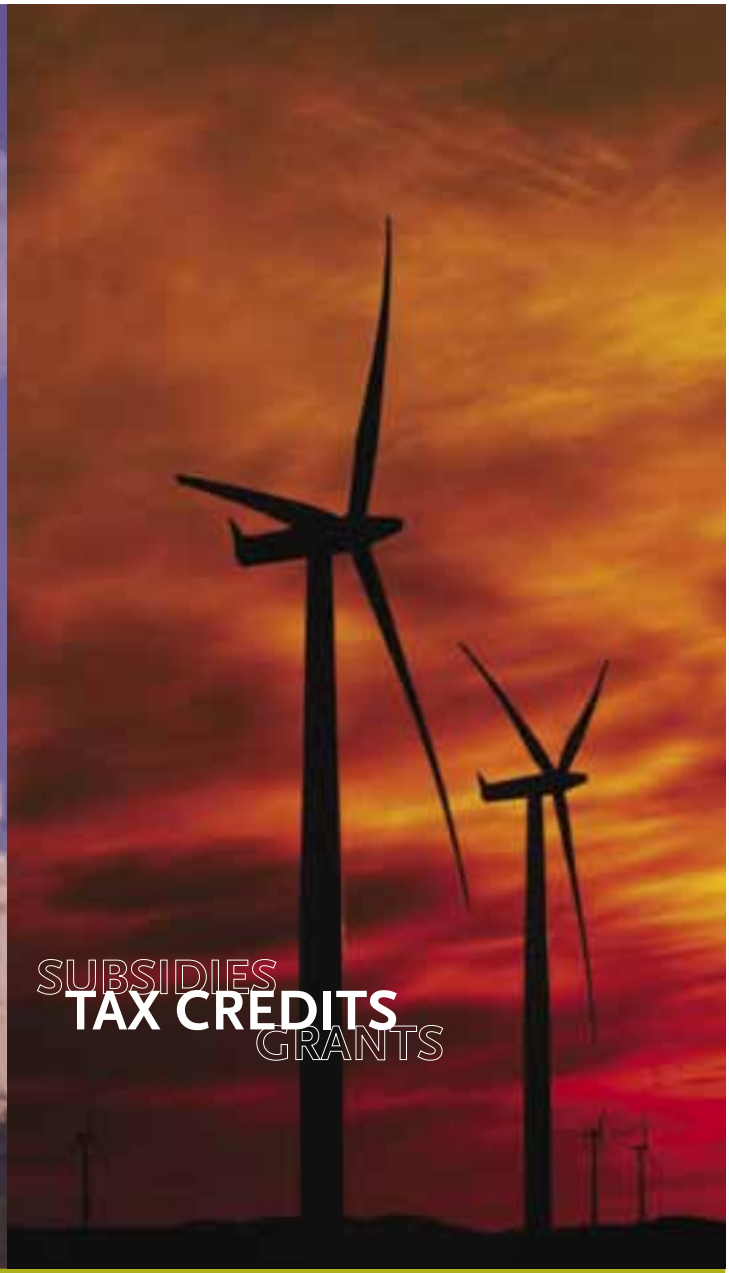

Reassessing Renewable Energy Subsidies

ISSUE BRIEF

FROM THE STAFF OF THE BIPARTISAN POLICY CENTER

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March 22, 2011

Dear Colleagues,

Over the last two years, the economic and political landscapes have shifted dramatically. As the economic recession began to unfold in late 2008, the financial markets collapsed. Among many other things, these conditions dramatically slowed the growth of renewable energy project development because project financing for renewable energy—which relies on specialized "tax equity" markets—virtually ground to a halt. Fortunately, today there are signs that the economy as a whole, and the renewables industry in particular, is in recovery.

The recovery for renewable energy is largely due to a policy fix called the Treasury's 1603 Cash Grant Program, which simplified project financing by delivering money directly to developers in an upfront grant rather than through the tax credits. The Cash Grant Program received a one-year extension under the tax extension package passed by Congress and signed by the President late last year. (This report went to press when it was unclear if the Cash Grant Program would be extended).

Still, the long-term outlook for renewables incentives remains uncertain. Congress is currently in a heated debate over the Congressional Resolution for the remainder of this fiscal year. The House has committed to significant spending cuts and has targeted a number of clean energy spending programs. Meanwhile, the Administration has made clean energy spending a priority. It is unclear how the impending budgetary showdown will play out, but it is increasingly likely that the Cash Grant Program will not be extended again.

This Issue Brief, completed late last year, examined the tax incentives for renewable electricity development. Recognizing the renewable energy tax credits have been an enormously important mechanism for growing the industry, the primary goal of this analysis was to explore how they could be improved to be more effective for project developers and more accountable to taxpayers. Our analysis described in this Issue Brief reveals that there is a large opportunity to make these mechanisms work better. Perhaps more importantly, however, this assessment suggests that there may be large opportunities to improve energy subsidies more broadly. As concern about the national debt puts increased pressure on all federal expenditures, it is clear that the time for a comprehensive review of *all* energy subsidies is now.

Over the coming months, the Bipartisan Policy Center will look more closely at these issues. This Issue Brief should be seen as a starting point for a broader discussion on energy subsidy reform. We believe this will appeal to both Republican and Democrats and we look forward to advancing the debate in the months to come.

Sincerely,

Sasha Mackler
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INTRODUCTION

Recent years have seen a surge of interest in, and support for, renewable energy technologies as a means to address climate change and other environmental concerns while at the same time diversifying the U.S. electricity supply mix, promoting advanced technologies, and supporting local economic activity and job creation. As 2010 draws to a close, however, the outlook for the renewable energy industry going forward looks increasingly uncertain.

This issue brief was prepared by the staff of the Bipartisan Policy Center (BPC) in close collaboration with Neil Auerbach and his team at Hudson Clean Energy Partners. In addition, the staff of the BPC would like to thank Richard Schmalensee, Norm Szydlowski, and Gordon Binder for their helpful comments on previous drafts. We would also like to acknowledge the expert contributions from Bloomberg's New Energy Finance and ClearPeak Advisors. However, the staff of the BPC is solely responsible for the content and views expressed in this paper.

On the one hand, 29 states and the District of Columbia have adopted renewable portfolio standards (RPS) that will require a growing fraction of electricity delivered in those states to be generated using renewable resources. On the other hand, Congress, which has debated various proposals to establish a similar policy at the national level, looks increasingly unlikely to act on either climate or renewable energy legislation any time soon.[1] Moreover, concern about the national debt seems certain to put increased pressure on all forms of public support for clean energy technologies in the years ahead. Against this backdrop of patchwork state requirements and continued federal paralysis, the question is whether existing policies and market drivers will be sufficiently strong and sufficiently stable—especially in the near term and especially in the current environment of high economic and regulatory uncertainty—to overcome the still formidable financing challenges that confront many renewable energy technologies. Absent a federal RES and with growing pressure on federal and state budgets, new approaches are needed to ensure that the public resources available for clean energy are being used as effectively as possible to help new renewable industries move down the learning curve and achieve greater economies of scale.

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To date, growth in those industries has been highly dependent on federal subsidies. In fact, a few federal tax policies have been responsible for most of the financing directed to renewable energy projects in this country for some time—specifically the Production Tax Credit (PTC) and the Investment Tax Credit (ITC).[2] And although the industry has made significant progress toward reducing costs and increasing efficiencies over the last two decades, many renewable projects would still be uneconomic in today's marketplace absent federal subsidies. At the same time, current incentive programs have significant drawbacks—many of which have been underscored by the recent economic downturn.[3]

Some of these drawbacks, of course, are being addressed on a short-term basis by the American Recovery and Reinvestment Act (ARRA) of 2009—most notably through the Section 1603 cash grant program.[4] However, unless Congress acts (which most observers regard as increasingly unlikely) many ARRA programs and provisions will not be extended beyond 2010 when the two-year stimulus program ends. The 1603 cash grant program will expire on December 31, 2010, for instance. Meanwhile,

[1] In 2009, the House of Representatives passed H.R. 2454, which includes a federal RES, and the Senate Committee on Energy and Natural Resources passed an energy bill, S. 1462, that also includes a national RES. The House version would establish a 20 percent RES by 2020, while the Senate proposal would set a 15 percent RES by 2021. In late September, 2010, Senators Bingaman, Brownback, Dorgan, and Collins introduced S. 3813, which includes a RES similar to that of S. 1462 (that is, a 15 percent RES by 2021). In a similar vein, Senator Lindsey Graham introduced S. 20 in September 2010, which would establish a national clean energy electricity standard of 20 percent by 2020 that would include renewables, nuclear, and CCS coal power plants.

[2] Other incentives, such as accelerated depreciation (MACRS) and interest deductions, have also been important.

[3] For example, the tendency of the PTC and ITC to cycle from expiration (or near-expiration) to short-term extensions has resulted in a destructive stop-start pattern of investment. Furthermore, because renewable energy project developers typically do not have sufficient taxable income to benefit from tax credits, they often need to partner with financial intermediaries ("tax equity providers"—typically large financial institutions) that barter their tax capacity to monetize these credits. The recent recession exposed the limits of tax equity providers' capacity to provide sustainable funding, however, and debt capital—which is also critical to clean energy deployment at scale—has likewise been relatively scarce (though the situation has begun improving).

[4] The Section 1603 cash grant program allows renewable energy developers to convert the PTC to an ITC and then receive a cash grant equal to the amount of the ITC as a way to overcome diminished investor demand for tax credits as a result of the recession. Other ARRA tax credit provisions, such as the 48C Manufacturers Tax Credit (MTC), have also proved useful to larger clean energy manufacturers, but have been extremely difficult for smaller, entrepreneurial industry participants to monetize.

An incentive structure that succeeds in attracting and sustaining private investment in renewable energy technologies as efficiently as possible, while still providing incentives for sustained cost reductions and performance improvements, is critically needed.

funding for new programs is likely to be more constrained than ever in an era of trillion-dollar deficits and mounting concern about the nation's ability to put its long-term fiscal house in order.[5]

Given these realities, an incentive structure that succeeds in attracting and sustaining private investment in renewable energy technologies as efficiently as possible, while still providing incentives for sustained cost reductions and performance improvements, is critically needed. This paper evaluates the existing subsidy programs for renewables, takes note of how they have worked in practice, and identifies several options for improving on the current structure in ways that would continue to provide strong support for renewable energy development while also reducing costs to the U.S. taxpayer.

Although this paper focuses exclusively on reforming renewable energy incentive programs, it must also be noted that numerous programs have evolved over the course of many years of state and federal involvement in the energy sector that subsidize or otherwise extend special treatment to a particular technology, fuel, or niche actor. In effect, virtually *all* forms of energy receive public support in one form or another—too often without scrutiny and public accountability. Given the fiscal environment that lies ahead, an opportunity exists to reexamine all public subsidies in the energy sector to ensure that they promote cost effective production and make good use of taxpayer resources. Over the coming year, the Bipartisan Policy Center (BPC) expects to undertake an in-depth assessment of other public energy subsidy programs to highlight program inefficiencies and to propose reforms as necessary.

[5] This year the national deficit is expected to be $1.3 trillion; next year it is estimated to be $1.1 trillion. The total national debt currently stands at $13.7 trillion dollars and is expected to rise to over $15 trillion in 2011.

THE EVOLUTION OF RENEWABLE ENERGY FINANCE POLICIES

Over the last decade or so, a convergence of state and federal policies, manufacturing and technology cost reductions, and private-sector investment have contributed to impressive growth for renewable energy sources, particularly for wind and solar photovoltaics (PV). Like nearly all important energy sources, renewable energy technologies have benefited from federal and state incentives with differing success rates. The most notable federal government finance incentives have been the PTC in the case of wind and geothermal and the ITC in the case of solar.[6]

[6] It should be noted that the interplay between state and federal incentives for wind and, in particular, solar has had a powerful impact on the growth of these industries. While federal tax incentives have been essential to the growth of renewables to date, the expansion that occurred in the last decade would likely not have been possible in the absence of state-based regulatory requirements and/or incentives. The markets for Renewable Electricity Credits (RECs) created by state-level RESs (also called Renewable Portfolio Standards or RPS) have also helped support renewable energy projects. Less fortunate, from the standpoint of nurturing nascent renewable energy industries, is the fact that RES requirements vary considerably from state to state. This has created a patchwork of relatively thin markets for RECs.

Over the last decade or so, a convergence of state and federal policies, manufacturing and technology cost reductions, and private-sector investment have contributed to impressive growth for renewable energy sources, particularly for wind and solar.

The federal PTC provides qualifying projects with an inflation-indexed, per-kilowatt-hour (kWh) tax credit over a 10-year production period.[7] The federal ITC, on the other hand, allows project owners to claim a one-time tax credit equal to 30 percent of a project's capital costs.[8,9]

PTC and ITC Changes in the ARRA

The Recovery and Reinvestment Act (ARRA) that passed into law in February 2009 included important modifications to the PTC and ITC programs.[10]

- The PTC eligibility date was extended for wind projects in service by December 31, 2012 and for biomass, geothermal, and other renewable energy projects in service by December 31, 2013;
- Renewable energy projects are now allowed to opt for either the ITC or the PTC;[11]
- Project owners may receive a cash grant from the Department of Treasury in lieu of an ITC for projects that begin construction in 2009 or 2010.[12]

Of these changes, the most notable is the Section 1603 cash grant program, which allows developers to receive upfront cash in lieu of tax credits. The goal of this modification was to simplify financing for renewable energy projects and improve access to capital during a time when tax burdens were inadequate to capitalize on tax-based incentives and debt financing was both scarce and expensive.

[7] As authorized by the Energy Policy Act of 1992, Section 45 of the Internal Revenue Code provides a PTC for eligible projects.

[8] The ITC is included in Section 48 of the Internal Revenue Code.

[9] Although a project owner is able to claim this tax credit at one time (usually the quarter of the year that the project is placed into service), there are many rules affecting what income this tax credit can actually count against (e.g. passive income rules). There are also rules that restrict the transfer of ownership interests in the project for a period of time after commercial operation (the "tax recapture period").

[10] In addition to the ARRA, important changes were made to the ITC and PTC as recently as September 2008 under HR. 1424, The Emergency Economic Stabilization Act of 2008. As part of this legislation, the ITC was extended for 8 years and the PTC for 1 year.

[11] If the ITC is chosen, the election is irrevocable and requires the depreciable basis of the property to be reduced by half of the amount of the ITC.

[12] To be eligible for the Section 1603 cash grant program, projects must commence construction or incur 5 percent of project costs by December 31, 2010. The Section 1603 cash grant is excluded from the gross income of the company and the depreciable basis of the property must be reduced by half of the grant amount.

CURRENT TAX POLICIES ARE INADEQUATE TO SUPPORT THE ACHIEVEMENT OF AMBITIOUS RENEWABLE ENERGY GOALS

Although the temporary 1603 cash grant program addresses the short-term challenge of inadequate tax capacity in the current market environment, there are also more persistent challenges with tax-based incentives that warrant review. Two major challenges have hindered the effectiveness of federal renewable energy tax credits: (1) the stop-start cycle of investment attributable to repeated extensions and expirations of these programs and (2) the structural challenges of these tax-based incentives — namely a limited investor pool with limited liquidity, which in turn creates higher financing costs and ultimately requires more tax dollars per megawatt of clean energy installations.

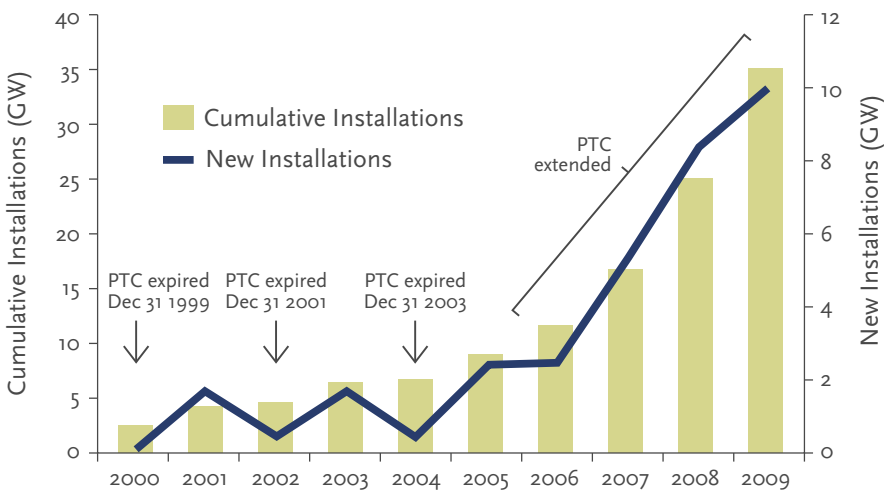
Stop-Start Policies Result in Stop-Start Investment

The problems with inconsistent financing incentives have been well documented ever since the PTC was first allowed to expire in 1999. In recent years the window during which projects could qualify for the PTC has been extended for at most two to three years at a time and on five occasions since 1999 the credit has expired before being renewed. The stop-start nature of the PTC has created boom-and-bust cycles for the renewable industry, constraining consistent growth in renewable energy capacity and complicating project supply chains. In effect, it has pushed turbine manufacturers to locate in offshore markets with more certain incentives. Similar uncertainty has characterized the PTC for geothermal energy and the ITC for solar power.

As is illustrated in Figure 1, every time the PTC has been allowed to expire, renewable energy capacity growth has dwindled to a fraction of the growth that occurred when the tax credit was in place. For instance, when Congress let the program expire in 2000, 2002, and 2004, wind capacity installations in those three years fell 93 percent, 73 percent, and 77 percent, respectively, from the previous year.

By failing to encourage steady, long-term investments, U.S. policies have not fostered stable industry growth. As a

Figure 1: Relationship of PTC to Growth in U.S. Wind Capacity



Source: American Wind Energy Association

result, domestic manufacturers have not captured all possible reductions in technology costs, thereby undermining the long-term competitiveness of renewable energy options. Additionally, intermittent incentives have discouraged long-term planning for complementary investments in manufacturing capacity, transmission infrastructure, and private-sector technology R&D and have hindered the growth of the skilled workforce needed to build and service renewable energy projects.

Structural challenges of the ITC and PTC

The tax-based nature of the ITC and PTC limits their effectiveness: tax incentives are complex instruments that are difficult to utilize and are accessible to only a small fraction of US investors (i.e. tax equity providers). These limitations constrain the industry's access to a small pool of corporate investors, whose numbers were further reduced during the recent economic downturn.

Investors who utilize the ITC and PTC are called "tax equity" investors. Tax equity is a term used to describe the passive financing of an asset or project, where an investor receives a return on investment based not only on cash flow from the asset or project but also on federal income tax deductions (through the utilization of tax credits). Tax equity providers are typically large tax-paying financial entities that can use the tax incentives to offset future tax liabilities. Renewable energy developers themselves typically do not have sufficient taxable income to benefit directly from these tax credits and must partner with tax equity providers in order to finance projects. Typically, they participate in a partnership structure that "flips" ownership of the project from the tax equity investor to the developer-owner once the tax benefits are realized.[13]

Intermittent incentives have discouraged long-term planning for complementary investments in manufacturing capacity, transmission infrastructure, and private-sector technology R&D and have hindered the growth of the skilled workforce needed to build and service renewable energy projects.

[13] In a flip structure the tax equity partner is the majority equity partner in the early years of the partnership (during which the tax equity investor receives a priority return, composed of tax benefits and cash, until the investment hits a negotiated yield target). After that, the tax equity partnership interest "flips" to a minority position. The flip exists because the tax equity investor is essentially an "accommodation" partner looking for a shorter maturity on its investment and an ability to monetize the tax credit. After the pay-back period, the tax equity partner typically retains only a nominal equity interest as allowable by law.

▪ Tax equity has a limited market: The limited number of U.S. corporate entities in a position to forecast their tax situation for the duration of the period over which renewable energy tax credits can be monetized means that only the largest and most sophisticated financial firms and utilities can be considered likely investors. As a result, the investor pool for these types of projects has historically been relatively small. Moreover, the recent recession has reduced this pool even further: the number of tax equity providers declined from approximately 20 in 2007 to 13 in 2008 and only 11 in 2009. The associated decline in overall tax equity financing provided to renewable energy projects was equally dramatic, falling from $6.1 billion in 2007 to $3.4 billion in 2008 and $1.2 billion in 2009.[14]

Figure 2: Tax Motivated Investor Market

Tax Equity Investors in 2007	Tax Equity Investors in 2008	Tax Equity Investors in 2009
▪ JPMorgan	▪ JPMorgan	▪ JPMorgan
▪ Union Bank of California	▪ Union Bank of California	▪ Union Bank of California
▪ Wells Fargo	▪ Wells Fargo	▪ Bank of America
▪ New York Life	▪ New York Life	▪ GE Capital
▪ Bank of America	▪ GE Capital	▪ Credit Suisse
▪ GE Capital	▪ Sempra Energy	▪ Morgan Stanley
▪ Morgan Stanley	▪ Morgan Stanley	▪ Citi
▪ HSH Nordbank(1)	▪ Bank of America(1)	▪ Wells Fargo(1)
▪ Key(1)	▪ US Bank(1)	▪ US Bank(1)
▪ Northern Trust(1)	▪ HSH Nordbank(1)	▪ Key(1)
▪ John Hancock	▪ Key(1)	▪ Northern Trust(1)
▪ Prudential	▪ Northern Trust(1)	
▪ NorthWestern Mutual	▪ SunTrust(1)	
▪ Citi		
▪ ABN Amro*		
▪ Fortis*		
▪ Lehman Brothers*		
▪ Wachovia*		
▪ AIG*		
▪ Merrill Lynch*		
Renewables Tax Equity Market: $6.1 Billion	**$3.4 Billion**	**$1.2 Billion**

Departed tax equity base during 2008-2009 due to insufficient taxable income or bankruptcy

*Permanent Departure

Sources: U.S. Partnership for Renewable Energy Finance (PREF)[15]

(1) These firms only participate in small-scale solar financings

[14] Sources: Bloomberg New Energy Finance, GreenTechMedia, JPMorgan and Hudson Clean Energy Partners.

[15] US PREF canvassed all of the leading tax equity market participants, asking each of them to project the supply of tax equity capital that their institution would have available for the balance of 2010, 2011 and 2012. A bottoms-up analysis of these projections produced an estimate of approximately $3 billion of available tax equity capacity in 2011 and 2012, assuming current market conditions persist. However, if the economy and/or credit market revert to 2009 conditions, the available amount of tax equity would be expected to shrink accordingly.

The tax code limits renewable energy investors to a small slice of the U.S. taxpayer base and creates barriers for passive investors (such as those who can participate through energy Master Limited Partnerships or MLPs) and overseas investors who cannot take advantage of U.S. tax credits. In contrast, more than 140 project financers actively invest in clean energy projects in Europe where renewable energy investment is not limited to participants with specialized expertise and sufficient tax capacity.[16]

- **Tax equity is expensive:** As a consequence of limited (and shrinking) participation in the tax equity market, financial intermediaries charge renewable energy developers a premium (or add a friction cost) to use their tax capacity. Consequently, tax equity financing is typically more expensive than other financing options. In the section below, we discuss an BPC-commissioned study that explores the additional friction cost associated with tax equity instruments in contrast to a cash grant. In 2009, Hudson Clean Energy Partners calculated that the premium charged for tax equity financing adds approximately 300 to 800 basis points, or 3–8 percent, to the typical cost of project finance debt.[17] This additional friction cost reduces the amount of production capacity that can be installed per dollar spent—a cost that is borne by taxpayers and electricity ratepayers.[18] By contrast, renewable energy projects financed with project debt and cash-based incentives are usually cheaper and easier to finance.

- **The tax equity market is illiquid:** Tax-based project investment is rigid and hampers the ability of markets to create securities that would deepen the market and widen the pool of potential investors. For example, the tax code restricts the transfer of asset ownership using tax equity financing for significant time periods. Furthermore, each tax equity investment is structured to meet the individual tax strategy and appetite of the originating investor. This limits the fungibility that is necessary for the formation of a viable secondary market.

[16] Source: Hudson Clean Energy Partners estimates

[17] Source: "Private Sector Perspective on New Government Initiatives", REFF Wall Street, June 2009

[18] Every 100bps increase in cost of debt adds $2.50 - $5.00 per MWh to renewable energy generation. Source: Ibid

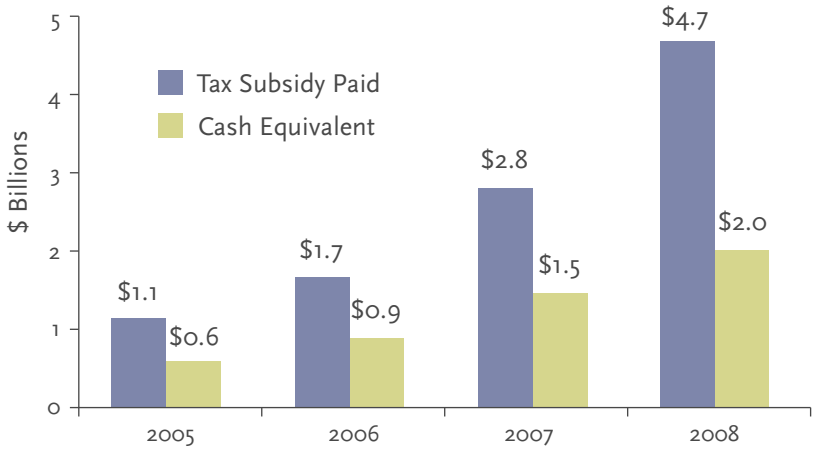
COMPARING THE EFFECTIVENESS OF TAX SUBSIDIES TO CASH GRANTS

The Treasury Cash Grant Program introduced under the ARRA was designed to deal with the shortage of tax equity that is currently available for renewable energy projects and to address, at least temporarily, many of the financing challenges created by the recent economic downturn. As described previously, this program provides cash payments directly to developers for 30 percent of the cost of capital for eligible projects. The ARRA grants expire at the end of 2010. With Congress unlikely to extend this program over the long term, the PTC and ITC will again likely be the primary incentive mechanisms in place for overcoming renewable energy financing challenges.

Because those challenges were so acute during the recent economic downturn, BPC commissioned Bloomberg's New Energy Finance (BNEF) to assess how effectively the tax-based system was leveraging taxpayer resources. Specifically, BPC asked BNEF to examine two narrow questions: (1) how efficient is the PTC in leveraging private sector investment and spurring clean energy development and (2) what would an equivalent subsidy cost the government if the aid was disbursed in cash, rather than via tax credits?[19] BNEF found that in most circumstances, cash grants are significantly more effective, and could be less expensive, than the PTC or ITC.[20]

From 2005 to 2008, wind projects totaling almost 19 gigawatts (GW) of new generating capacity were installed in the United States, incurring a liability to the federal government of about $10.3 billion in tax credits. BNEF found that the same results could have been achieved with approximately $5 billion in cash grants issued directly at the time of each project's commissioning. This suggests that a subsidy financed through tax equity markets is twice as expensive as a cash grant subsidy. Put another way, one dollar in cash would have gone nearly twice as far as one dollar in tax credits.[21] Although some in the renewable energy industry have argued that BNEF's estimate of the cash grant amount needed to achieve an equivalent result is too low, there is little disagreement that while the tax-based incentive system has been enormously supportive for the renewable energy industry, it is also a sub-optimal tool and will likely be unsustainable as the industry matures.[22] As such, there appears to be ample opportunity to improve the effectiveness of current renewable incentive policies as the nation seeks to facilitate an ambitious transformation to a low-carbon energy system without adding to our nation's long-term debt burden.

Figure 3: Total federal government cost of subsidizing U.S. wind with tax credits vs. assumed substitute cost of using cash grants ($ billion)



Source: "Cash is King: shortcomings of US tax credits in subsidizing renewables", Bloomberg New Energy Finance, January 20 2010.

There appears to be ample opportunity to improve the effectiveness of current renewable incentive policies.

[19] It should be noted that the BNEF analysis did not assess the ARRA cash grant program specifically. Rather, it sought to identify the amount of cash needed at the outset of a project to give developers the same rate of return they would get with the PTC. The ARRA program gives all projects a cash grant equal to 30 percent of eligible capital costs.

[20] This holds true for most of BNEF's scenarios. However, BNEF's model shows that if electricity prices drop below around $55/MWh, the PTC accounts for a larger portion of total project revenue and becomes more effective than the cash grant.

[21] An important point to note is that the PTC did not exist until the Energy Policy Act of 1992. Prior to the Act, wind received an ITC. Congress changed this incentive to a production-based credit because a significant number of developers were collecting the ITC after constructing wind projects but then leaving them idle. The PTC was designed to ensure that electricity production—not construction—was incentivized. If ITC or cash grants supplant the PTC going forward, it will be important to ensure that such incentive mechanisms are not open to fraud and abuse.

[22] Though the period analyzed by BNEF ends in 2008, the recent financial crisis further exacerbated the shortcomings of the tax-based incentive system. Liquidity in general was a problem during the crisis, and although liquidity in the tax equity market has since begun to improve, the market contraction of 2008–2009 likely further diminished the effectiveness of tax credits as compared to direct cash grants.

THE NEXT GENERATION OF SUPPLY-SIDE RENEWABLE ENERGY INCENTIVES: MODIFYING OR REPLACING THE TAX-BASED SYSTEM?

Given the shortcomings of tax-based incentives and a renewed impetus to cut federal expenditures, it is time to consider options for improving the efficiency of the current suite of renewable energy incentive programs. This is particularly important so long as the nation lacks a coherent overarching policy that would create sustained market demand for low-carbon energy sources. Such options should be weighed with the following goals in mind:

1) The policy framework for renewable energy incentives should be predictable, transparent and stable over long timeframes. A 5-year policy horizon would provide significantly greater certainty and predictability for project developers; 10 years would be even better.

2) Incentives should be adequate to enable renewables to compete against conventional energy sources but they should also be structured to provide incentives for continued technology improvement and cost declines over time. One way to do this is to gradually sunset subsidy programs in an orderly and predictable fashion; another is to award subsidies on a competitive basis.

3) Policies should serve to tap a variety of sources of capital. A broader investment pool will create a more liquid market, lower financing costs, and attract more investment.

Although there is no one single, simple mechanism that serves all these objectives perfectly, several options exist for a next generation of renewable energy financing incentives that could be more efficient for both project developers and taxpayers. These options are discussed below:

- **Long-term predictability:** As discussed previously in this paper, the current suite of tax credits is less efficient than it could be. One way to address this issue is to extend renewable energy tax credits for longer periods of time than the one- to two-year extensions that have been typical over the last decade. The stop-start pattern of recent years is driven by political dynamics more than anything else. As in other policy realms, the overt politicization of renewable energy incentives has produced inconsistent policies and frequent last-minute, short-term extensions. By contrast, long-term predictability would allow manufacturers and project developers to engage in long-term investment planning, which in turn would stimulate investment throughout the renewable energy supply chain and accelerate the addition of new capacity. Many developers and investors have indicated that they would accept smaller incentives in exchange for longer-term policy certainty.

- **Increase the pool of investors who are in a position to monetize tax credits:** The other central deficiency of the current tax credit system is that it limits the potential investor pool. To increase capital availability and support a deeper, more liquid market, the investor base must be broadened. One way to expand the pool of capital would be to broaden the eligibility of those who can claim renewable energy tax credits against income. Currently, only financial firms and utilities with significant and predictable levels of taxable income can engage this market. Enabling other institutional investors, profitable corporations, and high net-worth individuals to participate in tax equity markets to claim income deductions would greatly expand the pool of capital available for renewable energy investments.

Another option would be to enable renewable energy developers to utilize a financing/ownership structure known as a master limited partnership (MLP). MLPs can be used to create companies with two important features: (1) a limited liability ownership structure and (2) access to certain tax benefits that allow them to raise capital by selling securities (in essence, stock). MLPs enable individual investors to use the tax advantages of limited partnership investments, while also allowing them to pool and raise equity to invest in large, capital-intensive projects. Traditionally, MLPs have been used to pursue capital-intensive projects in natural resource development, real estate, and commodity distribution. Extending MLPs to renewable energy projects and related infrastructure would open access to a much larger and broader pool of equity. In effect, the general public would be able to make direct investments in clean energy projects by buying stock in MLPs that then use that equity to develop renewable energy projects.[23] This would help address the liquidity challenges of capital markets by broadening the pool of eligible investors beyond tax equity

[23] It should be cautioned, however, that MLPs are typically used to finance mature technologies with stable cash flows—not projects involving technologies that have yet to be widely commercialized and may carry significant technology risk. Thus, consideration will need to be given to which kinds of projects and technologies can benefit from the MLP approach and how this type of program can be structured to create a viable investment vehicle for different categories of renewables.

investors to the general public. Because MLPs would only increase the eligible investor pool, however, by themselves they would most likely not supplant the tax incentives currently in place. Additional reforms to the current tax-based incentives would still be needed. Extending MLPs to renewable energy projects would also require several changes in the tax code.[24]

- **Reform the current tax-based incentives**
  - **Cash grants:** The 1603 cash grant program, which substitutes upfront cash for the PTC or ITC, revived the renewable energy industry in 2009 when projects had all but ground to a halt. Cash grants have simplified financing structures for almost all renewable projects and made the renewable industry less dependent on tax equity investors. This has attracted a broader pool of lenders and reduced transaction costs. As such, cash grants have been significantly more efficient than other tax-based incentives, so much so that the BNEF analysis found that the federal government would need to spend about half as much in cash grants to subsidize a comparable project receiving the PTC. Because cash grants reduce financing hurdles, a properly structured cash grant program offers an attractive incentive mechanism going forward.

To increase capital availability and support a deeper, more liquid market, the investor base for renewable energy must be broadened.

Though it is unlikely that the cash grant program will be extended beyond 2010, there are several ways that the momentum it has generated could be sustained. One option would be to extend the grant program for several years but use a more targeted mechanism (such as a reverse auction) to determine the least amount of upfront funding needed to induce private investment in renewables projects. A similar, but modified option would be to make the tax credits refundable, or to provide the credit as a loan until the project begins generating taxable income at which point the loan could be repaid. A refundable tax credit would allow the owner of a renewable energy facility to receive a cash payment from the government if applicable tax credits are worth more the owner's tax liability (most renewable energy project developers/owners do not have taxable income, which is why they require tax equity investors). Currently, the PTC and ITC can only reduce a producer's tax liability to zero—they cannot be converted to federal payments if the credits are worth more than the producer's taxable income. Similarly, a loan structure would enable the company to receive upfront capital if it lacked sufficient tax liability against which to utilize the credit. In this case, the capital would be available in the form of a loan, repayable once the company began generating taxable income.

One downside to cash grants (or refundable tax credit / loan given upfront) is that it rewards capital investments, not electricity generation. Thus, there is a risk that the grant will not directly incentivize improvements in operating capacity and efficiency, which ultimately lower costs— instead it would incentivize maximum capital expenditures. If a new cash grant program is pursued,

[24] Apart from changing the definitions of eligible activities under these rules, other changes would need to be made to section 469 of the tax code, which governs "passive activity rules," and to Section 465, which governs "at-risk" rules.

it should ensure that developers are rewarded for efficient production. A grant (or refundable tax credit / loan) that declines over time or requires developers to compete for incentives (e.g. through a reverse-auction) would be one way to encourage technology innovation and low-cost production.

– **Feed-in tariffs:** Feed-in tariffs (FITs) allow eligible projects to receive a guaranteed price for the electricity they deliver to the grid. The tariff amount is typically set by law or regulation (usually on a per-kWh basis). Renewable energy projects that meet FIT requirements are usually eligible for a long-term contract for the power they produce (for example, contracts on the order of 20 years are typical). Assurance of a predictable, long-lived cash revenue stream greatly simplifies project financing. Because FITs create certainty around a project's future cash flow, associated financing structures tend to be simpler, cheaper and more attractive to lenders. FIT projects are often financed with one tranche of debt, which avoids the complicated financing structures associated with U.S.-based tax equity instruments. FITs have been popular in European countries over the last decade where they have been a key driver in stimulating the growth of domestic renewable technology and manufacturing industries, as well as clean energy deployment.[25] In the United States, the California Solar Initiative—which is akin to a FIT—has also been very successful in prompting solar energy development. Other FIT programs have recently been implemented around the country, in places like Gainesville, Florida, and Oregon where they are attracting considerable interest from project developers who have filled subscriptions to each of these FIT programs. Additionally, China announced in the last year that it will be supporting an enormous amount of renewable energy deployment in all regions of the country through a combination of four fixed wind FITs, a new national fixed feed-in tariff for biomass, and a new solar FIT, which is expected to be announced in 2010.[26,27]

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FITs present two potential challenges. First, it is difficult to set a "correct" feed-in price. If prices are set too high, the program is inefficient in its use of government resources and can strain

[25] Germany, Spain, Denmark and Portugal have all used FITs to successfully deploy significant amounts of renewable energy, particularly wind and solar. It should be noted, however, that many of the EU FIT programs have been criticized as overly generous to renewables and quite costly to national budgets.

[26] The wind FITs were announced August 2009. Source: "China Wind Market Outlook Q1 2010", Bloomberg New Energy Finance, February 2010.

[27] "A boost for biomass: new feed-in tariff level announced in China", Bloomberg New Energy Finance, July 2010.

federal or state budgets as governments are obligated to pay for all eligible renewable energy that comes online. Overly high prices also discourage technology improvement and innovation. As a result, some countries have established tariff digressions—and have even, in certain cases, accelerated these digressions when the installed cost of renewable energy declined more rapidly than expected. Germany, for example, recently accelerated the digression rate for its solar FIT in response to a substantial decline in the cost of solar modules and domestic budgetary concerns. Second, implementing a FIT poses a political challenge as a wires charge—a fee levied on power suppliers or their customers for the use of the transmission or distribution wires—is usually used as the funding source to pay for the subsidy. In a slow economy and a gridlocked political environment, passing any new consumer fee will be difficult. Nevertheless, FITs provide an intriguing option for shaping U.S. renewable energy subsidies going forward, not least because this mechanism has emerged as the policy tool of choice for some of the largest foreign power markets in this sector, including China.

– **Declining, production-based cash incentives program:** Another recent policy proposal, called "Incentives for Renewable Energy Generation" (IREG), combines the incentive properties of the PTC (in the sense that it is production-based and hence rewards actual output, while also encouraging cost discipline for project developers) with the advantages of a cash payments approach.[28] At the outset, renewable energy project developers would have two options. They could elect to receive currently available tax credits—the PTC or ITC depending on which type of tax credit the project were eligible for—or a production-based cash payment. Under the latter option, eligible projects placed in service during a specified time period would receive cash payments on a quarterly basis for 10 years. This would provide a predictable, long-term revenue stream. Under IREG's cash payment option, projects that would otherwise qualify for the current PTC would receive payments equivalent in value to the PTC for every kWh of electricity produced. Solar and fuel cell projects that would otherwise qualify for the current ITC would receive a one-time IREG payment equal to 30 percent of the tax basis of the project eligible for the investment credit. Over time, however, the ITC-equivalent IREG incentive would shift to a production-based payment so as to reward electricity production rather than sums of capital invested. For all types of projects, tax-based incentives would be phased out and IREG incentive payments would adjust gradually downward over time.

The IREG approach differs from the European-style fixed FIT in that it would be a supplemental tariff received *in addition* to the electricity price negotiated under a power purchase

[28] Hudson Clean Energy Partners issued a white paper describing the IREG in 2009.

agreement (PPA). This ensures that only those projects that can generate sufficient electricity at an appropriate level of cost are connected to the grid, thus avoiding the need to cap or otherwise limit the IREG program. Funding for the program could come from a range of sources, although an adjustable rate surcharge on retail electricity sales—i.e. a wires charge—would be an obvious choice. This would avoid the annual appropriations process thereby ensuring funding consistency. As already noted, however, the political hurdles to mandating a nationwide wires charge remain steep.[29]

- **Competitive tendering policies – reverse auctions:** Reverse auctions are a mechanism for competitively distributing government contracts and subsidies to private entities. In essence, reverse auctions require private firms to submit bids that stipulate the minimum price or subsidy level they would accept for an eligible output.[30] The entity tasked with managing the reverse auction—typically a governmental agency—then reviews all bids and accepts the lowest ones. As a mechanism for distributing clean energy subsidies or incentives, the reverse auction approach would require any potential subsidy recipient or beneficiary (in this case, renewable energy developers) to compete for public resources on a cost basis. The appeal of the reverse auction concept is that it is designed to maximize the returns from a given expenditure of scarce public resources, and that it provides continuous incentives for further technology innovation and cost reductions.

Several government entities in the United States—among them the Department of Defense, the U.S. Postal Service, and some state governments—have established successful reverse auction programs and used this mechanism to achieve substantial reductions in program costs. In addition, other countries have applied this approach specifically to promote clean energy development. For example, from 1990 to 1999 under a United Kingdom program to distribute subsidies for non-fossil fuel electricity, the use of a series of competitive auctions is credited with helping to stimulate significant cost reductions in the renewables industry over that time period.[31] Similar applications of the reverse auction concept to clean energy deployment, meanwhile, are gaining traction in several U.S. states. For instance, the California Public Utilities Commission recently issued guidelines to establish a reverse auction program for

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[29] Wires charges have already been proposed in several U.S. energy bills—for example, the "Renewable Energy Jobs and Security Act" proposed by Representative Inslee in July 2010—but have yet to gain significant political traction.

[30] The subsidy itself can take a variety of forms—for example, tax credits, grants, or FITs could all be distributed using a reverse auction mechanism.

[31] Newell, R. "Climate Technology Deployment Policy." Resources for the Future, 2007.

small-scale solar power projects. Under California's program, the state's investor-owned utilities will be required to hold biannual auctions for power purchase agreements with small, ready-to-build solar energy projects—essentially, creating a reverse auction for feed-in tariffs.[32] Solar project developers have already expressed considerable support for the California program and it is expected to be widely subscribed.

Although reverse auctions have many attractive incentive features, they must be carefully designed to address a number of specific concerns and potential disadvantages.[33] One important concern is that reverse auctions tend to favor technologies that represent the least-cost option today, rather than newer technologies that may have the potential to achieve significant performance improvements and cost reductions as they reach economies of scale in the future. To address this concern, it may be necessary to, on the one hand, establish separate programs designed to help emerging technologies bridge the divide from demonstration to early commercial deployment, while at the same time gradually broadening the portfolio of technologies considered eligible to participate in the reverse auction over time. Another concern is that large, sophisticated firms will dominate reverse auction markets because of their size and experience. Ensuring that a reverse auction gives smaller firms and newer technologies a fair chance to compete on the merits therefore represents another critical design issue. Lastly, reverse auction programs must include safeguards to ensure that winning projects are actually completed on time and—in cases where the subsidy being offered is not output based—that they also actually produce what they committed to.

Fortunately, it seems likely that all of these concerns can be substantially addressed through thoughtful program design. Moreover, it is worth recognizing that similar concerns would apply to most (if not all) other subsidy or incentive delivery mechanisms. The incentive program that is 100 percent efficient and completely free of flaws or potential to expend funds on failed projects likely does not exist. But in the current context of large budget deficits and limited resources at all levels of government, not to mention public distrust of many government spending programs, the advantages of competitive tendering mechanisms, like reverse auctions, begin to look especially compelling. As an option for distributing taxpayer (or ratepayer) funds in a way that also maximizes output per public dollar spent, fosters private-sector competition, and drives down technology costs, such mechanisms deserve increased attention as lawmakers look to design more effective clean energy policies in the years ahead.

[32] The California reverse auction will be limited to projects 20 MW or smaller. To "bid," projects must be ready-to-go in the sense that construction can be completed and they can come on line within 18 months. The program aims to add 1000 MW of decentralized solar power generation (such as rooftop projects); it included a size cap, in part, to prevent a few large solar companies from dominating the market. California utilities have separately entered into a number of long-term contracts with large-scale centralized solar power producers. For more information regarding CA's Renewable Auction Mechanism please see: http://docs.cpuc.ca.gov/efile/PD/122407.pdf.

[33] For a more complete discussion about design aspects of reverse auctions, see Richard Newell's discussion of tendering policies in his chapter, "Climate Technology Deployment Policy," contained in the report: *Assessing U.S. climate Policy Options*, Resources for the Future (2007).

CONCLUSION

Absent a coherent, long-term national climate and energy policy, targeted incentives for renewable energy will continue to be very important in maintaining strong industry growth in the United States. Although renewable energy tax credits have had a complex history, on the whole, they have been vitally important in deploying renewable energy capacity and driving down technology costs. However, as the industry continues to grow, a tax-based incentive system faces increasing costs and complexity and may be a suboptimal mechanism for achieving sustained, large-scale deployment goals.

It is therefore time to begin thinking about a different approach, one that achieves desired policy outcomes as efficiently as possible and at the least cost to the public. This means looking, in an integrated fashion, at the full suite of policies and incentives being used to promote renewable and other low-carbon energy technologies to understand how these policies and incentives interact, how they could be made more effective, and how their overall cost could be reduced. Practically speaking, the effort to bring about a long-term transformation of the U.S. energy mix will likely entail continuing and improving on the current set of largely supply-side renewable energy incentives in the near term while a national consensus emerges on the future direction of broader climate and clean energy policies. Once such policies are in place at a level where they create substantial market demand for renewable energy, public incentives should begin to taper off to avoid overlapping subsidies.

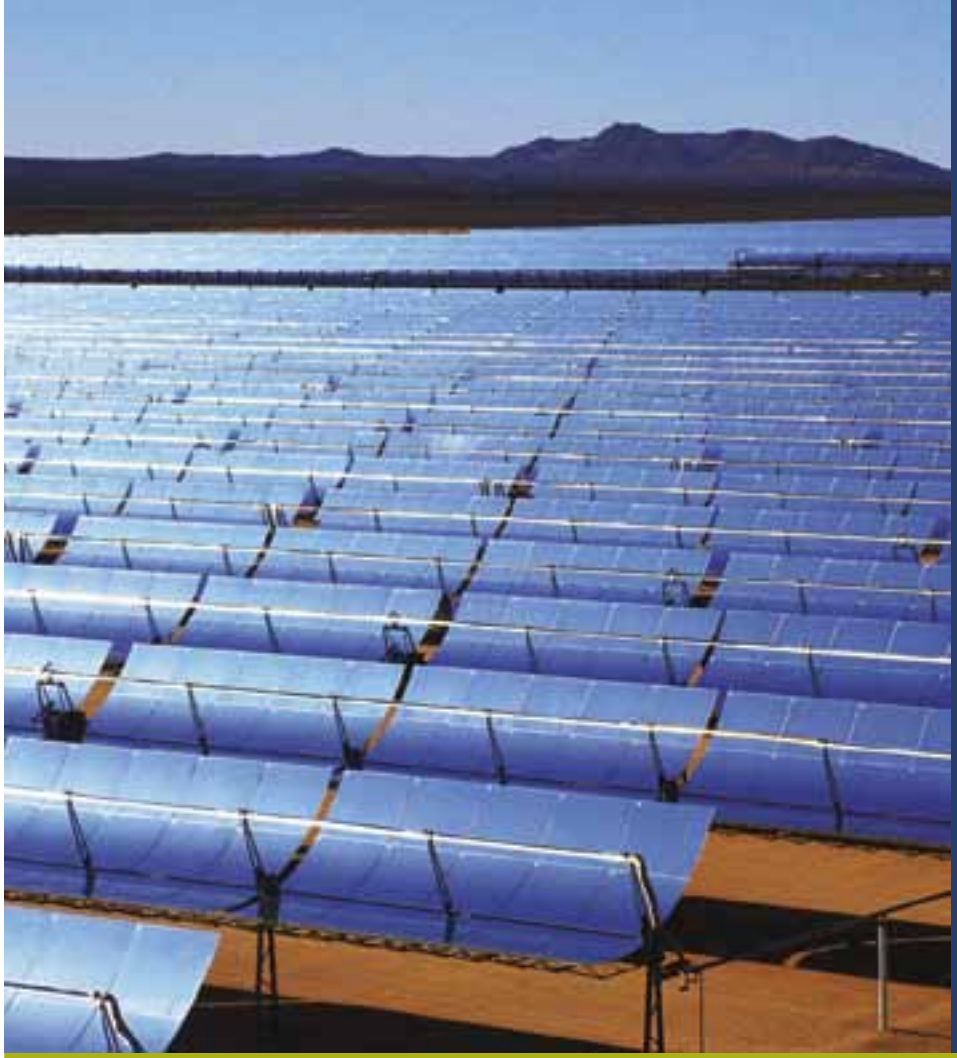
In this era of increasing fiscal austerity, paying for any large-scale incentive program will require a dedicated source of reliable funding. Any of the incentive mechanisms discussed above could be funded in one of two ways: through general tax revenues or through targeted revenues. Options for targeted revenue sources include: reducing or eliminating current subsidies to well-established fossil fuel industries, creating an oil import fee, or collecting a wires charge on sales of electricity. Although any of these revenue sources could generate enough funding to pay for even the largest incentive program, all have unique political pitfalls. To provide long-term predictability and certainty, Congress will need to take the difficult step of establishing a stable funding source.[34]

As the United States emerges from recession and grapples anew with its most important long-term challenges [...] it is clear that federal incentives for renewable energy development will need to be reexamined.

Moreover, because government funding will likely be scarce going forward, any renewable support program must create incentives for continued cost reductions and technology improvements, while also promoting public accountability. Awarding payments on a competitive basis, through mechanisms such as reverse auctions, will help ensure that any support program allocates public resources effectively and efficiently. Given that federal and state government agencies have established successful reverse auction programs in a variety of domains, it seem likely that this approach could be effectively utilized at the federal level to promote renewable energy generation while also driving continued technology innovation and cost reductions.

As the United States emerges from recession and grapples anew with its most important long-term challenges—confronting a burgeoning national debt, addressing looming energy and environmental risks, and retaining a leadership position in the high-tech global marketplace—it is clear that federal incentives for renewable energy development will need to be reexamined. This paper highlights some of the most promising policy approaches that could be used to incentivize renewable energy development more effectively in the future. These options deserve deeper exploration. It is our hope that this paper sparks a fresh dialogue in the policy community and contributes to the broader energy and climate policy debate in 112th Congress.

[34] Newly created clean energy deployment programs in place in China, Europe, and other countries appear to provide such funding stability.



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Reassessing Renewable Energy Subsidies

ISSUE BRIEF

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