



Good Government Investments in Renewable Energy

Fair, Effective, and Efficient Tax Policy Is Key
for Driving Renewable Energy Growth

Richard W. Caperton January 2012

Introduction

Budget deficits drove the conversation in Washington in 2011 with the daily news dominated by government shutdown threats, the “super committee,” continuing resolutions, and arcane budgeting practices. Unfortunately, this left Americans convinced that government investments in the future are off the table because of large federal budget deficits that need to be reduced.

Americans were misled. As the Center for American Progress [points out](#), the United States can balance our budget, reduce our long-term debt, and make key investments in our future all at the same time. CAP’s plan works toward a more vibrant economy where all Americans are better off and clean energy is an integral part of this future. Best of all, the investments that government needs to make are relatively modest and can be paid for by ending wasteful spending in the same energy sector.

There is no doubt that Americans need clean energy because it’s vital to our nation’s economic competitiveness, security, and health.

There is also no doubt that government will play an important role in making the transition to clean energy.

Why? Because the federal government always has been—and always will be—a player in energy markets. The federal government has made investments in energy for more than a century, by granting access to resources on public lands, helping build railroads and waterways to transport fuels, building dams to provide electricity, subsidizing exploration and extraction of fossil fuels, providing financing to electrify rural America, taking on risk in nuclear power, and conducting research and development in virtually all energy sources. There’s no reason that Washington should stop making new investments.

Considering the history, government investment has led to amazing developments, including universal access to reliable and affordable electricity, lasting economic development, and industrial growth. This success story alone could justify continued government engagement of vibrant energy markets.

When we consider that investments in clean energy are investments in America's future, it's clear that the smart choice is to make these investments to meet the next generation of energy challenges and to produce a foundation of affordable, reliable, and clean energy alternatives for future waves of investment and opportunity. At the same time we can no longer afford indiscriminate or wasteful subsidies. It is essential that government's investments in energy be fair, effective, and efficient.

This issue brief examines how the government currently invests in renewable energy, when those investments are effective, and how those investments should work in the future.

Energy and the tax code

The federal government has a suite of tools at its disposal to make investments, including cash grants, regulatory incentives, tax expenditures, and financing supports. When properly designed and targeted, each of these tools plays an important role.

In the energy sector most government investment happens through the tax code. Indeed, for energy companies that receive federal support, the most important day of the year is Tax Day, when they receive a large amount of their government benefits. In fact, 44 percent of energy spending in 2010 was through the tax system, with the remainder through other tools.

There are both good and bad reasons for this. Both companies and the government have an established system for paying and processing taxes, so providing investments through the tax code provides for efficient delivery of incentives by tapping existing infrastructure and rules. More cynically, however, tax expenditures are an expedient that may be at cross-purposes with good government practice because they are held to different budget standards than direct spending. This means that working through the tax code is less transparent and therefore far easier to pass through Congress with reduced budget scrutiny.

These issues are discussed in detail in the CAP report "[Government Spending Undercover: Spending Programs Administered by the IRS](#)" by Lily Batchelder and Eric Toder.

Tax expenditures are government spending programs that deliver subsidies through the tax code via special tax credits, deductions, exclusions, exemptions, and preferential rates. While the actual implementation can be complicated, tax expenditures are

economically the same as direct spending both for the government and for beneficiaries. With direct spending, the government brings in tax money and then spends it, while with tax expenditures the government simply reduces the taxes that a company owes. Either way, the company has more money and the federal government has less.

Tax expenditures should be held accountable for achieving results

The underlying reasons for so much energy spending being done through the tax code are unlikely to change, at least in the short term. Therefore it's important that energy tax expenditures work well. In [previous CAP work](#) we've called for regular reviews of all tax expenditures to ensure this spending is effective, efficient, and necessary.

There are some energy tax expenditures that clearly do not meet this standard. Sima Gandhi and I wrote in depth about this issue in "[America's Hidden Power Bill](#)," where we described obscure tax credits for the oil-and-gas industry that have existed for more than 80 years and have no demonstrable benefits for Americans. Such tax breaks simply provide windfall benefits to these mature industries at taxpayer expense. We also discussed several tax credits for clean energy that are much better designed.

This issue brief calls for Congress to take action on some of the most important clean energy tax issues in today's policy and political debates: the production tax credit, the investment tax credit, and the Treasury Cash Grant Program. Each of these can be extended in a way that both leads to powerful incentives for investment in our energy future and represents good tax policy.

Finally, it's important to note that each of the three primary issues is significant for a different reason. Because renewable energy sources have different characteristics they require different treatments within the tax code. Simply extending the production tax credit is not sufficient. Neither is extending the Treasury Cash Grant Program nor improving the investment tax credit. Congress needs to do *all* of these things. If Congress only takes action on one of these, they will in effect be "picking winners" across technologies.

Congress should instead focus on a comprehensive investment package that creates paths for all technologies so that American businesses will invest in the technologies that make the most sense for our country.

Three ways to invest efficiently and effectively

Fortunately, we already know some of the best ways for the federal government to make meaningful investments. Through effective and efficient use of the tax code, the

government can continue to help drive deployment of the energy technologies that will be critical to our future.

This section describes the three most important tax issues for the government to consider in encouraging the next wave of strategic energy investment in the United States. They are:

- The production tax credit
- The investment tax credit
- The Treasury Cash Grant

Let's look at each in turn.

The production tax credit

The renewable electricity production tax credit, or PTC, is the most critical tax incentive for renewable energy projects using wind, geothermal, biomass, and hydroelectric power technologies, among others. I'll focus on wind here because it's the most prominent, but investment in all of these resources is important.

The PTC is linked to electricity generation from a project. That is, for each kilowatt-hour of electricity produced, the owner of a project gets a tax credit. "Tax credit" means that the owner of the project gets to reduce their tax bill by a certain amount—currently 2.2 cents per kilowatt hour, or kWh—at the end of the year.¹

Let's look at an example. A typical large wind farm has several dozen turbines that can generate 100 megawatts of electricity. Because the wind conditions are only favorable for part of the year, it won't produce that much power all of the time. Instead, the wind turbines will only spin about 30 percent of the time. This wind farm will generate 262,800,000 kWh each year, which will earn \$5,781,600 in tax credits from the PTC.²

Let's be clear: This is a \$5 million government investment, but it just happens to have gone through the tax code. This tax credit is economically the same as government spending: The government has less money than they would have without the investment, and the project is more profitable. It is also true that the incentive helped stimulate the investment that made both the income and the tax expenditure possible. In short, this investment helped directly create economic activity and growth.

Since its creation in 1993, the government has invested several billion dollars in wind power through the PTC. These have been smart investments. The PTC is intended to incentivize the deployment of energy sources that are more expensive than fossil-fuel sources and whose cost will come down as more of the technology is deployed. This

is also known as driving a technology down its cost curve. Since 1980 the cost of wind power has declined by 90 percent.

Declining costs are critical because they allow for more clean energy to be built, which will improve our environment and diversify our power mix. Indeed, the PTC has led to massive amounts of new growth in the wind industry. Since 1993 more than 40 gigawatts of new capacity have come online.

We know this growth is attributable to the PTC. (see Figure 1)

Since its creation the PTC has only been extended for two years at a time. When it's not in effect, there's virtually zero investment. When it is in effect, investment is tremendous. There are also more formal economic studies suggesting the positive outcome of the PTC: Economist [Gilbert Metcalf](#), for example, finds that "[T]he data suggest that much of the current investment in wind can be explained by the production tax credit for wind." (For more information on how we know the PTC works, see the CAP report, "[America's Hidden Power Bill](#).")

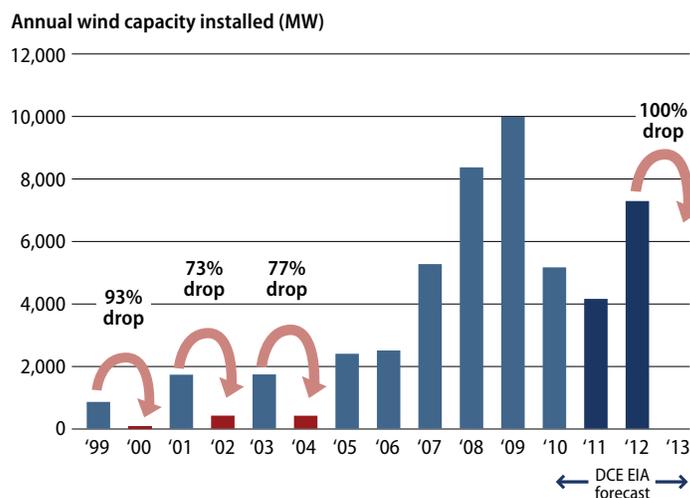
The PTC also has real benefits for American workers. At least 85,000 people work in the wind industry. These workers are spread all across our country and throughout the industry. We have people making turbines, installing them, and operating them, all in good-paying jobs.

Unfortunately, we don't have as many people working in the wind industry as we could. While the wind-manufacturing sector has grown in recent years, it has historically been crippled by the PTC expiring every two years. Manufacturers know that this on-again, off-again cycle for the industry would leave them with virtually no business every other year, so American wind farms use some imported parts.

Indeed, we have more demand for certain turbine parts than we have domestic manufacturing capacity. In particular, U.S. manufacturing capacity is insufficient for gearboxes, generators, bearings, and castings. The lack of consistent policy is clearly contributing to U.S. underinvestment in domestic production of these strategic technologies. Our economic competitors have simultaneously developed robust manufacturing capacity to serve both their growing domestic demand and meet global demand through technology exports. (see Figure 2)

FIGURE 1
Wind investments dramatically decline when the PTC lapses

Precipitous drop expected in 2013



Source: AWEA

Over the past three years, however, the United States experienced tremendous growth in wind manufacturing, partly because of the relatively stable PTC, which was most recently extended for four years as part of the 2009 American Recovery and Reinvestment Act, known as the stimulus. In that time new manufacturers set up shop across the country and the composition of domestic parts that each turbine made has steadily increased while our wind energy imports declined. This should be a lesson to Congress: A long-term PTC is more valuable than a short-term extension when we look at the overall impact on jobs and growth.

Instead of allowing the PTC to expire this year, it should be extended for at least four more years to give confidence and stability to investors throughout the supply chain. This doesn't mean, however, that the PTC should be extended indefinitely without review. This is exactly one of the biggest problems with many of the deeply flawed fossil-fuel subsidies. If Congress wants to extend it beyond that timeframe, they should build in a review process to evaluate whether or not the credit should be adjusted in any way.

Congress should review the size of the credit and review whether or not it should be linked to inflation. Ultimately as the industry matures and markets expand, the PTC—like other subsidies that have done their work and grown strong domestic industries—should be allowed to sunset, taking taxpayers off the hook for payments.

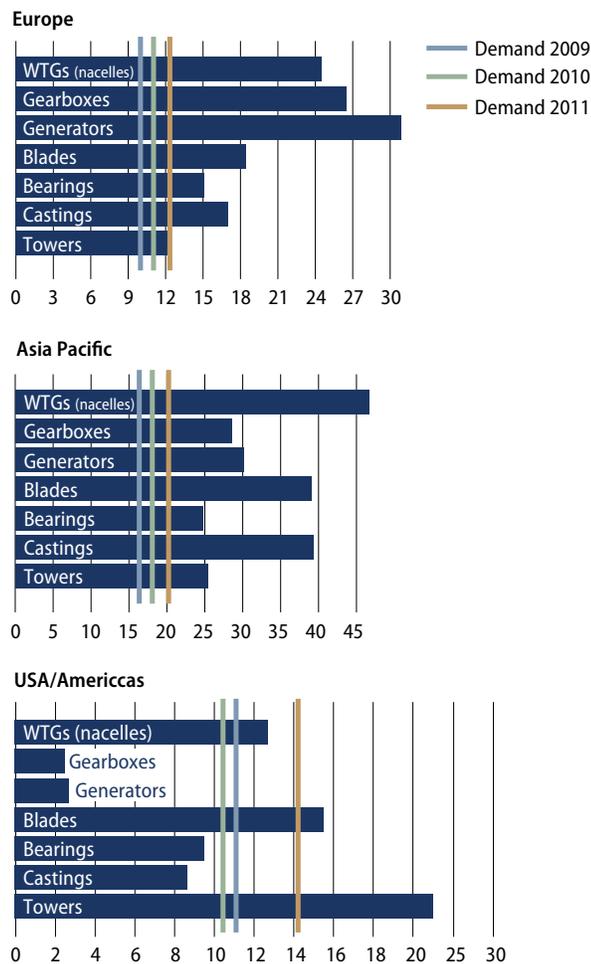
The investment tax credit

While the production tax credit primarily benefits wind, the solar industry is the primary beneficiary of the investment tax credit, or ITC. The ITC works a little differently, in a way that makes more economic sense for the type of capital investment required for developing solar energy projects. Instead of the tax credit being spread over 10 years and only awarded as energy is produced, renewable energy developers get an upfront tax credit based on the initial investment in the project. For solar power the credit is worth 30 percent of the initial investment.

So if a building owner spends \$6 million to put a 1 megawatt solar energy system on a building's rooftop, the building owner is then awarded a \$1.8 million tax credit—but the owner is not allowed to claim any other tax credits over the life of the project.

FIGURE 2
U.S. manufacturing capacity is insufficient for certain turbine parts due to policy instability

Extending the PTC would help build the entire manufacturing sector in the United States



Note: U.S. key gaps in supply
 Source: MAKE Consulting

The upfront, one-time nature of the ITC has some real benefits for solar power. First, solar is a more expensive technology to initially install, so investors have a special need for the investment-based incentive. Second, solar is a younger industry than wind, and the technology isn't quite as proven over the long term. This means that future energy production is slightly less certain with solar power than with wind power, so a production-based incentive would be less valuable.

Just like the PTC, the ITC has been a tremendous success. The solar industry has experienced extremely impressive cost improvements. (see Figure 3)

Not surprisingly, as costs fall and demand rises, the solar industry now employs more than 100,000 people, up from 20,000 just five years ago.

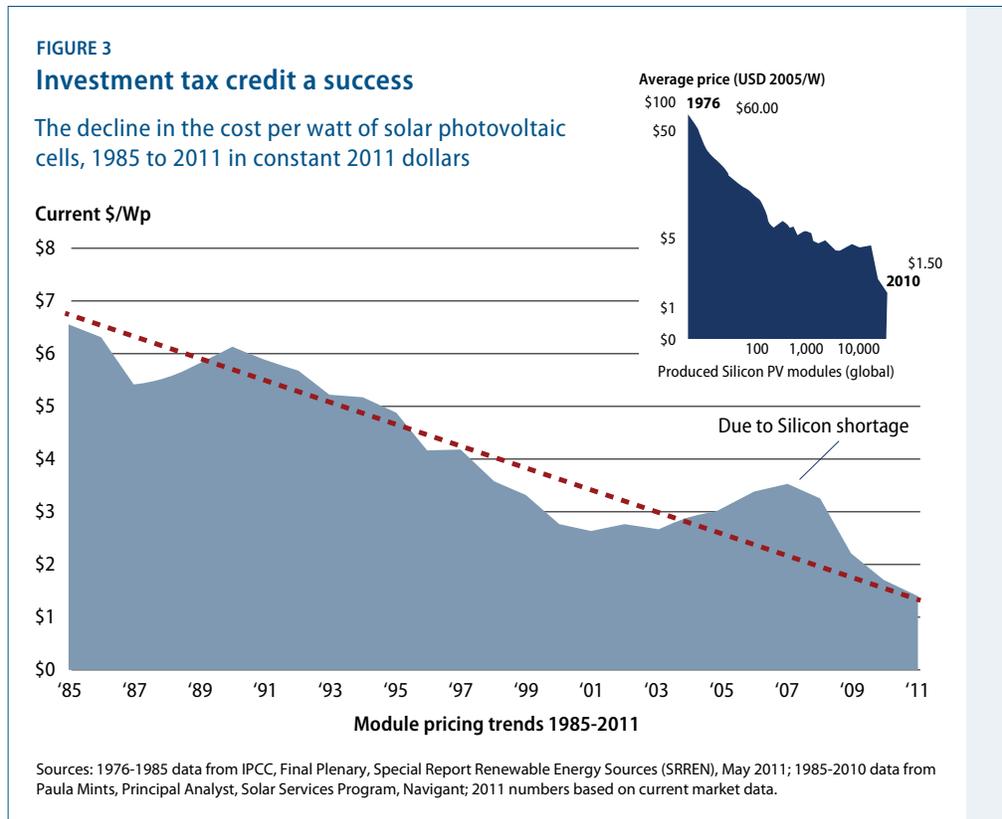
The ITC was extended until 2016 as part of the stimulus bill. The extension provided very valuable certainty to the solar market, but when it expires Congress should also review the size and effectiveness of this credit.

The Treasury Cash Grant in lieu of tax credits

Despite their incredible successes, the PTC and ITC aren't perfect, and they don't provide a complete offering to meet the full range of project-financing needs faced in the emerging renewable energy market. The biggest problem is that most renewable energy projects are structured in such a way that they don't earn profits for the first several years of the project's life.³ The developer only owes taxes on profits (not revenues), so they may not owe any taxes for years after building the project.

At the same time, tax credits are used to reduce the amount of taxes owed. Thus, if the developer doesn't owe any taxes, the associated credits are worthless. This is a structural limitation of using the tax code to support strategically valuable public investments.

Traditionally, project developers have worked around this problem by bringing in so-called "tax equity investors." These investors—typically large financial institutions—essentially



Source: Tom Dinwoodie (SunPower) and Dan Shugar (Solaria)

buy the tax credits from a project.⁴ This cash from the tax equity investor is extremely valuable and allows developers to monetize the tax benefits without actually owing taxes.

This system worked fairly well before the financial crisis. There was more than \$6 billion in tax equity available in 2007. The pool of tax equity capital shrank dramatically, though, when large financial institutions no longer owed taxes, as they lost money in 2008 and 2009.

This shortfall was fixed with something called the Treasury Cash Grant Program. This program, also known as the Section 1603 program because of where it's included in the stimulus bill, does two things:

- It makes the PTC-eligible technologies also eligible for the ITC.
- It allows developers to get a cash grant instead of the ITC.

This means that all renewable developers are able to get a cash grant from the Treasury Department for 30 percent of the initial investment in their project. This solved the tax equity market shortfall problem, and allowed renewable investments to continue. Instead of shrinking, the wind and solar industries grew during the recent recession, largely because the Section 1603 program helped with financing.

Unfortunately, this program drew to a close at the end of 2011. After creating the program in 2009, Congress extended it for one year at the end of 2010. Now they should extend the program for at least one more year, and ideally change it to run concurrently with the underlying PTC and ITC, always matching their expiration dates. This is especially important because there's not expected to be enough tax equity available to meet the demand. In 2011 the U.S. Partnership for Renewable Energy Finance estimated that there was a total of \$7.5 billion available through tax equity and the Treasury Cash Grant. They project that there will only be \$3.6 billion in tax equity available in 2012, which is far less than recent history suggests will be needed. (see Figure 4)

The cash grant program makes the PTC and ITC more effective, more efficient, and more transparent. It makes absolutely no sense to have this beneficial program on a different schedule than the tax credits it improves.

In addition to overcoming a simple shortfall in investment capital from the tax equity market, the cash grant program has several benefits that make it superior to a tax credit.

First, the cash grant is more economically efficient. In a best-case scenario, the tax equity investor is going to buy tax credits at a slight discount (it makes no sense to pay full price because then there's no possible profit for the investor). In real life, however, there's evidence that tax equity investors buy tax credits at a much deeper discount. The [Bipartisan Policy Center](#) finds that even though a tax credit and cash grant may have the same face

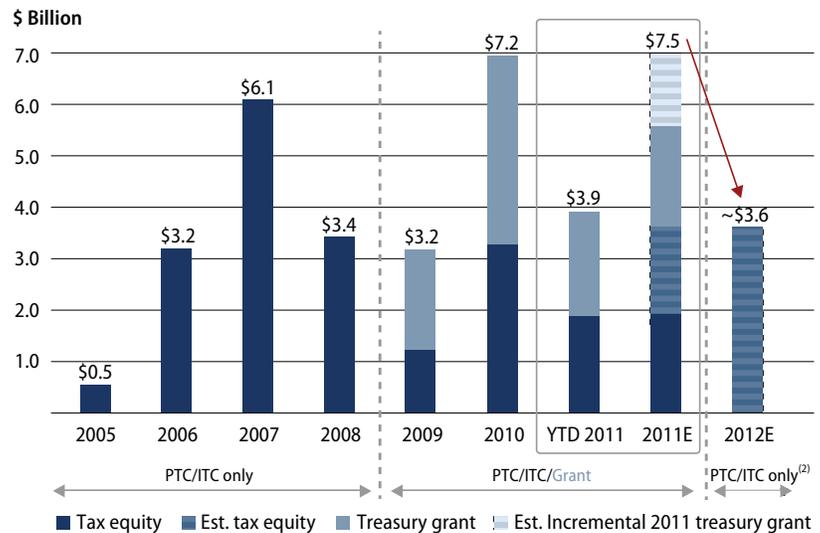
value to the government, the tax credit is only half as valuable as the cash grant to the project developer and thus is dramatically less effective at producing clean energy outcomes.

Second, the cash grant is much more transparent. When a developer claims the ITC, all they do is check a box and write in a number on a tax form. When they claim the cash grant, however, they submit much more information, such as details on the project and the number of jobs that will be created with the investment. And while tax information is strictly confidential, the Treasury publishes a list of every project that has received a Section 1603 cash grant.⁵

If Congress does choose to extend the cash grant program to always match the PTC and ITC extensions, thus making this public spending more efficient for taxpayers, they should also evaluate the size of the tax credits. The overwhelming popularity and the evidence of the cash grant's economic efficiency seem to indicate that the ITC could be made smaller if it is always offered as a cash grant.

FIGURE 4
The tax equity market has not recovered enough to end the Treasury Cash Grant Program

Tax equity and Treasury grant financing 2005 to 2010, 2011 (estimate), and 2012 (forecast)



Last year's US PREF tax equity study estimated there would be ~\$3.0 billion of tax equity available in the market place through the end of 2010 — by the end of 2010 ~\$3.3 billion of tax equity was deployed.

Last year's study estimated there would be ~\$3.0 billion in a normal market of tax equity available in 2011 — year-to-date \$1.9 billion in tax equity has been deployed, this study estimates by year end 2011 there may be ~\$3.6 billion of total tax equity.

Sources: U.S. Department of The Treasury, US PREF Estimates, Leading Tax Equity Market Participants
 (1) Includes all 1603 Treasury Grants for renewable projects
 (2) Projects with 5% equity spend or in continuous construction prior to 12/31/2011 and that achieve COD by 12/31/2012 are eligible for the Section 1603 cash grant

Source: US Partnership for Renewable Energy Finance

Expanding the investment tax credit for offshore wind

In addition to the three key policies described above, there is a fourth way that the tax code could be improved to boost renewable energy. For many years the technologies eligible for the PTC and ITC have remained unchanged. But there's no reason that new developments in renewable energy technology shouldn't be accounted for with modifications to the tax code. Most importantly Congress should place technologies within the PTC or ITC (or both) depending on the unique characteristics of each technology and their specific capital investment needs.

The offshore wind industry is poised to take off in the waters off of America's East Coast. Unfortunately, as Michael Conathan and I wrote in "[Clean Energy from](#)

America's Oceans, “More than 40,000 megawatts of offshore wind energy capacity have been permitted around the globe, yet the United States accounts for barely 1 percent of that, and we have yet to generate our first watt of electricity from this abundant, carbon-free source of power.”

There's no shortage of interest in building offshore wind farms and several projects are moving forward with permitting and siting. The right government investment can provide critical support for leveraging private capital investment in these projects to accelerate the growth of this new American industry.

In many ways, offshore wind looks more like solar than it looks like onshore wind. For instance, the technology has extremely high upfront costs. These are expected to rapidly decline over time, but they are currently a significant barrier to investors entering this market.

Further, the offshore wind technology is largely unknown and unproven in the eyes of American investors and returns are therefore discounted in the capital market. Because the future production from an offshore wind farm is less certain than with onshore wind, the value of the production tax credit is also unpredictable.

Congress should address this issue by making offshore wind temporarily eligible for the ITC, which better suits this emerging industry. As the industry grows and more closely resembles onshore wind, the technology should shift back to the PTC.

Conclusion

Clean, renewable energy is a bright spot in the U.S. economy. This industry is a success story that has resulted in job creation, scientific innovation, cleaner air, and a stronger manufacturing sector.

Yet this is still a young industry and it still needs significant public investment. Importantly, this investment should be structured in a way that supports the entire industry in an efficient, cost-effective manner. When the government invests in clean energy, they need to match the tools available to the specific technologies and businesses that they're supporting.

In this issue brief we have explained why the production tax credit should be extended. This is the fundamental tool that the government uses to invest in renewable energy, and it has been a tremendous success. But extending the PTC is not sufficient to support the whole industry.

Other technologies require an investment tax credit, which can be made more effective when issued as a cash grant, as in the Section 1603 Treasury Cash Grant Program.

Finally, there are new types of renewable energy that are not properly treated in existing law. Offshore wind power is much better suited to the ITC than the PTC, and Congress acknowledged this by making offshore wind specifically eligible for the ITC.

This strategy of strong investment in renewable energy, with the investment channeled through a mix of tools, will make America a better place. Congress should start 2012 by making this happen.

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Endnotes

- 1 The PTC is indexed to inflation. The credit was originally for 1.5 cents per kWh in 1993 and has increased since then.
- 2 $100 \text{ MW} \times 8760 \text{ hours per year} \times 30 \text{ percent} \times 1000 \text{ kWh per mWh} \times 2.2 \text{ cents per kWh} = \$5,781,600$
- 3 As with all tax issues, there are extremely complicated rules associated with the PTC and ITC that make their implementation somewhat challenging. For example, the accounting standards that help determine how big the initial investment in a project is (which is necessary for claiming the ITC) are often questioned.
- 4 The actual structure of these investments is extremely complex, since tax credits can't really be "sold." Instead, the tax equity investor typically owns all of the assets of a project for the first few years in order to capture the tax benefits, and then ownership reverts to the developer to capture profits in out years. For more on these structures, see: John P. Harper, Matthew D. Karcher, and Mark Bolinger, "Wind Project Financing Structures: A Review and Comparative Analysis" (Washington: Ernest Orlando Lawrence Berkeley National Laboratory, 2007), available at <http://eetd.lbl.gov/EA/EMP/reports/63434.pdf>.
- 5 For more on these issues and other benefits of cash grants, see "America's Hidden Power Bill."