax revenue created by 179D.

Conclusion

Section 179D supports a key investment in the American economy: energy efficiency. Energy efficiency is a force-multiplying investment that saves energy, saves money, and sustains and creates American jobs. Comprehensive energy efficiency upgrades drastically improve the reliability and performance of the nation's building stock, while reducing demand on our energy supply. We urge you to include multi-year extension of EPAct 179D in upcoming legislation.

Sincerely,

John Capazzi, AIA
President

LETTER SUBMITTED BY JOSEPH SHEPPS

Senate Committee on Finance
Dirksen Senate Office Bldg.
Washington, DC 20510-6200

Dear Mr. Chairman and Committee Members:

After reviewing the most recent Senate Finance Committee hearing on energy tax policy, I grew frustrated hearing the arguments between parties on how to move forward on tax policy. Even during times when our country is at political odds, Con-

gress should be able to push aside party lines and come together in agreement on comprehensive tax reform—an issue that affects businesses and households on a daily basis.

As a concerned citizen, I am troubled that Congress cannot come together to create a bipartisan effort over an issue that is imperative to the United States.

Another issue that I found frustrating to listen to during this hearing was how America's tax system plays industries against one another. Our system should not be in the business of picking winners and losers of industries, in which some sectors are politically favored and others face unfair discrimination.

A 21st-century tax system is needed for our 21st-century economy. Comprehensive tax reform is an issue that must be addressed immediately in order for American businesses to compete fairly and without bias in global markets. Otherwise businesses, and the jobs they provide, will move to an economy, which has a more competitive corporate tax rate and an up-to-date tax system.

I encourage Congress to act upon the urgent need for comprehensive tax reform that treats all sectors equally. Set aside party bickering and come together to work towards a new tax system that reflects modern needs.

Sincerely,
Joseph Shepps

LETTER SUBMITTED BY BRIAN SPALDING

Senate Committee on Finance
Dirksen Senate Office Bldg.
Washington, DC 20510-6200

Dear Mr. Chairman and Committee Members:

After listening to the most recent Senate Finance Committee hearing on energy tax policy, I felt the need to express my opinions on tax reform as a Pennsylvanian and a manufacturer. The status of our nation's tax system is appalling. Not only is it outdated, but certain interest groups and critics have used the tax code to create competition between industries that result in an unfair and biased market system.

We are a nation that is lagging behind in creating a 21st-century tax system. We need policy that encourages growth, free and fair competition, and opportunity for all American businesses. Starting with a complete overhaul of our tax system, America needs a clean slate to build upon in order to boost economic growth.

I'm tired of seeing a system that plays industries against each other—every sector should have the same opportunities as the next, and it's not government's role to pick winners and losers with tax policy. With the upcoming release of a comprehensive tax reform blueprint, I hope to see these changes made in order to build a better system for our businesses.

Sincerely,
Brian Spalding

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June 22, 2016

Senate Committee on Finance
Dirksen Senate Office Bldg.
Washington, DC 20510-6200

RE: Section 179D Energy Efficient Commercial Buildings Deduction Should Be Extended

Dear Chairman Hatch and Ranking Member Wyden:

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Our Company, Wendel, is a national design and construction firm headquartered in Williamsville, NY with 238 employees. One of our firm’s specialties is in the area of energy efficiency. We are recognized by the National Association of Energy Service Companies (NAESCO) as an accredited Energy Services Company (ESCO). As a vendor-independent company, Wendel works to solve our clients’ energy problems through the implementation of cost-effective capital improvement projects. Our Energy Services team uses their engineering and construction expertise to develop and deliver solutions that are both environmentally friendly and economically responsible. We employ a staff of licensed Professional Engineers (PE), Certified Energy Managers (CEM) and Leadership in Energy and Environmental Design Accredited Professionals (LEED AP) to provide innovative solutions in energy management and system design.

The 179D tax deduction has greatly benefited our company. As designers of energy-efficient projects for government-owned facilities, the tax incentive helps to grow our business, keep our PEs, CEMs and LEED APs employed, while also supporting our mission to be stewards of the environment in how we operate as a company and how we pursue our energy efficiency projects.

As you know, 179D directly supports two national priorities: Job Creation and Energy Independence. Section 179D was introduced into the tax code with the Energy Policy Act of 2005. It has been extended four times and will expire on December 31, 2016. Since the inception of 179D, it has assisted thousands of building owners and tenants in retaining jobs and increasing profitability; it has also increased job creation in the trades, where energy efficiency retrofits create large numbers of high paying jobs for a labor pool that was particularly impacted by the economic downturn. At the same time, 179D helps reduce our nation’s dependence on foreign oil, thereby increasing America’s energy security.

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Sincerely,

Stewart Haney, President and CEO

