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POWERING OUR FUTURE: PRINCIPLES FOR ENERGY TAX REFORM

HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY, NATURAL RESOURCES, AND INFRASTRUCTURE

OF THE

COMMITTEE ON FINANCE
UNITED STATES SENATE

ONE HUNDRED THIRTEENTH CONGRESS

FIRST SESSION

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POWERING OUR FUTURE: PRINCIPLES FOR ENERGY TAX REFORM

WEDNESDAY, JULY 31, 2013

U.S. SENATE,
SUBCOMMITTEE ON ENERGY, NATURAL
RESOURCES, AND INFRASTRUCTURE,
COMMITTEE ON FINANCE,
Washington, DC.

The hearing was convened, pursuant to notice, at 3:15 p.m., in room SD–215, Dirksen Senate Office Building, Hon. Debbie Stabenow (chairman of the subcommittee) presiding.

Present: Senators Wyden, Cantwell, Nelson, Bennet, Crapo, Cornyn, and Portman.

Also present: Democratic Staff: Joe McGarvey, Senator Stabenow's staff. Republican Staff: Andrew Siracuse, Senator Cornyn's staff.

OPENING STATEMENT OF HON. DEBBIE STABENOW, A U.S. SENATOR FROM MICHIGAN, CHAIRMAN, SUBCOMMITTEE ON ENERGY, NATURAL RESOURCES, AND INFRASTRUCTURE, COMMITTEE ON FINANCE

Senator STABENOW. Well, good afternoon. I want to call the Finance Committee Subcommittee on Energy, Natural Resources, and Infrastructure to order and apologize for the wait. Due to votes and an extended vote, we are starting later than we had anticipated. But I would like to ask Senator Moran to join us at the table, and Senator Coons is anxious to be here. He is now presiding over another hearing, unfortunately, so, if he is able to come before the meeting is over, we do intend to give him an opportunity later in the hearing to speak.

Last month, Chairman Baucus and Ranking Member Hatch invited all Senators to provide their ideas on what a reformed tax code should look like. I know the chairman and ranking member and their staffs will be carefully reviewing these ideas. Starting from the views of each member, we need to build a consensus in Congress and around the country on what our tax system should look like.

The purpose of today's hearing is to see if there are principles for energy tax reform where we can build consensus. In general, I believe that we should seek to streamline our Nation's tax code to grow our economy while making the system fairer and simpler for our families and our businesses.

Tax reform will only be successful, however, if it furthers our effort to make America more competitive in the global economy.

Competitiveness needs to be defined in a way that not only includes business success, but the economic success of individual Americans as well.

A recent study by the Harvard Business School makes the point exceptionally well, I believe: "The United States is a competitive location to the extent that firms in the U.S. can succeed in the global marketplace while raising the living standards of the average American."

That is why a top priority of tax reform needs to be the elimination of current barriers in our tax code that make it difficult to innovate and make things in this country, and thus create and sustain a strong middle class. We need a do-it-all approach when it comes to energy production.

This is not a new idea, and it has garnered support from both sides of the aisle, but we cannot have a true do-it-all approach if we only support one technology with 100-year-old tax credits and incentives while ignoring emerging energy technologies. Part of our strategy must be supporting innovative new clean energy industries and jobs in America.

The global demand on fossil fuels is increasing as well, with rapidly growing middle classes in countries like Brazil, China, and India using much more energy than in previous decades. China put 16.5 million vehicles on the road in 2010 alone.

Prices will continue to go up, and the world will increasingly look for alternatives. Other countries know this, and that is why they are investing heavily to develop new clean energy technologies. We know that China is spending over $178 million every day on clean energy technologies.

New clean energy industries not only mitigate the impact of climate change, they represent the potential for tremendous job creation here at home. They also give consumers more options and provide more market competition in energy.

Other countries know that the race is on to be the global leader in these new technologies and that the country that controls new energy production will be the Saudi Arabia of the 21st century. This is one of the most important economic and national security issues of our time. We cannot afford to trade dependence on foreign oil for dependence on advanced batteries, wind, solar, hydrogen, advanced biofuels, or any other forms of energy.

This discussion is also very much about jobs. There are 8,000 parts in a wind turbine, as I like to say, and we can make every single one of those in the United States. In fact, we can make every one of those in Michigan. During 2012, wind energy became the number-one source of new U.S. electricity generating capacity, providing 42 percent of new generating capacity and supporting 75,000 jobs nationwide. The solar industry employs 119,000 people, up 13 percent from 2011, representing one of the fastest growth rates for any industry. Solar prices have declined by 60 percent as well since 2011.

I believe we must engage in the global race to lead the world in these new technologies or risk falling farther behind other countries. It is our responsibility to create tax policies that help our companies thrive. We need to provide American businesses the long-term certainty they need so they will invest in creating these

new technologies and jobs, and give consumers real energy choices in order to bring down prices. We need to seize the opportunity before it is too late, and tax reform is that opportunity.

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

Senator STABENOW. I would now like to turn to my friend and ranking member, Senator Cornyn, for his opening remarks.

OPENING STATEMENT OF HON. JOHN CORNYN, A U.S. SENATOR FROM TEXAS

Senator CORNYN. Thank you, Madam Chairman. I appreciate you holding today's hearing, and it is certainly very timely considering the discussion of tax reform initiated by Chairman Baucus and Senator Hatch, although, as we know, the process of requesting Finance Committee members to send in their preferred tax expenditures has proven to be somewhat problematic. I read somewhere I think they offered to allow Senators to be part of the witness protection program if they submitted their preferred tax expenditures. [Laughter.]

So it has been a little bit of a challenge. But it is important to talk about taxes. Taxes affect everything we do, although I must say that the revolution, or maybe renaissance is a better word, of energy production in America was primarily due to the innovation in the private sector of George Mitchell, the father of horizontal drilling and fracking, who died just this last week.

I think he was 94 years old, and he was a legend and a great innovator in the oil and gas industry who created this process that promises to help us produce more oil in America than in Saudi Arabia by 2020. Of course, the natural gas revolution has been nothing short of phenomenal, causing inexpensive energy to be available for manufacturers, having them move back on shore.

I mentioned all that, which you know, just to say that the private sector is not waiting on the Federal Government, but the Federal Government can throw obstacles in the way of the private sector when it comes to producing more energy here at home.

In my State, we are fortunate to be a growing, stable economy, in large part because of our energy policies. We have a diverse array of energy sources. We are, by the way, number one in the production of electricity from wind energy, so we really do believe in the all-of-the-above policy. These industries, this energy production, provides great employment opportunities for Texans, while at the same time supplying energy needs to small businesses and working families.

Of course, any time Washington starts talking about taxes, people sit up and listen. I want to say that I do appreciate the work of Chairman Baucus and Senator Hatch, although I do notice some divisions between those who insist that tax reform generate more revenue and those of us who—actually, I think I heard President Obama at one time say, at least for the corporate side, that he is for revenue-neutral corporate tax reform, which would be in our Nation's self-interest and help get our economy back on track.

The President's own fiscal commission—if I am not mistaken, Senator Bennet was a part of that, the Simpson-Bowles Commission—argued that the tax code is rife with inefficiencies, loopholes,

perverse incentives, tax earmarks, and, as we all know, baffling complexity.

They also noted that we need lower rates, marginal rates, we need to broaden the base, and we need to simplify the tax code to make America the best place to start and grow a business and create jobs, especially during a time of chronic high unemployment and where the labor participation rate is at a 30-year low, because many people have simply quit looking for work and a lot fewer of them participate in the job market.

But our efforts to reform and simplify the tax code should not devolve into an opportunity just to raise taxes on the American people. After all, the Congressional Budget Office already projects that tax revenues in 2014 and beyond will exceed historical averages. Tax reform should not be taken as an opportunity to make job creation harder or more expensive or burdensome, especially given the millions of people who are out of work or under-employed.

So, for these reasons, I think we have a little bit of an impasse—maybe not a little bit of an impasse, a big impasse. When the Senator Majority Leader says that tax reform cannot even be close to revenue-neutral, that is a non-starter for my colleagues; certainly it is for me.

I do not think many, if any, families or small businesses in Texas believe that tax reform should just be another opportunity for Washington to suck more money out of the private sector. Tax policy is one important piece of the policy when it comes to making energy affordable and robust job creation a reality.

A regulatory regime that makes it more difficult to produce or deliver affordable energy and to sustain and create jobs here at home is a recipe for more dependence on foreign sources of energy, which can lead to volatility and be a threat to our economy. It certainly does not do anything to help create the jobs we need.

In this regard, I continue to be disappointed at the administration's pursuit of regulatory policies that will end up increasing the cost of energy to consumers, to their employers, and their families. I understand, and Americans understand, that raising taxes and putting more regulations on industry will translate into higher prices. They are not absorbed by the industry; they are passed along to consumers in terms of higher prices. But I really would like to commend Senator Stabenow for having today's hearing.

This is important to flesh out differences in point of view and to hear from the experts from whom I am sure we can learn a lot. Today's hearing is just another step down the path created by the chairman and ranking member of the full committee, and it is useful for the committee to examine what is in the tax code that is working and what is not. Many will argue for extensions of valuable tax incentives, or new tax incentives perhaps, for their preferred type of energy.

The question is, for me, are we getting the best bang for the tax dollar, and which ones should we extend, modify, or eliminate altogether? Of course, the answer is one that Congress will ultimately provide. I look forward to hearing the testimony of the witnesses on what should be our guiding principles as we move forward. I especially want to welcome my friend, Senator Moran from Kansas.

When Senator Coons comes and joins us, we look forward to hearing from him too.

Thank you, Madam Chairman.

Senator STABENOW. Thank you very much. I also want to recognize our very distinguished friend, Senator John Warner, who is with us. We welcome you and miss you and hope all is well. So we are very glad to see you today.

So, Senator Moran, if you would like to proceed, we would welcome your testimony.

STATEMENT OF HON. JERRY MORAN, A U.S. SENATOR FROM KANSAS

Senator MORAN. Madam Chairman, thank you very much. It is disappointing to me that my colleague and friend, Senator Coons, is not available for us to do this jointly, and I probably will not be here for his testimony, but he has been a great ally on an issue that he and I both are excited about and wanted to visit with the committee about today.

This is the first time I think in the 2½ years that I have been a member of the U.S. Senate that I have testified in front of a committee, and I was not intimidated—no offense to either one of you, Ranking Member or Chairman—but when my colleague from Colorado, Chairman Bennet, walked in, I became a bit more nervous. But then, when you announced that Senator Warner was seated behind me, now I am a little bit more nervous than I had hoped. There are standards that I wish we all could meet, and Senator Warner certainly exemplifies those.

The United States is experiencing a resurgence—and Senator Cornyn talked about what is happening in the private sector. But we are seeing a real resurgence in domestic energy and innovation in exploration and production. With this growth, more Americans all the time are employed in the development of our country's natural resources, both traditional and renewable.

Our country does much of its energy policy in the tax code, so, while many of us will spend time trying to develop what we call energy policy, the reality is that what this committee, what the Finance Committee does, how the tax code looks, in many ways determines what our energy policy is. So I am pleased that this committee and the subcommittee are pursuing this topic.

As our technologies have matured and our knowledge has advanced, our tax code has not adjusted to the needs of today's markets. As Congress considers the future tax treatment of the energy sector, there appears to be a bipartisan consensus around a sound financial tool that has allowed the oil and gas industry to efficiently raise more than $450 billion over the past 2 decades from a broad array of individuals and institutions, and that tool is the Master Limited Partnership (MLP) structure that was introduced in 1987 in section 7704 of the Internal Revenue Code. In my view, it should be renewed, continued, and, in my view, it should be modernized to include renewable and clean energy sources.

The MLP is what I would describe as a publicly traded partnership that holds energy or other specified assets. Traded on public stock exchanges, MLPs allow individuals and small institutional investors to invest in energy projects similar to the way a mutual

fund allows investors to make small investments in diversified stock portfolios.

MLPs are efficient structures for raising capital, in part because, unlike corporations, the taxable income and deductions are passed through directly to the investors, the limited partners, rather than being taxed twice, once at the corporate level and then again at the shareholder level. This feature of MLPs has enabled the oil and gas industry to raise capital efficiently at an appropriate cost that has provided investors with sustained and consistent cash flow. It is important to note that MLPs, in my view, do not represent what I would call a tax break.

For those industries that are eligible for MLP structures, it is not a tax break; rather, it is a tax simplification structure that concentrates tax at the investor level, avoids double taxation, and significantly broadens the potential investor base.

MLPs have aided in the construction and operation of much of our modern oil and gas infrastructure and, most recently, fueled the shale revolution in oil and gas. In 2012 alone, MLPs raised over $23 billion of new capital for eligible projects. These include significant parts of the oil and gas supply chain, such as production pipelines, refineries, and gathering and storage facilities.

MLPs create needed investment opportunities for individual savings for retirement, for pension funds, and, according to the National Association of Publicly Traded Partnerships, in their survey, 75 percent of investors in MLPs are over the age of 50. This is in part due to the fact that these individuals are seeking secure income-oriented investments that provide a reasonable return.

MLPs fill this roll, where other types of investments will fall short. This perhaps is most important for those who struggle to pay their utility bills. MLPs lower the cost of energy. MLPs afford the energy industry stable access to less expensive capital and therefore lower the cost of energy to consumers. While it is critical that MLPs continue to be available to investments in the non-renewable energy industry, it is also important that we extend this tax structure to the broader energy sector.

For example, companies involved in the production of solar, wind, geothermal, combined heat and power, our largest renewable energy industries, they have never been eligible for MLP treatment even though renewable energy has been burdened by the same high cost of capital as the non-renewable energy industry. Only a small group of investors, consisting mostly, almost entirely, of a few large corporations, have been able to invest profitably in renewable energy projects.

Ironically, the United States has the largest and most efficient capital markets in the world, but our renewable energy companies rarely have access to those markets. Extending MLP treatment to renewable energy could move the renewable energy industry from relying on a few investors demanding high rates of return to a broader and deeper investment pool for those energy projects.

Continuing the MLP structure in the Internal Revenue Code and expanding it to include investments in renewables and clean energy would provide a predictable tax policy that encourages investment in U.S. energy projects, creates jobs, and promotes American

competitiveness in the global race to develop and utilize competitively priced energy sources.

I grew up in a family whose father worked in the oil fields. It is what put food on our family's table. The energy sector is a perfect example of how America can provide an opportunity for all Americans to pursue the American dream, and I encourage the committee's consideration of MLPs, and I thank the chairman.

Senator STABENOW. Thank you very much. We welcome your testimony.

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

Senator STABENOW. I am pleased to be a co-sponsor of the bill. I think you and Senator Coons have done a terrific job in putting this together.

I am wondering if you might just speak a little bit more about the kinds of energy companies that you think would be most interested in organizing as MLPs. You talked a little bit about it, but, as you talk to businesses, how do you think this would have a specific impact, and what kind of businesses would be most interested in organizing as MLPs?

Senator MORAN. Madam Chairman, it is clear to me that certainly the tax treatment available, or the circumstances that our oil and natural gas companies, our pipelines, our infrastructure companies in the energy sector, are able to access today are very important to them, so in part I am here to indicate that that needs to continue.

But, as you say, there are a number of other companies involved in other sectors of energy: wind, geothermal. The inability to raise capital is one of the greatest impediments toward us pursuing more energy projects in the United States.

Senator Cornyn talked about Texas. Madam Chairman, I would only disagree with you when you indicate that all those things can be done in Michigan. They can, and are, being done in Kansas. The manufacturing of the necessary equipment to create wind and solar is occurring in our State. We are the third-largest supplier of wind energy in the country. The ability to transport that energy elsewhere where wind is not such a viable resource creates the necessity of raising significant amounts of capital to transport, to transmit that energy.

Again, these are areas in which private investment, not only in the production of energy but in the transmission of energy in the renewable area, is where I believe this legislation, this tax provision, creates great opportunities.

Senator STABENOW. Thank you very much.

Any questions from the committee? Senator Cornyn?

Senator CORNYN. I have some really hard questions for Senator Moran, but I am going to withhold them for now.

Senator STABENOW. Senator Bennet?

Senator BENNET. Not a question, but a comment. I just want to say "thank you" to you and to Senator Coons for your leadership on this important bill. As Senator Cornyn said, we are about to begin this discussion about tax reform generally in the country. What I hope people will remember when they hear people say, the government should not pick winners and losers, is that we already

have a tax code that is full of that, full of decisions that have been made about winners and losers.

What we need is a tax code that is actually looking forward into the 21st century, into the economy that the people of Kansas are building, the people of Colorado are building, that does not necessarily look like the economy from 100 years ago. So I want to say "thank you" to you for recognizing that and for the work you have done on this bill.

Senator MORAN. Thank you, Senator Bennet.

Senator STABENOW. Thank you very much. We appreciate your coming.

Senator MORAN. Madam Chairman, thank you. I did submit a letter to the committee, and I am interested in further pursuing the witness protection program. [Laughter.]

Senator STABENOW. We look forward to working with you on that as well.

We would ask our second panel, who have been very patient today, to please come forward. Good afternoon, and welcome. Let me introduce our panel, then of course, as you know, we will ask each of you to give us 5 minutes of testimony. We welcome your larger testimony in writing, as well as any other information that you have for us. We are very pleased to have such a distinguished panel of experts, people who have been working in these areas for a long time.

First, Ms. Phyllis Cuttino is director of the clean energy program for The Pew Charitable Trust. She has helped lead Pew's research on a series of reports on the global clean energy sector titled, "Who's Winning the Clean Energy Race?" Thank you for coming.

Mr. Dan Reicher—it is good to see you—is executive director at the Steyer-Taylor Center for Energy Policy and Finance at Stanford University. He is also a professor at the Stanford Law School and a lecturer at Stanford Graduate School of Business. Prior to joining Stanford in 2011, Mr. Reicher worked as director of climate change and energy initiatives at Google and as president and cofounder of New Energy Capital Corporation and Vantage Point Venture Partners, which provided early funding for clean energy projects. Of course, we all know you from your days in the Clinton administration, having served 8 years in a number of very key positions at the Department of Energy, including the Assistant Secretary for Energy Efficiency and Renewable Energy. So, it is great to see you again.

Mr. Will Coleman, it is good to see you again. Mr. Coleman is the founder and a partner in OnRamp Capital in San Francisco, which partners with corporations to invest in early-stage innovations. He was previously a partner at the venture capital firm, Mohr Davidow, investing in early-stage companies producing products like LED lighting and building networks. So, welcome. It is good to have you with us.

And Dr. Thorning. Dr. Margo Thorning is senior vice president and chief economist for the American Council for Capital Formation here in Washington, which represents members of the American business community on issues like tax and regulatory policy. She previously worked at the U.S. Department of Energy, the U.S.

Department of Commerce, and the Federal Trade Commission. We welcome you as well.

So we will now turn to Ms. Cuttino to begin today.

STATEMENT OF PHYLLIS CUTTINO, DIRECTOR, CLEAN ENERGY, THE PEW CHARITABLE TRUSTS, WASHINGTON, DC

Ms. CUTTINO. Well, thank you, Chairman Stabenow and Ranking Member Cornyn, for inviting me to discuss clean energy, tax policy, and our energy future. I would like to submit my full testimony for the record, and I will summarize it in the time that I have here.

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

Ms. CUTTINO. It was discussed earlier, but it is worth noting that a remarkable U.S. energy transformation has occurred in less than a decade. Oil imports have dropped to 40 percent, and the electric sector has never been so diverse, with approximately one-third of electricity coming from coal, one-third coming from natural gas, and a third from nuclear, hydro, and renewable energy sources.

Efficiency is also having a major impact in transportation, buildings, and commercial sectors. These developments have delivered important benefits to the American people: our trade balance has improved, energy prices are relatively stable and low, and carbon emissions have been reduced.

As a result, our economy is stronger, our country is more secure, and our environment is cleaner. The lesson is clear. Diversification and advanced energy technologies must be the cornerstone of U.S. energy and tax policy. Research by The Pew Charitable Trust has shown that clean energy technologies have entered the mainstream of global energy markets. In 2012, $269 billion was invested, and clean energy deployment was a record 88 gigawatts, spurred by dramatic price declines.

Private investment will continue to grow significantly as countries around the world prioritize clean energy. The International Energy Agency predicts that renewables will provide more than half of all new electric generating capacity over the next 25 years, and forecasters expect trillions of dollars to be invested in the sector.

This presents a significant economic opportunity for our U.S. manufacturers. Madam Chairman, even the oil-rich state of Saudi Arabia has set a goal of obtaining 30 percent of their electricity from solar power. We want to step up and compete in these emerging markets and supply these growing markets because, although we lead in clean energy innovation, we are not manufacturing, deploying, or exporting those technologies as we should be.

Once, we were the worldwide clean energy leader, but policy uncertainty in this country has hurt U.S. standing in the global sector. In 2012, China led the world in attracting private investment, with $65.1 billion. In the United States, investment fell 37 percent to $35.6 billion, and we are now in second place.

Last year, Pew organized roundtable discussions in New York, Ohio, Colorado, Georgia, Mississippi, and Washington, DC with clean energy leaders in the areas of finance, manufacturing, innovation, and deployment. They identified three key challenges facing their industry. Policy uncertainty was described as the over-riding

impediment, but stiff international competition and tight credit markets were also identified as challenges.

Our roundtable participants offered six policy priorities to address these challenges and for Congress—you—to consider. First, set a clear and long-term goal for the deployment of clean energy, providing the certainty needed for innovators to invent, investors to mobilize capital, and manufacturers to scale up. Tax policy can play a critical role.

Second, support energy R&D at higher levels in order to maintain that pipeline of ideas and innovation which are so critical to U.S. competitiveness.

Third, renew the production and investment tax credits. Congress has, and does, provide permanent incentives to incumbent technologies such as oil, gas, and nuclear power. Our industry participants would welcome a multi-year, but time-limited, extension of clean energy tax credits to help ensure full market maturation, including strengthening the investment tax credit to better reflect the needs of industrial energy-efficient technologies, including combined heat and power, and waste heat recovery. The renewal of the ITC and PTC would provide certainty and encourage a more diverse and clean energy mix.

Fourth, address barriers to industry progress and pass Senator Moran's and Senator Coons's MLP Parity Act, which would allow clean energy to qualify for the same tax treatment that is open to oil and gas infrastructure. It is a matter of fairness.

Fifth, support American manufacturing through the Advanced Energy Manufacturing Tax Credit. This will help us better compete in this critical and growing industry.

Finally, sixth, strengthen and expand trade promotion for exports of American-made technologies to emerging markets. In conclusion, U.S. competitiveness in the clean energy economy warrants public and private priority and partnership.

In this regard, policy matters. Encouraging the innovation, deployment, manufacturing, and trade of clean energy technologies through policy will help ensure that America capitalizes on this substantial economic opportunity. It will provide our Nation with economic, environmental, and national security benefits.

Thank you.

Senator STABENOW. Thank you very much.

Mr. Reicher, welcome.

STATEMENT OF DAN REICHER, EXECUTIVE DIRECTOR, STEYER-TAYLOR CENTER FOR ENERGY POLICY AND FINANCE; PROFESSOR, STANFORD LAW SCHOOL; AND LECTURER, STANFORD GRADUATE SCHOOL OF BUSINESS, STANFORD UNIVERSITY, STANFORD, CA

Mr. REICHER. Thank you, Chairman Stabenow, Ranking Member Cornyn, and subcommittee members. I really appreciate the opportunity to testify.

My written statement addresses three finance challenges: first, how to significantly lower the cost of financing renewable energy; second, how to dramatically increase investment in building efficiency retrofits; and third, how to more effectively commercialize energy technology of all kinds. I will address the first two chal-

lenges now, but I would be pleased to take questions on commercialization.

Regarding renewables, two factors largely determine the cost of large-scale renewable power projects: first, equipment costs, that is, what you pay for buying and installing solar panels, wind turbines, and the like; second, finance costs, what you pay for project capital.

Technological innovation has dramatically reduced renewable energy equipment costs, but financial innovation has not kept pace. As a result, the cost of financing today makes up an ever-greater fraction of the total cost of renewable energy projects, inflating the cost of the electricity that is produced. We face this because solar and wind projects are generally financed using Federal tax credits.

These credits, which have been critical over the last 2 decades, turn out to be an expensive way to finance renewable energy projects. First, there are only a couple of dozen investors nationwide who can monetize them; that is, only those with very large taxable incomes to shelter who can navigate the complicated structuring. This greatly drives up the cost of capital.

Second, use of these credits ties up capital for years because of IRS recapture rules. This illiquidity drives up rates further.

Third, renewable energy tax credits have only short-term congressional approval. Boom-and-bust cycles make tax credits less attractive to investors.

The good news? There is a straightforward solution: give renewables access to the very same mechanisms currently providing low-cost capital to hundreds of billions of dollars' worth of traditional energy projects like oil and gas pipelines and transmission infrastructure.

These mechanisms, as you have heard, are Master Limited Partnerships and Real Estate Investment Trusts, also known as MLPs and REITs. As you just heard from Senator Moran, the use of MLPs and REITs would give renewable energy developers access to much greater pools of capital, and they would no longer have to pay scarcity prices. We estimate that MLPs and REITs could cut the cost of capital in half for many renewable energy projects relying on tax equity.

MLPs and REITs would also mean that millions of Americans could finally own shares in a renewable energy project just like they can in a gas pipeline project. The MLP Parity Act, cosponsored by Senators Coons, Moran, Stabenow, and Murkowski, would open up MLPs to renewables and other kinds of energy projects, including co-generation and carbon capture, and there is a companion and bipartisan bill in the House.

On the REIT front, the Treasury Department, on its own, could issue a broad revenue ruling extending REITs to renewables. Thirty-five congressional Democrats and Republicans wrote President Obama, urging his support for REITs and MLPs.

I want to emphasize that my support for MLPs and REITs should in no way signal that I endorse an immediate phase-out of the PTC or any weakening of the current ITC. We need significant time for a smart transition to MLP and REIT financing.

Turning to energy efficiency finance, Deutsche Bank calculates that there is about a trillion dollars worth of energy to be saved in U.S. buildings over the next 10 years, and the bank says there

is about a $300-billion investment opportunity to achieve those savings, but there is barely a trickle of investment being made in energy efficiency improvements in existing buildings.

The challenge is helping investors of all types see their way clear to making large-scale energy efficiency investments and making some money. This means addressing the performance and credit risks in energy efficiency investments. There are several finance mechanisms now being used to address these risks, like property assessed clean energy and on-bill repayment.

The jury is still out on these mechanisms, but in the meantime there are steps that Congress could take to prime the pump. One is, legislation sponsored by Senators Bennet and Isakson of this subcommittee called the SAVE Act.

The SAVE Act would address an odd situation in home mortgage underwriting. A lender, in determining mortgage terms, takes into account the cost of real estate taxes and home owners' insurance but does not consider the cost of energy, often a greater expense in many parts of our country.

The SAVE Act would require a lender to take the projected energy savings of an efficient home into account when presented with a qualified energy report. Under Federal law, borrowers have to report whether termites are chewing up the beams in an attic. Why not encourage a homeowner to discover an inefficient furnace devouring cash in a basement and help find low-cost financing to replace it?

The SAVE Act enjoys the backing of key business organizations, including the National Association of Home Builders and the National Association of Realtors, and there is immediate opportunity to attach the SAVE Act to the Shaheen-Portman bill. There are few legislative moments in Washington these days where the stars are so well-aligned.

With that, I would be pleased to take your questions, including on commercialization. Thank you.

Senator STABENOW. Thank you very much.

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

Senator STABENOW. Mr. Coleman?

STATEMENT OF WILL COLEMAN, PARTNER, ONRAMP CAPITAL, SAN FRANCISCO, CA

Mr. COLEMAN. Thank you, Chairman Stabenow, Ranking Member Cornyn, and distinguished members of the committee. I appreciate the opportunity to be here today.

My name is Will Coleman. I am an investor in early stage energy and technology companies. I have spent the better part of the last 15 years assessing different ways to build and invest in new technologies in the energy sector.

I think we need to start this conversation by acknowledging that in energy, Federal policy, and particularly Federal tax policy, has a huge impact on where and how investors and corporations invest their dollars.

In my written testimony, I talked a lot about innovation. I focused on that because innovation is what has kept us competitive

as a Nation, and because the truth is the government has always played a huge role in driving innovation in energy.

We have nuclear energy because of policy, we have renewables because of policy, and we have the Bakken because of policy. So I want to focus on three major points today: number one, America is actually falling behind when it comes to energy innovation; two, the tax code is compounding that problem; and three, we need solutions that specifically target this innovation challenge that apply equally across technologies and that provide the long-term certainty necessary to drive investment, and then we need to get out of the way.

Energy has always been a strategic imperative. Some people argued just a few years ago that we already had the technology to compete and that we just needed to produce more, yet we have seen over the last few years how technologies like fracking and horizontal drilling that were developed over several decades by the National Labs and others have been applied to open up significant new resources like the Bakken. This would not have happened without new innovation, and it would not have happened without tax credits that reduced the risks of development.

But oil and gas is just one piece of the equation. Even with these resources, we still spent almost 30 percent more on imports in 2012 than we did in 2010. There are a multitude of other alternatives that could be equally transformative if they could just get to scale. Continued innovation is critical in oil and gas and beyond, not just because we need more alternatives, but because it ensures our competitiveness and it is a huge driver of growth in our economy at a time when growth is obviously at a premium.

It has been shown that innovation at large is responsible for 75 percent of the economic growth in this country since World War II. It drives down costs, catalyzes investments, and enables new industries. Unfortunately, the energy industry spends less on innovation than almost any industry in the world, and when independent investors like us look at the tax code, it clearly drives them toward investing in projects using only mature, already-proven technologies rather than taking risks on developing new technologies and unproven ones.

This would not be a problem if we did not need innovation, but we do. This committee has spent a lot of time thinking about how to reform the medley of energy tax provisions that have been spawned over the last century. As an investor with the flexibility to invest in whatever technologies and industries make economic sense, I am glad to hear the increasing view that, whatever we do, we need to apply tax policy more equally across technologies.

As investors, we ask the question: if you wipe the slate clean, where would there still be failures in the market? The answer is that new technologies in any category would still struggle to get to scale and commercialized, to get the financing to build that first manufacturing plant for the technology, and this would diminish any interest in investing further upstream in innovation.

In my written testimony, I detailed this persistent funding gap in energy and other industrial sectors. The bottom line is that technology innovation, particularly in sectors like energy, takes a long time. Without long-term, stable market indicators or policies that

otherwise incent investors to take the risks necessary for new technology, innovation atrophies. We have never accepted that as a Nation, and I do not think we have the ability to start now.

Venture capitalists have invested over $25 billion in energy technologies over the last 10 years, but in large part, because we have not yet figured out how to overcome this commercialization funding gap, even venture capital has begun to pull back from investing in new energy technologies. Investing in the early stages of innovation has dropped from 50 percent of capital deployed to less than 10 percent in 2012.

We believe there are solutions that can address this gap in a technology-neutral way, that are targeted and efficient, and that can continue to drive the innovation we need without dictating the playing field. In my written testimony, I detailed one such approach which provides a credit for investment in the manufacture of new and improved technologies. Companies would receive the credit up to a percentage of the capital invested to produce the innovation and would only receive the credit for actual production.

The credit would be available to all technologies across the energy sector, and it would support specific innovations only to the point where they reach commercially competitive scale and then roll off. The key in our minds is to create a credit that encourages the private sector to invest in strategically important areas and forces investors, rather than the government, to make the determination of whether a technology can eventually compete.

So let me be clear. If we are going to remain competitive, we need more Bakken shales, and we need more of them not just in oil and gas. Venture capital and other investors have the capacity to invest in these sectors, but the current code encourages us not to.

In this 113th Congress, the tax code is clearly front and center. I believe we have a rare opportunity to streamline the tax code to make it more efficiently and equitably encourage the next generation of technologies.

Innovation is something we have done extremely well in this country, but we cannot assume that we will continue to innovate in important sectors like energy without the right policies. I appreciate the time, and I look forward to working with you on these important issues.

Senator STABENOW. Thank you very much.

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

Senator STABENOW. Dr. Thorning, welcome.

STATEMENT OF MARGO THORNING, Ph.D., SENIOR VICE PRESIDENT AND CHIEF ECONOMIST, AMERICAN COUNCIL FOR CAPITAL FORMATION, WASHINGTON, DC

Dr. THORNING. Thank you, Chairman Stabenow, Ranking Member Cornyn, members of the committee. My name is Margo Thorning, and I am chief economist of the American Council for Capital Formation. I appreciate the chance to appear before you today.

I would like to look a little bit at where we are with respect to our economy. The new GDP numbers came out today showing that,

for the first half of 2013, economic growth has averaged only 1.4 percent. That is far too low to have an impact on the high unemployment rate, 7.6 percent. So, as we look at tax policy, I think it is very important that we look, as we think about reform, at how it is going to impact new investment, how it is going to impact economic growth.

One of the things I wanted to highlight is the contribution of the shale oil and shale gas revolution to our current job growth. It is not as strong as it should be, but States like Wyoming, North and South Dakota, Texas, Colorado, others, are experiencing much faster growth in personal income and much lower unemployment rates than our States that are not producing shale oil or shale gas.

Furthermore, a new McKinsey Global Institute study just released a week or so ago shows that, of the five game changers that could really help us restore economic growth, shale oil and shale gas are the number-one item. According to the McKinsey report, we could see GDP growth of between 2 and 4 percent by 2020 and an additional 1.7 million jobs. So we need to make sure, as we evaluate tax proposals, that we look at the costs and the benefits and think about what they may do to investment incentives.

I would like to propose that the policymakers think even more broadly about tax reform and think about a consumption tax in which all investment, including for renewables, oil and gas, every kind of energy, is expensed the first year. All investment would be expensed, and saving would be taxed at a very low rate.

I would like to ask that you include in the record a new paper that my colleague Dr. Çebi and I just released on the impact of a consumption tax and what it could mean to the capital stock and to job growth.

Senator STABENOW. Without objection.

[The paper appears in the appendix on p. 120.]

Dr. THORNING. So a consumption tax would be the best way to go forward, as a Treasury analysis in 2006 indicated, and I draw your attention to the table in my testimony that shows how much stronger the capital stock would grow if all investment could be expensed immediately and consumption was the tax base rather than income.

But if policymakers cannot make that leap and cannot get there in the near term, they should at least consider the impact of cash flow on investment. Recent research by academics shows that, for firms that have ready access to capital, each dollar of cash flow generates about 33 cents of new investment. For firms with not such strong access to capital, each dollar allows another 66 cents of new investment.

Recall that each $1 billion of investment in the U.S. is associated with 22,300 new jobs. The new GDP numbers that the Bureau of Economic Analysis released today show that we are still down $27 billion in non-residential fixed investment compared to the fourth quarter of 2007. So here it is, 5 years after the recession started, and we still have not gotten real investment up to the level that it was prior to the recession, and it obviously is hurting job growth.

So I would like to look a little bit at the provisions that impact the oil and gas industry. They of course use accelerated depreciation, LIFO, bonus depreciation, other provisions that are available

to all industries, but, in particular, provisions like geological and geophysical expenses, intangible drilling costs, percentage depletion, are really outlays for current labor costs, current well costs. These are costs that have no salvage value, and they should not be depreciated.

So it is important that these provisions be kept in the code, as long as we have the current system, in order to keep the cost of capital low for these investments that have been responsible for so much of the oil and shale gas boom.

One thing that I think we ought to also think about, and again, harking back to the need for a cost/benefit analysis, is, as we look at incentives for renewable energy, we need to look at the cost of that energy and the benefit that we are going to achieve. As you see in Table 3 in my testimony, the Department of Energy estimates that the capital cost of renewable energy electricity generation is far higher than that for conventional energy.

In addition, the costs in my table do not even measure the need for back-up generation; they are just strictly the capital costs. In this global situation where energy costs matter, we want to keep energy costs as low as we can in order to stay competitive and, we hope, strengthen our economic recovery.

It is interesting to note that European countries are cutting back on their subsidies for renewable electricity and energy, in part because they realize it is impacting their energy costs, so we need to be sure that each of the provisions in the code really meets that cost/benefit test. As data from the Congressional Research Service shows, the renewable sector gets 80 percent of all the tax code subsidies, and other energy is only getting 20 percent.

Finally, I would like you to think about some of the environmental regulations that act like a tax on U.S. industry in general, not just the energy industry. For example, the administration's new "social cost of carbon" number—which is pegged at about $36 a metric ton of CO_2 compared to their number 3 years ago, which was $22—is based on we are not sure what.

It has not been a transparent process, and we think stakeholders should be allowed to understand and comment on changes that may be justifying stricter requirements for renewable fuel and other mandates.

Other provisions like the Renewable Fuel Standard—which the National Academy of Science study just released shows—have actually increased greenhouse gases, not decreased them. That should be looked at too, because it is clearly costing consumers a lot of money, and it is not helping the environment.

And finally, the Clean Air Act is not a good tool for regulating GHGs and, according to ACCF studies which I cite in my testimony, and others, is costing quite a bit of investment because of the uncertainty and the inability to meet some of the targets that EPA is supporting.

So finally, I would just like to say, let us take each provision in the code and look to see how much job growth and investment it is creating and make sure that, as we move ahead, we are keeping our eye on the most effective ways of growing our economy. Thank you.

Senator STABENOW. Thank you very much.

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

Senator STABENOW. Before proceeding to questions, I do notice that Senator Coons has joined us. So, Senator Coons, if you would like to come up to the table, we would ask witnesses just to remain. Senator Coons, if you are willing to come up to the table here with our witnesses rather than asking people to step away, we will just ask you to join the table and to speak about your very important legislation.

Senator Moran was also here earlier and had an opportunity to speak. But we welcome you and appreciate your leadership on this question of leveling the playing field and providing some opportunities for capital, so we will let you proceed. I know you were presiding, and we are pleased that it worked out that you were able to join us.

STATEMENT OF HON. CHRISTOPHER A. COONS, A U.S. SENATOR FROM DELAWARE

Senator COONS. Thank you, Madam Chairman. As always, I am relying on the kindness of my colleagues. Senator Baldwin of Wisconsin was willing to accommodate me by changing her schedule and allowing me to get here a little early, so thank you.

Thank you to you for convening this hearing and for your leadership and partnership on this important piece of legislation. I think this is a timely and important subject, and so, as we look at energy taxes in particular and as you consider principles for energy tax reform, I am grateful for the chance to offer a brief testimony on an element of the tax code that I think, if appropriately modernized and focused, could drive significant new investment in clean and renewable energy while sustaining a long, beneficial, advantageous tax provision for traditional energy.

Chairman Stabenow, I am particularly grateful to you and Senator Moran, who testified previous to me, for your collaboration and support.

I think there is little debate about America's very strong potential to lead the world in clean energy development and deployment. We have unparalleled innovation and ingenuity. We are among the world's leaders in developing advanced clean energy technologies, but we are really struggling at the moment to deploy these innovations, and we are missing out, in my view, on the very real economic and sustainability opportunities they represent to benefit our country and our communities, in part because of the absence of a reliable source of long-term financing.

To advance, our technology needs a catalyst, the catalyst of a clearer and stronger regulatory and statutory structure that allows efficient access to long-term financing.

Today's energy market is defined broadly by narrowing profit margins in established technologies that are 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.

But the Master Limited Partnerships Parity Act of 2013—that is a mouthful—S. 795, which I re-introduced in April along with you,

Senator Stabenow, Senator Moran, and Senator Murkowski, would do just that. It is, I think, a strikingly simple, broadly bipartisan bill that modernizes a section of our tax code, harmonizing it with the all-of-the-above energy strategy for American energy independence that so many of us have endorsed as the blueprint for our country's energy future.

The MLP Parity Act would allow clean energy projects to utilize a beneficial tax structure that taxes a project like a partnership, a pass-through, but that allows its interest to be traded like a C-corp, a corporate stock. So it allows access to the liquidity of equity markets, prevents double taxation, and leaves more cash on the table available for distribution back to the investors.

For the last 30 years, MLPs have given natural gas, oil, and coal access to private capital on a lower-cost, long-term basis, something other capital-intensive projects badly need. It is a well-developed, well-established financing vehicle that currently has a market cap of about $450 billion, spread across roughly 100 currently traded MLPs.

The extension of access to this financing vehicle to a very wide range of energy sources—energy efficiency, energy storage, carbon capture and storage, and a wide range of renewable energy sources—has the real potential to bring a significant wave of private capital off the sidelines and into the potentially burgeoning renewable energy marketplace. It would not only level the playing field, but it would increase access to low-cost capital for all energy sources in our marketplace on an equal basis.

Again, I am thankful to you, Chairman Stabenow, to Senator Moran and Senator Murkowski, for your tireless partnership in this effort, and for working closely with me on this bill. Bipartisan companion legislation is being led by Congressmen Ted Poe, Mike Thompson, Peter Welch, Cory Gardener, and Chris Gibson, which is three Republicans and two Democrats, for those of you scoring at home, and was recently re-introduced in the House at the same time as the bill here in the Senate.

In summary, I think access to low-cost financing will define our Nation's energy future and will determine how, when, and which energy sources emerge as central players in our energy marketplace in the long term. I believe it is up to us to ensure that our vast supply of energy of all types, but, in particular for me, of renewable types, is a vital part of that equation.

Thank you.

Senator STABENOW. Thank you very much.

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

Senator STABENOW. I do not know if any members have any questions for Senator Coons at this point.

[No response.]

Senator STABENOW. If not, we would thank you very much. We will save the tough questions, and we will submit those in writing.

Senator COONS. Thank you. I welcome your questions, and I appreciate the opportunity to join you today.

Senator STABENOW. Thank you very much. You are certainly welcome to stay, but we certainly understand your schedule, and we

are appreciative that you were able to get here before the meeting was over. So, thank you very much.

Let us move now to questions. I think the fundamental question for me, in listening to all of your testimonies, really relates to the broad picture that we look at when we talk about this question of picking winners and losers. We hear that a lot, we should not pick winners and losers, but our tax code, in fact, has. It started 100 years ago, and I am sure I would have supported that 100 years ago.

We have proceeded, not only with a series of benefits and policies to spur the oil, gas, and coal industries over that time period, but they have been consistent. They have been imbedded in the tax code. They do not have to be put in tax extenders every year, so there is the ability to plan, to make investments, and it has paid off.

We invested, we picked winners, and they have won. It has been good for the economy. I mean, we certainly have many challenges now as it relates to other issues, but in the last 30 years we have given fossil energy companies support, Federal taxpayer support, worth about $166 billion adjusted for inflation.

We are now at a point where certainly our oil companies are the most profitable companies in the history of the world. They are the five top companies, making $112 billion in profits in 2012. I do not say that in any disparaging way except to say the question is, is it appropriate, is it needed, to continue, with limited dollars in a time of trying to balance budgets, with that?

So I guess I would ask each of the panelists in some way to respond to this in terms of what approach is best for us right now in the area of the ITC, the production tax credit, 48C. As the author of 48C, I look at the fact that in 2009 we put in place an advanced manufacturing technology credit for 30 percent of the costs of retooling equipment and so on for clean energies, and we had 3 times as many requests as we had dollars. It was capped at $2.3 billion. We had 3 times as many requests as we had available dollars, so each one of the three at the top had been stop-start, stop-start, or just stop in the case of 48C.

So when we look at all of this, in the age of clean slate tax reform, which the chairman and ranking member have asked us to do, we certainly would not have, I do not think, designed this 100 years ago to look like this. So here we are at this point in time, and what is the approach that we ought to be using at this point to fix this?

Ms. Cuttino?

Ms. CUTTINO. Well, in terms of principles, I think I can sum it up in just a few words, which are certainty, diversity of supply—we should not put our eggs all in one basket—innovation—it is critical to the future—fairness, and then finally clean, because there are other imperatives outside economic imperatives.

So those are the principles that I would look to. I think, in talking to our industry roundtable participants, those in the energy industry, they have been quite clear about, those are the kinds of things they need. So again, I would go back to the six steps, including renewal of 48C, a renewal of the ITC and PTC, and certainty across the board.

Senator STABENOW. Mr. Reicher, could you respond? And in responding, if you could also answer, can we be competitive with this kind of an approach here, an unequal playing field?

Mr. REICHER. Madam Chairman, I think it makes it quite difficult to compete internationally with this very complicated, fairly unreliable system that we have. I encourage you to go back to the 1980s when the Master Limited Partnership legislation was adopted.

There was actually a decision made not to include what were called non-depletable resources, that is, renewables and related technologies. It would be interesting to say to yourself, if they had been included back in the 1980s when this law was adopted, I think we would be in a very different place.

Instead, what we have had to rely on is this very much on-again/off-again system of tax credits, the production tax credit, for example, for wind, over a period of 15 years, having to be reauthorized and at several points running out and having to be retroactively put back on the books.

I was an investor in this industry for a period of time, and this was a very difficult place to want to put money when you were looking at a system of incentives built on such an unreliable set of tax credits, as opposed to the ability of the oil and gas industry to make an investment through the Master Limited Partnership structure and know that that incentive was there and you could move forward with it.

So, beyond its greater simplicity, which I think is one of its great attributes, its greater reliability than what we have had with tax credits is a real hallmark. If we could put that sort of reliable system in place, I think we would be doing a great deal of service to the renewable energy industry in this country.

Senator STABENOW. Thank you.

My time is up, but I am going to ask Mr. Coleman and Dr. Thorning to briefly comment, and we will add a minute to everyone's questions as well.

So, Mr. Coleman?

Mr. COLEMAN. Thanks. Yes, I think that, obviously, we need more innovation as sort of the driving force behind energy policy, and particularly tax policy. The reason is, we need to drive down cost. I think that the challenge is that, currently, the tax code focuses on individual technologies and allocates very specific credits to each of them.

The challenge there is that things change. I think the whole point of your chart is that they change pretty dramatically over time. If it was 1908 and we were looking at what things we need to support, we would probably say faster horses, but that is not what we needed 20 years from then.

And I think we need to create a tax code that allows the flexibility to be able to adapt over time. The only way you are going to be able to do that is if you do not have to say, this industry gets this credit, this industry gets that credit, this industry gets another credit. And, if you treat all those industries the same, i.e, if the tax incentives are permanent, that is the only way we are going to invest upstream.

Senator STABENOW. Dr. Thorning?

Dr. THORNING. I would suggest we let markets decide which technologies are going to survive and thrive. I think expensing, as I mentioned, for all types of energy investment would be optimal. It puts everybody on the same playing field.

I would like to point out the reason for our manufacturing renaissance: most people think the low-priced natural gas has been a huge factor in that, and the resurgence in U.S. oil production is certainly reducing our dependence. So, as we look at tax reform, we ought to be very careful not to harm the incentives that have been responsible for this very strong help in our economic recovery.

Senator STABENOW. Thank you.

Senator Cornyn?

Senator CORNYN. Well, thank you all for being here and for your testimony.

I want to start with Dr. Thorning, because I think there is a major misunderstanding here in Congress, and perhaps around the country, in terms of what sort of tax treatment different forms of energy receive.

I have heard some people suggest that oil and gas receives special tax treatment that is unavailable to other industries or other businesses. I am sure there are some specialized ones and you will mention those, but I was struck by your testimony that, of the tax benefits available to the energy sector, 80 percent of them flow to renewables already. Would you care to put a little meat on that bone for us?

Dr. THORNING. Yes. The tax provisions that are used by the oil and gas industry are primarily things like accelerated depreciation, LIFO. All of that is certainly available to every industry. The bonus depreciation was cut back for the oil and gas industry to 6 percent versus 9 percent for other manufacturing industries.

The geological and geophysical expenses, the intangible drilling costs, are really labor costs. It is engineering costs, it is finding the sites, it is drilling the well. Those are analogous to the costs that a Google or an Apple incurs when they are developing a product, so most analysts feel that expensing those costs is the right way to treat them, because they are not assets with a depreciable value. So I think it is important to look at the whole picture and consider that the oil and gas industry really does not have any particular advantage over other industries.

Another thing I wanted to bring out is, the oil and gas industry over time is no more profitable than any other industry. If you look at the data, their rate of return on assets is about the same as others', so we want to be careful as we think about tax reform not to do things that will hurt the cash flow that is used, especially by the independent producers, for finding oil and gas here in the U.S.

Senator CORNYN. Well, I certainly support Senator Baucus's and Senator Hatch's blank sheet approach to tax reform, because I think it would be very instructive, not just to members of the committee and Congress, but to the American people, to see what the relationship is between marginal tax rates and tax credits.

In other words, I think that Chairman Baucus's approach, a blank slate, will tell us—first of all, we will have to figure out how much revenue needs to be generated by the Federal Government, what would that rate be, and, if you are going to add back in var-

ious tax credits, subsidies, and expenditures, how much you would have to raise the marginal rate in order to accommodate that tax expenditure.

Now, I am confident there are many—or let us just say some—tax expenditures that will have strong bipartisan support, but hopefully everyone will have to compete and will have to make their case.

Just one more question, Dr. Thorning. I am intrigued by your table 5 on page 20. This is something else that I think is not well-understood. In other words, there are some who would suggest, again, that the oil and gas industry actually gets tax dollars, and my experience is, while they are subject to much of the same tax treatment as other similar enterprises, that they actually pay taxes, unlike many of these other enterprises. Can you explain the effective tax rate on energy-related capital investments and how that relates to the tax treatment by the Federal Government of different forms of energy?

Dr. THORNING. Well, as you can see in table 5, which I drew from a Congressional Research Service testimony by Molly Sherlock, the integrated oil drilling companies, the refiners, are actually paying effective rates of between 15.2 and 19 percent, whereas the renewable energy sector is benefitting in many cases because of the production credits and the other incentives, and they are experiencing highly negative tax rates. In other words——

Senator CORNYN. They are getting a check from the government?

Dr. THORNING. Yes. The wind industry's effective tax rate is minus 164 percent, and the solar/thermal industry is minus 245. So these industries are benefitting from taxpayer subsidies. Then, when you look at the costs and the benefits of that energy, you have to wonder if those incentives are really justified.

Senator CORNYN. I appreciate your clarifying that. I agree with, I think, every member of the committee or all the witnesses who said that we need greater certainty in our tax code, but I do think it is important to do a little fact check against preconceptions about different forms of energy and the benefits they receive from the taxpayer.

I would stipulate that it is important, particularly for new forms of energy that need some help along the way, to get some help to see whether they can be commercially viable. Mr. Reicher, my time is about up. Let me just ask you, you could probably hit this one out of the park.

On the production tax credit, one of the reasons why Congress has periodically renewed it is because I think, initially, no one thought that it would be a permanent tax credit, that it would be important to early developments of wind energy, it would be important to subsidize it with a tax credit, but at some point there would be a need to wean that form of energy off of the tax credit in order to let it compete with other forms of energy in the marketplace.

Would you share your thoughts on that?

Mr. REICHER. Senator, I think, in fact, done in the right way, that is probably the moment where we have arrived. We need a transition period, a significant transition period, with respect to the production tax credit. It needs to be reauthorized for several years.

But I think, in addition to that, we can move this system of finance towards Master Limited Partnerships and Real Estate Investment Trusts and therefore have the reliability, the stability, that the traditional energy industry has long enjoyed, not having to go back to Congress every couple of years and say, please renew this form of finance.

If we could make that transition, I think we would be a lot further ahead in terms of this industry, which is growing very fast, and where there is a highly competitive global industry. We really risk losing out on a major opportunity in renewable energy technology in this global race that we are facing right now.

Senator CORNYN. If I could just ask a quick follow-up to that, Mr. Reicher. Would MLPs be more effective for these renewable energy projects than targeted tax credits?

Mr. REICHER. You have to look at this project by project. I think, in a significant majority of cases, you probably will cut the cost of capital in a renewable energy project, the cost of financing that project—not in all cases, but in many cases. The point is, let us move in a smart transition.

Let us give these industries a transitional period under the production tax credit and the investment tax credit, but ultimately let us end up with these finance mechanisms that the rest of the energy industry has long used, and I think we are going to be all the better for it.

Senator CORNYN. Thank you, Madam Chairman.

Senator STABENOW. Thank you very much.

Senator Portman?

Senator PORTMAN. Thank you, Madam Chairman. Thank you for allowing me to join you today, even though I am not on the subcommittee. I was interested in the testimony, and I have learned a lot, and I appreciated the last question that Senator Cornyn asked and Mr. Reicher's response. As you know, we have an energy efficiency bill that is wending its way to the floor. In fact, it looks like it will be up tomorrow, and then maybe we will have votes on amendments as soon as we get back in September.

There are a number of interesting ideas for energy efficiency that are being proposed in the tax code, some of which are already part of our law, others that are new ideas. Energy services agreements, for instance, and energy savings performance contracts are something that a number of us have a strong interest in.

On the SAVE Act, I thought Mr. Reicher's testimony was very interesting, and I wonder if he could elaborate a little on that. He talks about how buildings, which use 40 percent of the energy in the United States and therefore are a big part of our energy bill, can be upgraded with relatively simple changes that would result in huge savings, but there are not a lot of incentives. He thinks that the SAVE Act that Senator Bennet, who was here earlier, and Senator Isakson have introduced would be helpful in that regard.

If you could talk a little about how this would work for the typical homeowner in terms of their mortgage payment, and also just a little bit more about how this would work in terms of non-Federal Government guaranteed loans.

In other words, most loans are guaranteed now, but, moving forward, many of us are interested in seeing how we can get Fannie

and Freddie and the Federal Government to pull back some on their secondary mortgage position. So how would this work outside of the Federal Government?

Mr. REICHER. Well, thank you, Senator Portman. First, the energy savings opportunities are vast in buildings. It really is an extraordinary number: 40 percent of U.S. energy use is in buildings. The opportunities, as Deutsche Bank has said, are huge. It has really been a challenge, though, to move private capital into retrofitting commercial and residential buildings.

The investment industry is concerned about credit risk and performance risk: will they get paid back, and will the buildings perform as predicted? The good news is, there are some mechanisms. You alluded to energy savings performance contracts, energy services agreements, property assessed clean energy, on-bill repayment. There are a whole host of mechanisms. Those are moving forward. I think they each have promise. The jury is out, though. We still do not know that.

I think what you can do, sitting here today, and what the Bennet-Isakson approach would do, is to look at something very simple, which is people going at this important moment to buy a home and going to get a mortgage, to get that energy savings cranked into the mortgage underwriting.

The mortgage underwriter looks at the cost of taxes, the cost of insurance, but often does not look at the cost of energy, which can be larger than those other two. If that got added into the formula, people would be strongly encouraged to be looking at more energy-efficient homes.

I think the home builders are supporting it, and the National Association of Realtors is supporting it, because they know this could be a big step forward. I think your bill would be a great vehicle for moving this forward.

Senator PORTMAN. Well, thank you. I appreciate that. In terms of, again, the number of mortgages that would be affected by it, my question about governmental or Federal loans or guaranteed loans versus those that were not guaranteed, do you have a thought on that?

Mr. REICHER. About 90 percent, as I understand it, of Federal mortgages are under the Federal Housing Administration, so about 90 percent of those mortgages issued today would be covered by this bill. I am not sure if I can take it any further than that.

Senator PORTMAN. Yes. Again, the notion is to move away from that over time, as has been talked about in the context of the appointment of the new Director, so it is just something to think about, how the private sector might take this on, too, because it is in their own interests, probably, when you look at the actual costs.

Mr. REICHER. Absolutely.

Senator PORTMAN. I am going to embarrass him, but I see Senator Warner is getting up to leave. I was going to acknowledge him and thank him for being here today. Whatever he is supporting today is going to have a much better chance of being pursued. I do not know what it is, but he is a good friend of this committee and a good friend of mine. Thank you for being here, Senator.

And thank you, Mr. Reicher. I really appreciated your testimony, and thank you to the other witnesses as well. This is a topic that

we will be taking up again on the energy-efficiency front soon, but also with regard to tax reform. Obviously, this is an issue that is timely.

So, thank you all. Thank you, Madam Chairman.

Senator STABENOW. Thank you very much. We look forward to having your legislation on the floor and working on it.

Senator Cantwell?

Senator CANTWELL. Thank you, Madam Chairman. Thank you for holding this hearing. One of the things I know that was in part of The Pew's work was, who is winning the clean energy race. Obviously your discussion about China—specifically you stated, last year Asia and Oceana became the leading destination for clean energy investment, attracting $101 billion in private investment and 42 percent of the global total.

So that is a concern to me in the context of, we want to not only have green energy solutions, but we would also like to have the supply chain that goes with it so all the money is going in one direction, and obviously, a lot of the long-term job creation will go there too.

So I wanted to get your thoughts on how we counter that. I am all for clean energy solutions in China. In fact, I think we should have a zero tariff on all clean energy products around the globe because, if we did, they would all be cheaper for everybody to implement. But I wonder if you could, Ms. Cuttino, comment on that and what we need to do in the race to win on the investment side. Mr. Coleman and Mr. Reicher, comment on that as well.

Then also if the panel could comment on a technology-neutral energy incentive program. Obviously, as we have discussed ITC and PTC over time, the complexity of both, one concept that has emerged as a way to not have to figure out every piece of the puzzle—whether it is biodiesel, wind, solar, biomass, or storage capacity, what have you—is to come up with an incentive that is technology-neutral, either based on Btu or kilowatt production or something of that nature, and if people could talk about that idea and give us your comments——

Ms. CUTTINO. Great. Well, Senator Cantwell, we certainly share your concern about the United States slipping to second in the global clean energy race. We have seen investment flowing to Asia. In fact, investment flows to nations that have policy certainty, and that is why we repeat time and time again that policy matters.

Those countries that have pulled back on policy, whether it is subsidies or whether it is targets or whatever, have seen investment decline. Those countries that have strengthened their targets or put them in place, no matter what the policy is, have seen investment flow in their direction. Certainly, when it comes to China, there is a competition afoot. We have been trading our leadership with China when it comes to attracting investment, and we need more policy certainty in this country, whether it is in the tax code or energy policy.

When it comes to different approaches, certainly an interesting approach would be a tiered technology-neutral approach that would be based on emissions or other measures. That is something that I know a lot of folks are looking at, so it is very interesting. There could be capacity goals that are set, so there are a variety of ap-

proaches that I think are very interesting that Congress could consider.

Senator CANTWELL. Mr. Reicher or Mr. Coleman, do you have any ideas about technology-neutral solutions as a way to include everything?

Mr. COLEMAN. Yes. So I think, in terms of the competitiveness issue, obviously, if you look at what has been happening in the marketplace, we have been developing quite a few technologies and we have a lot of investment through our National Labs and other places in these technologies, but we fail to commercialize them here.

In a lot of cases, they are being commercialized elsewhere, and they are being manufactured elsewhere and deployed around the world. So I think we really need to figure out how to solve this commercialization gap, which is what I was testifying about, because, until we do that, we will not be able to get early-stage innovations into the marketplace.

And, in terms of the technology neutrality part of it, we need to do it in such a way, obviously, that allows us, as the market, to try to pick these different technologies based on their competitiveness in the marketplace at the time. I think an MMBtu-based process is one approach.

I also think though that, if you can figure out how to do it based on criteria that we agree we need to accomplish—i.e., whether it is innovation or improvement in various criteria—that is something that can drive the way we think about investing in a category so that we are not just investing in the next technology, we are investing in better technology.

Senator CANTWELL. All right.

Mr. REICHER. Senator, I would just quickly add, there is an extraordinary number that an international energy agency has said that we are going to be spending—$38 trillion—between now and 2035 on global energy infrastructure. It might be clean or less clean, but, however it happens, that is the sort of number we are looking at in terms of what we are going to have to build out globally in energy infrastructure. That is an extraordinary number; it is an extraordinary market. I have to say, I think the Chinese have said, we are going to own—the Chinese are going to own—a very large proportion of that market. That is their plan.

They are moving forward, not only in low-cost manufacturing, but increasingly in R&D; increasingly, as Mr. Coleman just said, in commercialization. Many technologies invented here, often at government expense, are in fact being commercialized in China. The intellectual property is increasingly owned in China. So I think we really face a real race here.

There are ways to collaborate with the Chinese, but I think we also have to be smarter about competition as well. This is a vast, vast market with extraordinary numbers of jobs, and I do not think we are well-organized to seize a reasonable fraction of that for our own country.

Senator CANTWELL. All right.

Dr. Thorning, when you were talking about the amount of money spent on renewable energy versus fossil fuel energy, were you talking about section 1603?

Dr. THORNING. No, I was talking about the entire tax code. The Congressional Research tabulation of all the incentives in the code shows that 80 percent of them are going right now to the renewable sector.

Senator CANTWELL. I think there are something like $40 billion in tax incentives for the fossil fuel industry in various forms, so I definitely do not think we are spending $40 billion on renewable energy. So maybe we could compare notes and come up with a——

Dr. THORNING. Yes, I would love to. Because if you are counting accelerated depreciation and other expenses, other deductions, those are allowed for all industry, not just oil and gas.

So I believe it is the case that the renewable sector is benefitting, as I showed in table 5, from the quite negative effective tax rates, and so it is a question of whether the cost to the American taxpayer is worth what we are getting.

Senator CANTWELL. Well, I would love to compare notes, because I definitely think we are spending a lot more on fossil fuel incentives today than we are on renewable energy, but maybe we can compare notes and come up with something, and we can at least agree on the facts of what those things are. So, that would be helpful. Thank you so much.

Did you want to say anything about a technology-neutral approach?

Dr. THORNING. Well, I think, as I said in my opening statement, allowing expensing for all energy investments is the most neutral way to go, and let the market decide what is going to be put in place.

Senator CANTWELL. Thank you.

Thank you, Madam Chairman.

Senator STABENOW. Senator Wyden, welcome, the distinguished chair of the Energy Committee. We are so glad to have you.

Senator WYDEN. Thank you, Madam Chairman. I so much appreciate your leadership on this. Senator Cornyn and I have teamed up on a whole host of issues over the years, and I appreciate the chance to be with both of you.

Let me start this way. Historically in the Senate, energy policy has been about region versus region. Senators from one region or another come on in and duke it out, and you have one kind of energy source battling against another, where somebody comes in and says, I am a gas person, somebody says, I am a renewables person. The consumer barely gets mentioned in all of this. The consumer is the one who gets short shrift.

When Chairman Bingaman retired, I said, this is one of the areas I want to really be part of: trying to focus on the consumer, the consumer's well-being. So I want to start, and I am going to try to get all four of you in with a couple of questions, but let us try this one for Ms. Cuttino and Mr. Reicher.

We have a situation here where crude oil production is booming. We are glad to see that. Gas prices keep soaring. The consumer pulls up at the pump and just feels like they are getting mugged. I mean, prices just keep going up and up.

What are all these tax breaks that we are talking about going to do to provide some relief for that consumer? Because that is a big focus of what I have been looking at, and I know Senator

Stabenow and our committee have been looking at it. For you, Mr. Reicher, what are these tax breaks doing to try to get some help to the consumer, if anything?

Mr. REICHER. Great question, Senator Wyden. Clearly, these tax breaks have encouraged significant new development of these fossil energy resources, but those energy resources are being developed in an international market where we do not have a separate domestic price for oil. We compete in a global market for oil.

So we have encouraged greater production. We are in fact reducing our dependence on foreign sources of oil, but we work in a market that is an international one, where the price is not determined here. As you know, natural gas is a little bit different.

What I would say is—and this is really where I think policy comes into this—we have taken some extraordinary steps to help people deal with the price at the pump, and that is the fuel efficiency of vehicles. I think the President's fuel economy standards that he set——

Senator WYDEN. But that is not a tax area, primarily.

Mr. REICHER. Understood. It is regulatory.

Senator WYDEN. It is regulatory. I want to just get on this tax issue, because the tax code—and all three of us are going to be very involved in reform. I have had a bipartisan proposal for years with Senator Gregg formerly, then Senator Coates. So we are talking about tax expenditures. That is why what Senator Stabenow and Senator Cornyn are doing is so important: they are looking at expenditures. Just, if you would, tell me what these expenditures are doing to help the consumer at the pump.

Mr. REICHER. I think the answer is, they are helping in terms of production. They are not primarily oriented towards helping the cost at the pump. That is something that, as you look at the tax code, there are other ways to do that.

Senator WYDEN. Ms. Cuttino, unless you want to add something to this, and you are welcome to, I will just kind of move on. We will just hold the record open, because I would like to get into another area that I would welcome any of you to flesh out. I want the production. It is a very good thing. The fact is—and I am going to North Dakota with Senator Hoeven here in a few weeks—natural gas is 50 percent cleaner than the other fossil fuels, so this production is good.

But it has to translate to the consumer at the pump who feels like they are getting shellacked in this, and they are just kind of mystified. They turn on the news and production is up and jobs are being created, and they are saying, how is this going to translate to me? Of course, this also bumps up against what they have been told all these years, that if you just produced more, this would be good for the consumer, but it is not getting to them.

So here is my other question for the panel. Why do we not just start at the other end with you, Dr. Thorning and Mr. Coleman. Is there, in your view, any kind of measure—I guess the fancy word is to call it a metric; it probably does not count in Washington unless you call it a metric, but to me it is just kind of a plain, old measure—that a technology is competitive in the marketplace and would no longer be in need of government assistance?

Let me start with you on this one, Dr. Thorning. Is there any such creature here, a measure or a metric that would help us look at how we can have the innovation we want, a role for government, but recognize that the real challenge is to make sure we are generating the growth and the vitality in the private sector? Is there any measure that you know of?

Dr. THORNING. Well, that is a wonderful question, and I may have to reflect on it. But it seems to me if you look at market prices—for example, LNG, liquified natural gas, compressed natural gas, is making inroads into the transportation sector with fleet vehicles and so forth. The price per unit of Btu maybe is as good a metric as any, but I think it is important to again let the market decide which technology is best for transportation fuel.

Let me just go back quickly to the question about, why are consumers not seeing much benefit at the pump in terms of reductions in gasoline prices. As Mr. Reicher said, it is determined in international markets. Most analysts feel that the U.S.'s extra billion barrels of oil produced last year has had some helpful impact in terms of keeping the price from rising even faster. Another issue is whether the renewable fuel standards are raising the price of gas. So these are all things that are in addition to tax policy that I think we all should be aware of.

Senator WYDEN. I know I am over my time. Maybe the chairman will let Mr. Coleman respond.

Senator STABENOW. Please respond.

Mr. COLEMAN. It is a great question. Thank you. It is a great question because it gets right to the heart of the challenge round, saying we are going to renew things like the PTC or the ITC or other provisions until the industry is ready to roll off. I think one of the false premises there has always been that these industries are somehow homogeneous, that solar is at some point going to be ready to roll off of these credits.

I think the reality is, if you look inside the solar industry, there are companies like First Solar which have iterated on technologies over and over again and they have gotten down the cost curve and they are at a scale point, and there are other technologies that are much earlier in the chain which are nowhere near that. They have not even built the first plant.

So I think the reality is, we have to create structures that allow that to be accommodated over time. If you look at a lot of the oil and gas credits, part of the reason that they are permanent is to do that, and part of the reason that there are things like depletion allowances is they basically say, when you go into the marketplace and you take a risk, you will be rewarded by being able to write off the CapEx of that risk. That is the kind of thing that we are trying to get into place with this provision that we have proposed.

Senator WYDEN. My colleagues have been kind to give me the extra time, and I thank them.

Senator STABENOW. Thank you very much.

I had one question, and I am now going to do two in conclusion. Thank you all again for being here.

Dr. Thorning, you have twice now talked about the renewable fuel standard, and I just have to put my chair of the Agriculture Committee hat on and let you know I have a very different view

on this. As we look at how we level a playing field and create competition, I think we would all start by saying competition is a good thing; it brings prices down if it is fair competition.

We certainly do not see that at the pump in terms of availability of biofuels or other kinds of fuels at the pump—to be able to get real competition to bring prices down. But what is important, I think, when we look at biofuel producers, is this whole discussion that has gone on about the renewable identification number, or RIN, that is a part of what folks have said is a cost of this industry.

It is my understanding that, when a biofuel producer sells biofuel, they get this credit, this RIN, and they give it to the buyer, which is the oil company, for free. There is no cost to them; it is given free. Is that true, it is given free as part of buying the biofuel?

Dr. THORNING. Well, you have to buy the biofuel.

Senator STABENOW. You buy it.

Dr. THORNING. The RIN price, I think, has gone up to maybe $1.33 recently, so it is a cost that has to be passed forward.

Senator STABENOW. I guess the point is, I would just say—and it is important for the record that I make it, so I want to speak to this a minute—is that the purchaser buys the biofuel, they get the credit, there is no cost for that, and then the oil companies trade this and create the value back and forth.

There is a small group that trades all of this, and the cost goes up and up and up based on how they trade it. As I understand it, there are 2.5 billion unassigned credits, RINs, coming into 2013, and I am not sure how we know how the RINs get valued. Do you have any idea?

Dr. THORNING. I am not an expert on RINs either, but to me, as an economist, when I see the ever ramped-up EPA requirements for blending renewable fuels with gasoline, and we see that gasoline consumption is down in the U.S., there is going to be a blend wall hit, perhaps as soon as this year, according to a recent *Bloomberg* article, and that is bound to impact prices and the supply of gasoline.

So I am just saying we ought to take a look at this renewable portfolio, renewable fuel standard, and see if it is still making economic sense, especially since the National Academy of Sciences report indicated it actually increases GHGs.

Lastly, because ethanol does add octane to gasoline, even if the renewable fuel standards were cut back or eliminated, there would still be a market for biofuels. It would not disappear.

Senator STABENOW. Well, we are looking forward, in the Agriculture Committee, to getting into this more. But I would just say that we do not have a transparent market at all to determine the value of something given free to the companies that they then trade with each other and then goes up and up and up in value, and then there is a complaint about how high it is—it is an interesting system that has been put in place.

But I would just suggest that if we were blending more biofuels, if we had more access at the pump, then it would alleviate the price in terms of the RIN and so on. It is interesting that those controlling the access are creating a system and then arguing that

it is not working to create competition at the pump. It just is a very interesting system.

So we are going to get more into that, but I would just suggest that if we had more competition—with the little bit that we have from biofuels, it is estimated that the price of gas is 80 cents to a dollar lower, just with the little bit of E85 we have, and we do not have that much access to it. So I am looking forward to broader hearings on that one.

Senator CORNYN. Madam Chairman, can I ask just one question?

Senator STABENOW. Yes, you may. Yes, you may.

Senator CORNYN. Did you say "blend wall"?

Dr. THORNING. Yes.

Senator CORNYN. What is that?

Dr. THORNING. Well, right now, gasoline consumption is falling in the U.S., in part because of fuel efficiency for cars and so forth. So the fact that the EPA regulation mandates ever more use of renewable fuels each year, if you are not selling more gasoline but you have to use the renewable fuel, you are going to hit a blend wall.

It is like you have a coffee cup and you have to keep pouring more cream into it and less and less coffee, which is the gasoline at the bottom. So there is a National Economic Research Associates study, which I would be pleased to share with you, that looks at the economics of this and projects it will inflict significant costs on U.S. consumers.

Senator CORNYN. Thank you.

Senator STABENOW. The challenge is that more could be blended if there were more pumps and if there were more access to service stations—if there was more willingness to have it available. So that is really the larger debate in terms of whether or not it is available.

In conclusion, I would like to ask each of you, and particularly Mr. Coleman, because you mentioned this in your testimony: when we look at this broad question of how we go forward on tax policy, how do we create a level playing field, make it technology-neutral, let the market decide, create more competition for consumers, all of those things, jobs, address issues of a cleaner environment—there is a whole range of things that are very, very important?

I feel like we go round and round about which preferences are what or who is successful enough to be paying taxes and so on, and we do not look at the fact that we are comparing one group that is at the 50-yard line with others who are back just getting started, and we are not comparing this the same way.

I was interested that in your testimony you referenced a 2011 report by DBL Investors, noting that Federal spending on oil in the first 15 years of deployment was 5 times greater than what we have spent on renewables. From your investment experience, I know you know it takes about 15 years or more for some technologies to move from R&D to initial commercialization.

So we have mature industries, successful industries in America. Clearly, we want them to be successful, certainly we want the jobs and so on, but we are comparing a mature industry that has gone through all the beginnings of it, they do not need to worry about a refundable tax credit, they are at a point where they have gone through all those stages, and they are now paying taxes and so on.

Then you have all these new technologies that are in the interests of our country to develop, and so these debates go on, but these new technologies are not all at the same stage as we debate all of this.

So I am wondering if you could speak to that, any of you who would like to speak to that in terms of, again, how we look at these technologies, how we determine the policy, and how far along are we in the development of our clean energy technologies. What are the technologies that you think are going to become most competitive with conventional sources?

How do we wrap this all together? Because we can argue either side using lots of numbers that show a lot of different things, but we are talking about a mature industry versus new promising industries and the challenge of making sure that we can be competitive in those industries in a global marketplace and do the right thing for our country. Mr. Coleman?

Mr. COLEMAN. I think it is a complex issue to get your head around because—as evidenced by all of our testimonies; they can turn into dissertations in a hurry—the solution is not necessarily that complicated. So I think at the highest level the issue is that, even when you look at solar versus wind versus oil versus nuclear, it is absolutely true that some are really in the early stages of development and others are further along.

The numbers from the DBL report are really about those sectors as a whole, and the kind of support those sectors as a whole have gotten. But there is another layer to it, which is, even within those sectors, when you look at—just take solar as an example. When you look at this range of technology, you have some technology companies that are creating technologies that are at the very, very beginning, they are still in the lab, and they have not moved down the cost curve yet.

Cost curves are something that are really important in this debate, because what happens with the cost curve is you basically have a portion, a steep portion of the curve as you come down, which is really about fundamental innovation. Then the other portion of it, where you get this tipping point, where you get competitive and you can actually compete on your own two feet in the marketplace, is really about scale. It is really about actually producing at scale, because you get enormous economies of scale as you get more and more mature and iterate.

So the challenge is, how do you create a support that encourages the early innovation to happen and then also drives the scale in the marketplace, but does it in a way where we have continuous innovation over time? If you just look at solar versus oil, versus wind, you would see very different levels of support over time, and that is an issue.

But, if you get to the next layer, you also need to create these permanent credits, something that is a permanent structure that actually says, for new innovation, we are going to support the risk that is taken to go and do that, and we are going to help them get to the point where they are competitive in a marketplace.

That marketplace might not be you versus some other technology, it might be you versus other technologies in the market that are exactly the same but have a variation. How do we con-

tinue to do that so that we drive costs down for the entire sector and then for the entire energy industry as a whole? That is the only way we are going to get to a point where we have an evergreen innovation process in this country.

Senator STABENOW. Would anyone else like to comment about that as well? Mr. Reicher, would you like to?

Mr. REICHER. Senator, I would just add that there are an array of maturities among these technologies, from nuclear power, which has been here and well-established for decades and decades, fracking has arrived recently, solar still has a long distance to go, particularly certain aspects of solar, and how we treat each of these is quite different.

The loan guarantee programs that you put in place in the 2005, 2007, and 2009 acts have been an attempt to help that commercialization process, and we have seen some good results from those. We have seen some failures as well, but for the most part most of those investments have done reasonably well, and I think the taxpayer, looking back a few years from now, is going to see a pretty successful portfolio of investments in commercialization.

The Energy Department is moving on right now to begin to put some of that loan guarantee funding into advanced fossil technologies, into carbon capture, various things we need to improve the fossil energy industry. That should move forward.

But let me say this. If you, as members of Congress, decide not to ultimately recapitalize those loan guarantee programs which you put in place in 2005, 2007, and 2009, I would strongly encourage you to go back and take a look at something that you had very good bipartisan support for a few years ago, and that was the Clean Energy Deployment Administration. Senator Wyden, Senator Murkowski, Senator Bingaman, when he was here, were all strong supporters of this.

The beauty of that approach is that we would have put something into place with a very broad array of investment tools, not just loan guarantees and loans, but a whole set of other tools: the ability to issue bonds, the ability of this new entity to actually profit from the up-side, pay itself back and keep going, not to have to go back to Congress for new funding.

I would encourage you to go back and take a look at that if you decide not to recapitalize these loan guarantee programs, because I think that would be a way, in a very technology-neutral fashion, to support these earlier-stage technologies that in fact do struggle across what we call the Valley of Death. I think the Clean Energy Deployment Administration would be worth a strong second look.

Senator STABENOW. Yes, Dr. Thorning?

Dr. THORNING. I would just like to suggest that it might be better to have the government have taxpayer money going into R&D more than trying to pick the technologies and fund them. I mean, we have seen what happened after the 2009 act and the series of losses of taxpayer money from picking the technology.

I just want to bring you back to 1832. That is when the first electric car was developed in Scotland. It was a battery-powered electric car. By 1910 or so in New York City, the electric vehicles had a quarter of the market. But as we know, since 1910 in New York

City, the electric vehicle, because of failure to come up with a satisfactory range in battery, has just not made it.

So the electric vehicle has been in place for 180 years in one form or another, and it is still not really commercially viable. So I think picking winners is not the government's long suit. I would rather see money going into R&D to keep the tax code neutral so that each technology has the same ability to write off its investments as the other.

Ms. CUTTINO. We really need to invest in new technologies until they get to cost-competitiveness, at the very least. Senator Wyden asked, what is good for the consumer? That is good for the consumer, and it is good for our security, diversity in the mix, and also consumer choice.

But there are not only new technologies that we need to incentivize—we talked about the electric car—but for instance, combined heat and power. Currently in 48C, for instance, industrial energy efficiency is treated differently than solar power. There are technical fixes that need to happen to that for our industrial base to seize the benefits of industrial energy efficiency, which again would make them more competitive, would save energy, and would reduce costs. Now we know, after Hurricane Sandy, it would also provide resiliency.

So we do need to have some measures, and cost-competitiveness is certainly one, but other measures that would support these new, or in some cases older, technologies that just need a little more time to get over the hump.

Senator STABENOW. Well, thank you all very much. We appreciate your time and expertise, and we look forward to moving forward. This is a very important part of, I believe, growing the economy, creating jobs, and addressing many of our challenges.

So we would ask that any additional questions for the record should be submitted to the committee clerk within 5 business days from today. That is 5 p.m. on Wednesday, August 7th.

The hearing is adjourned.

[Whereupon, at 5 p.m., the hearing was concluded.]

APPENDIX

Additional Material Submitted for the Record

Testimony of Will Coleman, OnRamp Capital

Before the Senate Finance Committee

Energy, Natural Resources, and Infrastructure Subcommittee

Hearing on "Powering Our Future: Principles for Energy Tax Reform."

July 31, 2013

Thank you Chairwoman Stabenow, Ranking Member Cornyn, and distinguished members of the Committee. It is my privilege to be here today to share my views on how best to reform our nation's energy tax code to unlock new energy innovations, create jobs and improve the lives of Americans.

I am Will Coleman, the founder of OnRamp Capital, which partners with corporations to invest in early stage innovations. In this position and in former roles within the venture capital and energy industries, I have focused on investing in and building companies at the earliest stages of the innovation process and helping to grow them to commercial scale.

I am here today to talk about the fundamental role that tax policy plays in shaping the energy landscape, and in particular, how it continues to impact investment in the kinds of advanced energy innovations that we need to remain competitive as a nation. We have an enormous opportunity to leverage new innovations in energy and the industries that rely on access to affordable, domestic, efficient, safe energy. However, we will miss this opportunity if we don't take this moment to adjust some of our policies in the energy sector.

As an investor in the earliest stages of the innovation process, I have seen first-hand how policy and market gaps can produce ripple effects throughout the financing ecosystem. I would like to share some perspective on how the overlap between economics and public policy is causing persistent and growing barriers to investment in energy innovations – particularly the scaling up of new technologies. I will share a few thoughts on where I think the federal government – using the tax code – can and should play a role. Lastly, I will provide details on one newer approach – an energy innovation manufacturing tax credit – that offers a framework to address the continuing financing gaps in the energy sector for commercializing innovative domestic energy technologies.

How the Federal Tax Code Already Drives Energy Markets

It is important to acknowledge that the federal government has always influenced the energy sector, and that tax policy has been one of its primary tools for doing so. For over a century the federal government has used tax policy to guide investment on the premise that energy is

critical to the nation's strategic interests. Tax policy has helped drive investment in energy R&D, exploration, infrastructure, and generation projects. It has been used to stand up new technologies and expand others. Just over a year ago the CEO of Continental Resources, the largest leaseholder in the Bakken Shale explained to this committee the importance that tax incentives have played for the development of that resource. He said that the long standing oil and gas provisions in the tax code "played a significant role in the technology-driven oil and gas renaissance we are currently experiencing... the development of horizontal drilling took trial and error. Without the current capital [federal tax] provisions in place, we would not have been able to fail over and over again, which is what it took to advance the technology needed to produce the Bakken and numerous other resource plays across America. And this technology that allows us to drill two miles down, turn right, go another two miles and hit a target the size of a lapel pin is the technology that has unlocked the resources that make energy independence a reality."[1]

These tax credits have been critical to the development of our energy resources, but they must be applied more equitably to avoid picking winners and losers.

According to a report from DBL Investors, the average annual inflation adjusted federal spending on oil over the first 15 years of its deployment in the U.S. was five times greater than what we have spent on renewables. Spending on nuclear was 10 times greater.[2]

Today the tax code is an amalgam of decades of shifting energy priorities. It continues to support both renewable and conventional energy technologies, but the support is inconsistent in several key ways that make investing in new innovative technologies difficult. Different resources enjoy different levels of certainty, support, and commitment.

One of the biggest inconsistencies in the current code is that almost all of the conventional energy credits are permanent and targeted at increasing supply from mature technologies, while credits for renewables are temporary. This has a profound effect on where equity investors, corporations, and lenders are willing to invest their money. Tax policy has always been the silent dictator of winners and losers in energy markets. Long term capital, and venture capital in particular, must anticipate the competitiveness of a technology and the ability to finance future projects. If credits are permanent, then it is easier to invest in companies and technologies that leverage those credits well in advance of their readiness to use them. If credits are temporary then any amount of political uncertainty negates the signaling value of the credits. Short-term extensions, in particular, do little to provide certainty, especially when

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[1] See http://www.finance.senate.gov/imo/media/doc/Hamm%20Testimony1.pdf, p. 2.

[2] Nancy Pfund & Ben Healey. *What Would Jefferson Do? The Historical Role of Federal Subsidies in Shaping America's Energy Future*. DBL Investors, Sept. 2011.

recent Congressional moves to repeal even one-year extensions undermine confidence in these types of provisions. As long as some sectors get permanent credits and others don't, the playing field will not be level.

The problem is accentuated when looking at investing in innovative technologies because investment decisions are made well in advance of when a company or technology would access a production credit. Even in some of the faster moving sectors in which venture capital invests the average time from initial funding to liquidity is 4-8 years. In energy, where large commercial facilities often take years to construct and cannot be financed until a technology has been fully de-risked, investors require piloting, demonstration, and operating track records. Even if a company can secure the financing for a first-of-a-kind commercial facility, the company will need to operate that facility for up to five years before it can secure conventional debt financing for future plants. That means the timeline can be 15+ years from early R&D to initial commercialization for some energy technologies. These realities of today's funding ecosystem necessitate more predictable, long term structures to draw capital into innovative companies.

The second major issue with the current energy tax code is that it is mostly focused on producing more of the same from proven technologies rather than encouraging the adoption of newer, better solutions that can ensure continued competitive advantage for the U.S. Very little of the code has been effectively targeted at jumpstarting the innovation that fuels long term economic growth. Most of the oil and gas credits such as depletion allowances, expensing of drilling costs, and domestic production credits focus merely on expanding the current resource and allowing for quicker cost recovery, and even the alternative energy credits focus primarily on enhancing the economics of current technologies. Almost all the energy credits in the code are only accessible to large, mature corporations with sizable balance sheets and cash flows. This approach creates two problems: (1) it biases investment decisions toward tax advantaged primary production rather than the innovations that can significantly impact cost or performance; and (2) it makes it more difficult for new entrants to enter the market and compete.

The Congressional Joint Committee on Taxation (JCT) estimates that from 2010-2014, the federal government will spend upwards of $74 billion on an array of **direct** subsidies to support domestic oil and gas development and production.[3] This far outpaces support for emerging technologies. These incentives include exploration credits, depletion credits, royalty relief, and several others. In addition, the oil and gas industry enjoys many **indirect** tax incentives that most people don't recognize as part of the energy tax equation. Tax advantaged structures such

[3] Joint Committee on Taxation. *Estimates of Federal Tax Expenditures for Fiscal Years 2010-2014*. Government Printing Office, 2010.

as Master Limited Partnership (MLPs), which are limited to oil, gas, and natural resource projects, have grown from just $2 billion in 1994 to over $220 billion in 2010. Section 199 credits created in 2004 that provide relief for "qualifying production activities" reduce the corporate tax rate for qualifying energy companies by approximately 3 percent according to the American Petroleum Institute.[4] Foreign Tax Credits, 40 percent of which are used by the petroleum industry, provided an additional $42 billion in relief for the energy industry in 2008 alone.[5] And yet, oil prices continued to climb in 2012 to over $112/bbl.

Many of the direct and indirect supports have been essential to expansion of our domestic resource production, and were implemented at times when US oil companies were struggling to compete at $20 per barrel of oil. However, as we now strive to diversify the fuel sources that supply America's energy, we must acknowledge the role these "legacy" incentives have in shaping the current market if we are going to rebalance the current energy tax code.

The recent boom in U.S. natural gas production, which was largely unleashed by advancements in drilling and fracking technologies, has been a boon for the refining industry and has helped stave off some of the growing concerns about energy supplies. However, it is a mistake to think we have solved our energy problems. Even with the boom in gas production and slowing global economies the amount of money Americans spent on imported oil increased from $337 billion in 2010 to $434 billion in 2012.[6] In other words, we continue to transfer increasing amounts of America's wealth overseas – dollars that could be reinvested here at home.

The reality is that energy is a global commodity and growing global demand will continue to outstrip supply if we don't continue to innovate. We will continue to rely on gas, coal, oil and other conventional resources for decades to come, but we need to continue to develop new resources and use these existing resources with increasing efficiency.

To create a level playing field that encourages continued innovation we must acknowledge the past investments that have created the current systems. It is important to recognize that the government has played a role in cementing the current energy landscape. If we can agree that continued innovation in energy is critical to our competitiveness as a nation, then the federal government can and should play a role in helping to unlock that innovation.

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[4] American Petroleum Institute. *Repealing the 199 Manufacturing Deduction far Oil ond Gas Companies Puts Jobs at Risk*. February 2011.

[5] Internal Revenue Service. Statistics of Income Tax Stats, 2008. Corporation Complete Report Publication. Accessed May 26, 2011.

[6] http://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbbl_a.htm

Emerging Technologies Provide a Significant Opportunity

The global transition to next-generation technologies and resources remains one of the largest economic growth opportunities in generations. We are fortunate to have a strong, diverse natural resource base. However, much of our competitive advantage over the last two centuries has come from our ability to innovate – to develop new, lower-cost or advantaged technologies such as oil, nuclear, and now renewables, ahead of our global competitors. According to a report released by the Department of Commerce, "Technological innovation is linked to 75 percent of the Nation's post-WW II growth rate. Two innovation-linked factors – capital investment and increased efficiency – represent 2.5 percentage points of the 3.4 percent average annual growth rate achieved since the 1940's."[7]

The high cost of gas and oil in the early 2000's and the presumption that governments would need to begin to regulate carbon emissions drove significant new investment in shale gas development and other alternatives. In both cases the investments in commercializing these technologies and then scaling them up have led to impressive reductions in cost. Natural gas has dropped from a high of $7.97/thousand feet^3 in 2008 to $2.66/thousand feet^3 in 2012 and production has grown 16 percent over that time frame[8]. Wind, solar, biomass and other renewables are also playing increasing roles. Wind deployments grew more than 500 percent from 2007-2012[9] and solar grew more than 1000 percent over the same time period. Meanwhile, the cost of solar modules has dropped more than 60 percent in the last two years alone.[10] In comparison, most conventional resources that are affected by global demand have increased in cost. Coal prices have climbed more than 200 percent since 2003[11] and imported crude oil prices have climbed 350 percent over the same time period.[12]

Technology transitions have always been good for economic growth, driving both investment and jobs. The solar industry already employs more people in the U.S. (119,000)[13] than the coal mining industry (87,000)[14]. Solar employment has more than doubled in the last four years alone. It is important to recognize, however, that many industries are still largely in their infancy and barriers to entry remain high. Wind provides only 2.9 percent of our electricity and solar just 0.4 percent as compared to 42 percent from coal and 25 percent from natural gas. The reason is not a lack of resource. The U.S. has some of the largest wind, solar, and biomass

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[7] U.S. Department of Commerce, *Patent Reform: Unleashing Innovation, Promoting Economic Growth & Producing High-Paying Jobs.* 2010

[8] http://www.eia.gov/dnav/ng/ng_sum_lsum_dcu_nus_a.htm

[9] http://www.awea.org/learnabout/industry_stats/index.cfm

[10] http://www.seia.org/research-resources/solar-industry-data -

[11] http://www.eia.gov/totalenergy/data/annual/pdf/sec7_21.pdf

[12] http://www.eia.gov/forecasts/steo/realprices/

[13] http://thesolarfoundation.org/sites/thesolarfoundation.org/files/2012%20Census%20Press%20Release%20FINAL.pdf

[14] http://www.bls.gov/oes/current/naics4_212100.htm

resources in the world. In fact, the US possesses more than 231,000 GW[15] of annual capacity from untapped wind and solar resources alone. This is over 222 times our current total electricity capacity, and it disappears every day that we don't harness it. [16]

Unfortunately, the energy industry is extremely slow to adopt new technology. In 2010 the five largest oil companies spent less than 2 percent of profits and less than 0.4 percent of total expenditures on R&D.[17] In the utility sector, the major U.S. utilities employ on average less than five people in R&D roles per 1000 employees. This is the lowest level of investment in innovation of **any** industry.[18] Many companies recognize the value of innovation, but are understandably driven by optimizing and protecting existing business lines. This is particularly true when the majority of all federal energy incentives focus on bolstering the supply of conventional resources, irrespective of the efficiency or efficacy of the technologies used to access those resources.

The net result is an industry that does not natively produce an enormous amount of innovation or adopt novel technologies except in times of acute disruption. Given the length of the innovation cycle and the strategic importance of energy to our competitiveness, we cannot afford to wait until the next disruption or allow other nations to take over the lead on new technology. Many forward-looking companies are examining ways to get ahead of this trend in the sector and these companies will no doubt prosper. However, the bulk of investors in new energy technologies are increasingly struggling to overcome these hurdles for many of the most strategic and fundamental innovations.

The U.S. must continue to leverage its energy assets effectively to embrace the growth potential of new energy technologies and to remain economically competitive. Conventional technologies represent the vast majority of today's production,but we cannot afford to ignore the growing opportunity that other alternatives represent. We need a tax code that provides both consistency between conventional and renewable frameworks and encourages investment in new technologies that have the greatest potential to lower our energy costs over time. Congress should consider how to incentivize conventional industries to adopt new and

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[15] http://www.windpoweringamerica.gov/pdfs/wind_maps/poster_2010.pdf http://www.nrel.gov/docs/fy10osti/45889.pdf http://votesolar.org/wp-content/uploads/2011/02/NREL_Solar_Tools.pdf www.nrel.gov/gis/docs/resource_maps_200905.ppt

[16] http://www.eia.gov/electricity/annual/pdf/tables1.pdf

[17] Congressional Research Service. *Research and Development by Large Energy Production Companies.* August, 2011. Calculations are based on total R&D spending of $3.6bn in 2010.

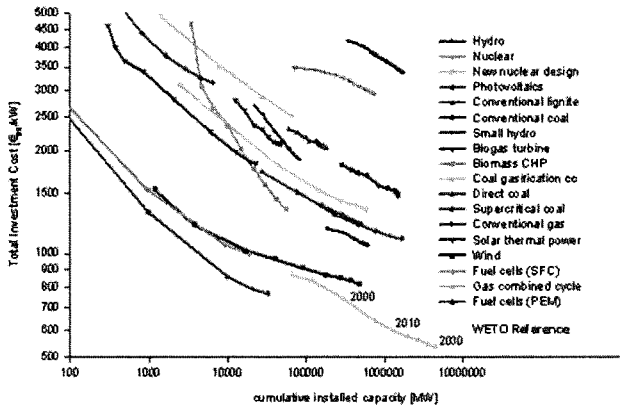
[18] National Science Foundation, Research and Development in Industry: 2006-07 (Arlington, VA: National Science Foundation, 2011), 130-131. Table 31 and 261. http://www.nsf.gov/statistics/nsf11301/pdf/nsf11301.pdf

innovative technologies and implement a tax regime that enables new and emerging energy technologies to compete on a more level and consistent playing field.

Innovation Drives Long Term Cost Reductions

Any tax solution that is going to provide support for innovation needs to account for the factors that drive innovation and competitiveness. One of the fundamental premises of technology development is that each technology reduces its costs over time through a combination of technical innovation and scaling up the volume of production. The result is that each technology undergoes a "learning curve" that drives costs down.

Historical Learning Curves by Technology (over volume)



Source: European Commission. *World Energy, Technology and Climate Policy Outlook 2030*. 2003. P.71

Different technology solutions – even within the same type of technology – can have different learning curves and development trajectories. For instance, in solar, learning curves are specific to individual technology platforms such as silicon panels (SunPower, Suntech, etc...) or cadmium telluride panels (First Solar), and even specific to different approaches within these material systems, rather than to solar technology as a whole. This is important because it means that different companies are at different places in the innovation cycle at different times and are at different levels of readiness to compete without support. Continued innovation on both variations and wholly new platforms can unlock step-changes in cost reductions even after existing technologies in a category have reached commercial scale.

Technology development is one piece of the equation, but "scale" is critical. First Solar, the leading solar company in the world, is a great example. Over the past 30 years, solar engineers have reduced cost with every generation of new technology, but for First Solar the final critical cost reductions came from taking one such technology and scaling up the volume of manufacturing for that technology. First Solar has reduced panel production costs from over $3.00/watt in 2004 to under $0.66/watt in 2013, due in large part to a 2,500 percent increase in production capacity from 2004-2008[19]. Further cost reductions are possible, but only if both research and deployment capital are available.

Solar is not alone. Almost every technology-driven industry evolves this way, whether it is energy, semiconductor, or steel production. The U.S. has benefitted from leading the innovation cycles in many of these industries, but commercial scale always requires significant investments from private capital sources which in turn requires the right market conditions, a robust pipeline of technology, and constructive public policy. Unfortunately, when it comes to energy, the U.S. is currently faltering in all three of these categories.

State of New Energy Financing

Over the last 10 years, market conditions, technology advancements, and public policy expectations led venture capitalists to deploy $25.1 billion into energy related technologies[20]. Investors relied on the supposition that macro conditions would persist and that other types of investors would participate in the scaling and deployment of the most effective technologies. This investment drove a boom in new technologies and attracted a growing pool of talent to the industry. The macro conditions have in large part remained. However, scaling these technologies has proven to be a major stumbling block. Commercializing most energy technologies demands a magnitude of capital and level of collaboration with incumbents that goes beyond the capacity of the venture capital industry. This financing gap has proven to be a persistent and fundamental economic obstacle for industrial technologies.

The challenge for most startups is that without operating track records or large balance sheets, they are unable to secure lower-cost debt capital to get to scale. This means that they typically need to raise higher-cost equity or some combination of equity, mezzanine financing (if available), or higher-cost debt (which often isn't available) to build early commercial manufacturing plants. More expensive forms of financing reduce the profitability of producing any technology and make it harder for investors at each level to realize competitive returns.

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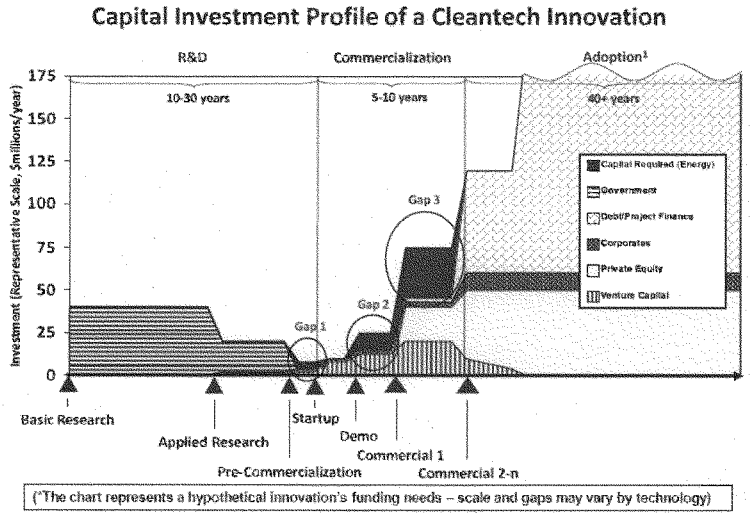
[19] http://www.greentechmedia.com/articles/read/First-Solar-Surprises-With-Big-2013-Guidance-40-Cents-Per-Watt-Cost-by-201

[20] Source: PricewaterhouseCoopers/National Venture Capital Association MoneyTree™ Report, Data: Thomson Reuters

The result has been a series of financing gaps that exist for scaling larger industrial technologies that need to reach a minimum efficient scale to be competitive.



Source: Mohr Davidow Ventures.

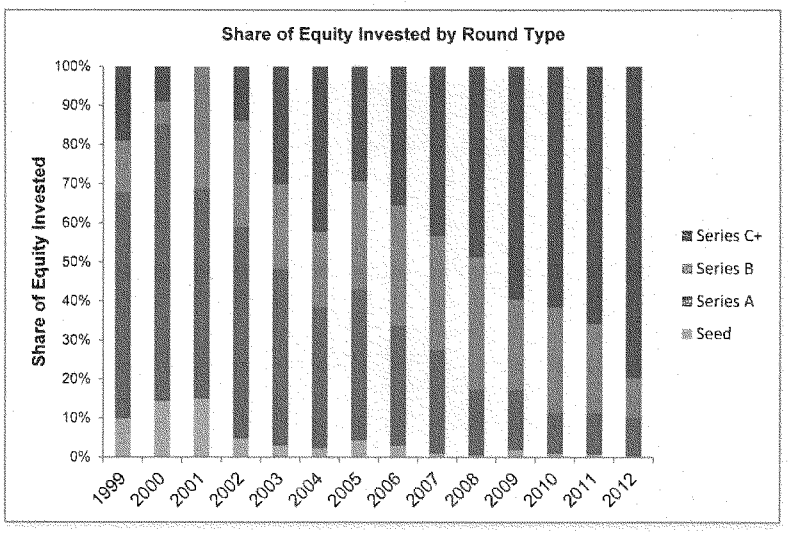
[1] The capital investment associated with adoption is depicted to indicate that it may well exceed $175 million/ year.

Venture capital has historically been able to bridge financing gaps in many sectors. Where it works, the results have been transformative. While under 0.2 percent of GDP is invested in venture capital each year, more than 21 percent of GDP is generated by companies that were originally venture-backed, and 11 percent of all private sector Americans are employed by these companies. But in energy, the magnitude of capital requires many other investment partners.

At the same time, the companies that are developing these technologies often do not have the financial structures, cash flows or tax profiles to take advantage of most of the energy tax provisions currently in place. Even some of the policies targeted specifically at novel technologies, such as the IRC Section 48c manufacturing tax credit, are proved to be inaccessible to smaller companies because of qualifying criteria that didn't accommodate the funding cycles of such fast growing companies.

Even in the best market conditions, with robust financing options, many promising energy technologies are not able to overcome these gaps. Over the last few years, changes in market

conditions, instability in financing, and wavering policy commitment have eroded investor confidence in energy technologies. As a result, the financing gaps have grown larger and venture capital has begun to pull back from investing in new innovations in heavy industrial applications, including energy. Venture investors continue to support existing investments, and family offices and corporate investors have increased investments in the sector. However, we have seen a marked decline in early stage investments in energy technologies. This decline is concerning for the future of energy innovation.



Source: OnRamp Capital analysis (aggregate data from i3, venture source, NVCA)

A healthy innovation process, particularly in energy, depends on a stable ecosystem of funding partners that includes venture capital, private equity, corporate investors, project finance, and other debt providers. If we as early stage investors don't believe that low-cost capital will be available to scale these technologies in manufacturing plants or utility scale projects, then there is no way we will invest in the early technology development in the first place. Thus, financing gaps at any stage have a rapid domino effect on the rest of the financing ecosystem, and innovation funding begins to dry up at all stages.

As I mentioned, large strategic corporate investors have begun to increase their investments in the sector over the last couple years. These "strategics" now account for 10.4 percent of

venture type investment in energy technologies.[21] Strategic investment is a critical piece of the equation. But most strategic investors have historically relied on venture capital for the earliest stages of investment and face legal and structural challenges investing in the earliest stages of the innovation process. OnRamp Capital and other models are emerging to help address this constraint, but the bottom line is that without the promise of low-cost capital to scale new energy technologies, fewer entities are actively investing in the kind of core energy innovation that is needed to continue progressing the industry. If investments decline so too will the interest from entrepreneurs and scientists. We risk losing the accumulated knowledge and talent we have developed over the last decade, and it will take a long time to rebuild these innovation ecosystems.

Solutions: Certainty, Technology Neutrality, and Targeting Innovation

As Congress considers reforms to the energy tax code, the primary challenge is to create more consistency across technologies to ensure a level playing field that encourages the market to invest in new technology development. Consistency, certainty, and a focus on innovation will be critical to attracting private capital to close the funding gaps associated with commercializing new technologies.

For federal policy to successfully unlock continued innovation, it will need to specifically consider the energy sector's scaling challenges for unproven technologies and work to accommodate the constraints of smaller emerging companies. Early stage investors can only take risks on a new technology if we believe the talent is available to develop it and that other investors and acquirers will be there to invest in the technology along the way. Other investors will only be there if the market need is persistent over a long period of time. Therefore, any solutions that the government provides need to have the same persistence and stability.

Tax provisions should prioritize innovative technologies, and they need to be flexible, efficient, and technology neutral. Above all else, they must be predictable. Investors need to know that if they invest in a company that unlocks meaningful innovations they will be able to finance the company to scale.

In order to meet these criteria, we propose the creation of a new energy innovation manufacturing tax credit. It is a new type of structure that was developed specifically to address the need for certainty, a level playing field, a focus on innovation, and a the need to draw private capital in to address funding gaps rather than rely on the government to do so. Such a credit would address the early stages of proving and scaling a technology and then force new innovations to compete on their own two feet. Whereas almost all existing credits focus on the

[21] Source: PricewaterhouseCoopers/National Venture Capital Association MoneyTree™ Report, Data: Thomson Reuters

deployment of fully proven commercially available technologies, this credit would focus on accelerating the adoption of new and innovative technologies in the marketplace.

The credit addresses the persistent challenge of how to create a technology neutral manufacturing credit that is permanent without creating permanent dependence through the following:

1) The credit would provide incentives to companies as they scale an innovation and automatically sunset once a company hits a specified volume of production of that specific innovation. The volume limit would be based on estimates of the production volume needed for any given technology to reach commercial scale. Not surprisingly these vary by sector, but they are relatively consistent across electricity and fuels technologies. The volume based structure ensures that credits are provided only for actual production and that no company can take the credits indefinitely.

2) The credit also uses a secondary cap that limits the credit to a portion of the qualifying capital expenditures associated only with the portion of capital invested to enable the innovative technology. Such a cap ensures that companies must invest in new innovations or enabling technologies to receive the credit.

3) The credit would be technology-neutral across the electricity generation and fuels sectors and accessible to all companies that invest in scaling innovative technologies. Qualifying innovative technology in the proposal is defined on the basis of improvements in function, efficiency, or reliability relative to commercially-available alternatives in both production processes and end-use applications.

4) The credit would be available to companies assembling final technologies as well as those component suppliers innovating further upstream in the supply chain. One of the macro policy objectives the proposal seeks to achieve is to incentivize manufacturing and production and stand up the associated supply chains here in the United States.

Our proposal targets a critical financing gap essential to commercializing new energy technologies. Its targeted structure limits the government's role but still creates the long-term certainty necessary to drive private capital into commercialization gaps. It does not specify technology "winners and losers" that potentially bias investment decisions, but allows the private market to decide what technologies are most worthy of investment. It provides support only for companies who are investing in the type of innovation that will ultimately drive down long-term costs and establish a diverse, low-cost, sustainable energy resource mix. And

importantly, it provides the credit only for actual production and only for the period of time where such support is most needed in the current financing ecosystem.

There are companies across the country developing innovative energy technologies that would benefit from such a tax credit. According to the National Venture Capital Association (NVCA), there are companies in virtually every state represented by Members of this Subcommittee. These are companies -- from Texas, Michigan, Montana, Utah, and many others – who are starting up new businesses around innovative energy technologies such as advanced batteries, underground coal gasification, nuclear power systems, solar, wind, and many others that will help transform the energy industry for decades to come.

The bottom line is that if we are serious about filling these gaps in sectors that have high strategic value to our nation, then government needs to create more enduring structures that can evolve with the market over time.

Conclusion

Let me conclude with a note of urgency. The global energy landscape is changing. New technologies are emerging, and the economic strength of our economy over the next several decades will depend not just on how effectively we use existing resources, but on how we choose to cultivate newer sources of energy.

The energy industry as a whole must continue to innovate and adopt new technologies to provide the strong economic base that the U.S. needs to remain competitive. To do so requires a new way of thinking about energy policy, and particularly tax policy, that can be applied consistently across the entire energy industry and that provides the long-term certainty that investors and corporations require to make rational decisions.

This committee has held many hearings on the deteriorating competitive position of the United States in new energy markets *vis a vis* China, Japan, Korea, and Germany, so I will not recount those details here. As the U.S. emerges from recession it is critical that resources should be carefully targeted at the most effective ways to strengthen the American economy. We need to remember that our legacy of innovation is uniquely American and has driven our success over the last century, but it can't be taken for granted. Federal policy plays a critical role in whether we continue to manufacture new American energy solutions that will keep us competitive. We have begun to see some of the limitations of our innovation process. It could not be more urgent to reduce the uncertainty of our current tax credits for alternative energy technologies and explore the creation of innovative, performance-based tax credits that are permanent and provide certainty, but do not create dependence.

In this 113th Congress, the tax code is clearly front and center. I believe we have a rare opportunity to streamline the tax code to make it more efficiently support the development of the next generation of technologies. The focus must shift to accelerating the rate of innovation, continuing to reduce the costs to taxpayers, and reducing the long-term dependence on government support. Such a transformation need not be complicated. The tools and approaches already exist. But we must work to rationalize these structures to better support the innovative companies that fuel our economy. We have the talent, the capital markets and the capacity to lead in energy technology. I look forward to the opportunity to work with this Committee on addressing these challenges moving forward.

Testimony of Senator Coons before Finance Committee on energy-finance legislation

- As Prepared for Delivery on July 31, 2013 -

Thank you for the opportunity to speak before you and for holding today's hearing on this timely and important subject. As you consider principles for energy tax reform, I'm grateful for the chance to offer brief testimony on an element of the tax code that I believe could drive significant new investment in clean and renewable energy. Chairwoman Stabenow, I am particularly grateful to you, and to Senator Moran, for your collaboration and support of this effort.

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 are struggling to deploy these innovations—and missing 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 clear, 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 Master Limited Partnerships Parity Act of 2013, S.795, which I reintroduced in April with Senator Stabenow, Senator Moran, and Senator Murkowski would do just that. It 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.

The Master Limited Partnerships 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 liquidity of equity markets, prevents double taxation, and leaves more cash available for distribution back to investors. 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. It is a well-developed, well-established financing vehicle. There are roughly a hundred MLPs at a market cap of about $450 billion at the moment.

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 the 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.

Again, I am so thankful to Chairwoman Stabenow, to Senator Moran, and to Senator Murkowski for their tireless partnership in this effort and for working closely with me on this bill. Bipartisan companion legislation led by Congressmen Ted Poe, Mike Thompson, Peter Welch, Cory Gardener, and Chris Gibson—which is three Republicans and two Democrats—was reintroduced in the House at the same time as the Senate bill.

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. I believe it's up to us to ensure that our vast supply of clean energy is a vital part of that equation. Thank you.

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TESTIMONY OF PHYLLIS CUTTINO
DIRECTOR, CLEAN ENERGY PROGRAM, THE PEW CHARITABLE TRUSTS
BEFORE THE SUBCOMMITTEE ON ENERGY, NATURAL RESOURCES, AND INFRASTRUCTURE
U.S. SENATE COMMITTEE ON FINANCE
JULY 31, 2013

Thank you Chairwoman Stabenow, and members of the Committee for inviting me to join you today to talk about tax policy and its relationship to the future of energy policy in the United States. I would like to submit my full testimony for the record and will summarize it in the time that I have this morning.

At the outset, it is worth noting the remarkable energy transformation that has occurred in less than a decade in this country. Six years ago, our country was more than 60 percent dependent on imported oil. Efficiency in the transportation sector had been stuck for several decades.

Today, our energy picture is far different from just a few years ago. Oil imports as a percentage of consumption have been reduced to 40 percent. Our electric sector energy sources have been diversified, with approximately one-third of our electricity coming from coal, one-third from natural gas; and one third from nuclear, hydro and renewable energy sources. End-use efficiency is also having a major impact in the transportation, buildings and commercial sectors. As a result, consumption in transportation and electricity has stabilized and is not expected to grow substantially in coming decades.

All of these trends are producing positive impacts for the American people. Economically, we've seen our balance of trade improve because we are importing less oil. Stable and

relatively low energy prices are good for consumers and have spurred increased manufacturing activity. Our reduced reliance on imported petroleum is enhancing our national security. And we are making progress toward the President's goals in terms of doing our part to reduce global carbon emissions.

Through innovation we are producing more and using less energy. As a result, our economy is stronger, our country is more secure and the environment is cleaner. The lesson is clear – diversification and advanced energy technologies must be cornerstones of U.S. energy policy and the tax policies that support it.

In the remainder of my testimony, I will provide the Committee with a window on how advanced, clean energy sources are part of these developments and also represent a tremendous opportunity for our economic, environmental and national security interests as a nation.

Simply put, clean energy technologies have moved from the margins to the mainstream of global energy markets as a result of increased global demand, worldwide economic competition and the resulting dramatic decline in the price of solar, wind and other emerging technologies.

The emerging size and scope of the global clean energy sector has been chronicled by The Pew Charitable Trusts over the past four years in a series of reports entitled "Who's Winning the Clean Energy Race?" Our most recent report was issued in April of this year and the 2012 data show that clean energy is a significant, growing sector of the global economy. While investment levels declined 11 percent to $269 billion in 2012, deployment of clean generating capacity increased by more than 10 percent to a record 88 gigawatts in 2012.

Our research shows that:

- Clean energy investment is shifting from the West to the East. Last year, Asia/Oceania became the leading regional destination for clean energy investment for the first time ever, attracting $101 billion in private investment – 42 percent of the global total.
- Investment in technologies is also shifting. For the second year in a row, the solar sector attracted more financing than any other clean energy technology: $126 billion in 2012. China, Europe, and the United States were top markets for investment.
- Prices for solar panels and wind turbines are declining as competition and deployment increases. In 2012, solar generating capacity grew by 4 percent to 31 gigawatts and wind added 48.6 gigawatts of capacity – record amounts for both categories.
- Markets in developing countries are growing most rapidly. In 2012, 20 percent of private investment went to non-G20 nations. Previously, the G-20 nations accounted for 95 percent of investment.

And the evidence suggests that the positive momentum and market penetration of clean, renewable energy will continue. Recently, the Bloomberg New Energy Finance research team estimated that clean energy investment is most likely to grow by 230 percent to a projected $630 billion annually in 2030. This same study estimates that 70 percent of new power generating capacity added worldwide over the next 25 years will be renewable.

The rationale for the clean energy revolution is no different than the rationale for the ongoing natural gas revolution. National governments, businesses and consumers are turning to clean energy to meet three basic interests: energy security, environmental security and economic opportunity.

Energy Security

Energy price volatility in recent decades has caused individuals, businesses and countries to seek out opportunities to enhance energy security and reduce vulnerability to price shocks or supply disruptions. In fact, our military has taken a position of institutional leadership in deploying clean energy as part of its effort to ensure the security of supply so that no mission and no warfighter is compromised by energy supply disruptions.

We've made great strides in enhancing our energy security in recent years by increasing efficiency, bolstering domestic supply of conventional fuels and deploying advanced energy technologies and fuels that help to diversify the energy mix. The transformation of the electric sector illustrates the change underway. FERC energy infrastructure data shows that gas and renewable energy sources have accounted for more than 80 percent of U.S. electric power capacity additions in three of the last four years. In 2012, renewables (mostly wind) accounted for 47 percent of all power capacity additions, with gas accounting for another 33 percent.

Environmental Security

Globally, concern about emissions associated with the combustion of fossil fuels that are harmful to human health and the environment is also spurring the deployment of clean energy technologies. Both the public and private sectors are embracing clean energy as a means of reducing local and global air pollution.

The U.S. Environmental Protection Agency estimates that electricity generation creates the lion's share of industrial air emissions in the United States, including "67 percent of national sulfur dioxide emissions, 23 percent of nitrogen oxide emissions, and 40 percent of man-made carbon dioxide emissions."[1]

The predominant fossil fuels used to generate electricity produce much more global warming related pollution than clean energy sources. Accounting for all aspects of production and use, coal results in about 20 times and natural gas 10 times the global warming related pollution as clean energy counterparts.[2]

Economic Opportunity

Recognizing public and private interests in energy and environmental security, investors see clean energy as a major economic opportunity for the future. To meet increased worldwide demand, the U.S. Energy Information Agency estimates that global energy consumption will increase by 47 percent between 2010 and 2035.[3] Eighty-five percent of that growth will occur in emerging and developing economies. The International Energy Agency estimates that clean energy will provide more than half of that new capacity,[4] and could attract up to $5.9 trillion

worth of investment.[5] In the last 8 years, renewable energy has garnered more than $1.3 trillion worth of investment.

There is no doubt but that these investments are going to create jobs and economic opportunities for the countries and companies that are at the forefront of the clean energy industry. Already, an estimated 5.7 million jobs around the world were connected to the clean energy sector as of the end of 2012.[6] In the United States, an estimated 152,000 Americans are employed in biomass, 100,000 employed in solar, and 75,000 are employed in the wind sector.[7]

The expansion of clean energy is also helping provide new manufacturing opportunities in the United States and other nations. According to the Solar Energy Industries Association, one-fourth (25,000) of all jobs in the U.S. solar sector are in manufacturing.[8] In recent years, American wind power has created almost 500 domestic manufacturing facilities and today, the manufacturing sector sources 30,000 domestic wind jobs.[9] The U.S. wind supply chain has grown in recent years, with 70 percent of the component parts of wind installations in the United States being sourced domestically.[10] Recent research has shown that investments in clean energy have yielded more than three times the number of jobs as comparable investments in conventional fossil fuels.[11]

WHERE THE UNITED STATES STANDS

With the global clean energy sector growing in size and reach, the United States finds itself at a competitive crossroads. Once a world leader in innovation, manufacturing, deployment and export of clean energy technologies, the United States now faces considerable competitive

challenges, as the center of gravity in worldwide clean energy leadership shifts from the industrialized Western powers to the emerging economies of Asia.

China appears to have established a lead in the clean energy race. Attracting $65.1 billion in private investment in 2012, China accounted for 30 percent of total investment among G-20 nations and attracted leading levels of investment in wind, solar and other renewables. All told, 23 gigawatts of new clean generating capacity were installed in China.

Whereas investment in China's clean energy sector has been increasing steadily, investment in the United States has been a roller coaster. Uncertainty surrounding the future of the production tax credit spurred unprecedented wind energy installations in the United States in 2012. But the rush to complete wind projects was insufficient to stem a 37 percent drop in U.S. clean energy investment. Overall, the United States saw some $35.6 billion invested, second-best among G-20 nations. Of that, $16.5 billion was invested in the solar sector and $13.9 billion went to wind energy technologies, enabling a U.S.-record 13.6 gigawatts of installed wind energy and 3.2 gigawatts of solar energy. The solar sector was something of a bright spot for the United States, with financial innovations such as private third-party financing leading to an investment increase of more than 40 percent for residential photovoltaic installations. In the United States, third-party financing mechanisms accounted for more than half of the residential and commercial market for rooftop solar installations.

The United States continues to lead the G-20 in the energy-efficient/low-carbon technology and the biofuels-related categories, which attracted $2.5 billion and $1.5 billion, respectively. In addition, venture capital and private-equity investment in the United States continued to dominate that class of financing, accounting for $4.3 billion of the $5.6 billion invested, or 78

percent of the total. Similarly, public and private research and development investment was highest in the United States, which accounted for 29 percent of the worldwide total.

With the United States leading the world in various measures of energy innovation but lagging far behind in such categories as deployment and manufacturing, it's evident that the United States is underperforming—inventing but failing to realize the economic, security, or environmental benefits of clean energy innovations through production and utilization. Installation of 3.2 gigawatts of solar was a record, but it is still less than half the amount that has been installed annually in leading European markets in recent years.

With regards to solar manufacturing, the United States has seen its early lead in this rapidly emerging sector steadily erode.[12] Over the last decade, manufacturing leadership has shifted from the United States to Japan, Europe, and more recently to Asia.[13] In 2012, nine of the top 15 solar PV module manufacturers were located in China. Although the U.S. solar manufacturing sector comprises about 100 production facilities making primary PV components (polysilicon, wafers, cells, modules, and inverters),[14] the United States is home to only two of the world's top 15 solar photovoltaic manufacturers, including First Solar, the second leading manufacturer in the world.

In the wind sector, one American company – GE Wind Power – is the leading manufacturer in the world, but the rest of the top 10 is comprised of Asian and European companies. Still, the United States has developed a significant supply chain in the wind sector. At the end of 2011, 470 wind turbine-manufacturing facilities were located in the United States.[15] This represents a more than 10-fold increase from the 30-40 wind-related manufacturing factories in 2004. In the intervening years, the number of tower plants increased from 6 to 22, blade facilities increased from 4 to 11 and the number of nacelle (housing for mechanical gears) assembly shops increased

from 3 to 12. As a result, it is estimated that 70 percent of the components in U.S. wind turbines are manufactured domestically, up considerably from half a decade ago.[16]

FEEDBACK FROM ROUNDTABLE DISCUSSIONS WITH INDUSTRY

To gain a better sense of the clean energy industry in the United States, last year The Pew Charitable Trusts organized a year-long, nationwide series of meetings with leading public and private sector experts, including business leaders in the areas of finance, manufacturing, innovation and deployment, to gather their feedback as to the strengths, weaknesses and opportunities for progress in the U.S. clean energy sector.

Roundtables were held as follows:

- **New York City, New York, March 19, 2012** – Finance Roundtable convened in conjunction with Bloomberg New Energy Finance
- **Columbus, Ohio, April 25, 2012** – Manufacturing Roundtable convened in conjunction with the Central Ohio Hub for Advanced Energy Manufacturing, EWI and the Ohio Manufacturers' Association
- **Golden, Colorado, May 9, 2012** – Innovation Roundtable convened in conjunction with the National Renewable Energy Laboratory
- **Atlanta, Georgia, June 14, 2012** – Deployment Roundtable convened in conjunction with the Georgia Solar Energy Association.
- **Jackson, Mississippi, August 7, 2012** – Deployment Roundtable convened in conjunction with the Mississippi Technology Alliance.

At this point in my testimony, I'd like to share with you some of the major themes we identified from these listening sessions with the industry.

Policy Uncertainty

Lack of certainty about the direction of U.S. energy policy was identified as the overriding impediment to clean energy investment and progress. The boom and bust nature of U.S. clean energy policies makes it extremely difficult for emerging industries to develop the supply chains and business models needed to establish a foothold in the competitive energy marketplace. Uncertainty also shakes the confidence of potential investors and keeps capital on the sidelines.

The looming expiration of the Production Tax Credit (PTC) was cited repeatedly as the most obvious and serious illustration of the difficulties associated with policy uncertainty. Prior episodes of uncertainty surrounding the renewal of the PTC resulted in a 70-95 percent drop in wind energy orders in 2000, 2002 and 2004.[17]

But the PTC is not the only uncertainty that exists – research and development funding is another example. Overall, participants lamented that currently there is neither a clear sense of purpose nor direction to U.S. energy policy. In the past, it was observed, the energy sector has been successful in meeting significant public policy goals set for the industry, such as making affordable electricity universally available in the United States. Similar goals are needed now to help focus the interests and efforts of scientists, investors, businesses and the citizenry. Policymakers are encouraged to set long-term goals that foster an economy-wide transformation toward advanced energy technologies that are cheaper, cleaner, and domestically available, thereby advancing the long-term prosperity of the United States.

International Competition

Worldwide interest in low-carbon and domestically-sourced energy supplies is creating momentum in clean energy deployment, as outlined above. Because clean energy is seen as an important economic opportunity, there has been a rush of investment in clean energy manufacturing in recent years. The speed and scale of investment in clean energy manufacturing capacity has spurred dramatic reductions in the market price for solar and wind products. The price of solar modules dropped 50 percent in 2011 alone and wind prices were down 10 percent. Recent estimates suggest that for every doubling of production capacity, the cost of manufacturing solar drops by 17 percent.[18]

Declining prices have been beneficial for consumers but stressful for producers, which now face acute global competition. In response to falling prices and growing deployment, manufacturers are making more product but at less profit. In the United States, Spain, Germany and China, several manufacturers have ceased or slowed production or gone out of business altogether, and more may soon follow. These are the realities of today's intensely competitive marketplace.

Several roundtable participants noted that the difficulties currently facing the clean energy sector are similar to those encountered in the past by other emerging technologies. The early stages of the computer and automobile industries were characterized by scores of early market entrants and subsequent consolidation. For example, it was noted that there were more than 100 car manufacturers in the early days of the industry. Experts involved in our discussions indicated that partnerships and consolidation between large and small businesses are likely to occur in the coming months and years.

Over the long-term, it is expected that the intense competitive pressures will strengthen the industry for the future. To survive and prosper, companies will have to pursue cost-saving

measures aggressively. Some of these savings will occur through improved materials and technological innovation. But industry representatives participating in our roundtables indicated that they are vigorously exploring ways to reduce "balance of system" costs across the value chain – from improved manufacturing processes to reduced financial, legal, transportation, permitting and installation costs.

It was also noted that, over the long-term, competitive pressures will place a premium on some of the strengths of American business -- including its commitment to producing high-quality products and ability to innovate across the supply chain. For example, General Electric has staked a leadership position in the production of larger and taller wind turbines that are more productive and cost-effective for customers.

Tight Credit

Recent global economic challenges and associated tight credit markets have made it difficult to raise the capital needed to grow businesses and scale up technologies in many sectors of the economy; clean energy included. Beyond the well-documented credit crunch, Pew's roundtables in 2012 revealed a number of special and distinct challenges facing clean energy businesses in the United States.

As noted previously, financing in the clean energy sector has been inhibited by perceived federal policy uncertainty. In addition, clean energy and other emerging technologies must overcome stubborn perceptions of risk, which discourage investment and increase the cost of capital.

Clean energy also faces challenges associated with the scale of its financial requirements. The energy sector is unlike the information technology or other high-tech industries—which can be

brought to scale at relatively low cost. In the energy world, considerable amounts of initial capital are needed to finance the scaling of newer technologies.

While the United States leads the world in private venture capital investments associated with clean energy, these investments typically occur in the earlier, proof-of-concept stage of technological development. Venture capital funding may not be a good fit for the commercialization of promising clean energy technologies and projects because of the large upfront capital requirements involved.

That is why predictable, long-term incentives are needed to usher this emerging industry as it approaches broad market acceptance. Declining prices are moving clean energy technologies closer to cost-competitiveness without subsidies. Already, clean energy is cost-competitive in certain domestic markets, many developing country markets (e.g. residential markets in areas with high electricity costs) and in areas with no power infrastructure. In our roundtables, we learned that the industry envisions and welcomes a subsidy-free and competitive marketplace among energy options in the power generation sector.

In fact, there is growing interest in private sector development of innovative new financing mechanisms for clean energy projects. The rapid emergence of third-party financing structures for residential solar energy projects was cited as a promising recent trend.

More broadly, experts welcome a move in the private sector to develop financial instruments suited to raising capital through broader pools of investors. Asset-backed securities, bonds and investment trusts are among the tools private sector interests are looking at to increase liquidity. In this regard, participants welcomed the entry into clean energy finance of large financial

institutions such as Goldman Sachs, Bank of America, Wells-Fargo, Citigroup and Warren Buffet's Mid-American Energy Holdings.

The Energy Playing Field is Not Level

Industry roundtable participants expressed a keen interest in "leveling the playing field" between conventional and emerging power technologies. Clean energy businesses welcome the opportunity to compete head-to-head with incumbent technologies but do not believe that the current marketplace allows for this kind of fair competition.

First and foremost, industry participants noted the sustained and substantial subsidies that conventional energy technologies have received over a period of decades. For example, some conventional energy subsidies have been in place for close to 100 years.[19] Similarly, it was mentioned that there are only four permanent tax credits in the energy sector, three of which are enjoyed by the oil and gas industry and one by the nuclear industry.[20] In contrast, clean energy tax credits are short-term and episodic.

Second, it was observed that the health and environmental costs associated with conventional energy sources are not reflected in the marketplace. If these costs, ultimately borne by society, were internalized in the price of various energy options, clean energy sources would be cost-competitive immediately. Health costs, the impacts of global climate change, and the costs of securing foreign sources of oil were mentioned among the external costs not currently reflected in energy pricing. Water was also discussed as a resource that should be considered in evaluating the relative merits of energy technologies. Conventional electric generating sources require large volumes of water to operate.

Finally, it was noted that there are a host of ways in which existing laws and regulations create barriers to clean energy development. In particular, participants mentioned rules associated with those who can generate electricity and barriers to connecting to the grid. Georgia, for example, is one of five states that prohibit anyone other than a publicly regulated utility from generating electricity.

U.S. CLEAN ENERGY OPPORTUNITIES

Leadership in Clean Energy Innovation

It is widely recognized that the United States has been at the forefront of research and development of clean energy technologies and remains a world leader in this area. That said, U.S. leadership in the innovation arena is being challenged, especially by emerging economies in Asia. Experts from industry and the research community agree that a number of steps need to be taken to ensure that the United States maintains its leadership in clean energy innovation.

There is broad consensus that U.S. clean energy research and development funding should be significantly increased. Due to international competitive pressures, experts believe that the United States must make robust investments to maintain a pipeline of clean energy innovations that will allow the country to stay ahead of international competitors in terms of developing products that compete on cost and quality in the global marketplace. To succeed, U.S. research and development efforts need to be funded on a consistent and long-term basis. Clean energy research and development has suffered as a result of frequent fluctuations in funding.

Participants welcomed recent initiatives in clean energy research, including the establishment through the Department of Energy of Energy Frontier Research Centers, Energy Innovation

Hubs and the Advanced Research Products Agency-Energy (ARPA-E)*.The Department of Energy's Sunshot Initiative, which aims to make solar energy cost-competitive without subsidies by 2020 was cited as one example of an appropriate, performance-oricnted research and development initiative.

Roundtable participants suggested that government research and development efforts need to be aligned more effectively with U.S. commercial interests and objectives. The National Laboratories and other research entities need to be accessible to businesses and university-funded research should also take account of the needs and interests of American industry. Research and development efforts should address innovation needs across the technology development spectrum, from basic research through manufacturing and operations.

Manufacturing

Most roundtable participants felt that there are a variety of opportunities for the United States in clean energy manufacturing, particularly in keeping a focus on the production of next generation technologies that harness domestic advantages, such as highly skilled labor. Underscoring this sentiment, Pew recently released results of a study on trade between the United States and China in key parts of the clean energy sector.

Our research showed that the United States held a $1.63 billion trade advantage with China in 2011 across three sectors: solar, wind and energy-smart technologies. We found that U.S. companies excel in production and sale of complex, high-margin, and performance-critical goods. This includes capital equipment for manufacturing solar panels and LEDs, specialty chemicals and materials needed for production of solar and wind products, as well as controls for

energy systems. In short, our trade advantage with China is based in large part on national leadership in innovation.

Throughout the roundtable process, it was noted that in today's highly competitive environment, cost-effectiveness across the value-chain is imperative and therefore, domestic manufacturers are likely to have an advantage in U.S. markets. In turn, servicing of domestic markets should help U.S. manufacturers become more competitive in international markets.

Indeed, it is widely acknowledged that domestic manufacturing must be viewed as part of the innovation process. Commercialization and manufacturing of next generation technologies help identify opportunities for improved materials, new production processes and other advances which are not only needed to reduce technology prices but also can be export opportunities. In this regard, experts note that the U.S. research and development community must work more closely with manufacturers.

Domestic Deployment

Roundtable participants consistently noted the importance of stimulating domestic demand as a means of encouraging the development and success of the U.S. clean energy sector. A domestic demand signal will encourage private investors to provide the capital needed to spur U.S. innovation and manufacturing in the sector. It will also help to encourage domestic manufacturing, as manufacturers prefer to be close to customers. In the wind industry, transportation costs and requirements necessitate close proximity between manufacturing facilities and wind farms. Several participants noted that U.S. manufacturers are disadvantaged by the fact that demand has been strongest in Europe and now in Asia. Ambitious national goals

and targets for deployment of specific clean energy technologies have stimulated local industry in these regions.

Enhanced deployment of clean energy technologies in the United States is also expected to drive innovations by manufacturers and project developers as they seek to reduce costs and gain a competitive advantage. As noted previously, the experience curve associated with solar and wind suggests that enhanced production drives down the cost of a given technology over time.

More efficient use of energy in manufacturing, particularly natural gas, can also drive down costs and spur new investment that strengthens U.S. manufacturing competitiveness in clean energy and other sectors of the economy. Steel companies including ArcelorMittal, automakers like BMW, and even Las Vegas casinos have made significant investments in combined heat and power and waste heat to power technologies because they lower energy costs while providing greater reliability. The Oak Ridge National Laboratory has estimated that doubling U.S. combined heat and power deployment can attract $234 billion in new private investment and create one million new jobs across the country while lowering total energy use by 3 percent.[21]

By encouraging price declines and stimulating innovation, a domestic demand signal would allow the public sector to diminish its role in clean energy as the private sector position strengthens.

STRATEGIES FOR STRENGTHENING OUR CLEAN ENERGY FUTURE THROUGH GREATER INNOVATION, MANUFACTURE, DEPLOYMENT AND EXPORT

To be internationally competitive in the emerging clean energy sector, the United States' public and private sectors were advised by participants to work closely together to innovate, manufacture, deploy and trade the advanced energy technologies that consumers around the world want and need. Participants in the Pew roundtables were optimistic that an effective public-private partnership can be created to ensure that the United States is an effective and successful competitor in the global clean energy marketplace.

A plethora of public policy ideas exist for strengthening America's competitive success in the clean energy sector. However the consensus of stakeholders participating in our nationwide series of roundtables is that relatively narrow, straightforward and mutually-reinforcing steps should be pursued. There is broad consensus among these leaders that the U.S. government's role in the sector should be light, limited and time-bound—federal policy has helped bring clean energy to the cusp of market acceptance and now, with commercial success in sight, would be an unpropitious time to change course. Roundtable participants suggested policymakers consider adoption of the following measures to help enhance the competitive standing of the United States in clean energy. Three of the six are directly related to tax policy.

Policy Recommendation #1: Set a Long-Term Goal for Clean Energy Deployment

Establishment of a clear, consistent and long-term goal for the development of clean energy (such as a Clean Energy Standard) was identified by roundtable participants as the single most important step that should be taken by policymakers to enhance U.S. industry in this sector. The

initiation of national goals corresponds to increased clean energy investment, manufacturing and jobs in the United States. Jeff Immelt, CEO of GE, said, "innovation and supply chain strength gets developed where the demand is the greatest."[22]

A national clean energy standard would help provide the long-term certainty needed for innovators to invent, investors to mobilize capital, and manufacturers to scale production. The resulting ramp up of a domestic supply chain of innovation and investment would, in turn, help continue the significant and sustained downward trajectory of prices for clean electric generating capacity – providing American consumers with an expanded menu of affordable electricity options and moving key clean energy technologies to grid parity (cost-competitiveness) with conventional energy sources. Price declines should, over time, allow the federal government to gradually reduce tax credits and other incentives intended to help the industry establish itself in the marketplace.

In developing legislation to establish a national clean energy standard, policymakers will consider a variety of design considerations. For example, the clean energy standard can be narrowly targeted toward renewable energy sources, or more broadly construed to include energy efficiency, carbon capture and storage technologies and cleaner-burning natural gas. The design of a national clean energy standard should also account for practical realities, such as different levels of clean energy potential in different regions. In addition, policymakers should consider adopting certain measures that encourage flexibility and lower costs, such as trading mechanisms and exemptions for small electric entities.

Policy Recommendation #2: Invest in Clean Energy Innovation

America has a clear advantage in clean energy innovation that must be maintained. Our competitive future hinges on the ability to maintain a pipeline of ideas and innovations for driving down the cost and ratcheting up the performance of advanced clean energy technologies.

The public sector has a special role to play in clean energy innovation because the intensity of international competition in the energy industry limits the ability of the private sector to undertake research and development. The U.S. national labs and university research capabilities provide the foundation for basic and applied energy research that is fundamental to developing advanced energy technologies in conventional and emerging sectors. Consistent and ample funding for federally-supported research at national laboratories and universities is essential to our long-term competitive position.

In recent years a broad variety of expert commissions and panels have looked at the scale and scope of U.S. energy research efforts. These have included the President's Council of Advisors on Science and Technology (PCAST); the American Energy Innovation Council (AEIC) comprised of distinguished American business leaders; and academic panels such as Harvard University's Belfer Center for Science and International Affairs. While there are different points of emphasis in the findings published by each of these panels, the overarching conclusion is the same – the United States is substantially underinvesting in energy research. The consensus view is that energy research and development funding should be increased by two to five times over the FY2012 level of $4.36 billion.[23]

Expert studies and our roundtable discussions demonstrate considerable support for the current direction and structure of both basic and applied U.S. energy research and development efforts.

Relatively new initiatives such as the network of Energy Frontier Research Centers for basic research and Energy Innovation Hubs for applied research are widely applauded. The Advanced Research Products Agency – Energy (ARPA-E) garners consistent high praise for its mission orientation and effective project priorities.

Policy Recommendation #3: Reinforce Incentives for Private Investment

Given the centrality of energy to the economic and security interests of the United States and the quality of life of the American people, government policy has long provided incentives to help advance energy development and services. More recently, the federal government has offered production and investment tax credits for qualified clean energy technologies. For all intents and purposes, these credits have been utilized primarily since the mid-2000s, when clean energy deployment reached commercially relevant levels. And they have worked – stimulating investment, deployment, manufacturing and helping drive the cost of technology down. But unlike some permanent tax incentives in other parts of the energy industry, the production and investment tax credits are clouded in uncertainty on an almost annual basis, creating a boom and bust investment environment that retards consistent progress.

To preserve the competitive viability and emergence of the U.S. clean energy sector, industry leaders urge policymakers to provide a long-term renewal of the production and investment tax credits. Several participants called for use of "shallow incentives" for technologies that are close, but need help getting over the line to cost-competitiveness. But participants in the roundtable process also noted that these tax credits cannot and should not go on forever.

With these considerations in mind, roundtable participants suggested that policymakers consider a multi-year but time-limited extension of the production and investment tax credits for clean

energy sources. In light of industry statements that cost-competitive clean generating capacity can be foreseen in this decade, an extension through 2020 would help foster cost-competitiveness, provide certainty and give industry the necessary lead-time to prepare for a post-subsidy world.

Policy Recommendation #4: Level the Energy Playing Field

There are a wide variety of economic, regulatory and legal barriers that favor incumbent technologies over those jockeying for a place in the marketplace. These barriers threaten the ability of new companies and technologies to gain a competitive foothold. Moreover, they block from consumers new technologies that can inject choice and competition, help lower prices and improve product offerings.

If barriers are eliminated, broader pools of private capital can be leveraged through innovative financing mechanisms that help lower the cost of capital. For example, master limited partnerships (MLP's) provide incentives for investors to help finance construction of domestic energy infrastructure. Investors can access these opportunities through equity markets and qualify for certain tax advantages. MLP's mobilize large reservoirs of low cost capital for oil and gas interests, but the law does not allow clean energy businesses access to these sources of finance.

In addition, there is an ITC available to a suite of industrial and institutional efficiency technologies, however, waste heat to power technologies are excluded. This method of capturing heat from an industrial process and turning it into power has the potential to generate 10 GW of additional energy making U.S. manufacturing more efficient and productive.[24]

There are also other advantageous legal arrangements that can be opened up to clean energy interests. At several of our roundtables, participants expressed support for allowing real estate investment trusts (REITS) to finance renewable energy projects. REITs are corporate entities that receive certain tax benefits in exchange for investing in income-producing real estate. These vehicles allow small investors to participate and mobilize large amounts of capital in real estate development. By qualifying renewable energy infrastructure as an eligible source of REIT financing, any investor would be able to purchase shares in a portfolio of renewable energy projects.

Policy Recommendation#5: Support U.S. Clean Energy Manufacturing

Clean electric generation technologies represent an emerging opportunity for America's high-technology manufacturers. Industry and economic development leaders are pursuing a range of initiatives to spur manufacturing in the clean energy sector, such as enacting renewable portfolio standards that stimulate demand; helping innovators and entrepreneurs grow businesses; and creating clusters of scientists, investors and business leaders to transition ideas out of laboratories into businesses that are supported and nurtured to success.

The federal government can also play a role in fostering renewable energy manufacturing at this critical time in the emergence of the U.S. and global marketplace. In recent years, one of the primary efforts to stimulate clean energy manufacturing was the Advanced Energy Manufacturing Tax Credit, also referred to as Section 48C of the Internal Revenue Code, authorized in 2009 as part of the American Recovery and Reinvestment Act. In an attempt to supply clean energy projects with components made in the United States, the Section 48C program provided a 30 percent credit for investments in clean energy domestic manufacturing

facilities capable of producing renewable energy equipment, energy storage systems, carbon dioxide capture and sequestration equipment, electric grids, energy conservation technologies, and other clean energy products. $2.3 billion in tax credits were granted to domestic projects for the 48C program, leveraging an additional $5.4 billion in private sector investment.[25] Experts also estimate that the tax credit directly created 17,000 jobs and that associated private investment supported roughly 41,000 additional jobs.[26] More than 180 manufacturing projects were supported in 43 states. Applications for the 48c credit far exceeded the program budget, which was exhausted in 2010.

Earlier this year, the Department of Energy initiated the Clean Energy Manufacturing Initiative (CEMI), to help boost U.S. competitiveness and manufacturing in the sector. This innovative public-private partnership should also help build the domestic supply chain and our long-term economic success in the sector.

Policy Recommendation #6: Expand Markets for U.S. Clean Energy Goods & Services

Long-term forecasts of electricity growth and clean energy markets demonstrate that the vast majority of future investment will occur in emerging economies and developing nations.

Markets for clean energy goods and services will grow as nations work to close the gap between the energy "haves" and "have-nots". An estimated 1.5 billion people around the world currently lack access to modern electric services.[27] Billions more have only limited, intermittent electric service or rely on wood, charcoal, and diesel generators for heat and cooking. Collecting or purchasing this fuel is burdensome to the energy poor. And extending electric infrastructure is an enormously expensive proposition. Clean energy offers the opportunity for communities to leapfrog the era of electric wires in the same way that cell phones have allowed these same

communities to bypass the era of hard-wired phones. In addition, some countries see opportunities in switching to renewable energy. Saudi Arabia, for example, plans to invest more than $100 billion in solar energy as a means of obtaining 30 percent of its electric needs through renewable energy over the next 20 years.[28]

In recent years, the United States has enhanced efforts to support renewable energy exports. According to the Department of Commerce, renewable energy exports increased from $1.3 billion in 2007 to $2.1 billion in 2009.[29] During that period, wind energy exports increased by 29 percent annually and biomass equipment and feedstock trade increased by 54 percent.[30]

To help coordinate and expand U.S. clean energy efforts as part of the National Export Initiative, the Trade Promotion Coordinating Committee, an interagency working group chaired by the Secretary of Commerce, has created a Renewable Energy and Energy Efficiency Export Initiative (RE4I). This initiative seeks to mobilize financing that supports exports by U.S. companies; open international markets to U.S. clean energy goods and services; and promote trade opportunities overseas. Twelve agencies participate in the RE4I initiative.

In recent years, some of the key export assistance arms of the U.S. government have stepped up efforts in the clean energy sector. The Export-Import Bank has dramatically increased its renewable energy portfolio, which doubled to $721 million between fiscal 2010 and 2011.[31] Likewise, the Trade and Development Agency has doubled its programmatic focus in the renewable energy arena. [32] And the International Trade Administration at the Department of Commerce has established a Renewable Energy and Energy Efficiency Advisory Committee to help bring private sector ideas into the federal government's export initiatives in the sector.

In view of the significant growth and potential of clean energy markets and emerging international trade issues in the sector, the United States Trade Representative has asked the International Trade Commission (ITC) to do a thorough review of the renewable energy services market.[33] The last ITC review of renewable energy and trade was conducted in 2004-05, when global investment was a fraction of what it is today. The ITC assessment, due to be completed later this summer, should give U.S. government agencies and policymakers useful guidance on the scale of clean energy markets, key sectors for U.S. priority and priority export markets for U.S. industry.

CONCLUSION

After several decades in laboratories and niche applications, clean energy technologies are primed for accelerated and widespread expansion in the world's power sector. In the United States and around the world, solar, wind and other renewable energy sources will represent a significant share of the new generating capacity deployed in the coming years and decades. These technologies will also be in demand as the world addresses persistent and emerging local and global environmental challenges. Finally, we know that clean energy will be sought after in the push to achieve greater energy security.

For all these reasons, the future of clean energy is bright. Less certain is the forecast for the United States' competitive position in this fast-growing sector. On a variety of key measures – from innovation to manufacturing to deployment to exports – the United States is struggling to maintain a position of leadership in the global economic and technological race.

Discussions with industry and other experts across the United States reveal tremendous frustration about the inability of American interests to capitalize more fully on the emerging

clean energy moment. Having invented and brought to market many of the prevailing clean energy technologies, U.S. scientists and entrepreneurs now find themselves buffeted by disparate national and international forces.

The United States has a proud history of public-private partnership in advancing national competitiveness in key sectors – from railroads and automobiles to telecommunications and conventional energy sources. In view of current and projected investment trends, U.S. competitiveness in clean energy warrants similar priority and partnership.

Above all else, industry and other practitioners in the clean energy field desire some degree of long-term policy certainty. These leaders are highly confident of the ability of American industry to succeed as the clean energy marketplace expands at home and around the world – provided there is consistency and consensus in policy along the lines outlined in my testimony.

Policies that encourage the deployment, innovation, manufacturing and trade of clean energy technologies will help bolster the competitive prospects of American industry. As Congress considers revisions to the tax code, Pew hopes to highlight that clean energy policies will enhance the nation's economic, environmental and national security prospects. The Pew Charitable Trusts is committed to working with public and private sector leaders to realize these goals.

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TESTIMONY OF SENATOR MORAN
BEFORE THE SUBCOMMITTEE ON ENERGY, NATURAL RESOURCES, AND INFRASTRUCTURE
U.S. SENATE COMMITTEE ON FINANCE
JULY 31, 2013

Chair Stabenow, Ranking Member Cornyn and Members of the subcommittee,

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. Our country does much of its energy policy in the tax code. As our technologies mature and our knowledge advances, our tax code is slow to adjust to the needs of the market.

As Congress considers the future tax treatment of the energy sector, there a point on which there appears to be bi-partisan agreement: a sound financial vehicle that has allowed the oil and gas industry to efficiently raise more than $450 billion over the past two decades from a broad array of individuals and institutions – the Master Limited Partnership (MLP) structure introduced in 1987 by Section 7704 of the Internal Revenue Code – should be continued and even modernized to include renewable and clean energy sources.

An MLP is a "publicly traded partnership" that holds energy or other specified assets. Traded on public stock exchanges, MLPs allow individuals and small institutional investors to invest in energy projects similar to the way mutual funds allow investors to make small investments in diversified stock portfolios. MLPs are efficient structures for raising capital in part because, unlike corporations, the taxable income and deductions are passed through directly to the investors (the limited partners), rather than being taxed twice – once at the corporate level and then again at the shareholder level. This feature of the MLP has enabled the oil and gas industry to raise capital efficiently and at an appropriate cost and has provided investors with sustained and consistent cash flow.

It is important to note that the MLP does not represent a "tax break" for those industries eligible for the MLP tax structure. Rather, it is a tax simplification structure that concentrates tax at the investor level, avoids double taxation, and significantly broadens the potential investment base.

MLPs have aided in the construction and operation of much of our modern oil and gas infrastructure and most recently fueled the shale revolution in oil and gas. In 2012 alone, MLPs raised over $23 billion of new capital for eligible projects. These include significant parts of the oil and gas supply chain, such as

production, pipelines, refineries, and gathering and storage facilities.

MLPs create needed investment opportunities for individuals saving for retirement and for pension funds. According to the National Association of Publicly Traded Partnerships (NAPTP) surveys, 75 percent of investors in MLPs are over the age of 50. This is in part due to the fact that these individuals are seeking a secure income-oriented investment providing a reasonable return. MLPs fulfill this role where other types of investments fall short.

MLPs lower the cost of energy. MLPs afford the energy industry stable access to less-expensive capital and therefore lowers the cost of energy (both fuels and electricity) to consumers.

While, it is critical that MLPs continue to be available to investments in the non-renewable energy industry, it is also important that we extend this tax structure to the broader energy sector. For example, companies involved in the production of solar, wind, geothermal and combined heat and power – our largest renewable energy industries – have never been eligible for MLP treatment even though renewable energy has been burdened by the same high cost of capital and the non-renewable energy industry. Only a small group of investors, consisting almost entirely of a few large corporations,

have been able to invest profitably in renewable energy projects.

Ironically, the United States has the largest and most efficient capital markets in the world, but our renewable energy companies rarely have access to those markets. Extending MLP treatment to renewable energy could move the renewable energy industry from relying on a few investors demanding high rates of return to a broader and deeper investment pool for these energy projects.

Continuing the MLP structure in the Internal Revenue Code, and expanding it to include investment in renewable and clean energy, would provide a predictable tax policy that encourages investment in all U.S. energy projects, creates jobs, and promotes American competitiveness in the global race to develop and utilize competitively priced energy sources.

Statement of Dan W. Reicher
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Steyer-Taylor Center for Energy Policy & Finance at Stanford University
Professor, Stanford Law School
Lecturer, Stanford Graduate School of Business
to the
Senate Finance Committee
Subcommittee on Energy, Natural Resources, and Infrastructure
Hearing on Principles for Energy Tax Reform
July 31, 2013

Chairwoman Stabenow, Ranking Member Cornyn, and members of the subcommittee, my name is Dan Reicher and I am pleased to share my perspective on principles for energy tax reform. I am Director of Stanford University's Steyer-Taylor Center for Energy Policy and Finance and a faculty member of the Stanford Law School and the Graduate School of Business. I also serve on the Board on Energy and Environmental Systems of the National Academy of Sciences, co-chair the board of directors of the American Council on Renewable Energy, and am a member of the board of directors of the American Council for an Energy Efficient Economy.

Prior to my role at Stanford, I was Director of Climate Change and Energy Initiatives at Google. I also served on President Obama's transition team where I helped develop the stimulus package for clean energy. Prior to my position with Google, I was President and Co-Founder of New Energy Capital, a private equity firm funded by the California State Teachers Retirement System and Vantage Point Venture Partners to invest in clean energy projects. Prior to this position, I was Executive Vice President of Northern Power Systems, a venture capital-backed renewable energy company.

Prior to my roles in the private sector, I served in the Clinton Administration as Assistant Secretary of Energy for Energy Efficiency and Renewable Energy, the Acting Assistant Secretary of Energy for Policy and International, and Department of Energy Chief of Staff and Deputy Chief of Staff.

The focus of this hearing is energy tax reform. Let me start with an important frame of reference. I believe the key to a more sustainable energy future involves simultaneous and coordinated progress in technology, policy and finance.

- We must accelerate the development of clean energy *technologies;*
- We need to adopt smarter clean energy *policies;*
- And we have to improve clean energy *finance.*

Today, I want to talk about three *finance* challenges with intimate connections to federal tax, regulatory, and fiscal policy. These challenges are:

- How to significantly lower the cost of financing renewable energy;
- How to dramatically increase investment in the energy efficiency of buildings;
- How to more effectively commercialize energy technology of all kinds.

1. Lowering the Cost of Financing Renewable Energy – MLPs and REITs

Without the need to pay for fuel, two factors largely determine the cost of large-scale renewable power projects. First, *equipment* costs, i.e. what you pay for buying and installing solar panels, wind turbines and the like. Second, *finance* costs, i.e. the cost of capital for a project.

Technological innovation has dramatically reduced renewable energy equipment costs over the last several years. But financial innovation has not kept pace in lowering the cost of capital for commercial-scale projects. As a result, the cost of financing today makes up an ever-greater fraction of the total cost of renewable energy projects, inflating the cost of the generated electricity, sometimes significantly.

Renewable energy projects struggle with high financing costs, not because of technology or off-take risks, but rather the heavy reliance on "tax equity", i.e. investment built around renewable energy tax credits, the Production Tax Credit (PTC), which has been used largely to back wind projects, and the Investment Tax Credit (ITC), which has focused largely on solar projects.

Tax credits are a challenge because:

- They have a very limited group of investors who can "monetize" them – i.e. a couple dozen investors nationwide with hefty tax bills to offset, such as big banks and a handful of highly profitable companies. This requirement for tax liability has sidelined many interested investors including tax exempt pension funds, sovereign wealth funds, and, importantly, millions of retail investors who trade stocks. The small group of eligible investors, facing little competition, can charge high rates for their scarce capital.
- The tax code's ownership requirements regarding the use of credits can tie up capital for years to avoid "recapture" of tax credit benefits, making tax credit-based deals relatively illiquid investments. This lack

of liquidity further drives up the rates that eligible investors can charge for their capital.

- Renewable energy tax credits generally have only short-term Congressional approval. The PTC, for example, was recently reauthorized for just one year. It has expired four times in the past 15 years and in some cases the credit has actually lapsed and had to be retroactively extended. The uncertainty around these credits makes them less attractive to investors and has created boom-and-bust cycles that have hindered the development of renewable power.

The good news is that there is a clear solution to the high cost of tax credits. Give renewables access to the very same mechanisms currently providing low-cost capital to traditional energy projects like oil and gas pipelines and transmission lines. These are Master Limited Partnerships (MLPs) and Real Estate Investment Trusts (REITs).

MLPs and REITs combine the fundraising advantages of a classic corporation, i.e. the sale of stock, with the tax benefit of a partnership, i.e. a single layer of taxation. Since Apache Petroleum launched the first MLP in 1981, MLPs have reached a total market capitalization of over $400 billion. REITs have a total market capitalization of over $500 billion, with IRS rulings opening up REIT investment for electricity transmission, gas pipelines, and other energy-related projects.

The use of MLPs and REITs would give renewable energy projects access to far greater pools of capital and, as a result, developers would no longer have to pay scarcity prices for project capital. For example, First Wind, a major wind developer, has stated that its current cost of capital in its tax equity-based investments is 14%. The company expects its cost of capital under MLPs will be 6-8%. Barclay Bank's analysis of MLPs reports a range of yields for energy MLPs, with 7% in the mid-range. So it is reasonable to expect renewable energy projects financed using MLPs to attract capital at approximately 6-8%. Cutting the cost of capital in half for a capital-intensive industry like renewable energy will have a profound impact.

Furthermore, with publicly traded shares, MLPs and REITs would allow millions of Americans to invest in our nation's renewable energy future. They would also open an attractive secondary market for renewable energy investment by allowing the entry of new investors beyond a project's initial phase of tax benefits, thereby enhancing liquidity in the renewable power marketplace.

In recent meetings, traditional MLP investors have expressed serious interest in adding renewable energy projects to existing oil and gas MLPs. They see a variety of potentially attractive aspects to such "hybrid" MLPs, including portfolio diversification.

Clearly, there are an array of advantages to MLP and REIT-based financing of renewable energy projects. The problem is that under current law renewable energy projects are not eligible MLP and REIT investments.

The MLP Parity Act, cosponsored by Senators Coons (D-DE), Moran (R-KS), Stabenow (D-MI) and Murkowski (R-AK) was introduced in April 2013 and would change this situation for MLPs. It is an improved and expanded version of a bill introduced in 2012 in the 112th Congress. The bill continues to include eligibility for renewable power generation and biofuels and widens the scope of projects that qualify for MLP status to include carbon capture and storage, energy storage, building energy efficiency, waste-heat-to-power, and biochemicals.

The MLP Parity Act was also introduced in the House by Representative Ted Poe (R-TX), Mike Thompson (D-CA), Peter Welch (D-VT), Chris Gibson (R-NY), and Cory Gardner (R-CO).

Regarding REITs, the Treasury Department -- on its own -- could issue a broad "revenue ruling" extending this financing mechanism to renewables. The IRS has already extended REITs, through private letter rulings, to, among other things, cell towers, transmission lines, and billboards lit with LED bulbs. There shouldn't be a big jump from these technologies to a revenue ruling including renewables. For example, an LED -- essentially a solar cell running in reverse -- mounted on a billboard is quite analogous to a solar panel on any number of structures, including buildings.

Thirty-five members of Congress – both Democrats and Republicans -- wrote to the President in December 2012 urging his strong support for both REITs and MLPs. The letter said in part:

> *"Opening MLPs and REITs to renewable energy would level the playing field by giving renewables the same access to low-cost capital enjoyed by oil, gas, coal, and transmission infrastructure projects. Small tweaks to the tax code could attract billions of dollars in private sector investment to renewable energy deployment, reduce the cost of renewable electricity by up to one third, and dramatically broaden the base of eligible investors."*

In their letter, the Congressional members did not take a position about an important related issue, i.e. with adoption of MLP legislation how to go forward with the extension of the PTC when it expires at the end of this year, and also how to address the phase-down of the ITC at the end of 2016. *I want to emphasize strongly that my support for MLPs and REITs should in no way signal that I endorse an immediate phase-out of the PTC or any weakening of the current ITC.* The PTC and ITC have been critical catalysts in the growth of US renewables.

The bottom line is that MLPs and REITs could significantly cut the cost of financing renewable energy projects and with further technology progress help make

renewables fully competitive in the near future. Congress and the Administration should open up these mechanisms to renewables and other clean energy technologies and do so soon.

2. Increasing Investment in Building Energy Efficiency: The SAVE Act

The second challenge is how to greatly increase the capital invested in energy efficiency upgrades of commercial and residential buildings.

Many call energy efficiency low hanging fruit. I'd go a step further: energy efficiency is low hanging fruit that grows back. Every day we are inventing and deploying ever more efficient energy technologies. My favorite example is the standard U.S. refrigerator that used about 2000 kWh per year in the early 1970s and -- pushed by a series of DOE efficiency standards since then -- now doesn't use more than about 400 kWh.

Deutsche Bank tells us there is more than a *trillion* dollars worth of energy to be saved in U.S. buildings over the next 10 years. And the bank says that we're looking at about a $300 billion dollar investment opportunity to achieve those savings. But there is barely trickle of investment being made in energy efficiency improvements in existing buildings. Even when opportunity stares us squarely in the face we don't seize it. Three percent of U.S. commercial buildings are renovated each year, yet only about 1 in 10 includes serious energy saving improvements. The numbers are even worse for our homes. Yes, on new counter tops in the kitchen. No, on an energy-sipping furnace in the basement. This is a big loss for the economy — and the climate — when you consider that buildings use about 40 percent of all the energy consumed in the United States.

The largest efficiency opportunity – deep energy retrofits of exiting buildings -- just isn't occurring at a significant scale. Let me be clear, this is *not* a technology issue. It is straightforward to do a serious upgrade to a building's heating, cooling and related systems using well-proven equipment and techniques.

Instead, this is a *finance* issue. How do we help investors of all types see their way clear to large-scale investments in building efficiency retrofits --- and make some money in the process?

Financial institutions have three concerns to varying degrees about investing in building energy efficiency improvements. In simple terms they are:

- **Credit risk** – will the borrower pay the money back?
- **Performance risk** – will the building upgrade save the amount of energy projected?

- **Asset risk** – could the retrofit actually hurt the value of the building?

There are a number of innovative financing mechanisms that are being tested to address these risks and potentially leverage large amounts of private capital for building efficiency retrofits. These include:

- On-bill repayment (OBR)
- Property assessed clean energy (PACE)
- Energy Services Agreement (ESA)
- Energy Savings Performance Contracts (ESPC)
- And others...

Each of these financing approaches has its advantages, and its challenges. For example Fannie Mae and Freddie Mac recently halted use of residential PACE, at least for now. The jury is out on each mechanism and it remains to be seen which can best address the risks -- real and perceived -- that plague private investment in building efficiency upgrades. I urge the Committee to take a serious look at these and other efficiency finance mechanisms and find ways to support their expanded use. In the mean time, there are policy mechanisms that might help in a number of ways.

In the automobile world we cracked the code on efficiency through fuel economy standards that Congress directed EPA and DOT to set. The most recent standards will increase the auto fleet average to about 55 miles per gallon by 2025.

We haven't taken a similar approach to buildings. But there are other policies that could advance building efficiency retrofits. Let me highlight one, the SAVE Act introduced by two members of this subcommittee, Senators Bennet (D-CO) and Isakson (R-GA).

To summarize the legislation, when you apply for a federally backed home loan, which represents more than 90 percent of all new mortgages, lenders include the costs of real estate taxes and homeowner's insurance to determine if you qualify. But they don't consider one of the biggest expenses of owning a home: the cost of the energy it consumes.

Consider two homes for sale with an identical price tag and similar features. But the energy bill for one is $2,000 a year and the other, $5,000 -- a $30,000 difference in home operating costs over 10 years. This simple information, if provided in a clear and timely manner, could make a real difference in a buyer's purchase decision. It might also encourage the seller to replace the old central air conditioner, rather than just gussy up the kitchen.

And, importantly, what if a lender included this information in calculating mortgage terms? *"Buying an energy efficient home? Get a better mortgage!"*

This is exactly what the SAVE Act would do. It would *require* a lender to take the projected energy savings of an efficient home into account when presented with a qualified energy report. Under federal law, borrowers have to report on whether termites are chewing up the beams in an attic. So why not provide the incentive for a homeowner to discover an inefficient furnace devouring cash in a basement — and help the homeowner find the low-cost financing to replace it?

Similar legislation was introduced in 2011 but failed to advance. But a new slightly pared down version now enjoys the backing of essential business organizations, including the National Association of Home Builders and the National Association of Realtors. And there is an immediate opportunity to attach the bill to the Shaheen-Portman energy-efficiency legislation that could be on the Senate floor in the near future. Senators Shaheen and Portman last year successfully shepherded another energy efficiency bill through Congress and across President Obama's desk. There are few legislative moments in Washington these days where the stars are so well aligned.

And it doesn't take an act of Congress to get started on the energy information front. Eight cities, including New York, San Francisco and Washington D.C., and two states -- California and Washington -- have already adopted building information laws requiring public disclosure of the energy performance of commercial buildings. Additionally, a new one was recently proposed for more than 3000 of Chicago's largest buildings.

It's too early to tell how much of an impact these laws will have on cutting energy use overall but the signs are promising. Of course better information won't, by itself, fully capture the nation's vast building efficiency potential. But making sure that consumers and businesses know how much money they can save through energy efficiency improvements is a good first step. And in combination with progress on energy efficiency finance we'll be in a stronger position to finally exploit this immense opportunity.

I strongly encourage the subcommittee to support the SAVE Act -- including attaching it to the Shaheen-Portman bill -- and also find ways to improve private sector finance of efficiency retrofits of commercial and residential buildings. With these steps we will be making a large and cost-effective down payment on our energy future.

3. Improving Energy Technology Commercialization

The third challenge is how to improve energy technology commercialization. This is a challenge that hinders the advancement of clean energy of all kinds -- from advanced nuclear power and carbon capture -- to wind, solar, geothermal, and biofuels. And it is a challenge that affects every kind of energy player from small

venture-backed start-ups and big companies --- to government labs and university researchers.

The key issue with commercialization is the huge amount of time -- and massive expense – often required to take an energy technology from a pilot project, often backed by venture capital investors, to a point where it can be deployed at commercial scale --- using project finance and other traditional funding mechanisms.

I spent four years at Google as Director of Climate and Energy Initiatives. It was fascinating to see Google information products developed and deployed. In simple terms Google software engineers would sit at computer screens, write sophisticated code, test it extensively, press a button, and soon after millions would be using it. Google often measures product time frames in months.

In stark contrast, in the energy technology world we generally measure time frames in decades --- from what it took to get nuclear power to commercial scale, to the successful development and deployment of natural gas fracking, to on-going efforts to take solar mainstream.

And to multiple decades we must add the hundreds of millions or billions of dollars it often takes for a single technology to be fully commercialized. Clean tech venture capitalists in Silicon Valley have leaned this lesson painfully -- and at great expense -- over the last few years.

I worked for a venture-backed wind turbine company. We had a wind turbine technology that offered some significant improvements over current designs in terms of efficiency and maintenance costs. It operated well at small scale and venture capital was secured to build a much larger utility-scale version. The company built two large turbines and they performed well. But project financiers said they needed to see about one hundred turbine-years of operation before they would invest in large-scale projects using the turbine. For two turbines that would mean 50 years of operation, a timeframe far too long for this little company. Alternatively, that would mean 50 turbines running for two years – an investment requirement far too large for a thinly capitalized operation like ours, without a well-endowed corporate partner.

The problem my company and so many other early stage energy technology companies face is this:

- The amount of money needed to build the first commercial-scale project is often ***far too much*** for most venture capital investors;

- And the bet on the successful commercialization of the technology is usually ***far too risky*** for the traditional energy project finance world.

Welcome to the "Valley of Death", where so many promising energy technologies die. A few large U.S. energy companies like GE have the capital and the staying power to pull some technologies across the Valley. But too often there simply isn't the funding – and the patience – to commercialize a high-risk advanced energy technology.

I went from the wind company to help launch a clean energy project finance company called New Energy Capital with backing from the California State Teachers Retirement System and Vantage Point Venture Partners. Day after day our firm received investment proposals for energy projects based on technologies with profiles that simply exceeded the risk threshold of our capital. Had the underlying technologies been proven in a lab? Generally yes. Had they operated in a pilot plant? Sometimes. Had they operated at commercial scale for a decent period of time? Rarely. We received so many project proposals but there were so few where we could actually make an investment. So what were we left with? Well, the not so little secret is that the biggest chunk of our initial capital was used to finance corn ethanol plants – a technology well proven at large commercial scale, for decades.

I went on to Google where we made venture capital investments in an array of promising technologies but many of them today are dying or dead or in the Valley, some appropriately, some not. One interesting one is called Enhanced Geothermal Systems or EGS. It borrows some technology from natural gas fracking. EGS involves drilling down deep into hot dry rock, fracturing the rock, and then circulating water through the hot rock to power a steam generator and make electricity.

EGS at scale could provide a massive 24/7 renewable resource but the companies trying to develop the technology are often starving for cash to show the technology can work safely and to push it down the cost curve. Google was willing to invest a few million dollars to help one EGS company with pilot-scale work. But the tens of millions -- or hundreds of millions -- it will cost for scale-up was simply not an investment the company would make, particularly with the associated risks.

It is helpful to understand that it took billions of dollars from private companies and the government -- and multiple decades -- to get natural gas fracking to scale with challenges like horizontal drilling, hydraulic fracturing, and seismography. The DOE alone stepped up with more than $100 million in R&D funding and the federal government has provided billions of dollars worth of tax credits for gas drilling. George Mitchell of Mitchell Energy is rightly called the "father of fracking" but Mr. Mitchell had a major partner in the U.S. government.

Similarly, it is important to note that DOE and its predecessor agencies – the Atomic Energy Commission and the Energy Research and Development Administration – provided much of the capital, measured in the many billions of dollars, and a good amount of know-how over several decades to get nuclear power to commercial scale.

EGS may also require a sustained government commitment, like both its first cousin fracking as well as nuclear power enjoyed, to address significant commercialization challenges. DOE is currently providing some support but it is an open question whether additional U.S. funding will be available over the long haul in our current federal policy and funding regime. Other countries are also pursuing the technology so it might well be that EGS -- which was pioneered in the US -- makes it across the Valley of Death on the backs of nations like Australia, Germany, the United Kingdom, or Japan.

So can our nation address the problem of the Valley of Death? Let me give you a quick rundown of some of the solutions.

The first solution is the federal government's loan guarantee program. As Peter Davidson, Executive Director of DOE's Loan Program Office (LPO) stated earlier this month in Senate Energy Committee testimony: "Lenders and bondholders are often unwilling to finance innovative technologies at scale that do not yet have a history of credit performance, despite realistic projections of a market rate of return." The loan guarantee program was designed in part to address this challenge.

There is much to discuss about the loan guarantee program but let me just say that I think it has received a great deal of undue criticism. Just three of the 26 projects that have been funded have defaulted (one of those is Solyndra) and losses to date represent just 2 percent of the $35 billion portfolio of closed and committed loans and loan guarantees – and less than 10 percent of the roughly $10 billion in loan loss reserves that Congress set aside for the program.

Looked at objectively DOE's Loan Program Office (LPO) has done what it was directed to do under three different programs adopted by Congress in 2005, 2007 and 2009. Thus the $465 million loan to Tesla enabled it to reopen a large shuttered California auto manufacturing plant to build innovative electric cars, create 3000 jobs, win the 2013 Motor Trend Car of the Year award, and repay the entire remaining balance of on its loan nine years early. The LPO has provided a guarantee to one of the nation's first commercial-scale cellulosic ethanol plants. There is an $8 billion conditional commitment to the first commercial nuclear power plant to be built in the US in three decades. And the LPO has supported the world's largest photovoltaic and concentrating solar power plants currently under construction.

Looking ahead there is remaining loan guarantee authority that DOE is considering for innovative fossil energy projects in order "to assist the private sector as it clears a path to commercialization" for technologies like carbon capture, low-carbon power systems, and efficiency improvements in fossil energy systems.

We won't know for a number of years the overall performance of the entire loan guarantee portfolio but there is a serious likelihood that US taxpayers will do well – and do good – with their investments. Despite this fact the prospects are not

positive that Congress will recapitalize the loan guarantee program, in part because of the highly partisan debate about its merits.

If the Congress decides not to support additional funding I strongly recommend a second look at an approach that received serious bipartisan support just a couple of years ago. I refer to the Clean Energy Deployment Administration (CEDA). CEDA was reported out of the Senate Energy Committee in the 111th Congress with strong bipartisan support including from Senators Bingaman, Landrieu, Murkowski, Brownback, Corker and Sessions. But despite this bipartisan push the legislation stalled.

Senate support for CEDA reflected a strong recognition of the challenge of energy technology commercialization. It also reflected concerns about the loan guarantee program: the multi-agency review process, the uncertainty of the budgeting cycle, and, overall, a sense that the financing of capital-intensive energy projects with serious scale-up risks – with leadership from and in close collaboration with the private sector -- was not a great match for the structure, oversight, risk tolerance, and financial tools of the Department of Energy

I believe that CEDA – with some independence from DOE and in strong partnership with the private sector – could more nimbly and efficiently support the scale-up of clean energy technologies, and U.S clean energy competitiveness, than the current approach. CEDA would have a broad array of tools to accelerate the commercialization of clean energy technology including direct loans, loan guarantees, letters of credit, and other credit enhancements. It would also have the authority to issue bonds, notes, debentures or other obligations or securities. These tools go well beyond the current loan guarantee program that DOE is administering.

Initially funded with an appropriation of $10 billion, CEDA could become a *self-sustaining* entity based on "profit participation" mechanisms that would allow it to take a financial stake in the projects it backs. Also, while CEDA would be established as an agency within DOE it would be under the direction of an administrator, a board of directors, and technical advisory council. It would enjoy an important degree of independence from DOE including, for example, from line reporting and the Secretary's reorganization authority. The best analogy is the Federal Energy Regulatory Commission (FERC), an independent arm of the DOE.

Congress should enact the CEDA legislation. Supporting the scale-up of innovative technologies of all kinds will help reduce the cost of energy for all Americans, enhance our national security, and address climate change. It will also position the U.S. to capture a massive global export market that is growing by the day – and create large numbers of good paying jobs in the process

If Congress does not recapitalize the loan guarantee program -- or establish CEDA -- we can rest assured that the biggest player of all in commercialization today will continue to move aggressively. I refer to China. Day by day, more and more US

companies struggling through the Valley of Death are looking to China for rescue. The Chinese are investing heavily in the commercialization of clean energy technology from solar, wind and batteries to electric vehicles, carbon capture, and advanced nuclear. Some of the struggling companies that the Chinese have acquired were actually the recipients of significant funding from U.S. taxpayers. And in some cases Chinese firms are buying these companies for pennies on the dollar.

We could and should have a long conversation about the pros and cons of China's approach to energy technology commercialization in terms of U.S. jobs, security, and environment. But suffice it to say the Chinese are pushing hard in the clean energy arena. With massive quantities of capital, well-trained engineers, smart government officials – and an overall plan -- China intends to dominate the market for global energy infrastructure. This is a market that the International Energy Agency estimates will involve $38 *trillion* of spending between now and 2035. And this is a market that the U.S. should have a serious piece of, not only because of the economic, security and environmental upside, but also because it involves many technologies invented and demonstrated here, often at taxpayers' expense.

In closing let me just refer you back to my initial frame of reference. Technology is indeed the great driver of progress in clean energy but without smart policy as well as plentiful – and cheap -- capital, we're not going make progress very fast in this high-risk, high-return, and highly competitive area. Congress and the Administration can do much to advance clean energy through thoughtful policymaking and targeted support of the energy capital markets.

Thank you for the opportunity to testify.

Opening Statement of Chairwoman Debbie Stabenow (D-Mich)

Senate Finance Committee Subcommittee on Energy, Natural Resources and Infrastructure

"Powering Our Future: Principles of Energy Tax Reform"

July 31, 2013

As prepared for delivery

Last month, Chairman Baucus and Ranking Member Hatch invited all senators to provide their ideas on what a reformed tax code should look like. I know the Chairman and Ranking Member and their staffs will be carefully reviewing those ideas.

Starting from the views of each member, we need to build a consensus in Congress, and around the country, on what our tax system should look like. The purpose of today's hearing is to see if there are principles for energy tax reform where we can build consensus.

In general, I believe that we should seek to streamline our nation's tax code to grow our economy while making the system fairer and simpler for our families and businesses. Tax reform will only be successful, however, if it furthers our effort to make America more competitive in the global economy. And competitiveness needs to be defined in a way that not only includes business success but the economic success of individual Americans as well.

A recent study by the Harvard Business School makes the point exceptionally well:

> "The United States is a competitive location to the extent that firms in the U.S. can succeed in the global marketplace while raising the living standards of the average American."

That is why a top priority of tax reform needs to be the elimination of current barriers in our tax code that make it difficult to innovate and make things in this country, and thus, create and sustain a strong middle class.

We need a "do it all" approach when it comes to energy production. This is not a new idea, and it has garnered support from both sides. But we can't have a true "do it all" approach if we only support one technology with 100-year-old tax credits while ignoring emerging clean energy technologies. Part of our strategy must be supporting innovative new clean energy industries and jobs in America.

The global demand on fossil fuels is increasing, too, with rapidly growing middle classes in countries like Brazil, China and India using much more energy than in previous decades. China put 16.8 million vehicles on the road in 2010 alone. Prices will continue to go up and the world will increasingly look for alternatives.

Other countries know this— and that's why they're investing heavily to develop new clean energy technologies. China is spending over $178 million per day on clean energy technologies.

New clean energy industries not only mitigate the impact of climate change – they represent the potential for tremendous job creation here at home. They also give consumers more options and provide more market competition in energy.

Other countries know that the race is on to be the global leader in these new technologies, and that the country that controls new energy production will be the Saudi Arabia of the 21st Century.

This is one of the most important economic and national security issues of our time. We can't afford to trade dependence on foreign oil for dependence on advanced batteries, wind, solar, hydrogen, advanced biofuels or other forms of energy.

This discussion is also very much about jobs. There are 8,000 parts in a wind turbine, for example, and we can make every one of them here. During 2012, wind energy became the number one source of new U.S. electricity generating capacity, providing 42% of all new generating capacity and supporting 75,000 jobs nationwide. The solar industry employs 119,000 people – up 13% from 2011 – representing one of the fastest growth rates for any industry. Solar prices have declined by 60 percent since 2011.

We must engage in the global race to lead the world in these new technologies, or risk falling further behind other countries. It's our responsibility to create tax policies that help our companies thrive. We need to provide American businesses the long term certainty they need so they will invest in creating these new technologies and jobs and give consumers real energy choices in order to bring prices down.

We need to seize the opportunity before it's too late. And tax reform is that opportunity.

Pro-Growth Energy Tax Reform
By
Margo Thorning, Ph.D.
Senior Vice President and Chief Economist
American Council for Capital Formation
Before the
Senate Committee on Finance
Subcommittee on Energy, Natural Resources and Infrastructure
July 31, 2013

Executive Summary

Contribution of Oil and Gas Industry to Current and Future Growth: Since the recession ended in the second quarter of 2009, personal income and job growth in major energy producing states such as North and South Dakota, Texas, Oklahoma, Montana, Wyoming, and Colorado have been much greater than in other states and their unemployment rates are lower than the national average. A new report by the McKinsey Global Institute estimates that if the U.S. fully realizes its opportunity, shale oil and gas could add 2–4 percent ($380 billion–$690 billion) to annual GDP and create up to 1.7 million permanent jobs by 2020. McKinsey finds sharply lower U.S. natural gas prices are boosting the GDP growth and that exporting liquefied natural gas from the U.S. will further enhance economic recovery.

Consumption-Based Tax Reform: As a new ACCF report, "*Switching to a Consumption-Based Tax from the Current Income Tax*" explains, economic research by top academics, government agencies and think tanks over the past two decades shows that switching from our current income tax to a consumption-based tax system in which all new investment is expensed (deducted in the first year) would help achieve the goals of stronger investment and faster U.S. economic growth.

Cash Flow, Investment and Job Growth: If switching to a consumption-based tax system is not achievable, it is critical to preserve a strong capital cost recovery system. New academic research provides evidence of the strong link between investment and cash flow. A dollar of current and prior-year cash flow is associated with $0.32 of additional investment for firms that are least likely to face difficulty in raising money in capital markets and with $0.63 of new investment for firms likely to face constraints. If accelerated and bonus depreciation for equipment is repealed and replaced with economic depreciation, which is generally longer than the current Modified Accelerated Cost Recovery System (MACRS), the cost of capital for new equipment will rise and investment is likely to decline.

Tax Reform and U.S. Energy Investment: Several tax reform proposals put forward in the last several years eliminate or reduce accelerated and bonus depreciation, LIFO, and provisions used by the oil and gas industry such as G&G, IDCs while lowering the corporate income tax rate. These proposals could slow economic recovery; a new Wood MacKenzie analysis shows that by 2023, the proposals to delay the current IDC deduction timing would result in a loss of 3.8 million barrels of oil equivalent per day from US oil and gas fields. Liquids and natural gas production are both impacted, and job losses would reach 233,000 by 2019.

Renewable Energy Costs are High and Renewables Receive the Largest Share of Tax Code Subsidies: Data from DOE's EIA show that new electric generating capacity using wind and solar power tends to be considerably more expensive than conventional, available and secure natural gas and coal resources. In 2012, an 81% of the $16.6 billion in federal tax incentives went to renewables, for energy efficiency, conservation and for alternative technology vehicles while only 19% went to fossil fuels according to the Congressional Research Service (CRS). Some renewable electricity enjoys negative tax rates: solar thermal's effective tax rate is -245% and wind power's is -164%.

Environmental Regulations and Investment: Regulations and policy guidelines such as the Social Cost of Carbon, the Renewable Fuel Standard and the regulation of GHGs under the Clean Air Act can raise the hurdle rate for new investment and slow new development and job growth just as can taxes. All regulations should be subject to a transparent cost /benefit analysis with broad stakeholder involvement.

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Introduction

Chairman Stabenow, Ranking Member Cornyn, and members of the Subcommittee, my name is Margo Thorning, senior vice president and chief economist, American Council for Capital Formation (ACCF),* Washington, D.C. I am pleased to present this testimony on how pro-growth tax reform can enhance both U.S. energy production and energy security as well as overall economic and job growth.

The American Council for Capital Formation represents a broad cross-section of the American business community, including the manufacturing and financial sectors, Fortune 500 companies and smaller firms, investors, and associations from all sectors of the economy. Our distinguished board of directors includes cabinet members of prior Democratic and Republican administrations, former Members of Congress, prominent business leaders, and public finance and environmental policy experts. The ACCF is celebrating 30 years of leadership in advocating tax, energy, regulatory, environmental, and trade policies to increase U.S. economic growth and environmental quality.

Chairman Stabenow and the Subcommittee members are to be commended for their focus on how tax reform could affect the development and expansion of the U.S. energy sector, which has been an important factor in the current U.S. economic recovery.

Contribution of the Oil and Gas Industry to U.S. Economic Recovery

As policymakers debate what type of tax reform can accelerate sluggish U.S. economic and job growth, it is important to note the positive impact the U.S. oil and gas industry has had on the U.S. economic recovery over the past several years as well as what its continued expansion can mean for jobs, economic growth and energy security.

**Founded in 1973, the American Council for Capital Formation is a nonprofit, nonpartisan organization advocating tax, energy, regulatory, environmental and trade policies that facilitate saving, investment, economic growth and job creation. For more information about the Council or for copies of this testimony, please contact the ACCF, 1750 K Street, N.W., Suite 400, Washington, D.C. 20006-2302; telephone: 202.293.5811; fax: 202.785.8165; e-mail: info@accf.org; website: www.accf.org*

To put the economic impact of the oil and gas industry in perspective, it is useful to look at the recent impact of increased energy production on U.S. employment. Since the recession ended in the second quarter of 2009, personal income and job growth in major energy producing states such as North and South Dakota, Texas, Oklahoma, Montana, Wyoming, and Colorado have been much greater than in other states and their unemployment rates are lower than the national average (see Table 1). In addition, an analysis by the Progressive Policy Institute, "*Investment Heroes: Who's Betting on America's Future*" notes that in 2011, four of the top ten non-financial companies investing in the U.S. were oil and gas companies)[1]. These four companies, Exxon Mobil, Occidental Petroleum, ConocoPhillips and Chevron, invested a total of $28.3 billion domestically in 2011. Historically, each $1 billion increase in investment is associated with an additional 23,200 jobs in the United States (see Figure 1). Thus, the $28.3 billion of investment by the four oil and gas companies may have produced over 600,000 new jobs in 2011.

The PPI report notes that most of the U.S. capital expenditures by energy companies consisted of production and exploration costs, which includes building out oil and natural gas pipelines and exploratory costs for new drilling sites. The report concludes, "Despite any environmental concerns, the fact remains that such large amounts of domestic investment by these individual companies have the ability to prop up local area economies while meeting the realities of increased power demand."[2]

Other evidence of the role of the oil and gas industry in our economic recovery is cited in a report by the Small Business & Entrepreneurial Council. While overall U.S. jobs in employer firms declined by 3.7 percent from 2005 to 2010, jobs grew by 27.6 percent in the oil and gas extraction sector during the same time period.[3]

In the coming years, the oil and gas industry can play an even greater role in GDP and job growth according to a new analysis *"Game Changers: Five Opportunities for U.S. Growth and Renewal"*, by the McKinsey Global Institute.[4] The report observes that the technological advances in horizontal drilling and hydraulic fracturing have unlocked large deposits of both natural gas and oil trapped in shale—resources once considered too difficult or costly to extract. From 2007 to 2012, North American shale gas production climbed by 50 percent and production of so-called light tight oil is now growing even faster. The report concludes that if the United States fully realizes its opportunity, shale energy could revitalize the oil and gas industry, have downstream benefits for energy-intensive manufacturing, and send ripple effects across the economy.[5] The McKinsey report estimates shale oil and gas could add 2–4 percent ($380 billion–$690 billion) to annual GDP and create up to 1.7 million permanent jobs by 2020. They also note that this development could be an important source of high-wage employment for workers

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[1] http://progressivepolicy.org/wp-content/uploads/2012/07/07.2012-Mandel_Carew_Investment-Heroes_Whos-Betting-on-Americas-Future.pdf

[2] Ibid, p.5.

[3] Small Business & Entrepreneurship Council (SBEC), "The Benefits of Natural Gas Production and Exports for U.S. Small Businesses," May 2013, page 3 http://www.sbecouncil.org/wp-content/uploads/2013/05/BenefitsofNatGasSBECouncil.pdf.

[4] http://www.mckinsey.com/insights/americas/us_game_changers. See also ACCF Center for Policy Research Special Report, "How Federal Energy Policies Can Support U.S. Economic Recovery"(July 2013) at http://accf.org/wp-content/uploads/2013/07/ACCF_Special_Report_071713.pdf

[5] Ibid, p.9.

without college degrees and would generate economic activity in parts of the country that have seen little investment in recent decades.

In addition, the report notes that building the required infrastructure for the shale boom is providing a short-term stimulus to the recovery. McKinsey estimates it would take up to $1.4 trillion in investment to complete the necessary pipelines, rail networks, and drilling and gathering infrastructure. This could generate 1.6 million temporary jobs during the build-out, mainly in the construction sector. And this investment boom is being financed mainly by private capital from the United States and abroad; it does not hinge on public funding.

Beyond the increase in output and jobs, the implications are significant. The surge in shale gas production has driven down the price of U.S. natural gas from nearly $13 per MMBtu in 2008 to approximately $4 per MMBtu in spring 2013—sharply lower than prices elsewhere around the world and a level at which some wells are being capped as producers cannot recoup their investment. In response, the United States is considering exporting liquefied natural gas (LNG), a shift that would require converting underutilized import terminals to export terminals. The U.S. Department of Energy has approved two applications for such projects to date, and 20 more are under review. Combining potential LNG exports with reduced demand for imports of crude oil, the United States now has the potential to reduce net energy imports effectively to zero in the next decade and beyond.[6]

Pro-Growth Tax Reform

Continuous tax reform developments overseas, many of which have reduced corporate income tax rates, underscore the need for U.S. reform. U.S. firms are falling behind as is apparent from the decreasing share of U.S. companies among Fortune 500 global companies. Any new tax code should be designed to take into account global economic changes to promote increased investment and growth in the U.S. For example, an ACCF international comparison of capital cost recovery allowances for key energy and electricity generation investment[7] shows that investments in the U.S. face slower cost recovery and higher effective tax rates than many of our trading partners.

Consumption-Based Tax Reform: Impact on Economic Growth

As a new ACCF report, "*Switching to a Consumption-Based Tax from the Current Income Tax*" explains, economic research by top academics, government agencies and think tanks over the past two decades shows that switching from our current income tax to a consumption-based tax system would help achieve the goals of stronger investment and faster economic growth.[8] A pure consumption tax is defined as a system that taxes individuals on the goods and services they

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[6] Ibid. page 10. See also a recent ACCF report "Liquefied Natural Gas: Why Rapid Approval of the Backlog of Export Applications is Important for U.S. Prosperity" at http://accf.org/wp-content/uploads/2013/07/ACCF_Special_Report_071713.pdf

[7] American Council for Capital Formation, "International Comparison of Depreciation Rules and Tax Rates for Selected Energy Investments," Prepared by Ernst & Young, May 2, 2007. http://accf.org/wp-content/uploads/2007/05/internationalComparison.pdf

[8] See http://accf.org/news/publication/switching-to-a-consumption-based-tax-from-the-current-income-tax and Joint Committee on Taxation, "Tax Modeling Project and 1997 Tax Symposium Papers," November 20, 1997. https://www.jct.gov/publications.html?func=startdown&id=2940

purchase and exempts all saving from tax. For example, in 2005 the President's Advisory Panel on Federal Tax Reform analyzed the economic impact of three tax reform proposals, two of which employ a consumption tax base and one employing income as the tax base. The Panel looked at a progressive consumption tax (PCT) system that would completely eliminate the difference between the pre-tax and the after-tax return on investment by allowing expensing (immediate write off). It also considered a more blended or hybrid tax structure that would move the current tax system towards a consumption tax by allowing expensing for investment while preserving some features of income taxation. This blended option is called the Growth and Investment Tax Plan (GIT). The panel also analyzed the Simplified Income Tax (SIT) plan which broadens the current income tax base.[9]

- **Reform Plans Overview**
  Under the GIT plan, households would file tax returns and pay tax on their wages and compensation based on three tax rates: 15, 25 and 30 percent. Most households would face a lower tax rate than under the current income tax system. This system would be different than a pure consumption tax system by imposing a reduced flat rate on capital income (capital gains, dividends and interest) received by individuals. This rate would be set at 15 percent.

  Under the PCT, the tax rates applicable to individuals and business cash flows would be slightly higher than GIT, at rates of 15, 25 and 35 percent. There will be no taxation of capital income under the pure consumption tax system eliminating the need for special savings accounts. There would be lower deduction and exclusion for employee provided health insurance in order to maintain revenue neutrality.

  The SIT provides four tax rate brackets for individuals: 15, 25, 30, and 33 percent and large businesses would be taxed at 31.5 percent. Other key features for individuals include replacing the mortgage interest deduction with a Home Credit equal to 15 percent of mortgage interest paid. Cost recovery allowances for business investment would be slowed.

- **Economic Impact of the Three Tax Reform Plans**
  Evaluation of these three plans by Office of Tax Analysis in U.S. Department of the Treasury concludes that both the GIT and the PCT would substantially increase the national capital stock and national income. For example, implementation of the GIT could lead to long-run increases in the capital stock ranging from 5.8 to 20.4 percent and long-run increases of national income ranging from 1.4 to 4.8 percent. Economic growth would be even stronger under the PCT with long-run increases in the capital stock ranging from 8.0 to 27.9 percent, and long-run increases in national income ranging from 1.9 to 6.0 percent. In contrast, the SIT has very little economic impact; it increases long-run national income by an average of only 0.4 percent and the capital stock increases

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[9] President's Advisory Panel on Federal Tax Reform, "Simple, Fair, & Pro-Growth: Proposals to Fix America's Tax System," November 2005, http://www.treasury.gov/resource-center/tax-policy/Documents/Simple-Fair-and-Pro-Growth-Proposals-to-Fix-Americas-Tax-System-11-2005.pdf

range from 0.9 to 2.3 percent (see Table 2).[10] The strongly positive results for the two consumption tax reform plans approaches are consistent with a wide body of previous research.

Issues to Consider for Tax Reform

The majority of tax reform proposals offered recently by policymakers and think tanks retain income from all sources as the primary tax base. For example, the Bowles/ Simpson Plan (the plan offered by President Obama's National Commission on Fiscal Responsibility and Reform in 2010) is a case in point.[11] The Bowles/Simpson plan and others like it will not provide the type of saving and investment incentives that would have the strongest impact on U.S. economic growth because they do not propose a shift away from taxes on income toward a consumption tax base.

As described above, switching to a consumption tax in which all investment is expensed would be the best approach for encouraging new investment of all types and for increasing U.S. income and job growth. If that policy shift cannot be achieved at present, it is critical to maintain key provisions of the federal tax code that impact the cost of capital and hurdle rates for new investment.

Some in the business community support giving up current tax code provisions such as accelerated depreciation, Section 199, last in-first out (LIFO) and other provisions that reduce the cost of capital for new investment in exchange for a reduction in the corporate income tax rate. Given the weakness of the U.S. GDP growth, the unemployment rate remaining at 7.6% and real non-residential investment still $62 billion below the 4th quarter of 2007, policymakers need to be sure that tax reform proposals will help, rather than hinder, new investment and economic growth.

- **Cash flow and new investment**
  A key question is how reducing cash flow to capital intensive industries by eliminating provisions such as accelerated depreciation and Section 199, LIFO and others will impact U.S. investment and economic growth. Recent academic research provides evidence of the strong link between investment and cash flow; a dollar of current and prior-year cash flow is associated with $0.32 of additional investment for firms that are least likely to face difficulty in raising money in capital markets and with $0.63 of new investment for firms likely to face constraints.[12] These results have implications for U.S. investment and

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[10] Robert Carroll, John Diamond, Craig Johnson and James Mackie III, "A Summary of the Dynamic Analysis of the Tax Reform Options Prepared for the President's Advisory Panel on Federal Tax Reform," May 25, 2006. http://www.treasury.gov/resource-center/tax-policy/Documents/Summary-of-Dynamic-Analysis-of-Tax-Reform-Options-5-2006.pdf

[11] The National Commission on Fiscal Responsibility and Reform, December 2010, http://www.fiscalcommission.gov/sites/fiscalcommission.gov/files/documents/TheMomentofTruth12_1_2010.pdf

[12] http://mba.tuck.dartmouth.edu/pages/faculty/jon.lewellen/docs/Investment%20and%20cashflow.pdf
Jonathan Lewellen and Katharina Lewellen, "Investment and Cash Flow: New Evidence", January 2012, working paper. See also ACCF testimony at http://accf.org/wp-content/uploads/2012/07/ACCF-Testimony-7-27-2012-FINAL1.pdf

job growth since ACCF research shows that each $1 billion in new investment is associated with an additional 23,200 jobs.

- **Accelerated Depreciation, the Cost of Capital, U.S. Investment and Job Growth**
  If accelerated depreciation for equipment is repealed and replaced with economic depreciation, which is generally longer than the current Modified Accelerated Cost Recovery System (MACRS), the cost of capital for new equipment will rise and investment is likely to decline, relative to the baseline forecast. The benefit of MACRS is its positive impact on cash flow, which occurs immediately as the investment is put in place. As noted above, there is a direct correlation between available cash flow and new investment and, thus, retaining or enhancing MACRS (e.g. by retaining bonus depreciation) will increase new investment, while reducing cash flow by eliminating MACRS can be expected to reduce new capital investment.

Further, in an increasingly uncertain world in which markets, demand and production costs can shift almost overnight, the rapid payback from MACRS depreciation substantially reduces the risk premium for investment in equipment. For long-term investments which take many years to plan and complete, the impact of MACRS on hurdle rates and cash flow may be particularly important as profit expectations may have changed significantly by the time the project comes on line. While a lower corporate income tax rate would also make investment attractive, if MACRS and other provisions that increase the cash flow from investment are repealed, it seems likely that the slower payback period will raise the hurdle rates and slow the productivity enhancing investment in new equipment.

If higher hurdle rates were to cause U.S. investment in equipment (which averaged $1.2 trillion in 2012) to decline, there would be a significant negative impact on employment since each $1 billion in investment is associated with 23,200 new jobs. In addition, reducing corporate income tax rates benefits "old capital" and provides a windfall to previous investments. Thus, to the extent that the rate reduction is "paid for" by repealing accelerated cost recovery provisions, new investment will be slowed, exactly the opposite result that policymakers would want to achieve.

- **Bonus Depreciation and the U.S. Economic Recovery**
  Since the 4th quarter of 2007, which marks the beginning of the recession, through the 1st quarter of 2013, real U.S. equipment investment has increased by 5%, from $1.12 trillion to $1.18 trillion. Given the weakness of growth in GDP and consumer demand during this period (quarterly real GDP growth has averaged only 0.9% and quarterly real personal consumption expenditures increased by an average of only 0.6% during the past 5 years), it seems likely that accelerated and bonus deprecation have played a major role in sustaining investment in equipment. In fact, if bonus depreciation were made permanent, and thus could be incorporated into the planning for all future projects, we would expect to see an even greater boost to domestic investment. Thus, tax policies such as repeal of MACRS, Section 199 and bonus depreciation would reduce the cash flow from new investment and could have negative consequences for growth in investment, GDP and employment.

Tax Reform and U.S. Energy Investment

As mentioned above, several of the tax reform proposals put forward in the last several years, including the National Commission on Fiscal Responsibility and Reform (Bowles/Simpson), eliminate accelerated depreciation, bonus depreciation, LIFO accounting and other deductions used by both capital intensive and other industries while lowering the corporate income tax rate.[13] The President's Framework for Business Tax Reform, released in 2012, would eliminate or curtail many current law tax provisions which reduce the cost of capital for new investment such as accelerated depreciation, deduction for interest expense, LIFO as well as provisions applicable to the oil and gas industry.[14]

For example, the President's plan calls for eliminating expensing for intangible drilling costs (IDCs), requiring such costs to be depreciated over time. When companies drill for oil or gas, they incur IDCs which are largely the labor costs of locating and drilling wells. IDCs are costs that cannot be recovered as they have no salvage value (in contrast to the drill pipe and casing itself, which is a "tangible asset" and is subject to depreciation). It is noteworthy that all other natural resource industries (e.g., minerals and coal production) have almost precisely the same rules as apply to oil and gas and other industries, such as software development and pharmaceuticals, are able to expense research and development costs. A new analysis by Wood Mackenzie (W/M) finds that curtailing the rate at which IDC expenses are recouped will have a significant impact on future U.S. liquids and gas production. This is primarily as a result of the economics of many U.S. plays and fields becoming marginalized by delaying the IDC deduction. W/M estimates that by 2023, the proposals to delay the current IDC deduction timing would result in a loss of 3.8 million barrels of oil equivalent per day from U.S. oil and gas fields. Liquids and natural gas production are both impacted. There would also be significant employment losses resulting from these changes, which W/M estimates will reach 233,000 by 2019.

Furthermore, U.S. industry investment would drop by $407 billion over the 2014-2023 period, an annual average of more than $40 billion. In addition Federal tax increases would be more than offset by reductions in federal, state and private royalties and other state taxes.[15]

In addition, the President's FY 2013 budget also calls for increasing the amortization period for geological and geophysical costs (G&G). G&G expenses include the costs incurred for geologists, seismic surveys, and the drilling of core holes; like IDCs, they have no salvage value.[16] Further, the President's FY 2013 budget would repeal Section 199 for only oil and gas companies, leaving it in place for all other companies that manufacture, produce, extract or grow items in the U.S.

Given the importance of cash flow to investment spending, policymakers need to weigh carefully the impact of repealing current law provisions that reduce the cost of capital for new investment.

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[13] http://www.fiscalcommission.gov/sites/fiscalcommission.gov/files/documents/TheMomentofTruth12_1_2010.pdf

[14] http://www.treasury.gov/resource-center/tax-policy/Documents/The-Presidents-Framework-for-Business-Tax-Reform-02-22-2012.pdf

[15] http://www.energyandtaxes.com/sites/default/files/API_US_IDC_Delay_Impacts_Release_Final_7_11_13.pdf

[16] http://www.treasury.gov/resource-center/tax-policy/Documents/General-Explanations-FY2013.pdf

As the recent report by the Progressive Policy Institute notes, the strong domestic investment by U.S. oil and gas companies in 2011 was due in part to outlays that would be classified as intangible drilling costs and G&G. If IDCS had to be depreciated rather than deducted or, in the case of G&G, amortized over longer periods, it is likely that less investment would have occurred in the oil and gas industry and fewer new jobs would have been created in the U.S.

How Should the Tax Code Treat Energy and other Investments?

The research comparing the impact of a consumption tax under which all investment is expensed (described above) shows that it would provide the strongest boost to economic and job growth. If that type of tax reform cannot be implemented at present, many public finance experts suggest that the tax code should provide the same provisions for all types of industries and activities so as to avoid advantaging one industry over another.

For example, accelerated depreciation, in which the write-off period may be shorter than the actual economic life of an asset, is generally provided to all taxpayers regardless of their industry or type of investment in plant or equipment. Section 199 was established to help support U.S. manufacturing of all types. The foreign tax credit deduction is designed to prevent the double taxation of income earned abroad by U.S. multinationals. Dual capacity rules were put in place to avoid the double taxation of U.S. multinationals which acquire or extract natural resources such as oil and gas, mining and timber.[17] Similarly, LIFO is an accounting method in use for more than 70 years to protect companies from inflation or rising prices over the course of their operations. All of the above mentioned tax code provisions are available to any industry and are not considered "subsidies."

As Gary Hufbauer, a member of the ACCF's Center for Policy Research Board of Scholars, noted in a recent article, it is important not to confuse "subsidies" with legitimate tax deductions available to all industries.[18] Dr. Hufbauer states, "The semantically accurate way to describe legislation that would eliminate the manufacturing deduction or curtail the foreign tax credit for oil and gas companies is straightforward: the imposition of tax discrimination, not the removal of federal subsidies. Because most Americans agree that tax discrimination is bad policy - Uncle Sam shouldn't be picking winners and losers through the tax code - accurate language would diminish enthusiasm for these proposals."[19]

By the same token, the current policy of providing subsidies and negative tax rates for renewable energy, energy efficiency and alternative fuel vehicles should be reexamined with an eye toward balancing costs and benefits.

Tax Reform and Renewable Energy Investment

Energy use is a key component in U.S. economic recovery, in recent years each 1% increase in GDP in the U.S. has been accompanied by a 0.2% increase in energy use. Higher energy prices tend to slow economic growth and reduce the competitiveness of the U.S. manufacturing sector.

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[17] http://accf.org/wp-content/uploads/2012/11/ACCF-Special-Report-on-Dual-Capacity-Tax-FINAL.pdf

[18] http://www.washingtontimes.com/news/2011/dec/7/debunking-the-big-oil-subsidy-myth/

[19] Ibid

As policymakers confront the slow U.S. economic recovery and slow job growth, they need to consider the impact of tax, budget and regulatory decisions that promote the use of renewable energy compared to the expansion of conventional fossil fuels or nuclear power electricity generation and for transportation.

Federal policies such as the American Recovery and Reinvestment Act's subsidies for renewables and alternative vehicles and biofuels (and subsequent extensions of many of its provisions) promote the use of more expensive renewable energy to replace cheaper and already environmentally sound and compliant conventional energy sources. These programs have the effect of increasing federal spending, reducing tax receipts and raising the price of energy. According to recent EIA data, new electric generating capacity using wind and solar power tends to be considerably more expensive than conventional natural gas and coal. As shown in Table 3, the total cost of offshore wind, at $222 dollars per mega watt hour (MWH) is almost 240% higher than for advanced combined cycle natural gas–fired plants which cost only $66 per MWH. The cost of solar thermal, at $261 MWH, is almost 300% higher than natural gas-fired electricity production. Similarly, advanced nuclear costs an estimated $108 per MWH and advanced coal costs only $123 per MWH.[20]

Another perspective is provided by examining current data on electricity prices in states with renewable portfolio standards (RPS). States with an RPS mandate tend to experience higher costs for electricity those without an RPS mandate. In 2013, the 29 states with an RPS mandate faced residential electricity prices that were 26% higher than those without a mandate and industrial electricity prices were 22% higher (see Figure 2).

Renewable energy has received federal support through direct subsidies and tax credits for many years. In fact, as documented in a recent analysis by the Congressional Research Service, in 2011 the federal tax code provided $21.8 billion in support of the energy sector; the renewable electricity, renewable fuels and energy efficiency and alternative vehicles received 80 percent of the total ($18.5 billion), while fossil fuels received only 20 percent ($3.3 billion). In 2012, the renewable sector received $13.4 billion, while fossil fuels received only $3.2 billion (see Table 4).[21]

Another way of measuring the degree of federal subsidies for alternative energy sources is to measure the effective tax rate. A negative tax rate indicates that the tax code is subsidizing the investment since the investor is willing to accept a before-tax rate of return that is less than the after- tax rate of return. According to a study by Gilbert Metcalf, the tax code in 2007 created strong incentives for renewable energy investments.[22] For example, a 30% investment tax credit combined with 5 year accelerated depreciation gave solar thermal investments an effective tax rate of -244.7% (see Table 5). Wind power had a -168.8% rate. Since the rates Metcalf computed were created before the new renewable energy incentives provided by the Recovery Act, the size of the negative tax rates has doubtless increased. It is worth noting that as of 2007, the overall

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[20] http://www.eia.gov/forecasts/aeo/electricity_generation.cfm

[21] See Congressional Research Service document at http://www.fas.org/sgp/crs/misc/R41953.pdf, pages 6-7.

[22] See http://www.nationalaglawcenter.org/assets/crs/R41953.pdf.

effective tax rates for renewables and nuclear are substantially lower than the effective rates on gas, integrated oil drilling, refining and coal.[23]

Environmental Regulations: Impact on Energy Investment, Economic Growth and Environmental Quality

In addition to tax policy, environmental regulations and guidelines, if not carefully designed, can hinder economic growth while having little or no impact on environmental quality. In effect, environmental regulations often act like a tax on business by raising the hurdle rate that a new investment must earn before it will be undertaken. As policymakers debate how to stimulate the weak economic recovery (real GDP growth has averaged only 0.9% quarterly since the recession began in 2007), they need to weigh the costs and benefits of current and proposed environmental guidelines and regulations. A few of the more prominent ones which are good candidates for review are described below.

- **Social Cost of Carbon**
  In trying to assess and address the potential threat of climate change, analysts have developed the concept of the social cost of carbon, which attempts to quantify the benefits of avoiding carbon emissions. As the U.S. government's Interagency Working Group on Social Cost of Carbon notes in its recent report "The purpose of the 'social cost of carbon' (SCC) estimates presented here is to allow agencies to incorporate the social benefits of reducing carbon dioxide (CO2) emissions into cost-benefit analyses of regulatory actions that impact cumulative global emissions".[24] In its new 2013 report, the Interagency Working Group states that the SCC is currently about $36 per metric ton of CO2, up from $22 per ton in its 2010 report, a 64% increase since 2010.

  The higher value placed by the Interagency Working Group by avoiding a ton of CO2 emissions means that EPA and other regulatory agencies will be able to justify more extensive and expensive environmental regulations on U.S. industry, including manufacturing, oil and gas extraction and production, mining, electric utilities, transportation and agriculture sectors. Given the importance of the SCC in helping policymakers decide whether new regulations meet the cost/benefit test, it seems that the Interagency Working Group should have allowed stakeholders outside of government to be part of a transparent modeling and evaluation process the Working Group used in developing its significantly higher estimates of the SCC.

  In addition, the U.S.'s carbon emissions are scheduled to stay below their 2005 levels until at least 2040 while those in developing countries are rising sharply (see Figure 3). In fact, as the Interagency Working Group report notes, "...climate change presents a problem that the United States alone cannot solve. Even if the United States were to reduce its greenhouse gas emissions to zero, that step would be far from enough to avoid substantial climate change. Other countries would also need to take action to reduce

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[23] See Congressional Research Service document at http://www.fas.org/sgp/crs/misc/R41953.pdf., page 22.

[24] http://www.whitehouse.gov/sites/default/files/omb/inforeg/social_cost_of_carbon_for_ria_2013_update.pdf

emissions if significant changes in the global climate are to be avoided."[25] Thus, as policymakers attempt to navigate a path between restoring strong U.S. economic growth and reducing CO2 and other greenhouse gas emissions they need to make sure that environmental policies that increase the cost of energy or the production of goods and services in the U.S. are based on a clear understanding of what these policies will mean for U.S. GDP and job growth as well as global concentrations of GHGs.

- **Renewable Fuel Standard**
  The renewable fuel standard (RFS) is another example of an environmental policy with unintended adverse consequences on the U.S. economy which has little or no impact on reducing CO2 emissions. In fact, as a new analysis by the National Academy of Sciences, "*Effects of U.S. tax Policy on Greenhouse Gas Emissions*" makes clear, while "the combined impact of current energy tax expenditures on GHG emissions is very small and could be negative or positive," the impact of the biofuels provisions has been to increase CO2 emissions.[26]

  The RFS, passed by Congress in in the Energy Policy Act of 2005, required refiners to blend 7.5 billion gallons of renewable fuel into the existing fuel supply. In 2007, Congress increased this to 36 billion gallons by 2022 (RFS2). A recent analysis by the economic consulting firm NERA notes that the RFS2 requires transportation fuel producers and importers (obligated parties) to incorporate specified volumes and categories of biofuels into their products. Compliance with the RFS2 each year is demonstrated through "Renewable Identification Numbers" (RINs), which are unique identifiers attached to every gallon of renewable fuel produced or imported. Obligated parties submit RINs as evidence of meeting the annual target. Having to purchase biofuels or RINS in order to sell gasoline or diesel is simply a tax on refiners which is then passed on, to the extent possible, to consumers.

  The NERA study finds that the RFS2 volume requirements will exceed the transportation fuel market's ability to absorb the biofuel volumes mandated within three to four years. At that point in time, obligated parties will not be able to meet market demand for transportation fuel and still remain in compliance with the RFS2. Therefore, after exhausting all other available options for compliance, individual obligated parties, each acting independently, could be forced to reduce their RIN obligation by decreasing the volume of transportation fuel supplied to the domestic market – either by reducing production or exporting. As domestic fuel supplies decrease, large increases in transportation fuel costs would ripple through the economy imposing significant costs on society. As domestic supply continues to decline, the blending percentage obligation becomes increasingly untenable, the NERA study notes. The obligated parties rely on RINs acquired and carried forward from earlier years to meet compliance obligations. However, the findings of the NERA report indicate that by 2015-2016, compliance with the RFS2 in its current form will likely be infeasible and would result in significant damage to the economy. The death spiral impact is seen most acutely in the diesel fuel

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[25] http://www.whitehouse.gov/sites/default/files/omb/inforeg/social_cost_of_carbon_for_ria_2013_update.pdf, page 15.

[26] http://www.nap.edu/catalog.php?record_id=18299, pages 4-7.

market, the report finds. The tightening of the diesel supply (up to 15% decline in 2015) causes large fuel cost increases to ripple through the economy, adversely affecting employment, income, consumption, and GDP. By 2015, the adverse macroeconomic impacts include a $770 billion decline in GDP and a corresponding reduction in consumption per household of $2,700. [27]

In fact, the NERA analysis may be understating how quickly the "blend wall" will arrive. A new Bloomberg report states that refiners may be forced to exceed 10 percent ethanol in their fuels as early as next year.[28]

- **EPA Regulation of GHGs under the Clean Air Act**
  Another example of an environmental regulation that has the same type of impact on new investment as does an explicit tax is EPA's regulation of greenhouse gases (GHGs) under the Clean Air Act (CAA). An ACCF analysis showed that one of the most adverse features of EPA's regulating GHGs under the CAA is the impact on business expenses, the cost of capital and on new U.S. investment. Analysis with IMPLAN, an input-output model, shows that if U.S. capital spending declines by $25 to $75 billion, in 2014 there would be an economy-wide job loss of 476,000 to 1,400,000 when direct, indirect and induced effects are included. As a result, GDP would be $47 billion to $141 billion less in 2014.[29] While it is true that a certain number of jobs may be created in some industries that build the energy efficient equipment mandated by regulators, overall, however, the evidence suggests that the total impact on U.S. net job growth will be negative. The main effect of EPA mandating Best Available Control Technology (BACT) for GHG emissions reductions under the CAA will be to make energy more expensive, increase production costs and slow productivity and economic growth. In addition, the CAA's New Source Performance Standards (NSPS) provision to establish "performance standards" for both new and existing sources is another example of a program ill-suited to address GHG mitigation. For example, EPA's current NSPS proposal published on April 13, 2012, that applies to new sources effectively eliminates coal use as a fuel for new electric generation by establishing options that for future potential coal utilization that are simply to financially risky for any electric utility to undertake. Maintaining coal as a viable option for electricity generation increases U.S. energy security.

Conclusions

If we are to embark on the enormously complex and difficult task of comprehensive tax reform, it is important to maximize the economic benefits derived from that exercise. Thus we recommend considering even more powerful approaches to tax reform such as a consumption tax where all investment is expensed. If that goal is not achievable at the present time, we should weigh carefully the possible consequences of eliminating accelerated depreciation and other provisions which affect the cash flow from new investments and slow the payback period in order reduce the corporate income tax rate. It would be particularly ironic if the choices made in

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[27] http://www.api.org/policy-and-issues/policy-items/alternatives/~/media/Files/Policy/Alternatives/13-March-RFS/NERA_EconomicImpactsResultingfromRFS2Implementation.pdf

[28] http://www.bloomberg.com/news/print/2013-06-26/epa-says-ethanol-bounty-may-push-refiners-over-blend-wall.html

[29] http://accf.org/wp-content/uploads/2011/02/House-Energy-Commerce-Testimony-292011-FINAL.pdf

tax reform actually harmed versus increased economic growth. Further, as many practitioners will remember, the cut in the corporate rate to 34% in 1986 only survived five years, so there is no guarantee that a future rate cut will endure. It may be well to consider "paying for" corporate and business income tax rate reductions with cuts to entitlements for upper income individuals (as suggested in the Bowles/Simpson tax reform plan), rather than eliminating proven investment provisions such as accelerated depreciation that enhance growth.

In addition, if markets are allowed to select the energy technologies that are deployed rather than government officials using tax incentives, subsidies or a clean energy standard mandate, costs to consumers and the federal government's budget will be reduced. Policies that encourage the responsible development and transportation of U.S. oil and gas resources should be accelerated so as to promote a cleaner environment and stronger economic and job growth. Finally, policymakers need to realize that environmental regulations often have the same effect on new investment as does an explicit tax and employ appropriate cost/benefit analysis in their decision making process.

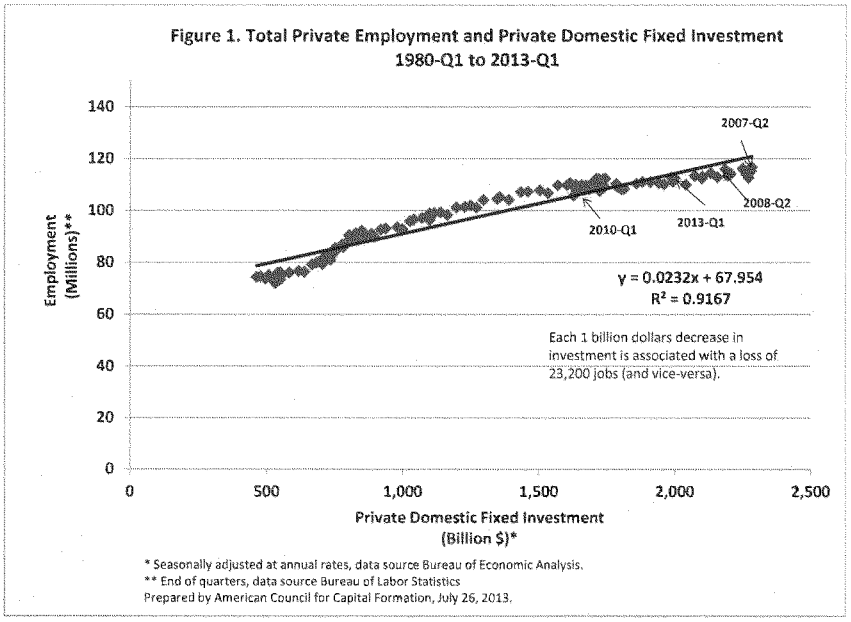
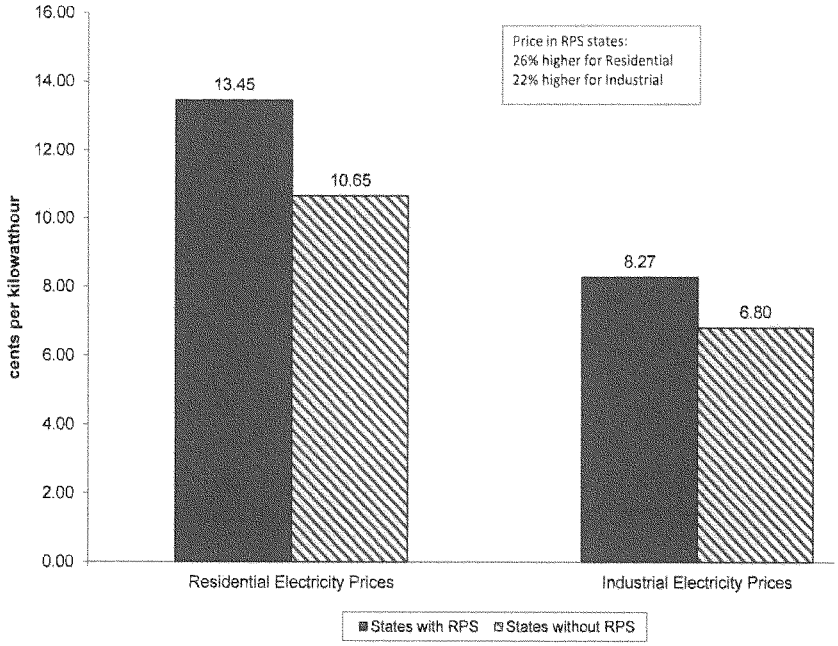


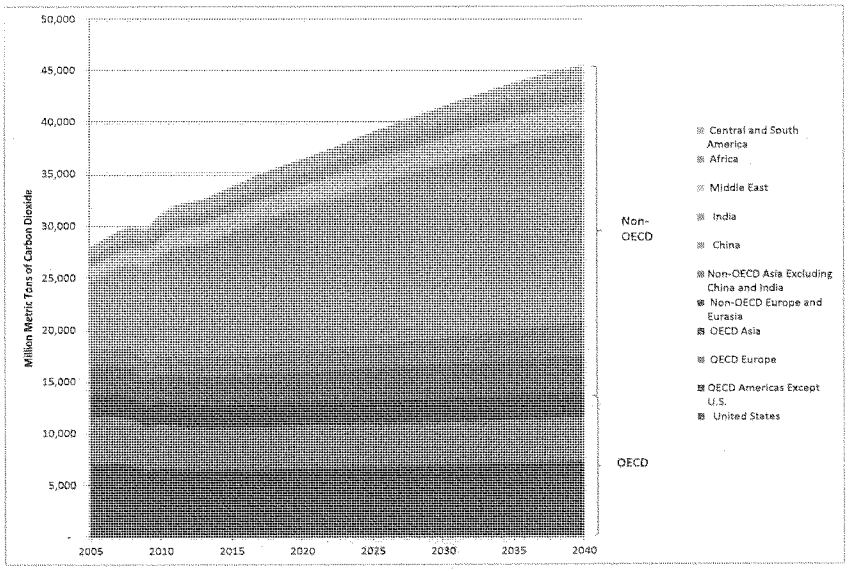
Figure 1. Total Private Employment and Private Domestic Fixed Investment
1980-Q1 to 2013-Q1
Employment (Millions)**
140
120
100
80
60
40
20
0
0
500
1,000
1,500
2,000
2,500
Private Domestic Fixed Investment (Billion $)*
2007-Q2
2008-Q2
2010-Q1
2013-Q1
y = 0.0232x + 67.954
R² = 0.9167
Each 1 billion dollars decrease in investment is associated with a loss of 23,200 jobs (and vice-versa).
* Seasonally adjusted at annual rates, data source Bureau of Economic Analysis.
** End of quarters, data source Bureau of Labor Statistics
Prepared by American Council for Capital Formation, July 26, 2013.

Figure 2. Electricity Prices in 2013: States with Renewable Portfolio Standards versus States without RPS



Source: Data for Year to date, May 2013. Energy Information Administration, Table 5.6.B, http://www.eia.gov/electricity/data.cfm#sales

Figure 3. World Carbon Dioxide Emissions by Region



Source: International Energy Outlook 2013, Energy Information Administration, U.S. Department of Energy.

Table 1. Personal Income Growth and Unemployment Rate in Energy Producing States Compared to the U.S. as a Whole (From the End of Recession to Present)

	Personal Income (millions of dollars)		Percent Change	Unemployment Rate	
	2009 Q2	2013 Q1	09 Q2-13 Q1	June-09	June-13
Colorado	204,301	239,115	17.0%	8.5%	7.0%
Montana	32,764	38,131	16.4%	6.0%	5.4%
North Dakota	26,018	37,121	42.7%	4.1%	3.1%
Oklahoma	126,662	151,624	19.7%	7.0%	5.2%
South Dakota	30,697	38,415	25.1%	5.3%	3.9%
Texas	905,885	1,104,807	22.0%	7.6%	6.5%
Wyoming	23,940	28,358	18.5%	6.4%	4.6%
United States	11,866,547	13,589,477	14.5%	9.5%	7.6%

Source: Bureau of Economic Analysis and Bureau of Labor Statistics

Table 2. Macroeconomic Effect of Tax Reform Options: Percentage Change from Initial Steady-State for Selected Variables and Years After Reform

	Progressive Consumption Tax			Growth and Investment Tax			Simplified Income Tax		
	Budget Window*	Year 20	Long-run	Budget Window*	Year 20	Long-run	Budget Window*	Year 20	Long-run
National Income									
Ramsey Growth Model	2.3%	4.5%	6.0%	1.9%	3.7%	4.8%	0.0%	0.2%	0.3%
OLG Model	0.7%	2.6%	2.8%	1.5%	2.1%	2.2%	0.4%	0.8%	0.9%
Solow Growth Model	0.2%	0.6%	1.9%	0.1%	0.4%	1.4%	0.0%	0.1%	0.2%
Capital Stock									
Ramsey Growth Model	5.1%	16.7%	27.9%	3.7%	12.1%	20.4%	0.4%	1.4%	2.3%
OLG Model	3.3%	9.8%	14.0%	3.0%	7.5%	9.8%	0.1%	0.7%	1.3%
Solow Growth Model	0.7%	2.5%	8.0%	0.5%	1.8%	5.8%	0.1%	0.3%	0.9%
Labor Supply									
Ramsey Growth Model	1.4%	0.7%	-0.5%	1.3%	1.0%	0.1%	-0.1%	-0.2%	-0.3%
OLG Model	0.5%	1.0%	0.9%	1.2%	0.7%	0.6%	0.3%	0.4%	0.4%
Solow Growth Model	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Consumption									
Ramsey Growth Model	-2.7%	2.0%	5.6%	-1.6%	2.0%	4.8%	-0.4%	-0.1%	0.2%
OLG Model	-1.7%	1.3%	2.2%	-0.4%	1.3%	1.8%	0.4%	0.8%	1.0%
Solow Growth Model	-0.4%	0.2%	1.9%	-0.3%	0.1%	1.4%	-0.1%	0.0%	0.2%
Net Investment									
Ramsey Growth Model	59.1%	43.7%	27.9%	42.6%	31.9%	20.4%	4.8%	3.4%	2.3%
OLG Model	30.7%	22.4%	15.2%	26.2%	15.3%	10.7%	1.3%	2.1%	1.3%
Solow Growth Model	7.9%	7.9%	8.0%	5.7%	5.7%	5.8%	0.9%	0.9%	0.9%

* Average percentage change over the first ten years after reform enacted.

Source: Robert Carroll, John Diamond, Craig Johnson and James Mackie III, "A Summary of the Dynamic Analysis of the Tax Reform Options Prepared for the President's Advisory Panel on Federal Tax Reform," May 25, 2006. http://www.treasury.gov/resource-cente

Table 3. Estimated Levelized Cost of New Generation Resources, 2018

		U.S. average levelized costs (2011 $/megawatthour) for plants entering service in 2018				
Plant type	**Capacity factor (%)**	**Levelized capital cost**	**Fixed O&M**	**Variable O&M (including fuel)**	**Transmission investment**	**Total system levelized cost**
Dispatchable Technologies						
Conventional Coal	85	65.7	4.1	29.2	1.2	100.1
Advanced Coal	85	84.4	6.8	30.7	1.2	123.0
Advanced Coal with CCS	85	88.4	8.8	37.2	1.2	135.5
Natural Gas-fired						
Conventional Combined Cycle	87	15.8	1.7	48.4	1.2	67.1
Advanced Combined Cycle	87	17.4	2.0	45.0	1.2	65.6
Advanced CC with CCS	87	34.0	4.1	54.1	1.2	93.4
Conventional Combustion Turbine	30	44.2	2.7	80.0	3.4	130.3
Advanced Combustion Turbine	30	30.4	2.6	68.2	3.4	104.6
Advanced Nuclear	90	83.4	11.6	12.3	1.1	108.4
Geothermal	92	76.2	12.0	0.0	1.4	89.6
Biomass	83	53.2	14.3	42.3	1.2	111.0
Non-Dispatchable Technologies						
Wind	34	70.3	13.1	0.0	3.2	86.6
Wind-Offshore	37	193.4	22.4	0.0	5.7	221.5
Solar PV[1]	25	130.4	9.9	0.0	4.0	144.3
Solar Thermal	20	214.2	41.4	0.0	5.9	261.5
Hydro[2]	52	78.1	4.1	6.1	2.0	90.3

[1]Costs are expressed in terms of net AC power available to the grid for the installed capacity.

[2]As modeled, hydro is assumed to have seasonal storage so that it can be dispatched within a season, but overall operation is limited by resources available by site and season.

Note: These results do not include targeted tax credits such as the production or investment tax credit available for some technologies, which could significantly affect the levelized cost estimate. For example,new solar thermal and PV plants are eligible to receive a 30 percent investment tax credit on capital expenditures if placed in service before the end of 2016, and 10 percent thereafter. New wind, geothermal, biomass, hydroelectric, and landfill gas plants are eligible to receive either: (1) a $22 per MWh ($11 per MWh for technologies other than wind, geothermal and closed-loop biomass) inflation-adjusted production tax credit over the plant's first ten years of service or (2) a 30 percent investment tax credit, if placed in service before the end of 2013, or (2012, for wind only).

Source: U.S. Energy Information Administration, Annual Energy Outlook 2013, December 2012, DOE/EIA-0383(2012).

Table 4. Estimated Revenue Cost of Energy Tax Provisions: Fiscal Years 2010 through 2012 ($ billions)

Provision	2010	2011	2012
Fossil Fuels			
Expensing of Exploration and Development Costs for Oil and Gas	0.7	0.8	0.8
Percentage Depletion for Oil and Gas	0.5	0.9	0.9
Amortization of Geological and Geophysical Costs for Oil and Gas Exploration	0.1	0.1	0.1
15-year Depreciation for Natural Gas Distribution Lines	0.1	0.1	0.1
Election to Expense 50% of Qualified Refinery Costs	0.7	0.8	0.7
Amortization of Air Pollution Control Facilities	0.1	0.2	0.2
Credits for Investments in Clean Coal Facilities	0.2	0.2	0.2
Excise Tax Credits for Alternative Fuel Mixtures	n.a.	0.2	0.2
Subtotal, Fossil Fuels	2.4	3.3	3.2
Renewables			
Production Tax Credit (PTC)	1.4	1.4	1.6
Investment Tax Credit (ITC)	(i)	0.5	0.5
Accelerated Depreciation for Renewable Energy Property	0.3	0.3	0.3
Section 1603 Grants in Lieu of Tax Credits[a]	4.2	3.5	4.1
Credit for Clean Renewable Energy Bonds (CREBs)	0.1	(i)	(i)
Residential Energy Efficient Property Credit	0.2	0.2	0.2
Credit for Investment in Advanced Energy Property	0.5	0.7	0.4
Subtotal, Renewables	6.7	6.6	7.1
Renewable Fuels			
Credits for Alcohol Fuels	0.1	0.2	0.1
Excise Tax Credits for Alcohol Fuels[a]	5.7	6.5	3.6
Excise Tax Credits for Biodiesel[a]	0.5	0.8	0.2
Subtotal, Renewable Fuels	6.3	7.5	3.9
Efficiency & Conservation			
Energy Efficiency Improvements to Existing Homes	1.7	1.5	1.3
Credit for Production of Energy Efficient Appliances	0.2	0.2	0.1
Energy Efficient Commercial Building Deduction	0.2	0.2	0.2
10-year Depreciation for Smart Electric Distribution Property	(i)	0.1	0.1
Subtotal, Efficiency & Conservation	2.1	2.0	1.7
Alternative Technology Vehicles			
Credits for Alternative Technology Vehicles	0.8	(i)	(i)
Credit for Plug-In Electric Vehicles	n.a.	0.1	0.3
Subtotal, Alternative Technology Vehicles	0.8	0.1	0.3
Other			
Percentage Depletion for Other Fuels	0.2	0.2	0.2
15-year Depreciation for Electric Transmission Property	0.1	0.1	0.2
Exceptions for Publicly Traded Partnerships with Qualified Income fro n Energy-Related Activities	0.5	0.2	0.2
Special Rule to Implement Electric Transmission Restructuring	(i)	1.8	-0.2
Subtotal, Other	0.8	2.3	0.4
TOTAL	**19.1**	**21.8**	**16.6**

Source: Joint Committee on Taxation and the Department of the Treasury.

Table 5. Effective Tax Rates for Energy-Related Capital Investments, 2007

	2007 Law	No Tax Credits	Economic Depreciation
Electric Utilities: Generation			
Nuclear	-99.5	32.4	-49.4
Coal (Pulverized Coal)	38.9	38.9	39.3
Coal (IRCC)	-11.6	38.9	-10.3
Gas	34.4	34.4	39.3
Wind	-163.8	12.8	-13.7
Solar Thermal	-244.7	12.8	-26.5
Petroleum			
Oil Drilling, Non-Integrated	-13.5	-13.5	39.3
Oil Drilling, Integrated	15.2	15.2	39.3
Refining[a]	19.1	19.1	39.3
Natural Gas			
Gathering Pipelines	15.4	15.4	39.3
Other Pipelines	27.0	27.0	39.3

Source: Gilbert E. Metcalf, "Investment in Energy Infrastructure and the Tax Code," in Tax Policy and the Economy, ed. Jeffery R. Brown, 24 ed. (The University of Chicago Press, 2010), pp. 1-33.

Notes:

a. The effective tax rate on refining capital reflects the 50% expensing allowance available in 2007 for investments in additional refinery capacity.

Source for Table 4 and 5: Energy Tax Incentives: Measuring Value Across Different Types of Energy Resources, Molly Sherlock, September 18, 2012, http://www.fas.org/sgp/crs/misc/R41953.pdf

Switching to a Consumption-Based Tax from the Current Income Tax

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The American Council for Capital Formation Center for Policy Research brings together academics, policymakers, business leaders and the media to focus on important new research on economic, tax, energy and regulatory policies. For more information about the Center, please contact the ACCF Center for Policy Research, 1750 K Street, N.W., Suite 400, Washington D.C. 20006-2302; telephone: 202.293.5811; email: info@accf.org; website: www.accf.org.

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Executive Summary

For the last five years, the U.S. economy has struggled with high unemployment and anemic growth. Despite recent improvements, the national unemployment rate remains at 7.6 percent (May 2013). According to the most recent estimates, non-residential private fixed investment is still below pre-recession levels. Given these facts and the persistent budget problems, rising demands of the aging baby boomers, and increased global competition, policymakers are increasing their efforts to overhaul the tax code. If successful, this will be the first major tax reform since 1986.

According to economic research over the past two decades, switching from our current income tax to a consumption-based tax system could achieve the goals of stronger investment and faster economic growth. A pure consumption tax is defined as a system that taxes individuals on the goods and services they purchase and exempts all saving from tax. Most economists believe that switching to a system where the tax base depends primarily on consumption rather than income could increase saving, investment, real output, and long run economic growth.

Over the past several years, members of Congress, commissions, and others have presented policy makers with a number of proposals to reform the Federal tax system. The majority of these proposals retain income from all sources as the primary tax base for the taxation of both individuals and businesses. However, the tax reform proposals being given the most consideration by policymakers today would not provide the type of saving and investment incentives that economic research shows would have the strongest impact on U.S. economic growth since they are not proposing a shift away from taxes on income toward a consumption tax base.

In this paper, we discuss three policy proposals put forth by 2005 the President's Advisory Panel on Federal Tax Reform. The Panel looked at a progressive consumption tax (PCT) system that would completely eliminate the difference between the pre-tax and the after-tax return on investment. It also considered a more blended or hybrid tax structure that would move the current tax system towards a consumption tax, while preserving some features of income taxation. This blended option, called the Growth and Investment Tax Plan (GIT), would be more readily accepted by today's policymakers and the public due to its simplicity, lower rates, and retention of some of today's popular provisions such as the tax credit for mortgage interest. The panel also analyzed the Simplified Income Tax (SIT) plan which broadens the current income tax base.

Under GIT, households would file tax returns and pay tax on their wages and compensation based on three tax rates: 15, 25 and 30 percent. This system would include tax-exempt savings accounts that would shield many households from taxation on their savings. Businesses would pay a single tax rate of 30 percent on their cash flow. Cash flow is defined as total sales less purchases of goods and services from other businesses, less wages and other compensation paid to workers and could expense new investment. Non-financial businesses would not be taxed on income from financial transactions, such as dividends and interest payments, and would not receive deductions for interest paid or other financial flows.

Under PCT, the tax rates applicable to individuals and business cash flows would be slightly higher than GIT, 15, 25 and 35. There will be no taxation of capital income under the pure consumption tax system eliminating the need for special savings accounts. There would be lower deductions and exclusions for employee provided health insurance in order to maintain revenue neutrality.

The SIT provides four tax rate brackets for individuals: 15, 25, 30, and 33 percent. Other key features for individuals include replacing the mortgage interest deduction with a "home credit" equal to 15 percent of mortgage interest paid. Cost recovery allowances for business investment would be slowed.

Evaluation of these three plans by Office of Tax Analysis in U.S. Department of the Treasury concludes that both the GIT and the PCT would substantially increase the national capital stock and national income. In contrast, the SIT plan has very little impact on national income, the capital stock, net investment or consumption income.

As the United States faces the economic challenges of the twenty-first century, including funding the retirement of the "baby boom" generation as well as providing employment for workers of all ages, fundamental tax reform that moves the U.S. tax system toward greater reliance on consumption taxes can be an important policy lever for achieving stronger economic growth, funding important spending priorities and higher living standards.

Introduction

For the last five years, the U.S. economy has struggled with high unemployment and anemic growth. During the great recession (December 2007-October 2009), the country experienced a larger increase in unemployment than in any of the previous five recessions.[1] Despite recent improvements, the national unemployment rate remains at 7.6 percent (May 2013). According to the most recent estimates, non-residential private fixed investment is still below pre-recession levels. Given these facts and the persistent budget problems, rising demands of the aging baby boomers, and increased global competition, policymakers are increasing their efforts to overhaul the tax code. If successful, this will be the first major tax reform since 1986.

Continuous tax reform developments overseas, many of which have reduced corporate income tax rates, underscore the need for U.S. reform. U.S. firms are falling behind as is apparent from the decreasing share of U.S. companies among Fortune 500 global companies. Any new tax code should be designed to take into account global economic changes to promote increased investment and growth in the U.S. For example, an ACCF international comparison of capital cost recovery allowances for key energy equipment investment[2] shows that investments in the U.S. face slower cost recovery and higher effective tax rates than many of our trading partners. According to economic research over the past two decades, switching from our current income tax to a consumption-based tax system could achieve the goals of stronger investment and faster economic growth.

Current U.S. Tax System and Goals of Tax Reform

The current U.S. tax code can be described as a hybrid system that relies heavily on income tax with some features that resemble a consumption tax. A pure consumption tax is defined as a system that taxes individuals on the goods and services they purchase and exempts all saving from tax. The current U.S. tax code contains, tax preferred savings vehicles, such as IRA's and 401ks; these are features of the tax code that act like a consumption tax. Individuals can contribute pre-tax dollars to these accounts, tax is deferred on the accumulation of savings, and the income tax due is paid when these funds are withdrawn. In addition, the current tax system allows some investments to be expensed (deducted from taxable income in the first year). There is also accelerated depreciation which reduces the tax burden on some investment. Even though these "consumption tax like features" reduce the distortionary impact of the current tax system, they are selective and limited in scope. Most economists believe that switching to a system where the tax base depends primarily on consumption rather than income could increase saving, investment, real output, and long run economic growth.

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[1] International Labour Organization, "The Great Recession in the U.S." http://www.ilo.org/washington/ilo-and-the-united-states/spot-light-on-the-us-labor-market/the-great-recession-in-the-us/lang--en/index.htm

[2] American Council for Capital Formation, "International Comparison of Depreciation Rules and Tax Rates for Selected Energy Investments," Prepared by Ernst & Young, May 2, 2007. http://accf.org/wp-content/uploads/2007/05/internationalComparison.pdf

There are additional problems with the current state of the U.S. tax system. The tax code exists not only to raise revenue but also to achieve desired social and economic policy goals. The current U.S. tax system fails to satisfy the majority of these goals. According to a recent paper by C. Alan Garner, there are five possible goals for tax reform[3]:

- Simplicity: The current tax system is considered to be very complex system, which drains considerable resources from the economy in terms of man hours and financial resources. According to some estimates, the U.S. spends 6.1 billion hours annually dealing with the tax code, with nine out of 10 taxpayers relying on a paid tax preparers or tax software.[4]
- Stability: The 1986 act achieved many reforms and simplified the tax code but since then there have been frequent modifications to the U.S. tax code. Temporary provisions have become a normal part of the system. This uncertainty over the tax code further handicaps long-term investment and planning decisions.
- Fairness: Even though it is based on value judgments, one definition of fairness is that people or businesses in similar circumstances should be treated equally by tax law. Under the current tax system's numerous tax breaks, this is not the case.
- Adequate Revenue: This goal should be based on the question of what are the public spending priorities. The current budget deficit is the combined result of overspending and not enough revenues. Once the appropriate level of spending is determined, the tax code can better target a revenue goal.
- Economic Efficiency: It is widely accepted that current tax code distorts labor, saving, and investment decisions. For example, dividends and capital gains are taxed twice, once at the corporate level and then again at the individual level. This high level of taxation reduces overall investment by decreasing after-tax returns. At the same time, some tax breaks create over investment in some industries or assets. An efficient tax code should minimize these distortions by letting market forces drive the decision-making process.

Current Tax Reform Proposals under Discussion by Congress, the Administration and Public Policy Experts

As noted in the recent report by the Joint Committee on Taxation,[5] over the past several years, members of Congress, commissions, and others have presented to policy makers a number of proposals to reform the Federal tax system. The majority of the proposals reviewed retain income from all sources as the primary tax base for the taxation of both individuals and

[3] C. Alan Garner, "Consumption Taxes: Macroeconomic Effects and Policy Issues," 2005, http://www.frbkc.org/Publicat/econrev/PDF/2q05garn.pdf

[4] National Taxpayer Advocate, "2012 Annual Report to Congress," December 2012, http://www.taxpayeradvocate.irs.gov/userfiles/file/2012-Annual-Report-to-Congress-Executive-Summary.pdf

[5] The Joint Committee on Taxation is a nonpartisan committee comprised of Members of the United States Congress, originally established under the Revenue Act of 1926. The Joint Committee is chaired on a rotating basis by the Chairmen of the Senate Finance Committee and the House Ways and Means Committee. The Joint Committee operates with an experienced professional staff of PhD economists, attorneys, and accountants, who assist Members of the majority and minority parties in both houses of Congress on tax legislation. The Committee is charged with assisting Congressional tax-writing committees and Members of Congress with development and analysis of legislative proposals and preparing official revenue estimates of all tax legislation considered by the Congress among other things. https://www.jct.gov/about-us/overview.html

businesses. Other proposals are more accurately characterized as consumption-based taxes. In addition, both House Ways and Means Chairman Dave Camp and Senate Finance Committee Chairman Max Baucus are working on their own approaches to reforming the federal tax code. The two Chairmen have posted discussion papers on their new website[6] but neither has yet proposed a comprehensive plan for overhauling the tax code.

Among the most prominent of the recent comprehensive reform proposals is the one issued on December 1, 2010 by President Obama's National Commission on Fiscal Responsibility and Reform, co-chaired by Erskine Bowles and Alan Simpson.[7] The goal of the proposal was to put forth recommendations that would meaningfully improve the long run fiscal outlook and would result in a balanced budget, excluding interest payments on the debt, by 2015. The illustrative tax plan outlined in the report reduces marginal income tax rates, broadens the tax base, simplifies the individual and corporate income tax by eliminating tax expenditures, and reduces the deficit by reducing spending. The individual income tax reform plan replaces the current six brackets with three brackets, 12, 22 and 28%, and repeals the Alternative Minimum Tax (AMT). All capital gains and dividends are taxed at ordinary income tax rates. The plan consolidates all retirement accounts and caps tax-preferred contributions to lower of $20,000 or 20% of income. On the business side, the plan proposes a single corporate income tax rate between 23% and 29% (28% under the illustrative proposal), paid for by eliminating corporate tax expenditures. The plan suggests adopting a territorial tax system in which foreign source income earned by U.S. corporations is not taxed in the U.S. The plan keeps the current subpart F income rules that address the income of a controlled foreign corporation (CFC), which is a corporation more than 50% controlled by U.S. shareholders.

Another proposal to reform the tax system was offered by the Bipartisan Policy Center's Debt Reduction Task Force, co-chaired by Senator Peter Domenici and Dr. Alice Rivlin. Similar to Bowles-Simpson, the goal of the proposal was to address the immediate needs for economic growth and to control Federal government debt in the long-term. Since originally released in November 2010, the plan has been updated. The revised plan, referred to as Domenici-Rivlin Debt Reduction Task Force Plan 2.0 (Dec 3, 2012),[8] aims to raise approximately $1.6 trillion more than current policy with a radically simplified tax system. On the individual side, the plan has two income tax brackets, 15 and 28%. Similar to Bowles-Simpson, Domenici-Rivlin also taxes capital gains and dividends as ordinary income. Rather than the current itemized deduction system, the plan provides a flat 15% refundable tax credit for charitable contributions and up to $25,000 per year of mortgage interest on a primary residence. On the business side, there is a flat 28% corporate tax rate. This plan eliminates most of the corporate tax expenditures, but retains accelerated depreciation for machinery and equipment and buildings other than rental housing, expensing of certain small investments, expensing of research and experimentation expenditures, employer defined benefit plans. Unlike Simpson-Bowles the plan maintains the current worldwide tax systems with deferral for the active income of controlled foreign corporations.

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[6] https://taxreform.gov/
[7] The National Commission on Fiscal Responsibility and Reform, December 2010, http://www.fiscalcommission.gov/sites/fiscalcommission.gov/files/documents/TheMomentofTruth12_1_2010.pdf
[8] http://bipartisanpolicy.org/library/report/domenici-rivlin-debt-reduction-task-force-plan-20

In contrast to the two tax reform plans discussed above, which retain income as the tax base and featured prominently in the media, authors affiliated with the American Enterprise Institute (AEI) submitted a plan in 2011 to the Peter G. Petersen Foundation that replaces the income tax system with a progressive consumption tax.[9] The plan has two features: a household-level tax on wages and other compensation, and a flat tax on business cash flow. The tax on wages and other compensation, including fringe benefits (such as employer-provided health insurance and employer contributions to defined contribution plans), follows a graduated rate schedule with three rates: 15 percent, 25 percent, and 35 percent. The proposal repeals the corporate income tax and taxes businesses on a cash-flow basis for the goods and services they provide, so that investment is expensed rather than depreciated over time. Firm cash flows are subject to tax at a flat rate of 35%. Negative cash flows may be carried back for five years or carried forward indefinitely. Businesses, however, would be required to pay interest on their carry-forwards at the one-year Treasury rate.

In conclusion, the tax reform proposals being given the most consideration by policymakers today would not provide the type of saving and investment incentives that economic research shows would have the strongest impact on U.S. economic growth since they are not proposing a shift away from taxes on income toward a consumption tax base.

Consumption Tax versus Income Tax

Analyses over the past two decades by academic scholars and policy experts demonstrate that switching from the current federal income tax system to a broad based consumption tax system would have a positive impact on long term economic growth and living standards. While policy proposals range from a hybrid system to pure consumption tax system, the magnitude of the positive impact depends on the extent to which the proposed policy would reduce the tax on capital income.

For example, a 2005 report by the President's Advisory Panel on Tax Reform notes that "Taxing consumption rather than income would remove the saving disincentives that are central to income tax systems. Although one cannot know with absolute certainty the effect of raising the return on private saving by lowering the tax burden, most economic models suggest that such a change would result in higher household saving and a greater level of capital accumulation. Allowing businesses to deduct the cost of new investment immediately, rather than to depreciate assets over time, would encourage new investment. It also would eliminate the tax-induced differences between before-tax and after-tax returns on investment projects that are found in our current system."[10]

The President's Advisory Panel also observed that the increased level of capital accumulation that would follow the adoption of a U.S. consumption tax would lead to enhanced productivity growth which is the key to raising standards of living for American workers. **Figure 1** shows the historical relationship between changes in wages and productivity growth. The two move closely

[9] http://www.pgpf.org/solutionsinitiative

[10] President's Advisory Panel on Federal Tax Reform, "Simple, Fair, & Pro-Growth: Proposals to Fix America's Tax System," November 2005, http://www.treasury.gov/resource-center/tax-policy/Documents/Simple-Fair-and-Pro-Growth-Proposals-to-Fix-Americas-Tax-System-11-2005.pdf

together: wages grow when productivity grows, and wages stagnate when productivity declines. As real non-residential fixed investment in the U.S. is still below that of the fourth quarter of 2007, enhancing the incentives for new investment would promote both job growth and raise the productivity of the U.S. work force. (**Figure 2**)

An earlier report[11] by the Congressional Budget Office (CBO) analyzed the effect of switching from the federal income tax to a comprehensive consumption-based tax. CBO's report shows that substituting a broad-based consumption tax for an income tax would probably increase national saving and raise the living standards of future generations. They found that a consumption tax would increase the capital stock and raise the level of national output by between 1 percent and 10 percent, although CBO concludes that increases at the upper end of the range are unlikely.

The CBO study outlines a number of reasons why switching to a consumption-based tax would increase economic efficiency as well as output. First, the switch would eliminate the influence of taxes on the timing of consumption. Second, the new system might treat different sources of income more uniformly by including more of them in the tax base and subjecting all of them to similar tax rates. Third, a broader base would allow lower overall marginal tax rates, reducing the amount by which taxes affect relative prices and hence all kinds of economic decisions. As noted in the CBO study, as well as in previous section of this report, efficiency is not the only criterion to use in judging the desirability of a given tax reform. Administrative and compliance costs are also important factors. If a consumption tax offered substantial gains from reduced complexity, then even a minimal gain in economic efficiency would be an added bonus.

Other studies analyze a wide range of policy options and their economic impacts. For example, David Altig, Alan Auerbach, Laurence Kotlikoff, Kent Smetters and Jan Walliser compare the equity, efficiency and macroeconomic effects of five different tax policy proposals to the current U.S. federal income tax system.[12] The analysis uses a large scale dynamic simulation model. Each of the reforms replaces the federal personal and corporate income taxes and each is simulated assuming the same growth adjusted levels of government spending and government debt. The proposed reforms are:

- Proportional Income Tax: This proposal eliminates all personal exemptions and deductions. It applies a single tax rate to labor and capital income.
- Proportional Consumption Tax: This proposal differs from the proportional income tax by permitting 100 percent expensing of new investment. The tax can be implemented as a tax on wages with all saving exempt from tax at household level, and as a cash flow tax on business.
- Flat Tax: This tax differs from the clean consumption tax by including a standard deduction against wage income and by exempting implicit rental income of owner occupied housing and consumer durables.

[11] Congressional Budget Office, "The Economic Effects of Comprehensive Tax Reform," July 1997. http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/0xx/doc36/taxrefor.pdf
[12] David Altig, Alan J. Auerbach, Laurence J. Kotlikoff, Kent A. Smetters, Jan Walliser, "Simulating Fundamental Tax Reform in the United States," American Economic Review, June 2001, pp. 574-595.

- The Flat Tax with Transition Relief: This proposal helps existing asset holders by permitting continued depreciation of old capital.
- The X Tax: This reform aids lower income tax payers by substituting the flat tax's single-rate wage tax with a progressive rate. In order to recoup the lost revenue, the business cash flow tax rate is set at the highest tax rate applicable to wage income.

These reforms differ in the treatment of marginal capital income, the extent of base broadening and progressivity. Among the five proposals, the proportional consumption tax had the highest positive impact on long-run output, by more than 9 percent. However, reducing the progressivity of the tax system would have a negative impact on the welfare of the poorest members of society. Introducing standard deductions or transition reliefs lessens some of these distributional impacts. However, that comes in the expense of reducing the impact on long-run economic growth. Under the flat tax, long-run economic output increases by less than 4 percent. In terms of efficiency, equity, and long term output growth, the X tax had the most balanced result. This reform raises long term output by 6.4 percent. Wealthier taxpayers face higher effective tax rates on their labor supply and the X tax provides a greater long-run benefit to the poor than to wealthy taxpayers.

In 1997, the Joint Committee on Taxation (JCT), led by Congressman Bill Archer and Senator William V. Roth, hosted a symposium of economists who were heavily involved with developing models for U.S. economy. The papers presented at this symposium were the result of a year long modeling experiment by these noted economists. The resulting discussion was published by JCT in a report entitled "Tax Modeling Project and 1997 Tax Symposium Papers"[13] The modeling exercise by these researchers focused on a broad based income tax and a broad based consumption tax. The economic impacts of these simulations are shown in **Table 1**.

Even though the magnitudes differ, the effects of a consumption tax on GDP are generally positive over the medium and long terms. For example, the Jorgenson-Wilcoxen model predicts that real GDP would be 3.3 percent higher each year in the long run under a consumption tax, compared to 1.3 percent higher under a unified income tax. The Auerbach, Kotlikoff, Smetters, and Walliser model predicts even greater gains in the long run (7.5 percent) under a consumption tax and losses (-3.0 percent of GDP) under a unified income tax. The impact of the choice of tax base is more pronounced when the capital stock is considered: The Engen-Gale analysis shows that the capital stock would be 9.8 percent higher in the long run under a consumption tax but 1.6 percent smaller under a unified income tax. The Auerbach et al. analysis has a 31.5 percent higher capital stock in the long-run under the consumption tax compared with a 10.5 percent lower capital stock under the income tax. The majority of the studies, regardless of what model is used, seem to indicate that the economy would fare better under a "pure" consumption tax than under a "pure" income tax or under current law.

Finally, an earlier ACCF study conducted by Dr. Allen Sinai analyzed the economic impact on the U.S. if we had switched in to a consumption tax system in 1991. Under this system, all investment was expensed, all saving was deductible, and interest expense was not deductible.

[13] Joint Committee on Taxation, "Tax Modeling Project and 1997 Tax Symposium Papers," November 20, 1997. https://www.jct.gov/publications.html?func=startdown&id=2940

The analysis concludes that U.S. economic growth would have been significantly stronger over the 1991 and 2004 period under a consumption tax than under our income tax. Dr. Sinai's results show that by 2004, real GDP would have been 5.2 percent higher; business capital spending would have been 36 percent higher; and saving, equities, and federal tax receipts would also have been greater (see **Table 2**).

U.S. Tax Reform: What Kind of Consumption Tax?

Even though the economic literature provides considerable evidence on the economic benefits of a consumption tax, current tax reform discussions fail to consider policy options that would move U.S. to a more consumption-based tax system. However, in 2005, the President's Advisory Panel on Federal Tax Reform, headed by Chairman Connie Mack and Vice-Chairman John Breaux,[14] considered two of such systems among other policy reform options that could be the foundation for major tax reform.[15] The Panel looked at a progressive consumption tax system that would completely eliminate the difference between the pre-tax and the after-tax return on investment. It also considered a more blended or hybrid tax structure that would move the current tax system towards a consumption, tax, while preserving some features of income taxation. This blended option, called the Growth and Investment Tax Plan (GIT), is outlined in full detail in the Panel's report. It seems likely that the GIT proposal would be accepted more readily by today's policymakers and the public than would the progressive consumption tax.

The GIT is the best form of the consumption tax because it:

- Is much simpler than the current income tax and has lower rates
- Retains some of the provisions popular with middle income taxpayers including a tax credit for mortgage interest paid
- Allows expensing (first year write off) for all new business investment which will encourage capital formation
- By continuing to tax dividends, capital gains and interest received by individuals (albeit at a lower rate the plan would forestall some of the criticism by those who think capital income should be taxed.

Thus, the remainder of this report will focus primarily on the blended option (the GIT) rather than on the progressive consumption tax.

* Growth and Investment Tax Plan

The GIT is described in detail in **Tables 3A** and **3B**. According to the Panel's outline, households would file tax returns and pay tax on their wages and compensation based on three tax rates: 15, 25 and 30 percent. Most households would face a lower tax rate than under the

[14] The members of the Panel were: William E. Frenzel, Elizabeth Garrett, Edward P. Lazear, Timothy J. Muris, James M. Poterba, Charles O. Rossotti and Liz Ann Sonders.
[15] President's Advisory Panel on Federal Tax Reform, "Simple, Fair, & Pro-Growth: Proposals to Fix America's Tax System," November 2005, http://www.treasury.gov/resource-center/tax-policy/Documents/Simple-Fair-and-Pro-Growth-Proposals-to-Fix-Americas-Tax-System-11-2005.pdf

current income tax system. This system would be different than a pure consumption tax system by imposing a reduced flat rate on capital income (capital gains, dividends and interest) received by individuals. This rate would be set at 15 percent. The current personal exemption, standard deduction and child tax credit would be replaced with a Family Credit available to all taxpayers at the amounts shown in Table 3A. There would be a deduction for charitable gifts and health insurance, and the mortgage interest deduction would be replaced by a Home Credit. Phase outs (multiple provisions that phase out with income such as earned income tax credit, lifetime learning credit, tuition deduction, student loan interest deduction etc.) and the Alternative Minimum Tax would be eliminated as well as the deduction for state and local taxes.

This system would include tax-exempt savings accounts that would shield many households from taxation on their savings, such as "Save for Retirement" and "Save for Family" accounts. Assets held outside of such accounts would be subject to a reduced 15 percent capital income tax rate. However, employer sponsored retirement accounts would be taxed under the current "Roth IRA" structure, meaning that contributions would be made with after-tax dollars, but that withdrawals would be tax free.

Under the GIT, businesses would pay a single tax rate of 30 percent on their cash flow. Cash flow is defined as total sales less purchases of goods and services from other businesses, less wages and other compensation paid to workers. This definition implies that businesses can immediately expense all new investment. As shown in Figure 3, the differences in effective tax rates on alternative investments would be reduced under the GIT, thus providing a lower, more uniform tax burden on the returns of marginal business investments. Non-financial businesses would not be taxed on income from financial transactions, such as dividends and interest payments, and would not receive deductions for interest paid or other financial flows. The elimination of interest deductibility would equalize different types of financing (debt versus equity) and get rid of tax induced distortions on investment decisions.

According to the calculations of the Panel, the GIT would lower the marginal effective tax rate (measure of difference between an investment's pre-tax and after-tax return) to 6 percent. This would equalize the tax burden on different types of investment and significantly encourage capital formation and attract foreign capital. **Figure 3** shows how the combination of expensing and more equal treatment of interest and dividends would lower the tax burden on the returns of marginal business investment.

The Panel also considered special rules for financial firms. Under their recommendation, financial firms would consider all principal and interest inflows as taxable and deduct all principal and interest outflows.

The Panel's recommendation for the taxation of international income was to apply tax on a "destination-basis" thereby treating all domestic consumption equally, regardless of where the goods were produced. Under this system, exports would be excluded from tax base while imports would be included. For example, if a U.S. producer produces a good in the U.S. for $90 and sells it abroad for $100, it would not be taxed on the $100 of income but would receive a rebate for the production cost of $90.This has the effect of eliminating the tax burden on goods that are sold

abroad. The tax rebate that the seller receives at the point of export is known as a border tax adjustment.

The Transition to the Growth and Investment Tax Plan

As the Treasury report notes, replacing the current income tax with the Growth and Investment Tax Plan would affect the value of many assets and might have a negative impact on a number of households and on some business taxpayers. Thus the Panel recommends providing some transition relief over a five year period for most provisions impacting the business sector. Below is a brief review of several key transition issues along with the Panel's recommendations on how to mitigate the impact of moving to the GIT from the current income tax:

- Transition relief on existing depreciation allowances: As noted in the report, "Depreciation allowances on assets put in place prior to the effective date for the Growth and Investment Tax Plan should be phased out evenly over a five-year period."[16]
- Transition relief for businesses with outstanding debt: Panel recommends the same five-year phase out structure, followed by deductions of 60, 40 and 20 percent. Under this rule, 80% of an interest deduction allowable under current law would be permitted in the first year after the effective date of GIT.
- Transition relief for firms that might be affected by border tax adjustment: If exchange rates do not adjust as rapidly as economic theory predicts, then border tax adjustments would place an undue burden on imports and importers. The Panel therefore recommends "a four-year phase-in period for border tax adjustments. The phase-in rules would be administered on a firm-by-firm basis, and they would be limited to a base amount, calculated as the average value of import purchases, or export sales, in the two years before the Growth and Investment Tax Plan took effect."[17]
- Transition rules for financial institutions: "Because financial firms never received a deduction against cash flow when raising the capital for outstanding loans, it would be unfair to levy tax on returns of capital when the lending firm receives them. Interest on loans extended prior to the effective date of the Growth and Investment Tax Plan, however, would be taxed as a component of individual cash flow. As with debt contracts for homeowners and non-financial businesses, any modifications to existing contracts would be treated as new contracts and not entitled to transition relief"[18]

[16] Ibid, pg 173
[17] Ibid, pg 173
[18] Ibid, pg 174

* The Progressive Consumption Tax Plan

The GIT plan described above is not a pure consumption tax system since it imposes a tax on capital income. The panel also described a pure consumption tax plan, called the Progressive Consumption Tax Plan (PCT). The differences between the PCT and the GIT are:

- No taxation of capital income under the PCT at the household level,
- No need for special savings accounts such as "Save for Retirement" and "Save for Family" accounts since there is no tax on savings under the PCT,
- Lower deduction and exclusion for employee-provided health insurance coverage for revenue neutrality under the PCT, and
- Higher top individual and business cash flow tax rates for revenue neutrality (rates will be 15, 25 and 35 percent) under the PCT.

This system would greatly simplify record keeping and the marginal effective tax rate on new investment would be zero.

The PCT plan was not chosen by the President's Advisory Board as the preferred consumption tax option primarily because "it would result in a less progressive distribution of tax burden"[19] or in other words it was considered too difficult to overcome the objections of those who think capital income should be subject to taxed.

Macroeconomic Impact of Switching to a Consumption Tax Compared to an Income Tax

Shortly after the publication of its report, the impact of the Panel's proposals on the U.S. economy was evaluated by Robert Carroll, John Diamond, Craig Johnson and James Mackie by Office of Tax Analysis in U.S. Department of the Treasury.[20] Using three different models, the Solow growth model, the Ramsey infinite horizon growth model, and an overlapping generation (OLG) life cycle model, the authors did a dynamic macroanalysis of three different tax reform proposals: the Growth and Investment Tax (GIT), the Progressive Consumption Tax (PCT) and the Simplified Income Tax (SIT).

The GIT and PCT are described above. The Simplified Income Tax (SIT) provides four tax rate brackets for individuals: 15, 25, 30, and 33 percent. Other key features for individuals include replacing the mortgage interest deduction with a Home Credit equal to 15 percent of mortgage interest paid, limited in a manner related to the taxpayer's regional average housing prices. A deduction is allowed for charitable contributions subject to a floor of one percent of income. In addition, dividends received by individuals from U.S. earnings of U.S. corporations are fully

[19] Ibid pg 184
[20] Robert Carroll, John Diamond, Craig Johnson and James Mackie III, "A Summary of the Dynamic Analysis of the Tax Reform Options Prepared for the President's Advisory Panel on Federal Tax Reform," May 25, 2006. http://www.treasury.gov/resource-center/tax-policy/Documents/Summary-of-Dynamic-Analysis-of-Tax-Reform-Options-5-2006.pdf

excludable from income. Capital gains of individuals from sales or exchanges of stock of U.S. companies are 75 percent excludable, resulting in a tax rate from 3.75 to 8.25 percent depending on the applicable individual rate bracket. Interest income is fully includable as regular income. Large businesses with gross receipts of $10 million or greater are subject to tax at a single 31.5 percent rate. In place of expensing, the simplified depreciation system applies. The simplified depreciation system provides for four categories of depreciable assets. Depreciation is computed by multiplying the taxpayer's average balance in each asset category by the depreciation rate for that category. The four depreciation rates are 30, 7.5, 4, and 3 percent. [21]

The authors conclude that both the GIT and the PCT substantially increase the national capital stock and national income.
In contrast, the SIT has very little impact on national income, the capital stock, net investment or consumption income (see the simulation results shown in Table 4).

For example, the models suggest that the GIT could lead to long-run increases in the capital stock ranging from 5.8 to 20.4 percent and long-run increases of national income ranging from 1.4 to 4.8 percent. The growth effects of the PCT were the largest of the plans modeled, with long-run increases in the capital stock ranging from 8.0 to 27.9 percent, and long-run increases in national income ranging from 1.9 to 6.0 percent. The analysis by Carroll, et. al. concludes that the options that move the tax system in the direction of a consumption tax base the most, the PCT and GIT, provide the greatest increases in capital accumulation and national output and substantially outperform the SIT. The SIT increases long-run national income by an average of only 0.4 percent and the capital stock increases range from 0.9 to 2.3 percent. The strongly positive results for the two consumption tax approaches are consistent with a wide body of previous research.[22]

Current Public Policy Challenges: Funding Infrastructure and Retirement Security

To meet the economic policy challenges we face within the next 15–20 years, plans for major tax reform should be at the forefront of policymakers' agendas. The challenges we face are daunting, for example a recent report by the American Society of Civil Engineers shows that the cost of rebuilding and expanding the country's roads, bridges, water systems and the electrical grid will require expenditures of $157 billion a year between now and 2020.[23] Another key challenge is to fund the retirement of our aging baby boomers who are leaving the work force in ever increasing numbers. While the U.S. population is still growing, the ratio of retirees to workers is also growing. According to Boston College's National Retirement Risk Index,[24] 53 percent of households are "at risk" of not having enough savings to maintain their living standards after retirement. The inclusion of the health care costs further increases the percent of households at risk. The

[21] https://www.jct.gov/publications.html?func=startdown&id=4517
[22] For example, see Joint Committee on Taxation (1997) and Altig *et al.* (2001).
[23] http://www.asce.org/failuretoact/
[24] http://crr.bc.edu/special-projects/national-retirement-risk-index/

Annual Retirement Confidence Survey conducted by Employee Benefit Research Institute and Mathew Greenwald & Associates points out the main reason of this risk: lack of savings. According to the survey, more than half of workers surveyed (57 percent) reported less than $25,000 in total household savings and investment (excluding the value of their primary homes and any defined benefit pension plans).[25]

Providing for the country's needs, whether it is infrastructure or lack of retirement savings, will require faster economic growth, which in turn will help generate the tax revenues that will help fund needed expenditures.

Conclusions

As described above, a substantial body of research suggests that fundamental tax reform and more reliance on consumption taxes could have a profound, positive effect on long-term economic growth. Most previous economic analyses of the impact of moving toward a consumption tax base suggest at least a 3% increase in long-run output. Even small changes in economic growth rates can make a big difference in living standards; a 3 percent increase in output would increase GDP by almost $500 billion annually and would likely raise wages and compensation by about $330 billion. As the United States faces the economic challenges of the twenty-first century, including funding the retirement of the "baby boom" generation as well as providing employment for workers of all ages, a fundamental tax reform that moves the U.S. tax system toward greater reliance on consumption taxes can be an important policy lever for achieving stronger economic growth, funding important spending priorities and higher living standards.

[25] EBRI's 2013 Retirement Confidence Survey, http://www.ebri.org/pdf/surveys/rcs/2013/PR1013.19Mar13.RCS.pdf

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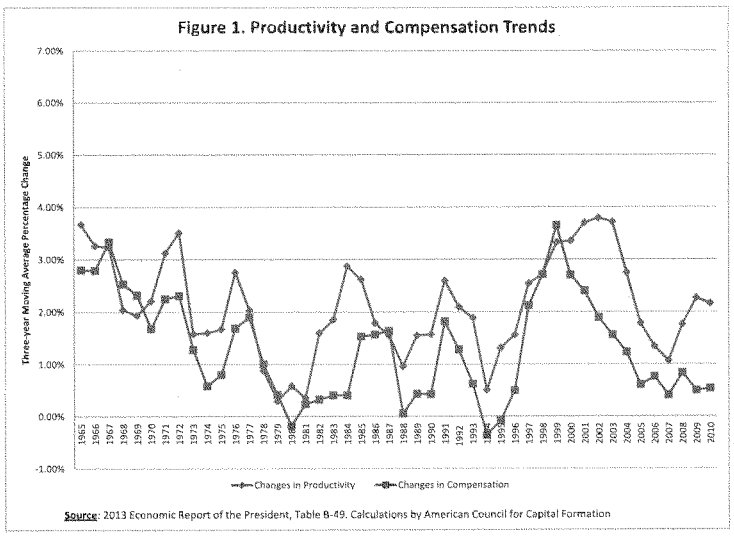

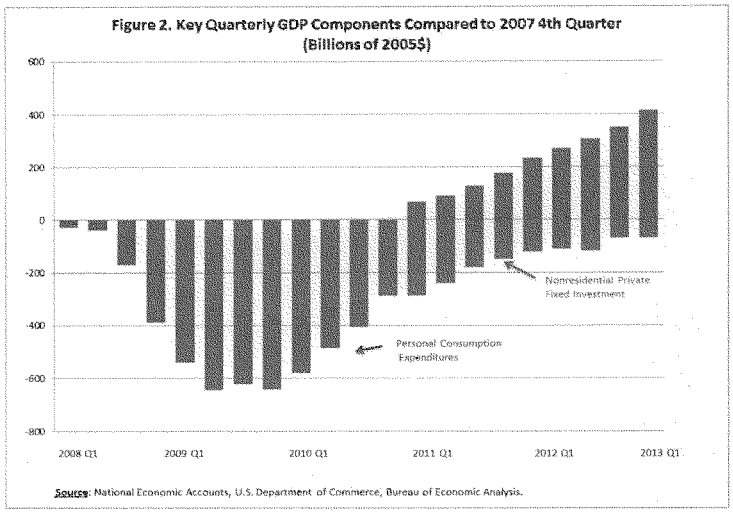

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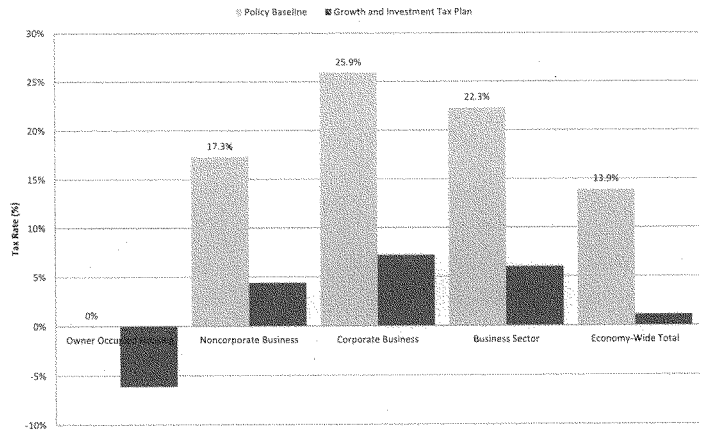
Figure 3. Comparison of Effective Tax Rates on Different Types of Investment



Source: President's Advisory Panel on Federal Tax Reform, "Simple, Fair, & Pro-Growth: Proposals to Fix America's Tax System," November 2005, http://www.treasury.gov/resource-center/tax-policy/Documents/Simple-Fair-and-Pro-Growth-Proposals-to-Fix-Americas-Tax-System-11-2005.pdf

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Table 1. Impact of Tax Reform on GDP and Capital Stock Growth

(Percent Differences from Current Tax Code Baseline)

	Consumption Tax			Unified Income Tax		
Summary Variables	**2005**	**2010**	**Long Run**	**2005**	**2010**	**Long Run**
REAL GDP:						
Fullerton-Rogers—low1	---	---	1.7	---	---	1.8
Fullerton-Rogers—high2	---	---	5.8	---	---	3.8
Auerbach, Kotlikoff, Smetters, & Walliser	4	5	7.5	-1.7	-2.1	-3
Engen-Gale	1.8	2.1	2.4	-0.2	-0.3	-0.5
Jorgenson-Wilcoxen	3.6	3.3	3.3	1.6	1.4	1.3
Macroeconomic Advisers (transition relief)	1.4	1.3	5.4	---	---	---
Robbins	16.4	16.9	---	14.6	15.4	---
DRI Inc./McGraw-Hill	4.7	---	---	-1.1	---	---
DRI Inc./McGraw-Hill—"VAT"	-4.2	---	---	---	---	---
Gravelle	0.7	1	3.7	0.6	0.7	1.8
Coopers & Lybrand	1.2	---	---	1.1	---	---
CAPITAL STOCK:						
Fullerton-Rogers—low1	---	---	5.2	---	---	5.4
Fullerton-Rogers—high2	---	---	23.8	---	---	11.8
Auerbach, Kotlikoff, Smetters, & Walliser	14	19.1	31.5	-4.2	-5.9	-10.5
Engen-Gale	7	7.6	9.8	-0.7	-1	-1.6
Jorgenson-Wilcoxen	0.9	0.6	0.3	-2	-2.3	-2.6
Macroeconomic Advisers (transition relief)	4.3	4.8	13.2	---	---	---
Robbins	47	57.2	---	38.8	48.6	---
DRI Inc./McGraw-Hill	13.7	---	---	-1.5	---	---
DRI Inc./McGraw-Hill—"VAT"	-0.7	---	---	---	---	---
Gravelle	1.7	2.7	11.2	0.5	0.9	4.1
Coopers & Lybrand	1.5	---	---	1.1	---	---

Notes:
1. Assumes leisure-consumption (intratemporal) and intertemporal elasticities both are 0.15.
2. Assumes leisure-consumption (intratemporal) and intertemporal elasticities both are 0.50.

Source: Joint Committee on Taxation, "Tax Modeling Project and 1997 Tax Symposium Papers," November 20, 1997. https://www.jct.gov/publications.html?func=startdown&id=2940

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Table 2. Economic Impact on the United States of Switching to a Consumption Tax in 1991

Expensing business investment, removal of the business and personal interest deduction, and tax exemption of savings

	Average 1991-1995	Average 1996-2000	Average 2001-2004
Real GDP -- Level (Billions of $96)			
Base	7,085.8	8,499.6	10,113.1
Simulation of consumption tax	7,203.2	8,890.0	10,637.7
(Difference in level)	117.5	390.5	524.6
(Percent change in level)	1.7%	4.6%	5.2%
Business Capital Spending, Total (Billions of $96)			
Base	684.2	1,092.0	1599.6
Simulation of consumption tax	824.9	1,495.60	2,168.80
(Difference in level)	140.7	403.5	569.2
(Percent change in level)	20.6%	37.0%	35.6%
Consumption (Billions of $96)			
Base	4,761.7	5,717.2	6,746.3
Simulation of consumption tax	4,773.3	5,843.4	7,021.5
(Difference in level)	11.6	126.1	275.3
(Percent change in level)	0.2%	2.2%	4.1%
	Cumulative 1991-1995	**Cumulative 1996-2000**	**Cumulative 2001-2004**
Total Receipts			
Base	6,210.50	8,853.20	9,179.30
Simulation of consumption tax	5,745.50	8,821	9,607.70
(Difference in level)	-465	-32.2	428.5

Source: Institute for Policy Innovation, "U.S. Capital Formation: How the U.S. Tax Code Discourages Investment," Margo Thorning, February 2002, http://www.ipi.org/docLib/PR170-Thorning-Capital.pdf-OpenElement.pdf

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Table 3A. Growth Investment Tax for Households	
Provisions	**Growth and Investment Tax Plan**
Households and Families	
Tax Rates	Three tax brackets: 15%, 25%, 30%
Alternative Minimum Tax	Repealed
Personal exemption	Replaced with Family Credit available to all taxpayers: $3,300 credit for married couples, $2,800 credit for unmarried taxpayers with child, $1,650 credit for unmarried taxpayers, $1,150 credit for dependent taxpayers; additional $1,500 credit for each ch
Standard deduction	
Child tax credit	
Earned income tax credit	Replaced with Work Credit (and coordinated with the Family Credit); maximum credit for working family with one child is $3,570; with two or more children is $5,800
Marriage penalty	Reduced. Tax brackets and most other tax parameters for couples are double those of individuals
Other Major Credits and Deductions	
Home mortgage interest	Home Credit equal to 15% of mortgage interest paid; available to all taxpayers; mortgage limited to average regional price of housing (limits ranging from about $227,000 to $412,000)
Charitable giving	Deduction available to all taxpayers (who give more than 1% of income); rules to address valuation abuses
Health insurance	All taxpayers may purchase health insurance with pre-tax dollars, up to the amount of the average premium (estimated to be $5,000 for an individual and $11,500 for a family)
State and local taxes	Not deductible
Education	Taxpayers can claim Family Credit for some full-time students; simplified savings plans
Individual Savings and Retirement	
Defined contribution plans	Consolidated into Save at Work plans that have simple rules and use current-law 401(k) contribution limits; AutoSave features point workers in a pro-saving direction (Save at Work accounts would be "prepaid" or Roth-syle)
Defined benefit plans	No change
Retirement savings plans	Replaced with Save for Retirement accounts ($10,000 annual limit) available to all taxpayers
Education savings plans	Replaced with Save for Family accounts ($10,000 annual limit); would cover education, medical, new home costs, and retirement saving needs; available to all taxpayers; refundable Saver's Credit available to low-income taxpayers
Health savings plans	
Dividends received	Taxed at 15% rate
Capital gains received	Taxed at 15% rate
Interest received (other than tax exempt municipal bonds)	Taxed at 15% rate
Social Security benefits	Replaces three-tiered structure with a simple deduction. Married taxpayers with less than $44,000 in income ($22,000 if single) pay no tax on Social Security benefits; fixes marriage penalty; indexed for inflation

Source: President's Advisory Panel on Federal Tax Reform, "Simple, Fair, & Pro-Growth: Proposals to Fix America's Tax System," November 2005, http://www.treasury.gov/resource-center/tax-policy/Documents/Simple-Fair-and-Pro-Growth-Proposals-to-Fix-Americas-Tax-System-11-2005.pdf

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Table 3B. Growth Investment Tax for Businesses	
Provisions	**Growth and Investment Tax Plan**
Small Business	
Tax Rates	Sole proprietorships taxed at individual rates (top rate lowered to 30%); Other small businesses taxed at 30%
Recordkeeping	Business cash flow tax
Investment	Expensing of new investment
Large Business	
Tax Rate	30%
Investment	Expensing for all new investment
Interest paid	Not deductible (except for financial institutions)
Interest received	Not taxable (except for financial institutions)
International tax system	Destination-basis (border tax adjustments)
Corporate AMT	Repealed

Source: President's Advisory Panel on Federal Tax Reform, "Simple, Fair, & Pro-Growth: Proposals to Fix America's Tax System," November 2005, http://www.treasury.gov/resource-center/tax-policy/Documents/Simple-Fair-and-Pro-Growth-Proposals-to-Fix-Americas-Tax-System-11-2005.pdf

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Table 4. Macroeconomic Effect of Tax Reform Options: Percentage Change from Initial Steady-State for Selected Variables and Years After Reform

	Progressive Consumption Tax			Growth and Investment Tax			Simplified Income Tax		
	Budget Window*	Year 20	Long-run	Budget Window*	Year 20	Long-run	Budget Window*	Year 20	Long-run
National Income									
Ramsey Growth Model	2.3%	4.5%	6.0%	1.9%	3.7%	4.8%	0.0%	0.2%	0.3%
OLG Model	0.7%	2.6%	2.8%	1.5%	2.1%	2.2%	0.4%	0.8%	0.9%
Solow Growth Model	0.2%	0.6%	1.9%	0.1%	0.4%	1.4%	0.0%	0.1%	0.2%
Capital Stock									
Ramsey Growth Model	5.1%	16.7%	27.9%	3.7%	12.1%	20.4%	0.4%	1.4%	2.3%
OLG Model	3.3%	9.8%	14.0%	3.0%	7.5%	9.8%	0.1%	0.7%	1.3%
Solow Growth Model	0.7%	2.5%	8.0%	0.5%	1.8%	5.8%	0.1%	0.3%	0.9%
Labor Supply									
Ramsey Growth Model	1.4%	0.7%	-0.5%	1.3%	1.0%	0.1%	-0.1%	-0.2%	-0.3%
OLG Model	0.5%	1.0%	0.9%	1.2%	0.7%	0.6%	0.3%	0.4%	0.4%
Solow Growth Model	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Consumption									
Ramsey Growth Model	-2.7%	2.0%	5.6%	-1.6%	2.0%	4.8%	-0.4%	-0.1%	0.2%
OLG Model	-1.7%	1.3%	2.2%	-0.4%	1.3%	1.8%	0.4%	0.8%	1.0%
Solow Growth Model	-0.4%	0.2%	1.9%	-0.3%	0.1%	1.4%	-0.1%	0.0%	0.2%
Net Investment									
Ramsey Growth Model	59.1%	43.7%	27.9%	42.6%	31.9%	20.4%	4.8%	3.4%	2.3%
OLG Model	30.7%	22.4%	15.2%	26.2%	15.3%	10.7%	1.3%	2.1%	1.3%
Solow Growth Model	7.9%	7.9%	8.0%	5.7%	5.7%	5.8%	0.9%	0.9%	0.9%

* Average percentage change over the first ten years after reform enacted.

Source: Robert Carroll, John Diamond, Craig Johnson and James Mackie III, "A Summary of the Dynamic Analysis of the Tax Reform Options Prepared for the President's Advisory Panel on Federal Tax Reform," May 25, 2006. http://www.treasury.gov/resource-cente

COMMUNICATIONS

Statement of the Alliance to Save Energy
Senate Energy, Natural Resources and Infrastructure Subcommittee
Senate Committee on Finance
"Powering Our Future: Principles of Energy Tax Reform"
July 31, 2013

INTRODUCTION

The Alliance to Save Energy is pleased to submit policy recommendations to the Senate Energy, Natural Resources and Infrastructure Subcommittee that would help remove current barriers to energy efficiency investments, and play a significant role in the ongoing tax reform endeavors to increase the productivity of our economy, create jobs, and save businesses and consumers money.

For more than 35 years, the Alliance to Save Energy has capably served as a bipartisan, nonprofit coalition of business, government, environmental, and consumer leaders committed to promoting energy efficiency worldwide to achieve a healthier economy, a cleaner environment, and greater energy security. Founded in 1977 by Senators Charles Percy, a Republican from Illinois, and Hubert Humphrey, a Democrat from Minnesota, the Alliance has worked tirelessly to improve the efficiency of America's energy resources and to make certain that energy is not wasted.

The organization is currently led by Senator Mark Warner as Honorary Chairman, and National Grid US President Tom King as Chairman of our Board of Directors. Senators Susan Collins, Chris Coons, Ed Markey, Lisa Murkowski, Rob Portman, Mark Pryor, Jeanne Shaheen, Mark Udall and Ron Wyden, and Representatives Michael Burgess, Ralph Hall, Steve Israel, Adam Kinzinger, Paul Tonko and Peter Welch serve as Honorary Vice-Chairs. Over 140 companies – including United Technologies Corporation – and organizations support the Alliance as Associates. Attached to these comments are lists of the Alliance's Board of Directors and its Associate members.

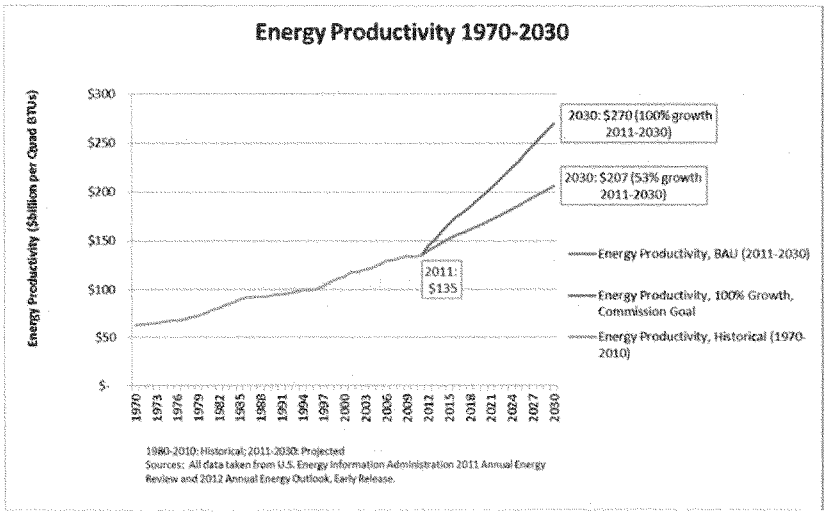
COMMISSION ON NATIONAL ENERGY EFFICIENCY POLICY

Earlier this year, the Alliance Commission on National Energy Efficiency Policy (ACNEEP) (attached is list of Commission members and their biographies) unveiled its policy recommendations (Energy 2030) that were based on the bold yet actionable goal of doubling U.S. energy productivity, or for every unit of energy consumed in 2030 will produce twice the amount of Gross Domestic Product (GDP) compared to 2011. Meeting this goal can deliver exceptionally large benefits to the United States, including enhanced economic competitiveness, technological innovation, greater energy reliability and security and strengthened stewardship of our environment and natural resources.

Created in 2012 to identify solutions for increasing U.S. energy productivity and jumpstarting the economy, the Commission built its recommendations on a large body of research that examines the issues of investment, technology, human behavior, and government and their relation to growing energy productivity in the U.S. across an array of economic sectors, including commercial, industrial, transportation and residential. An independent analysis by the Rhodium Group (RHG) found that doubling our nation's energy productivity by 2030 could:

- Cut average household energy costs by more than $1,000 a year;
- Save American businesses $169 billion annually;
- Reduce government agency spending by $13 billion a year;
- Create 1.3 million jobs and increase GDP by up to 2%;
- Decrease energy imports by more than $100 billion annually; and,
- Reduce CO_2 emissions by 33 percent below 2005 levels.

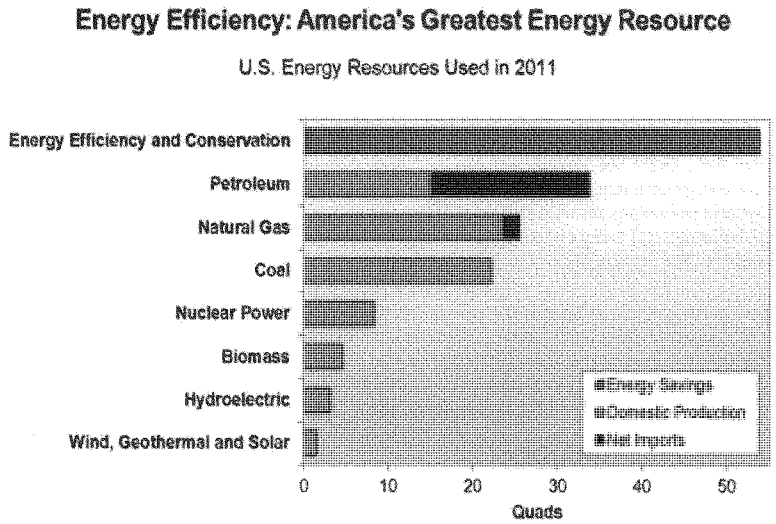
Moreover, the enclosed figure demonstrates how the Commission's energy productivity target compares with the reference (current course of activity) case projection of the U.S. Energy Information Administration (EIA) 2012 Annual Energy Outlook.



Over the last 40 years, the United States has made significant gains in energy productivity. In 1970, about $63 billion of GDP in year 2005 dollars were produced per quadrillion Btu (quad) of energy used domestically according to the U.S. Energy Information Administration. In 2011, the figure was about $135 billion per quad. The Commission's goal is for the U.S. economy to achieve $270 billion (in 2005 dollars) of GDP for each quadrillion Btu consumed in 2030.

If not for U.S. energy productivity gains since the early 1970s, the United States would need to consume about 50% more energy – with concomitant impacts on energy bills, oil imports, energy

reliability and security, and environmental quality – to deliver today's GDP. The following Alliance to Save Energy figure graphically illustrates the point.



While the United States has made significant energy productivity progress over the last several decades, the nation cannot afford to rest on its laurels. Indeed, heightened international economic competition; stresses on American energy, transportation, and other physical infrastructure; continued economic and geopolitical vulnerabilities to energy price shocks (despite increased North American oil and natural gas production); and multiple environmental challenges associated with energy all indicate a need to strengthen U.S. efforts to enhance energy productivity.

In addition to the Commission's work, three other reports have been issued recently that include calls for energy efficiency as a central pillar of sound U.S. energy policy. These include the National Association of Manufacturers' Energy Efficiency Task Force on the building sector; the Business Roundtable's Taking Action on Energy: A CEO Vision for America's Energy Future; and the Bipartisan Policy Center's America's Energy Resurgence: Sustaining Success, Confronting Challenges. The Commission intends to work collaboratively with these organizations and their associates to implement our common and important agendas on energy efficiency, including on taxes.

HISTORY OF EFFICIENCY TAX INCENTIVES

Tax incentives have been and should continue to be a critical element of a comprehensive energy efficiency policy. But they should be carefully designed to address market failures and to spur market transformation. To stimulate adoption of residential and industrial energy-efficiency

measures, several tax incentives were created in the 1970s. The Energy Tax Act of 1978 contained a 15% tax credit for residential conservation and renewable energy investment between 1977 and 1985. Conservation measures included weather stripping and insulation among others. The Energy Tax Act also covered a 10% tax credit for certain energy-efficiency measures installed by businesses. However, according to a study done by the American Council for an Energy-Efficient Economy (ACEEE), the residential and industrial tax credits between 1978 and 1985 had relatively little net impact on driving energy-efficiency improvements.

In the last decade, tax incentives for private firms and consumers to make investments in energy efficiency were included in the Energy Policy Act of 2005 and the American Recovery and Reinvestment Act (ARRA) of 2009 as well as other more specific tax policies. Establishing the first major federal energy-efficiency tax incentives in two decades, the Energy Policy Act of 2005 contained several provisions for new energy-efficient homes and vehicles, home improvements, new commercial buildings and energy retrofits, and energy-efficient appliances. ARRA modified and expanded many of the existing federal energy efficiency tax credits.

Most of these incentives are technology-neutral and performance-based. While not all the energy efficiency tax incentives have been equally successful, many have spurred market transformation toward more energy-efficient products, with introduction of new technologies and dramatic increases in market share. They have reduced energy costs for consumers, spurred American manufacture of appliances and building components, and strengthened our energy systems.

DEPRECIATION SCHEDULES

Business investment decisions often are affected by their anticipated tax consequences; one example of a perverse and unintended consequence is reduction in private sector outlays in newer, more efficient assets when depreciation rules fail to reflect the actual service lives of the equipment. Fundamental tax reform offers an excellent opportunity to enact depreciation policies that support efficiency investments and positively impact project economics.

Significant improvements in energy productivity can arise from replacing old capital stock with new, more efficient technologies and equipment. The 2012 Annual Energy Outlook and other projections link energy intensity and productivity improvements to new capital investment.

However, the tax code has discouraged business investments with unrealistically slow depreciation – in some cases equipment that typically lasts fifteen years can only be depreciated over 39 years (on the other hand the energy costs that would be saved can be expensed in one year – the government pays businesses one-fourth or even one-third of the cost of wasted energy). Additionally, back-up generators, a seldom-used asset, depreciate over three years while a combined heat and power (CHP) system that delivers ongoing energy efficiency and reliability benefits has a 20-year or even longer depreciation schedule. The same or similar equipment can have different depreciation schedules based on the kind of building or industrial sector in which the equipment is installed, rather than on engineering-based estimates of the actual life of the asset. If recovery periods are too long, they encourage continued operation of obsolete equipment and discourage replacement with new more efficient products.

Manufacturing is vital to American economic well-being, accounting for more than 11% of GDP and 60% of exports, and directly employing nearly 12 million individuals with above average wages and benefits. The industrial sector consumes 26 quadrillion Btu or roughly 27% of national energy use. U.S. Department of Energy scenarios project approximately a one-third improvement in energy productivity for manufacturing by 2035, but more is possible. Enhancing depreciation schedules for energy equipment is well aligned with improving American industrial productivity and competitiveness.

To that end, making depreciation schedules and other tax provisions more favorable to new capital investment could enhance energy productivity while expanding overall industrial competitiveness. Moreover, depreciation provisions can have reduced or, perhaps, favorable fiscal impacts on the Treasury compared to other measures.

RECOMMENDATIONS

Federal tax incentives have played a key role in encouraging market adoption of energy-efficient new homes, home improvements and appliances, new commercial buildings and upgrades, hybrid cars and heavy duty vehicles, and public transportation. As part of federal tax reform, Congress should consider the following Energy 2030 recommendations:

Adjust commercial and industrial depreciation schedules:

- Employ accelerated or bonus depreciation measures to encourage modernizing capital stock. New equipment – including HVAC products (air conditioning units, heat pumps, furnaces and boilers), water heaters, combined heat and power, roofs and other commercial/industrial products – buildings, and vehicles tend to be more energy efficient than old stock. Since depreciation adjustment changes the timing but not the total amount of tax paid to the Treasury, fiscal impacts can be relatively modest (and the increased economic activity may be fiscally beneficial).

Focus energy efficiency tax incentives on high efficiency technologies and measures:

- Strengthen the qualifying criteria, amounts, and durations of energy efficiency tax incentives to promote innovation and market transformation. One approach would be to direct DOE or EPA to set the specific criteria, preferably based on designations used in market transformation programs, which would allow for more timely and expert response to market changes.

CONCLUSION

By wisely utilizing the tax code, the federal government can spur the development and use of energy-efficient equipment, technologies, buildings and vehicles throughout a myriad of economic sectors in the United States. While important strides have been made in this area, the energy-efficiency tax incentives can and must be expanded and enhanced in order to ensure that the American people are given immediate, cost-effective and sustainable assistance in addressing high energy costs, an ever-less secure energy future and the harmful environmental impacts associated with the production and use of energy.

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Sen. Mark Warner (D-Va.), elected to Congress in 2008, has reached across the aisle to revive the economy, support small business, reduce the deficit and champion energy efficiency. As governor of Virginia from 2002 to 2006, Sen. Warner revived the state's economy by bringing 135,000 new jobs into Virginia, supporting public education and turning a record budget deficit into a surplus.

Tom King was named National Grid USA President in 2007. This year King touted the 20th anniversary of National Grid's EE program which collectively cut customers' electricity bills by more than $2.5 billion. King's long history in the energy industry includes service as president of Pacific Gas & Electric Corporation, president and CEO of Pacific Gas and Electric Company and senior posts with Kinder Morgan Energy Partners and several Enron affiliates.

Members

Dr. Dan Arvizu is the Director of the National Renewable Energy Laboratory, the U.S. Department of Energy's primary laboratory for energy efficiency and renewable energy research and development. He was a chief technology officer with CH2M HILL Companies, Ltd., an executive with Sandia National Laboratories, and started his career at the AT&T Bell Telephone Laboratories. In 2004, Dr. Arvizu was appointed by the President for a six-year term on the National Science Board, the governing board of the National Science Foundation and the national science policy advisory body to the President and the Congress.

Frances Beinecke is currently the President of the Natural Resources Defense Council (NRDC). Under Frances's leadership, the organization sharply focuses on curbing global warming, developing a clean energy future, and many other important environmental issues. Frances has worked with NRDC for more than 30 years. Prior to becoming the president in 2006, she served as the organization's executive director for eight years, during which time NRDC's membership doubled and the staff grew to more than 300. In addition to her work at NRDC, Frances has played a leadership role in several other environmental organizations. She currently serves on the boards of the World Resources Institute, the Energy Future Coalition and Conservation International's Center for Environmental Leadership in Business.

Gregory M. Bridgeford has been a Chief Customer Officer at Lowes Companies Inc. Mr. Bridgeford served as an Executive Vice President of Business Development at Lowes Companies Inc. since February 2, 2004. Mr. Bridgeford, a 22-year Lowe's veteran, oversees all aspects of Lowe's development of new business opportunities, strategic planning, research and business process improvement. Previously, he served as Lowe's Senior Vice President, Business Development since 1999. Mr. Bridgeford was also the Senior Vice President, Marketing from 1998 to 1999 and as Senior Vice President and General Merchandise Manager from 1996 to 1998. Mr. Bridgeford joined Lowe's in 1982 and has served in a variety of increasingly responsible positions, including Vice President of corporate development, Senior Vice President of merchandising/General Merchandising Manager and Senior Vice President of Marketing. He played an important role as a member of the team that wrote a new corporate vision for Lowe's in 1989, ultimately transforming it into one of the nation's leading retailers. Mr. Bridgeford holds a bachelor's degree in psychology from the University of Virginia, and earned an M.B.A. from Wake Forest University.

Jorge Carrasco is the Superintendent of Seattle City Light, the ninth largest public electric utility in the United States. Carrasco was appointed by Mayor Greg Nickels in late 2003 and confirmed by the Seattle City Council in February 2004. Since his appointment, Carrasco has reduced the utility's debt ratio from 85% to approximately 60%. Carrasco has supported and expanded City Light's commitment to environmental stewardship. For the third year in a row, City Light has been zero-net greenhouse gas emissions – the first electric utility in the country to make that claim.

General Wesley Clark is a retired four-star General of the United States Army and served for 38 years. General Clark has won many awards for his service including the Purple Heart and Presidential Medal of Freedom. In his early years the General graduated as valedictorian from West Point in 1966, went on to earn a masters at Oxford University as a Rhodes Scholar. After retiring from the service, General Clark ran for U.S. President in 2004. The General now serves as Chairman and CEO of Wesley K. Clark & Associated, a strategic consulting firm. General Clark has also become a well-known figure in the energy community. He is currently the co-chairman of Growth Energy and chairman of Solar Energy Squared, and he is a member of the Clinton Global Initiative's Energy and Climate Change Advisory Board.

Michael Eckhart is Managing Director and Global Head of Environmental Finance and Sustainability for Citigroup in New York City. In this role he supports Citi's goal to be the leading financial services firm in renewable energy, energy efficiency, clean water and related areas. From 2001 to 2011, he was founding President of the American Council On Renewable Energy (ACORE), a Washington DC-based nonprofit organization with members in all sectors of renewable energy and energy efficiency. He is a 2009 recipient of the Corporate Responsibility Award for Social Entrepreneurship, a 2008 recipient of the prestigious Skoll Award for Social Entrepreneurship, a 2006 recipient of RSF's Good Deal for All Award, and a four-time invited participant in the Clinton Global Initiative.

Anthony Eggert is the executive director of the UC Davis Policy Institute for Energy, Environment and the Economy. From 2007 through 2012 Eggert served as an appointee of Governors' Brown and Schwarzenegger in several senior policy positions including Science and Technology Policy Advisor to the Chair of the Air Resources Board, Commissioner for the California Energy Commission, and Deputy Secretary for Energy Policy of the California Environmental Protection Agency overseeing clean energy and environmental policy development for California. Prior positions include advising the University of California on federal energy and climate policy, directing research on low-carbon fuels and vehicles at UC Davis' Institute of Transportation Studies, and as an engineer and then manager for Ford Motor Company. Anthony received a Bachelor of Science degree in mechanical engineering at University of Wisconsin Madison and Masters of Science Degree in Transportation Technology and Policy at U.C. Davis.

Carol Eicher is business group vice president for Dow Building & Construction, a business group within Dow's Advanced Materials Division that includes the following businesses: Dow Building Solutions, Dow Solar and Construction Chemicals. Dow Building & Construction specializes in the development and production of materials and technologies enhancing energy efficient and sustainable building. Before joining Dow (in 2009), Eicher spent 10 years at Rohm and Haas, where she held multiple vice president and director roles. Most recently, she was business director for the Performance Monomers unit which provides essential raw materials to the company's coatings, construction and adhesives markets. Ms. Eicher is also a director of Tennant Company, a 138-year old public company that markets environmentally friendly cleaning systems.

Sherri Goodman is currently the senior vice president, general counsel and corporate secretary at CNA Analysis and Solutions. She also serves as Executive Director of CNA's Military Advisory Board. Previously, Sherri served as the Deputy Undersecretary of Defense as the chief environmental, safety, and occupational health officer for the Department of Defense from 1993 to 2001. In addition, she practiced law at Goodwin Procter as well as on the staff of the Senate Armed Services Committee, RAND and SAIC. Sherri also serves on the boards of the Atlantic Council of the US, Blue Star Families, the National Academy of Sciences' Energy & Environmental Systems Board, the Marshall Legacy Institute, and the Woods Hole Oceanographic Institution. She is also a member of the Council on Foreign Relations and serves on the Board of its Center for Preventive Action.

Fred Krupp has served as the head of Environmental Defense Fund for 26 years. Fred is widely recognized as the foremost champion of harnessing market forces for environmental ends, such as the market-based acid rain reduction plan in the 1990 Clean Air Act that The Economist hailed as "the greatest green success story of the past decade." Fred broke new ground by engaging American companies to lessen their impact on the environment. Strategic partnerships with McDonald's, FedEx, and DuPont, among others, have resulted in the elimination of millions of pounds of waste, the adoption of hybrid delivery vehicles, and an accord to reduce the environmental risks of nanotechnology.

Alex Laskey is the President and Founder of Opower, a company that provides a customer engagement platform for the utility industry. Laskey is responsible for engaging utility and government partners with Opower's purpose and products. In his role as Opower's President, Alex was invited to the White House to meet with President Obama and eight other industry leaders to discuss innovation and job creation in the green economy. Prior to founding Opower, Alex enjoyed a career in politics and policy, serving as a campaign manager, strategist, and public-opinion analyst for several candidates.

Dr. J. Michael McQuade was named senior vice president, science and technology at UTC in September 2006. His responsibilities include overseeing UTC Power and UTC's Research Center and providing strategic oversight and guidance for research and development activities throughout the corporation. McQuade has held senior R&D and general management positions with technology development oversight at 3M and Eastman Kodak. Beginning in 2002, he was vice president of 3M's Medical Division. Previously, he was president of Eastman Kodak's Health Imaging business, including responsibility for its research laboratories. Prior to 1998, McQuade held several positions at Imation Corp. both before and after its spinoff from 3M in 1996 McQuade holds a doctorate, master of science and bachelor of science degrees in physics from Carnegie Mellon University.

Michael P. Melaniphy has been the President and CEO of the American Public Transportation Association (APTA) since November 2011. A nationally recognized leader, Melaniphy's entire career has been in public transportation, with more than 23 years of both public and private sector experience. Prior to APTA, Melaniphy was the Vice President Public Sector for bus manufacturer Motor Coach Industries, Inc., of Schaumburg, IL. He also led public transit systems in Charlotte, NC; Wichita, KS; Hamilton, OH; and Laredo, TX.

Governor George Pataki is the founder and Chairman of the Pataki-Cahill Group, a business development firm focusing on energy and infrastructure. Prior to starting the Pataki-Cahill Group, he was the 53rd Governor of New York State for three terms (1995-2006). Governor Pataki instituted the nation's green building tax credit incentive program which led to the building of the first high-rise green building in the world, the first high-rise residential building in the United States and a host of other green projects. Governor Pataki serves on the Advisory Council of global investment bank Greentech Capital Advisors and serves on numerous boards, including Ecological, a sustainable real estate development firm.

Susan Story is President and CEO of Southern Company Services. In addition to overseeing the company's operations, SouthernLINC Wireless, and Southern Telecom, Story also leads Southern Company's efforts related to "smart" technology investment and deployment. Story joined Southern Company in 1982 as a nuclear power plant engineer, and served in many other capacities before joining Gulf Power as CEO in 2002-2010, where she implemented important demand-side management programs. Story also currently serves on the Edison Foundation's Institute for Electric Efficiency Strategy Committee, the National Center for Energy Workforce Development board, and is involved in many other leadership positions.

Don Sturtevant is the Corporate Energy Manager of J.R. Simplot Company where he is responsible for the energy portfolio of one of the largest privately-held corporations in the United States consisting of AgriBusiness, Land and Livestock, and Food Group Divisions. In this role, he successfully developed and integrated a company-wide energy optimization program that is endorsed by the CEO and senior corporate leadership and became both a DOE Save Energy Now LEADER and an EPA Energy Star partner. Don received a B.S. in Mechanical Engineering from the University of Idaho and is an Honor Graduate of both the Army Basic Officer's Course and Basic Non-Commissioned Officer's course receiving the prestigious Lynch leadership award. He also he serves on many boards throughout the Northwest and is an advisory committee member to the Climate Registry. In addition to his civilian life, Don spent over twenty years in the Idaho Army National Guard.

Susan Tierney is currently a Managing Principal at Analysis Group in Boston, Massachusetts. During her time there she co-authored a highly regarded report on the Economic Impact of Regional Greenhouse Gas Initiative in Ten States. Ms. Tierney served as the Assistant Secretary for Policy at the U.S. Department of Energy under President Clinton (1993-1995) and served under other leading politicians as a senior advisor. For the past 15 years, she has consulted to electric utilities, other energy companies, and other organizations on energy markets, the structure and regulation of the electric industry in the U.S. and other countries.

Eisuke Tsuyuzaki was appointed chief technology officer of Panasonic Corp. of North America on July 1, 2009. In addition to his responsibilities as Panasonic's technology leader in the United States and Canada, Tsuyuzaki, as CTO, directs Panasonic's efforts in technical standards-making and corporate development. He also directs the building of strategic alliances, especially with the Hollywood movie studios and content creators. Prior to joining Panasonic, Tsuyuzaki served in leadership positions within the corporate strategy and business development functions of Sony Corp., Sony Pictures Entertainment and Columbia TriStar Motion Pictures.

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Statement of the

AMERICAN PUBLIC POWER ASSOCIATION

Submitted to the

SENATE SUBCOMMITTEE ON ENERGY, NATURAL RESOURCES, AND INFRASTRUCTURE

For the hearing on

"Powering Our Future: Principles for Energy Tax Reform"

Submitted August 14, 2013

The American Public Power Association (APPA) appreciates the opportunity to submit this statement in relation to the Senate Subcommittee on Energy, Natural Resources, and Infrastructure July 31, 2013, hearing on "Powering Our Future: Principles for Energy Tax Reform." While a number of issues relating to tax reform will have a direct effect on our members, and so on U.S. energy policy, this statement will focus on Clean Renewable Energy Bonds (CREBs), New Clean Renewable Energy Bonds (New CREBs), and the current federal income tax exclusion for municipal bond interest.

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 47 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' primary purpose is to provide reliable, efficient service to local customers at the lowest possible cost, consistent with good environmental stewardship. Public power systems are locally created governmental institutions that address a basic community need: they operate on a not-for-profit basis to provide an essential public service, reliably and efficiently, at a reasonable price.

Energy Security and Public Power Utilities

Except for the federal government, which has 56 percent of its electric generating capacity in hydro-power facilities, all the nation's energy generating sectors rely predominantly on coal, natural gas, and other fossil fuels for generating capacity. This includes the public power, cooperative, and investor-owned utility sectors and the non-utility generator sector. Public power utilities are generally exempt from state renewable portfolio standards. Still, the public power sector is leading the nation's charge to move beyond reliance on fossil fuels as a source for power generation (See Table 1), make these investments in response to customer demand and to expand their generation portfolio. While public power utilities generate 10.4 percent of the nation's electric power, they own 13.5 percent of the nation's renewable power capacity. Public power utilities have 20,766 megawatts in hydropower capacity, 749 megawatts in

wind capacity, 282 megawatts in biomass fuel capacity, and 220 megawatts in geothermal capacity, for a total of 22,023 megawatts in renewable power capacity.

Table 1: Generating Capacity from Coal and Natural Gas (As Percent of Total Capacity) (By Utility Type)	
Utility Type	**Percent (Coal and Gas)**
Public Power	*67.2%*
Federal	34.6
Non-Utility Generator	70.9
Investor-Owned	77.4
Cooperative	89.7

The federal government has provided some incentives for such investments, either through appropriated accounts or tax-preferred financing, but the vast majority have been financed with the same tool used by public power utilities over the last century and by state and local governments for more than 200 years – municipal bonds. With federal discretionary aid to state and local governments set to fall to its lowest level since 1976, there appears to be little chance Congress will reinstate appropriated incentives for renewable energy investments. Likewise, tax preferences intended to encourage such investments could be enhanced and improved as part of tax reform, but if changes are made to the tax code, it appears they will be subtractive not additive. At the very least, though, Congress should agree to do no harm by leaving intact the current-law exclusion for municipal bonds. The exclusion has been a part of the income tax code since its inception and enables public power utilities to finance nearly $13 billion in new investments – including in renewable energy – every year.

Tax Reform and Tax Expenditures

Advocates for federal income tax reform argue that the federal income tax code includes too many deductions, credits, exclusions, exemptions, and other "tax preferences." This conclusion is driven, to varying degrees, by the belief that these tax preferences interfere with efficient economic decision-making and increase the cost of government. The latter hinges on the argument that certain items in the tax code are tantamount to federal spending, e.g., a tax credit for the production of energy from a renewable fuel source is economically equivalent to a direct federal payment for production of energy from a renewable fuel source. These tax "expenditures" are distinguished from provisions of the code considered to be part of the "normal" tax, e.g., a deduction from income for ordinary business expenses. There can be substantial disagreement as to whether certain items should be considered a tax expenditure,[1] but as a practical matter, policymakers generally defer to the staff of the Joint Committee on Taxation (and to a lesser extent the Office of Management and Budget) in making such distinctions.

Financing Renewable Energy Investments

Congress has shown a long-standing interest in providing financial incentives for investments in renewable energy production. While some of these incentives have been directed at the public power and cooperative utility sectors, the vast majority has been directed at the investor-owned utility and non-utility

[1] Patrick Heck & John Godfrey, *Treasure or Trash: Sorting Tax Expenditures in Tax Reform*, 130 Tax Notes 1565 (2011).

generator sectors. Business energy investment tax credits were enacted in 1978 and in 1980 to stimulate the development and "alternative" energy sources.[2] This credit remains in effect today, and is estimated to provide $500 million in tax relief annually.[3] In 1992, Congress created a tax credit for production of energy from renewable resources.[4] In the last decade, Congress has extended the "temporary" section 45 Production Tax Credit (PTC) eight times. The production tax credit remains in effect today, and is estimated to provide roughly $1.7 billion in tax relief annually.[5]

Not-for-profit entities, including public power utilities, cannot directly benefit from either the investment tax credit or the production tax credit. As a result, in 1992 Congress also authorized Renewable Energy Production Incentives (REPI) for public power and cooperative utilities. Both the PTC and REPI payments were set at 1.5 cents per kilowatt hour. However, REPI payments can only be made to the extent that Congress appropriates funds for such payments. Annual funding for the program started at $693,000 in fiscal year 1995 and peaked at $4.5 million in fiscal year 2009. Congress stopped appropriating funds for REPI after fiscal year 2009. In only two of the REPI program's 15 years did Congress appropriate enough funding to fully reimburse qualified applicants: during that time, public power and cooperative utilities qualified for $329 million in REPI payments, but Congress appropriated just $54 million.

To provide a further incentive for public power and cooperative utility investment in renewable energy, Congress created the Clean Renewable Energy Bond (CREB) in the tax title of the Energy Policy Act of 2005.[6] Qualified issuers include public power utilities, states and towns, and cooperative electric companies. Interest paid on a CREB is taxable, but the holder receives a tax credit. The tax credit is equal to a percentage of interest paid on the bond and is set by the Department of Treasury at the date of bond issuance at a level intended to allow the bond issuance at the same interest rate as if the bond had been issued as a tax-exempt bond. CREB bond volume was limited to $800 million, with no more than $500 million to be allocated to "governmental bodies." Congress provided an additional $400 million in CREB bond volume in 2006, with all bonds to be issued by Dec. 31, 2008.[7] In 2008, Congress extended the deadline for issuing CREBs to Dec. 31, 2009, and created a new version of CREBs, called New CREBs.[8] New CREBs differed from CREBs in that the tax credit was set at 70 percent of the level necessary to allow the bond issuance at the same interest rate as if the bond had been issued as a tax-exempt bond. New CREB bond volume was limited to $800 million split equally between public power providers, other governmental bodies, and cooperative electric companies. In 2009, Congress increased the New CREB bond volume by $1.6 billion (to a total of $2.4 billion).[9] In 2010, Congress modified New CREBs to allow issuers the option of receiving a direct payment from Treasury in lieu of providing bond holders a tax credit.[10] CREBs and New CREBs provide roughly $50 million in tax relief and direct payments to issuers annually.[11]

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[2] Energy Tax Act, Pub. L. 96-618, 92 Stat. 1374; Crude Oil Windfall Profits Tax Act Pub. L. 96-223, 94 Stat. 229 (codified as 26 U.S.C. 48).
[3] Jt. Comm. on Taxation, "Estimates of Federal Tax Expenditures for Fiscal Years 2012-2017," JCS-1-13 (Feb. 1, 2013).
[4] Energy Policy Act of 1992, Pub.L. 102-486 § 1914 (codified as 26 U.S.C. 45)
[5] Jt. Comm. on Taxation, *supra* note 3.
[6] Energy Policy Act of 2005, Pub.L. 109-58 § 1303 (codified as 26 U.S.C. 54).
[7] Tax Relief and Health Care Act of 2006, Pub. L. 109-432, 120 Stat. 292.
[8] Energy Improvement and Extension Act of 2008, Pub. L. 110-343, 122 Stat. 3765 (codified as 26 U.S.C. 54C).
[9] American Recovery and Reinvestment Act of 2009, Pub. L. 111-5, 123 Stat. 115.
[10] Hiring Incentives to Restore Employment Act of 2010, Pub. L. 111-147, 124 Stat. 71.
[11] Jt. Comm. on Taxation, *supra* note 3.

In 2009, the Internal Revenue Service (IRS) received 38 applications from public power providers requesting a total of $1,445,771,056 in New CREB bond volume.[12] The allocation process was oversubscribed even though some utilities chose not to apply because of the uncertainty of the allocation amount they would receive and the costs and complications of applying for the bonds. This demand was fueled in part because of the direct payment option. All qualified public power applicants were allocated bond volume, but to avoid exceeding the $800 million cap, IRS reduced each request proportionally.[13] As a result, each public power project that qualified for New CREB financing was allocated just 55 percent of the New CREB bond volume requested.

Because data from the IRS on New CREB bond issuances to date is not available, it is not clear how many of the 38 projects for which New CREB bond volume was requested have proceeded. Given the global economic downturn in 2009, the availability of Build America Bonds (taxable direct payment bonds available to finance any government purpose project) as a far less cumbersome vehicle for financing public power projects, and the substantial difference between the amount of New CREB bond volume requested and the amount available, we believe that many of the projects intended to be financed with New CREBs either did not proceed or proceeded with alternative means of financing.

This is not due to any inherent flaw in the New CREB program. We support allowing public power utilities to issue taxable direct payment bonds such as New CREBs as an alternative to finance renewable energy projects. We believe these bonds can expand the pool of investors available to issuers, reducing borrowing costs. The rate of direct payment can also reduce borrowing costs and encourage the types of renewable power generation Congress is seeking. However, New CREBs have been hamstrung by a burdensome application process, a low cap on bond volume, and an allocation process that provided bond volume allocations of a fraction of the amounts being sought.

Still, we think it was particularly prescient for Congress to provide a mechanism for recycling New CREB bond authority back into clean renewable projects when allocated bond authority is not used. Permitting obstacles, market concerns, and technological hurdles all but guaranteed that some of the bond authority allocated in 2009 would not be used within the three years required under the law. Because Congress provided that such allocations would revert back to Treasury to be re-allocated for other New CREB financed projects, these secondary and tertiary issues will not stand in the way of Congress' primary goal in creating and expanding on the CREBs program: encouraging investment in and development of clean renewable energy.

In sum, we believe that the potential for CREBs has not yet been tapped and that the program should be enhanced, as proposed in the Clean Renewable Energy Investment Act of 2010 (H.R. 6117 and S. 3855 as introduced in the 111th Congress). Among other provisions, this legislation would have repealed the national bond volume cap for four years. As noted above, while renewable power investment and production incentives are now totaling $2.2 billion annually, with the demise of REPI, the total value of incentives for not-for-profit entities is just $50 million annually. Putting this in perspective, not-for-profit utilities (including public power and cooperative utilities) are responsible for about 17 percent of the nation's non-federal power generation.

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[12] Internal Revenue Service "IRS Announces New Clean Renewable Energy Bonds Allocations" (Oct. 27, 2009) (http://www.irs.gov/Tax-Exempt-Bonds/IRS-Announces-New-Clean-Renewable-Energy-Bonds-Allocations) (last visited Aug. 13, 2013).
[13] *Id.*

Municipal Bonds and Public Power

Municipal bonds have been used for centuries by state and local governments to finance a wide range of public infrastructure. They allow issuers to build projects with capital provided upfront by bond investors, repaid over the projects' useful life by the citizens and customers benefitting from the project.

Municipal bonds are the largest source of financing for core infrastructure in the U.S.,[14] and are the single most important financing tool for public power, given the capital-intensive and long-lived nature of assets needed by the electric industry. Each year, typically, public power utilities make $13 billion in new investments financed with municipal bonds. Over the last 5 years, $94 billion in municipal bonds have financed 1,136 power-related projects.[15]

Public power utilities use municipal bonds to finance investments in power generation (including through renewable and alternative fuels), transmission, distribution, reliability, demand control, efficiency, and emissions controls. While the typical power-related bond issue is relatively small, electric generation or transmission projects often cost hundreds of millions or even billions of dollars and can have as long as a 50-year operational life.

Because interest on municipal bonds is exempt from federal income tax, investors generally accept a lower rate of return than they would otherwise demand from issuers of taxable debt. Investors are also attracted to municipal bonds because of the stability of the municipal bond market and the extremely low rate of default for municipal bonds. Historically, interest rates demanded by investors for tax-exempt municipal bonds have been an estimated average 200 basis points lower than comparable taxable corporate bonds. Savings to the issuer from this reduced cost in borrowing allow further investments or are passed through to taxpayers in the form of lower taxes or, in the case of public power customers, reduced utility rates.[16]

An added advantage of municipal bonds as a source of state and local financing is that the need for, and terms of, financing are determined by state and local citizens, either directly or through their representatives. Additionally, significant flexibility is afforded to state and local government issuers compared to issuers of taxable debt, including the term of the issue, the debt structure, and the ability to optionally call fixed rate debt after 10 years.

It is a long-standing principle that the federal government should not tax interest on municipal bonds. This reflects the basic "federalism" principle that one level of government should not tax another. This principle applies–with some exceptions–to almost all forms of government financing. So, just as state and local governments do not assess property taxes on federal property within their jurisdictions and do not tax interest on Treasury bills, notes or bonds, so the federal government does not tax municipal bond interest.

This principle was at the core of the 1895 Supreme Court decision that, as a constitutional matter, the federal government could not impose such a tax.[17] The Revenue Act of 1913 codified this exemption, restated in Section 103(a) of the Internal Revenue Code of 1954 and reaffirmed in the Tax Reform Act of

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[14] Cong. Budget Office, J. Comm. on Taxation "Subsidizing Infrastructure Investment with Tax-Preferred Bonds" (Oct. 2009)(showing that for education, water, and sewer, nearly all capital investments are made by state and local governments and that for transportation most investments are made by state and local governments).

[15] The Bond Buyer & Thomson Reuters "2012 Yearbook" (2012); The Bond Buyer & Thomson Reuters "2006 Yearbook" (2006).

[16] American Public Power Association "2012-2013 Public Power Annual Directory and Statistical Report" 51 (2012).

[17] Pollock v Farmers' Loan & Trust Company, 157 US 429 (1895).

1986. While the latter greatly reduced private activities that may be financed with tax-exempt bond proceeds, it did not fundamentally alter the exemption for bond financing of public activities as is being considered.

Even after the Supreme Court found that the federal government could regulate municipal bonds in 1988[18]—a decision taken as opening the door to begin taxing bond interest—Congress has continued to honor the principle that the federal government should not tax state and local bonds.

As a result, APPA believes that tax-exempt financing should be preserved and enhanced—not further limited. This includes reversing the limits put on tax-exempt bonds in the Tax Reform Act of 1986. Tax-exempt financing is critical for maintaining infrastructure, updating electric utility services, providing electricity at reasonable costs for ratepayers, and creating jobs.

Conclusion

The Federal government has largely focused its efforts to provide incentives to produce energy from renewable sources on the investor-owned and non-utility generator sectors. These incentives have worked. Incentives to public power utilities have either ended – as in the case of REPI payments – or been substantially limited – as in the case of New CREBs.

We would encourage Congress to reconsider the limits placed on New CREBs to give them a chance to provide the incentives intended. If Congress is unwilling to expand the CREB program, it could also consider amending the section 45 production tax credit to make the credit "tradable" by not-for-profit power generators. Roughly 17 percent of the nation's non-federal electric power generation comes from not-for-profit entities. Making the section 45 credit available to these entities would directly advance the goal of energy security.

We would also note that despite the shortcomings of federal renewable energy incentives for the public power sector, public power utilities are providing a disproportionate share of the nation's renewable power generation. These investments have been driven by customer interest and utility efforts to broaden generation portfolio so as to be able to continue to provide reliable and affordable electric power.

Imposing a federal tax on the municipal bonds used to finance these investments will necessarily increase public power utility costs, increase the cost of investing in all energy infrastructure, and increase electric power costs for the 47 million Americans served by public power utilities. This is true whether the proposal is to "cap" the tax value of the current law exclusion with a partial surtax, to replace municipal bonds with direct payment or tax credits bonds, or repeal the income tax exclusion entirely.

As discussed above, there are a number of ways to advance the goal of encouraging investments in new technologies needed to ensure our nation's energy security and bring consumer prices down. Congress should not – as its first step – make those investments more expensive and increase consumer costs by imposing an unprecedented federal tax on municipal bond interest.

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[18] South Carolina v. Baker 485 US 505 (1988).

Senate Finance Committee
Subcommittee on Energy, Natural Resources, and Infrastructure

Statement of Glen Kedzie
Vice President, Energy & Environmental Counsel
American Trucking Associations

Hearing on

Powering Our Future: Principles for Energy Tax Reform

July 26, 2013

Introduction

Thank you for the opportunity to submit this statement on behalf of the American Trucking Associations (ATA). ATA is the largest national trade association for the trucking industry. Through its federation with other trucking groups, industry-related conferences, and its 50 affiliated state trucking associations, ATA represents more than 37,000 members covering every type of motor carrier in the United States.

The trucking industry consumed nearly 53 billion gallons of total fuel in 2012 at a cost of $204 billion. Fuel is now the number one operating expense for most trucking companies. Given that trucking businesses operate on razor-thin profit margins in the range of 1-3%, our industry desperately needs Congress to enact energy tax reforms with respect to alternative fuels and their use to mitigate the widely varied swings in fuel pricing that we currently experience.

Natural gas, which is currently at a 10-year pricing low, and around $1.50-$2.00 cheaper than diesel fuel, can help fill this role. Natural gas technologies have a growing appeal for the trucking industry, yet purchasing the costly equipment is difficult especially for the 97% of trucking companies classified as small businesses (*i.e.*, they own 20 or fewer trucks). For this reason, ATA supports eliminating economic barriers to help stimulate investment in heavy-duty natural gas vehicles and fueling infrastructure. In this regard, a number of significant energy tax reforms must be addressed before this can happen.

Rectify Current Federal Fuel Tax Disparity Between LNG and Diesel Fuel

Financial disparity exists between how liquefied natural gas (LNG) and diesel fuel are taxed as transportation fuels. While both fuels are taxed on a per gallon basis as though they are equals, the reality is they are anything but. It takes approximately 1.7 gallons of LNG to match the energy provided by one gallon of diesel fuel. The energy content of diesel fuel is roughly 128,700 BTUs per gallon, while the energy content of LNG is roughly 74,720 BTUs per gallon. This disparity results in LNG paying 17 cents more in excise tax for the same amount of energy. This taxing differential increases the annual fuel costs of operating a natural gas over-the-road truck by $3,542 per year (assuming 6 miles per gallon and 125,000 miles of travel per year), compared to an equivalent diesel-powered truck.

Provide Tax Incentives for the Purchase and/or Retrofit to Natural Gas Trucks

The average price for a new, long-haul tractor is approximately $125,000. Equivalent natural gas trucks generally cost roughly $30,000 - $80,000 more per vehicle. The retrofitting of older diesel-powered trucks to run on natural gas costs roughly $30,000 per vehicle. However, these retrofit costs can be much higher depending on specific fuel tank configurations and fuel holding capacities. Many trucking companies are being financially constrained from purchasing new

natural gas trucks or retrofitting used equipment to run on natural gas due to these high costs. This is especially true for small trucking companies.

To help accelerate the purchase and expedite the market-penetration rates of natural gas vehicles, ATA supports short-term financial incentives.

Extend the Natural Gas Fueling Infrastructure Tax Credits

Installing a natural gas fueling location is extremely expensive. According to a 2010 report published by Pacific Northwest National Laboratory for the U.S. Department of Energy, installing a compressed natural gas (CNG) fueling station can cost up to $2 million depending on the size and application. According to the Energy Information Administration, an LNG fueling site can cost between $1 to $4 million. For many trucking fleets, such a large financial investment is prohibitive and difficult to justify. In recognition of the high cost of building natural gas infrastructure locations, the Energy Policy Act of 2005 (EPAct), (PL 109–58), provided an income tax credit equal to 30 percent of the cost of installing new natural gas refueling equipment. The credit was worth up to a maximum of $30,000 in the case of business property. In order to qualify for the incentive, the fueling equipment generally had to be new and the original use of the equipment must begin with the person claiming the credit. The tax credit replaced a tax deduction that had been allowed under the 1992 EPAct.

When originally enacted, the expiration date for this credit was the end of 2009. Congress extended the tax credit through the end of 2010 as part of the Emergency Economic Stabilization Act of 2008 (PL 110-343, § 207). The Tax Relief, Unemployment Insurance Reauthorization and Job Creation Act of 2010 (PL 111-312) then extended the credit through the end of 2011 at the 30 percent or $30,000 credit level. And most recently, the American Taxpayer Relief Act of 2012 (HR 8; PL 112-240, § 402) extended the availability of this incentive through the end of 2013 and makes it retroactive for property placed in service in 2012. The tax credit is now set to expire at the end of 2013. ATA strongly supports a further extension of this credit to expedite the build-out of the nation's natural gas fueling infrastructure.

Modify the 12 Percent Federal Excise Tax on Natural Gas Truck Purchases

As noted above, the average price for a long-haul tractor is approximately $125,000, and equivalent natural gas trucks cost roughly $30,000 - $80,000 more per vehicle. The federal excise tax collected on the purchase of a new truck is 12 percent. Thus, a $125,000 diesel truck purchase will add an additional $15,000 in taxes to the final cost. A comparable natural gas truck priced at $205,000 would pay an additional $24,600 in taxes (or $9,600 more than a similar diesel truck). Revenues generated from the federal excise are deposited in the Highway Trust Fund (HTF) with the aim of maintaining the nation's highways and infrastructure. Natural gas vehicles are taxed disproportionally to comparable diesel. This inequity prejudices natural gas truck purchases. In short, the extra federal excise tax collected on natural gas vehicles serves as a further barrier to those considering buying such vehicles. Legislation to replace the 12 percent

federal excise tax on new trucks and trailers with an equivalent tax on diesel fuel and natural gas would eliminate this disincentive.

Extend Excise Tax Credit to the Seller of CNG or LNG Fuel

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), (PL 109–59), provides a 50-cent tax credit per gasoline gallon equivalent (GGE) of CNG and per liquid gallon of LNG sold for use as a motor vehicle fuel. The credit went into effect October 1, 2006, and originally expired December 31, 2009. Congress has extended this credit twice. The first extension was included in the Tax Relief, Unemployment Insurance Reauthorization and Job Creation Act of 2010 (PL 111–312). That law extended the credit through 2011 and made it retroactive for fuel sales or use during 2010. The second extension of the credit occurred January 3, 2013 and was part of the American Taxpayer Relief Act of 2012 (HR 8; PL 112–240). Section 412 of the law extended the availability of the 50-cent credit through the end of 2013 and makes it retroactive for 2012.

Extend Income Tax Credits for Alternative Fuel Vehicles

The EPAct of 2005, provided for an income tax credit for the purchase of a new, dedicated alternative fuel vehicle of 50 percent of the incremental cost of the vehicle, plus an additional 30 percent if the vehicle met certain tighter emission standards. These credits ranged from $2,500 to $32,000 depending on the size of the vehicle. The credit was effective after December 31, 2005 and expired on December 31, 2010. While Congress did not extend this credit, it enacted a new bonus depreciation provision that allowed companies to expense 100 percent of the cost of new capital equipment through 2011. For 2012, bonus depreciation was worth 50 percent of the cost of property placed in service. The American Taxpayer Relief Act of 2012 (HR 8; PL 122–240) extended the bonus depreciation provision at the 50 percent level for 2013

ATA also supports the voluntary use of alternative fuels to help reduce dependence on foreign oil and reduce greenhouse gas emissions. Extending the renewable diesel and propane tax credits is critically important to enabling the continued use and growth of these alternative fuels without creating economic disadvantages for end users. ATA also asks that the following energy tax credits be extended beyond 2013:

Extend Biodiesel and Renewable Diesel Tax Credits

The $1.00 per gallon tax credit for biodiesel and renewable diesel is set to expire at the end of 2013. The biodiesel tax credit has reduced the cost of biodiesel and has helped advance the development of alternative fuel production. The cost of diesel fuel will likely increase in the absence of extending the biodiesel blenders tax credit. In considering whether to extend the renewable diesel tax credit, it is important to note that several new biofuel technologies are being developed. While biodiesel is a known diesel fuel alternative that may be acceptable in low percentage blends, newer processes to make renewable diesel may overcome some of the

operational challenges presented by biodiesel and may prove to be a better alternative than first generation biodiesel.

Extend Cellulosic Bonus Depreciation and Production Tax Credit

Under current law, facilities producing cellulosic biofuel can expense 50 percent of their eligible capital costs in the first year for facilities placed-in-service before the end of 2013. This tax credit is set to expire at the end of 2013. Through the end of 2013, facilities producing cellulosic biofuel can also claim a $1.01 per gallon production tax credit on fuel produced. Both of these credits have resulted in increased investment and have helped bolster confidence in the development and expansion of the cellulosic markets.

Propane Tax Credit

Diesel-fueled forklifts have been a staple of the trucking industry for loading and unloading freight. To reduce diesel emissions, some trucking companies use propane-fueled fork lifts in their operations. The key to ensuring increased penetration of propane-fueled forklifts and to enable their continued use is through the propane tax credit. This tax credit helps trucking companies overcome the premium associated with converting their fleet of forklifts from diesel to propane, and we urge Congress to extend the credit.

Conclusion

Thank you for the opportunity to submit ATA's statement regarding the need for energy tax reforms. We look forward to working with the Committee and the Administration to ensure that the use of tax incentives for alternative fuels will continue to support the nation's trucking industry in fulfilling its role as the engine that moves the nation's economy. If you are in need of any further information or clarification, please contact me at 703-838-1879 or gkedzie@trucking.org.

NATIONAL ASSOCIATION OF
PUBLICLY TRADED PARTNERSHIPS

WRITTEN STATEMENT OF THE

NATIONAL ASSOCIATION OF PUBLICLY TRADED PARTNERSHIPS

SUBMITTED FOR THE RECORD OF THE SENATE COMMITTEE ON FINANCE SUBCOMMITTEE ON ENERGY, NATURAL RESOURCES & INFRASTRUCTURE

HEARING ON

POWERING OUR FUTURE: PRINCIPLES FOR ENERGY TAX REFORM

July 31, 2013

National Association of Publicly Traded Partnerships
4350 N. Fairfax Drive, Suite 815
Arlington, VA 22203

WRITTEN STATEMENT OF THE
NATIONAL ASSOCIATION OF PUBLICLY TRADED PARTNERSHIPS

SUBMITTED FOR THE RECORD OF THE SENATE COMMITTEE ON FINANCE
SUBCOMMITTEE ON ENERGY, NATURAL RESOURCES, AND INFRASTRUCTURE

JULY 31, 2013 HEARING ON

POWERING OUR FUTURE: PRINCIPLES FOR ENERGY TAX REFORM

The National Association of Publicly Traded Partnerships (NAPTP) is pleased to provide its views on the appropriate taxation of businesses engaged in energy-related activities as part of tax reform. NAPTP is a trade association representing publicly traded partnerships, more commonly known as master limited partnerships (MLPs),[1] and other companies that provide services to MLPs or otherwise have an interest in their welfare. We currently have 136 full and associate members and represent 85 MLPs.

NAPTP strongly recommends that Congress continue to preserve the ability of business enterprises to choose the structure that is the most efficient and effective for their particular business activities, whether it be a pass-through structure or a C-corporation, in any future tax legislation. In particular, we ask that publicly traded entities that are currently able to choose pass-through taxation be allowed to continue doing so. To do otherwise, in our view, would not be good policy and would slow our nation's progress towards energy independence by reducing the capital available for needed energy infrastructure. It would also cost jobs in an economy that cannot afford to lose them, and would deprive a growing number of individual investors, many of whom are seniors, of a dependable source of income.

Background

MLPs have been in existence since 1981, and were first created to add liquidity to partnership investments. In doing so, they provided businesses that had traditionally operated in partnership form with the ability to raise capital from individual investors who could not afford the sizeable, illiquid, investment demanded by nontraded partnerships. By creating partnership investments that came in affordable units (the term for an ownership interest in an MLP) which were liquid, MLPs allowed smaller investors to invest in energy and real estate development while providing those industries with a valuable new source of capital.

In 1987 Congress enacted section 7704 of the Internal Revenue Code to limit MLPs to the industries that had traditionally used partnerships. Section 7704 limits pass-through tax treatment to publicly traded partnerships receiving at least 90 percent of their gross income from a narrow range of business activities, primarily those related to natural resources, or passive income sources such as interest and dividends.[2] Natural resources for this purpose include oil

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[1] There are several dozen PTPs which are merely commodity pools and not entities conducting business operations. These are generally not thought of as MLPs.

[2] Section 7704 also permits real estate operations including the development, sale, and rental of real estate.

and natural gas (and products thereof), coal and other minerals, fertilizer, and timber, while permissible activities include exploration, development and production; mining; gathering and processing; natural gas compression; transportation by pipeline, ship, or truck; storage; refining; marketing; and distribution. Other than propane sales, permissible activities stop short of the retail level, so that revenue from operating gas stations, for example, would not be qualifying income. In 2008 Congress expanded section 7704 to also permit MLPs to engage in the transportation and storage of biofuels and to include industrial source carbon dioxide in the definition of natural resource.

When section 7704 was being considered by Congress, the continued use of the MLP structure by natural resources industries was supported by the Treasury Department, which had otherwise supported imposing corporate taxation on publicly traded business entities. In 1987 testimony before subcommittees of both the House Ways and Means and the Senate Finance Committees, Assistant Secretary for Tax Policy J. Roger Mentz stated that "consideration should be given to continued authorization of pass-through entities providing direct investment opportunities traditionally conducted in non-corporate form" -- and, more specifically, "Given the importance of natural resource development to the nation's security, Congress should consider carefully whether such traditionally non-corporate activities should be subjected to corporate level tax."

MLPs Today

Today MLPs are primarily engaged in natural resource activities. Natural resource MLPs comprise about 80 percent of MLPs by number, and close to 90 percent of MLP market capital. The great majority operate in the midstream sector, which is focused on logistics and includes activities such as gathering and processing; natural gas compression; transportation by pipeline, ship, or truck; storage; and distribution services. About 70 percent of MLP market capital, and 80 percent of the market capital of natural resource MLPs, is in the midstream sector.

Midstream MLPs own approximately 300,000 miles of natural gas, NGL, refined product, and crude oil pipelines, a vast network ranging from local gathering lines that bring products from the field to processing plants to major interstate pipelines traversing thousands of miles. These pipelines are the backbone of our domestic energy system, serving as the link between energy producers and end-use consumers.

In addition to the MLPs that build and operate energy infrastructure, a number of MLPs provide consumers throughout the United States with propane for home heating and other uses. Some natural resource MLPs earn revenue from oil, gas, and coal properties. Some manufacture fertilizer, and others own timber properties either as a primary business or in addition to other natural resource activities. MLPs operate in every state, producing, processing, transporting, storing, and distributing energy products to meet the needs of that state's residents.

At the end of June the total market capital of MLPs was about $460 billion, of which just under $406 billion was in the natural resource sector. Not counting acquisitions, MLPs raised

over $23 billion in equity capital during 2012.[3] As noted, a large part of this equity capital is devoted to expanding the nation's domestic energy infrastructure.

According to surveys done by some of our members, the majority of the investors providing this capital—up to 80 percent--are individual investors. Many of the investors are seniors--roughly 75 percent are over the age of 50. For the most part, they are individuals seeking a relatively secure income-oriented investment providing a reasonable return, something that is hard to come by in today's market. These investments are particularly attractive to fixed income investors because MLPs generally are contractually required to distribute all cash available from their operating surplus every quarter, providing investors with a reliable income stream. In addition to the individuals investing directly in MLPs, there are millions more who are investing in MLPs through one of approximately 45 MLP-oriented closed- and open-end mutual funds and ETFs. These funds provide individual investors with a comparable income stream without the tax complications of being a partner that direct investment entails.

In addition to providing income for investors, MLPs create jobs. As entities that distribute their cash flow rather than retain earnings, MLPs depend upon access to capital. Nevertheless, during the recent economic downturn, when capital was relatively scarce, they were among the first to recover, raising and investing billions of dollars in job-creating infrastructure projects at a time when most corporations were downsizing and laying off employees. A study performed for NAPTP by Quantria Strategies LLC found that midstream energy MLPs support approximately 323,000 U.S. jobs as of 2012, both directly and through supply chain linkage.[4] To the extent that growth in every sector of the economy depends on the free flow of energy supplies, MLPs may have an even greater impact on domestic employment.

Why MLPs Are Important

The majority of the growth in MLPs has been in midstream energy services because in the years since 1987, the energy industry has discovered that the MLP structure is uniquely well-suited for midstream operations. Midstream businesses require considerable capital for the construction of pipelines, processing plants, and other assets, and thus the cost of capital is a very important consideration for them. Once these assets are in place, they last a long time and generate a steady and reliable stream of revenue. This is a fee-for-service industry, generally not exposed to commodity price shifts but rather generating moderate revenue through contracts to process and transport natural gas, oil, and petroleum products.

While steady and reliable, the income from midstream assets is somewhat low in relation to the amount of capital expended, particularly in the case of rate-regulated pipelines. For this reason, corporate energy companies have increasingly preferred to divest themselves of these low-return assets and put their capital into more profitable exploration and drilling operations;

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[3] As reported by Barclay's Capital.

[4] John F. O'Hare and Judy Xanthopolous, *Midstream Energy Master Limited Partnerships Economic Analysis – Contributions to Employment and Income*, June 2012.

and when they do, these assets are typically acquired by MLPs. The single-taxed MLP structure lowers the cost of capital, allowing a more reasonable return on investment in these assets.

Moreover, the steady income stream allows midstream MLPs to meet a key demand of MLP investors: reliable cash distributions. As with any pass-through entity, MLP unitholders must pay tax on their share of the MLP's income every year, whether they receive it or not. Thus, an MLP will attract investors only if it pays out enough cash to cover the unitholder's tax and provide a reasonable return on top of that. Accordingly, MLPs' organizational documents contain a requirement that MLPs distribute their available cash flow to investors rather than retain earnings, and MLPs that fail to meet that standard do not do well in the market.

MLPs do not just own and acquire existing midstream assets; they are busily constructing new ones. Today it is increasingly MLPs that are building, expanding, and operating pipelines and other energy infrastructure in the United States. It is MLPs that ensure that domestic oil and gas get from the places they are produced to the places where they are consumed, in the forms which consumers need. Most importantly, it is MLPs that will advance the potential for energy independence by allowing natural gas and oil produced from the recently discovered shale plays to be fully utilized. Some of these shale plays are in areas with little of the infrastructure required to process and transport the underlying resources; others have overwhelmed the infrastructure that does exist.

A paper published by the INGAA Foundation in 2011 estimated that over the next ten years, we will need to invest $130 billion in natural gas, NGL, and oil pipelines and related infrastructure.[5] Over 25 years (2011-2035), $251 billion will be needed. Those investments are being made to a large extent by MLPs. From 2007 through 2012, the largest MLPs have made non-acquisition capital investments of approximately $88 billion, many of them in the shale-play areas. This year they are expected to invest another $25 billion, bringing total investment to approximately $113 billion.

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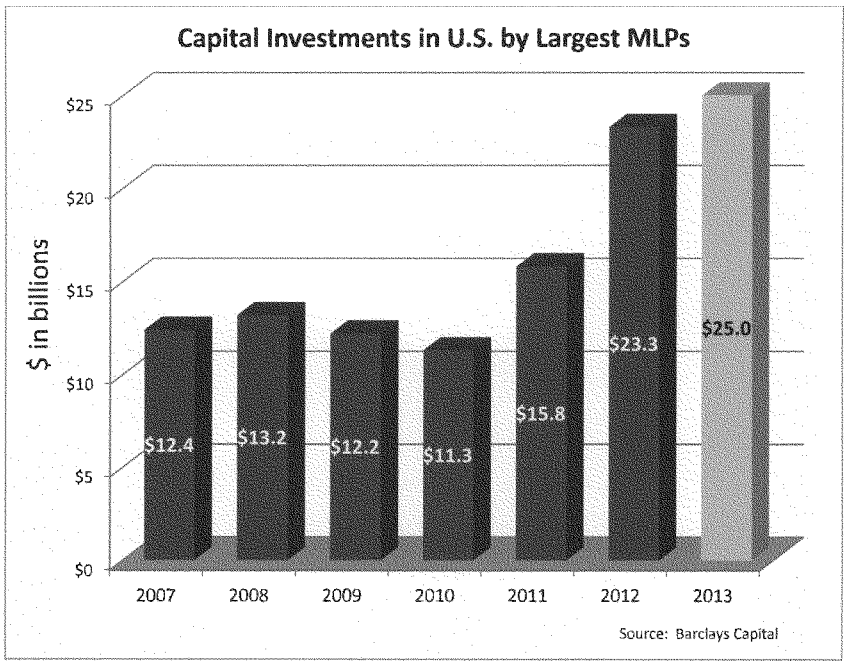
[5] ICF International, North American Midstream Infrastructure Through 2035 – a Secure Energy Future, June 28, 2011.



According to the Quantria Strategies study, over the next five years the midstream MLP industry will support more than 1.6 million jobs on an annual equivalent basis,[6] or about 330,000 jobs per year, and will pay cumulative wages totaling $147 billion.

Consequences of Corporate Taxation

While MLPs are formed for a number of reasons, it is the pass-through tax treatment that makes the MLP structure such an effective vehicle for midstream assets. Pass-through taxation lowers the cost of capital for a capital-intensive industry with a very modest rate of return and provides ordinary investors with a reliable income source in return for participating in the build-out of U.S. energy infrastructure.

[6] Annual equivalent employment is defined by Quantria Strategies as the number of full-time jobs supported over a 12-month period.

For these reasons eliminating the pass-through tax treatment of MLPs would significantly and adversely impact future investment in our nation's domestic energy infrastructure at a time when such investment is urgently needed. If such a change were made, there would initially be significant disruptions in the financing and construction of pipelines and related facilities during the transition, as MLPs coped with the new rules, and investors dealt with this significant change. After that, the build out would not be halted, but it would proceed more slowly and at a lower level than it would have if the law had not been changed,

A study by Phillip Swagel, former Assistant Treasury Secretary for Economic Policy, and Robert Carroll, former Deputy Assistant Treasury Secretary for Tax Analysis, found that the higher cost of capital resulting from corporate taxation of MLPs would reduce pipeline investment by close to 30 percent--or more--immediately following the change to corporate tax status, with investment still 13 percent to 20 percent lower ten years after the change. As a result of such a delay in building the infrastructure needed to deliver energy to consumers, U.S. businesses and households would face over $13 billion in higher annual energy costs, and possibly considerably more if reduced investment in energy transportation infrastructure led to serious bottlenecks that impacted energy prices.[7] It is likely that higher energy costs would in turn have a negative impact on the overall economy.

There would be a cost in jobs and wages as well. The Quantria Strategies analysis found that if midstream energy MLPs were subject to corporate-level tax, total annual employment would decrease by more than 27,000 jobs over the next five years and wages paid to workers directly and indirectly by the sector would decrease by about $2 billion.

Finally, imposing corporate taxation on MLPs would impact millions of individual investors, particularly seniors, who have turned to MLPs as one of the few remaining investments that reliably generate income in a low interest rate environment. The change would affect the value of over 100 MLPs, adversely impacting their direct investors, as well as the investors in dozens of open- and closed-end mutual funds, ETFs, and other investment vehicles whose assets consist wholly or largely of MLPs. Billions of dollars of assets would be devalued with one stroke of the pen. This is in marked contrast to 1987, when only about 35 MLPs with "nonqualifying income" were impacted by the new law, and MLPs were still a relatively obscure investment, with no MLP-oriented investment funds in existence.

Conclusion

Twenty-six years ago, Congress examined the question of whether MLPs should continue to be taxed as partnerships or whether all MLPs should have to pay corporate tax. It decided that while MLPs were not appropriate for industries that had historically used corporate structures, the energy industry, which was and is vital to our country's well-being and which had always raised capital through partnerships, should continue to be allowed to expand its access to investor capital through the use of MLPs.

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[7] Phillip Swagel and Robert Carroll, *The Impact of Changes to the Tax Treatment of Master Limited Partnerships*, January 2012.

In the years since, that decision has proven to be a wise one. MLPs have operated as Congress envisioned in 1987 and are now an integral part of the way our nation is positioned to move forward in achieving greater energy independence by developing our own domestic energy supplies. Over the past several years, MLPs have raised tens of billions of dollars of capital, and have invested it in building new and vitally needed energy infrastructure, while at the same time seeing that energy products make their way efficiently and in numerous forms from the production fields, through processing facilities, and across the country to end users.

MLPs have also grown to be an important investment option for many individuals, in particular older Americans looking for a safe and reliable income source to fund their retirement. Millions of individual investors are enjoying an investment opportunity that before the advent of MLPs was available only to the very affluent, while at the same time contributing to the achievement of energy independence.

As the saying goes, "If it ain't broke, don't fix it." There is no compelling reason as a matter of tax or other policy to subject MLPs to an entity-level tax. Neither public trading nor a particular size requires corporate taxation.

Any concern over MLPs eroding the corporate tax base was ended in 1987 by the enactment of section 7704. The substantial growth in pass-through entities in recent years, noted by so many, did not come from MLPs. Imposing corporate tax on MLPs would do a great deal of harm to our efforts at achieving energy independence, to tens of thousands of workers, and to millions of investors, in return for a benefit that, if it exists at all, is very difficult to perceive.

STATEMENT FOR THE RECORD

Senate Finance Subcommittee on Energy, Natural Resources, and Infrastructure
Hearing on Powering our Future: Principles for Energy Tax Reform
July 31, 2013

Dear Madam Chairwoman:

On behalf of our thousands of member companies and more than half a million Americans working in our industries, we urge the Congress to extend the production tax credit (PTC) and the investment tax credit (ITC) [in Sections 45, 48 and 25D of the Internal Revenue Code], with a commence construction eligibility standard for both tax credits. Moreover, under any given tax incentive structure, there should be parity in the tax code between technologies. This would mean updating the tax code to ensure that technologies receive comparable incentives rates and equal accessibility within any given tax incentive structure.

Access to a diverse, abundant, reliable and affordable supply of energy is inarguably in the national interest. Over the last century, federal policies have provided a legislative and regulatory framework that have helped every major source of energy utilized in the U.S. reach commercial scale. Well-crafted tax incentives have played, and should continue to play, a vital role in developing new domestic energy resources, contributing significantly to America's long-term economic prosperity and growth.

Over the past five years, more than 35% of all new domestic power generation has come from renewable energy resources, including more than 49% of all new power generation in 2012 – surpassing all other energy sources. The production tax credit and the investment tax credit have been the primary policy drivers for this growth, spurring private sector investment, creating jobs, and driving down costs significantly, making renewable and clean technologies more cost competitive.

The clean energy sector has the potential to be one of the greatest engines of middle class job growth in the 21st century, while providing our nation with secure sources of clean and renewable domestic energy. To realize that objective, however, we must have a supportive and certain tax policy environment. Renewable tax incentives help make the tax code fairer, aid in

our national and energy security and have promoted job and economic growth across the country.

Our trade associations, which represent a broad portfolio of clean and renewable energy technologies, urge the Congress to maintain long-term tax incentives that will continue to encourage the growth of clean and renewable domestic energy resources in the United States.

Sincerely,

Rhone Resch, President and CEO
Solar Energy Industries Association

Tom Kiernan, CEO
American Wind Energy Association

Jim Lanard, President
Offshore Wind Development Coalition

Ted Michaels, President
Energy Recovery Council

Karl Gawell, Executive Director
Geothermal Energy Association

Linda Church Ciocci, Executive Director
National Hydropower Association

David Gardiner, Executive Director
Alliance for Industrial Efficiency

Robert E. Cleaves, President & CEO
Biomass Power Association

Patrick Serfess, Executive Director
American Biogas Council

Jennifer Jenkins, Executive Director
Distributed Wind Energy Association

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