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on

Clean Energy Tax Incentives:
The Effect of Short-Term Extensions on Clean Energy Investment, Domestic Manufacturing, and Job Creation

Chairman Bingaman and Ranking Member Cornyn, and Members of the Subcommittee – on behalf of the Congressional Research Service, I thank you for the opportunity to appear before you today.

I have been invited here today to discuss expiring energy tax provisions. In this testimony, I will briefly review the history of temporarily enacted energy tax provisions, noting provisions that are scheduled to expire in 2011. I will also address some of the economic impacts of allowing targeted energy tax incentives to expire. Finally, I will outline characteristics of economically efficient and effective energy tax policy.

I. Expirations of Temporary Energy Tax Provisions

The income tax code has long been used as a policy tool for promoting U.S. energy priorities. Prior to the 1970s, energy tax incentives supported development of oil and gas resources.[1] In the late 1970s, tax incentives supporting renewable and alternative energy resources were introduced. Unlike the pre-1970s tax incentives for fossil fuels, which were permanent features of the tax code, the investment tax credit (ITC) for renewable

[1] A history of U.S. energy tax policy can be found in CRS Report R41227, *Energy Tax Policy: Historical Perspectives on and Current Status of Energy Tax Expenditures*, by Molly F. Sherlock.

energy introduced in 1978 contained a sunset provision.[2] Subsequent production and investment tax incentives for renewable energy have also, generally, been enacted on a temporary basis.[3]

Major energy legislation in the 1990s provided a number of energy-related tax incentives. One of those provisions was the renewable energy production tax credit (PTC). Since being introduced in 1992, the PTC has been the primary federal incentive supporting wind. The PTC has been extended seven times since 1992. In three of these cases, the PTC was allowed to lapse prior to being extended. Under current law, the PTC for wind will expire at the end of 2012 (the expiration date for other eligible technologies is 2013).

In lieu of the PTC or ITC, between 2009 and 2011, renewable energy investors could elect to receive a one-time grant from the U.S. Treasury.[4] This provision—commonly referred to as the "Section 1603 grant" —was included in the American Recovery and Reinvestment Act of 2009, to compensate for weak tax-equity markets.[5] Before the recession, large-scale renewable energy projects relied on tax-equity markets to convert tax credits into cash. Tax-equity markets dried up during the recession, making it harder for many market participants to realize the value of renewable energy tax benefits. The Treasury grants in lieu of tax credits program supported the renewable energy industry during the recession, when tax equity availability was limited. After 2011, the grant option will no longer be available.[6]

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[2] When first enacted in 1978, the renewable energy investment tax credit was scheduled to expire at the end of 1982. In 1980, the credit rate was increased and the duration of the credit extended, through the end of 1985. The investment tax credit for solar was allowed to lapse at the beginning of 1986, before being retroactively extended through the end of 1988. The credit was again extended in 1989 and 1991. In 1992, the 10% investment tax credit was made permanent. Legislation in 2005 temporarily increased the renewable energy investment tax credit for solar from 10% to 30%. Subsequent legislation in 2006 and 2008 extended this 30% rate through the end of 2016.

[3] A permanent 10% investment tax credit (ITC) for solar energy is currently part of the tax code. Renewable energy investments also qualify for 5-year accelerated cost recovery under MACRS, which is a permanent feature of the tax code.

[4] See CRS Report R41635, *ARRA Section 1603 Grants in Lieu of Tax Credits for Renewable Energy: Overview, Analysis, and Policy Options*, by Phillip Brown and Molly F. Sherlock.

[5] The Treasury grant option is often referred to as the "Section 1603" grant, after its section in the American Recovery and Reinvestment Act of 2009 (P.L. 111-5).

[6] Tax credits for wind are scheduled remain available for one year, through the end of 2012. Tax credits for other technologies are scheduled to expire in 2013 or 2016.

The PTC is not the only energy-related tax incentive that has been allowed to lapse in recent years. Several other energy tax provisions were allowed to expire at the end of 2009. Among those allowed to expire were incentives supporting biodiesel, renewable diesel, and alternative fuels. Most of the energy tax provisions that were allowed to expire at the end of 2009 were retroactively extended at the end of 2010 through the end of this year. A number of energy-related tax incentives, including those supporting renewable fuels, alternative technology vehicles, as well as a number of incentives promoting energy efficiency, are also scheduled to expire at the end of 2011.[7]

Fuels-related incentives scheduled to expire this year include those supporting biodiesel, renewable diesel, ethanol, and other alternative fuels.[8] Tax incentives for ethanol were first introduced in 1978, and substantially modified in 2004. Tax incentives for biodiesel and renewable diesel first became available in 2005. Biofuels are also supported by non-tax programs, such as the Renewable Fuel Standard (RFS). The RFS, which requires a certain amount of renewable fuels be included in the nation's transportation fuels supply, was first established in 2005 and expanded in 2007.

The tax code also contains a number of incentives for alternative technology vehicles and related infrastructure, some of which are scheduled to expire at the end of 2011. The credit for electric-drive motorcycles, three-wheeled, and low-speed vehicles, as well as the credit for plug-in electric vehicle conversion kits, are scheduled to expire at the end of 2011. The tax credit for alternative-fuel vehicle refueling property is also scheduled to terminate at the end of 2011.[9]

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[7] For a full list of energy-related tax provisions scheduled to expire at the end of 2011, see CRS Report R42105, *Tax Provisions Expiring in 2011 and "Tax Extenders"*, by Molly F. Sherlock. For a list of energy-related tax provisions scheduled to expire in 2012 through 2020, see U.S. Congress, Joint Committee on Taxation, *List of Expiring Federal Tax Provisions 2010 - 2020*, committee print, 112th Cong., January 21, 2011, JCX-2-11.

[8] The tax credit for the production of cellulosic biofuel, which has been available since 2009, is scheduled to expire at the end of 2012. For a summary of federal incentives for biofuels, see CRS Report R40110, *Biofuels Incentives: A Summary of Federal Programs*, by Brent D. Yacobucci.

[9] Expenditures for property related to hydrogen may be eligible to receive the tax credit through 2014.

A number of tax incentives designed to support enhanced energy efficiency are scheduled to expire at the end of 2011. After 2011, taxpayers making certain energy-efficiency improvements to their homes will no longer be eligible for a tax credit. The tax credit for energy-efficiency improvements to existing homes was available during 2006 and 2007, but was allowed to lapse in 2008, before being reinstated for 2009.[10] As part of the Recovery Act, the credit rate was increased from 10% to 30% and the maximum credit amount increased from $500 to $1,500, for 2009 and 2010. At the end of 2010, the credit was extended for one year, at the reduced rate of 10%, subject to a lifetime cap of $500. Other energy-efficiency related incentives scheduled to expire at the end of 2011 include the credit for manufacturers of energy-efficient appliances and the credit for construction of energy-efficient new homes.

2. Economic Issues Related to Temporary Tax Incentives

There are several reasons why tax provisions might be enacted temporarily. There are also a number of reasons why temporary tax incentives may create cause for concern. In both cases, some of the reasons are economic, while others are related to federal budget policy or politics. This testimony focuses on economic considerations related to temporary tax incentives.

On a macro economic level, one motivation for temporary tax incentives might be economic stimulus. Tax incentives can be used to promote new investment and increase economic activity.[11] Ultimately, this additional economic activity could contribute to increases in economic growth and potentially job creation, but the cost effectiveness of such policies depends on the response.

[10] Credits for residential energy efficiency were first introduced in 1978, but were allowed to expire in 1985. For more information on residential energy tax credits, see CRS Report R42089, *Residential Energy Tax Credits: Overview and Analysis*, by Margot L. Crandall-Hollick and Molly F. Sherlock.
[11] See CRS Report R41034, *Business Investment and Employment Tax Incentives to Stimulate the Economy*, by Thomas L. Hungerford and Jane G. Gravelle.

Alternatively, temporary tax incentives may be offered as support for newly developing industries. Arguably, temporary tax incentives can help new technologies "scale up." Realizing scale economies might help new technologies to compete directly with established alternatives.[12]

Another rationale for enacting tax incentives temporarily is that expiring provisions provide Congress with an opportunity to evaluate the efficacy of the expiring incentives. Under this premise, poorly designed or ineffective incentives would be modified or allowed to expire. Tax incentives achieving policy goals would be extended.

In practice, the implementation of temporary tax incentives raises a number of concerns. Very few "temporary" tax incentives, after becoming part of the Internal Revenue Code, are actually allowed to expire. Many temporary incentives, including a number that support energy, are routinely lumped together and extended as part of a "tax extender" package. The number of provisions included in tax extender packages has increased in recent years, and it is unclear how much scrutiny is given to individual provisions prior to the typical one- or two-year extension.

Temporary tax incentives can also create real economic problems. The uncertainty associated with temporary tax incentives can distort economic decision making. Taxpayers may rush to make certain investments before a possible expiration date. Longer term projects that could benefit from tax incentives in the future may stall, since it is unclear if those tax incentives will be available once investments are actually made. This uncertainty can also lead to supply-chain problems, as manufacturers may be reluctant to make permanent investments when the future of industrial incentives remains in flux.

Temporary tax incentives also contribute to tax code complexity. Taxpayers will invest time and resources in making contingency plans. If certain tax incentives expire,

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[12] For example, the tax credits for hybrid vehicles that was established in 2005 terminated on January 1, 2011. Prior to termination, credits were subject to a per-manufacturer limit, such that the credit began to phase out once 60,000 units of a qualifying vehicle were sold.

investments may be made in Project A. Otherwise, Project B might get the go ahead. This type of contingency planning is unlikely to result in the most efficient allocation of resources. Retroactive extensions of temporary provisions may also require firms to file amended returns. Further, taxpayers that benefit from incentives by filing retroactive returns are not motivated by the incentive, but rather receive a benefit for actions already taken. This issue is discussed in greater detail later in this testimony.

Temporary Tax Incentives and the Energy Industry

The expiration, or threatened expiration, of renewable energy tax incentives may have real impacts on renewable energy industries. This testimony briefly examines evidence related to expiring tax incentives for the wind and biodiesel industries.

Lapses in the PTC have been associated with a so-called "boom-bust" cycle in wind development.[13] In years where the PTC was allowed to expire, new wind development substantially declined.[14] Declines in wind development have also occurred outside of PTC lapse periods. In 2010, when both the PTC and the grant option were available, new wind capacity installations were down nearly 50%.[15] While new installations of wind capacity have increased in 2011, new installed wind capacity by quarter thus far in 2011 remains below 2009 installation levels.[16] The amount of wind capacity under construction, however, has been increasing throughout 2011.

When the PTC has been allowed to lapse, some projects may have been cancelled, while others might have been put on hiatus. Uncertainty regarding PTC-status during lapse

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[13] Ryan Wiser, Mark Bolinger, and Galen Barbose, "Using the Federal Production Tax Credit to Build a Durable Market for Wind Power in the United States," *The Electricity Journal*, vol. 20, no. 9 (November 2007), pp. 77-88.

[14] The PTC was allowed to lapse in 1999, 2002, and 2004. Between 1999 and 2000, wind capacity installations fell 93%. Between 2001 and 2002, capacity installations declined 73%. Between 2003 and 2004, capacity installations fell 77%.

[15] The American Wind Energy Association (AWEA) reports that 10,010 megawatts (MW) of wind capacity were installed in 2009. This compares to 5,116 MW of capacity reportedly installed in 2010. See http://www.awea.org/learnabout/industry_stats/index.cfm.

[16] See data reported by the American Wind Energy Association (AWEA), available at: http://www.awea.org/learnabout/publications/reports/upload/3Q-2011-AWEA-Market-Report-for-Public-2.pdf

periods might have led project developers to stall. Some of these stalled projects would likely have moved forward even if the PTC had been allowed to terminate, but were waiting for policy clarity. The surge in wind installations following the reinstatement of the PTC, thus, likely includes some projects that were directly motivated by the PTC, as well as others that might have moved forward without the incentive.

A number of other market factors are also important to consider when thinking about the role federal incentives play in supporting wind development. First, the cost of competing energy technologies influences investment in wind. For example, low natural gas prices increase the attractiveness of natural gas power plants, making wind less attractive in comparison. Second, the price of inputs related to wind power is also important. As advances in wind turbine manufacturing and materials bring down the costs associated with wind power, investment in wind should increase. It should be noted, however, that wind development that occurs in fits and starts can create bottlenecks in the turbine manufacturing process, which might delay projects and raise overall costs.[17]

Similar to wind, biodiesel production declined following a lapse in tax incentives. From 2005, the year tax credits for biodiesel were enacted, through 2008, biodiesel production increased annually.[18] In 2009, biodiesel production declined, relative to 2008 levels. Biodiesel consumption, however, remained effectively unchanged between 2008 and 2009. Tax credits for biodiesel were allowed to lapse during 2010. In 2010, both biodiesel production and consumption declined, 39% and 28%, respectively. For the first eight months of 2011, biodiesel production and consumption is well above 2009 and 2010 levels.

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[17] See Gilbert E. Metcalf, "Tax Policies for Low-Carbon Technologies," *National Tax Journal*, vol. 62, no. 3 (September 2009), p. 526 and Mark Bolinger and Ryan Wiser, *Understanding Trends in Wind Turbine Prices Over the Past Decade*, Ernest Orlando Lawrence Berkeley National Laboratory, LBNL-5119E, October 2011, http://eetd.lbl.gov/ea/emp/reports/lbnl-5119e.pdf. For a detailed overview of the U.S. wind turbine manufacturing sector, see CRS Report R42023, *U.S. Wind Turbine Manufacturing: Federal Support for an Emerging Industry*, by Michaela D. Platzer.

[18] In 2005, biodiesel production was 2,162 thousand barrels (Mbbl). By 2008, biodiesel production had increased to 16,145 Mbbl. Biodiesel production data is available from the Energy Information Administration (EIA), at http://www.eia.gov/totalenergy/data/monthly/pdf/sec10_8.pdf.

As was the case with wind, several factors, including tax incentives, likely influence biodiesel market trends. One factor affecting biodiesel markets is the price of soybean oil, the primary feedstock for biodiesel. High soybean prices and the economic recession contributed to declines in biodiesel production, even before tax incentives were allowed to expire at the end of 2009.[19] Diesel prices also fell at the end of 2008, making it harder for biodiesel to be produced at a competitive price.

3. Characteristics of Economically Efficient and Effective Renewable Energy Tax Policy

From an economic perspective, energy prices would ideally reflect the full social cost of energy production and consumption. Having accurate cost and price signals would direct economic resources towards their most productive use. The most economically efficient way to achieve this outcome would be to tax energy resources that have negative external social costs, such as pollution. Increasing the price of energy resources would not only reduce overall demand for energy, but would also create incentives for investment in non-polluting alternatives.

The history of U.S. energy tax policy indicates a preference for subsidies, rather than direct taxes. Given this preference, this testimony provides some economic guidance related to designing efficient and effective energy tax incentives.

Cost-effective incentives are those that encourage changes in behavior, rather than simply rewarding current practices

The goal of energy tax incentives is to encourage, promote, or support production or consumption of targeted energy resources. Tax subsidies for residential energy efficiency,

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[19] For more information on biodiesel markets, see CRS Report R41631, *The Market for Biomass-Based Diesel Fuel in the Renewable Fuel Standard (RFS)*, by Brent D. Yacobucci and CRS Report R41282, *Agriculture-Based Biofuels: Overview and Emerging Issues*, by Randy Schnepf.

for example, are intended to promote investment in residential energy-saving property. Tax subsidies for residential energy efficiency (as well as other energy-related tax subsidies) reward two types of consumers: those who would not have installed the energy-saving property without the tax incentive, and those who would have installed the energy-saving property even if a tax incentive were not available. In practice, it is very difficult to target tax incentives such that only the first group benefits.

Economists find tax incentives are more efficient (and cost-effective) when a larger proportion of taxpayers change their behavior to become eligible for the tax incentive. If few taxpayers actually change their behavior to benefit from a tax incentive, tax incentives either 1) provide windfall gains to taxpayers already engaged in the activity the incentive was designed to promote; or 2) the incentive is ineffective.

For renewable energy projects with longer planning horizons, tax uncertainty might prevent marginal projects from moving forward. These marginal projects are those that would likely respond directly to the tax incentive, but without a tax incentive, are not viable. In the face of tax uncertainty, investments in renewable energy are still likely to take place. These investments, however, are not those that are motivated by tax incentives. If tax incentives happen to be available when these projects are placed in service, these projects will benefit. For the latter class of projects, however, tax incentives did not cause additional renewable energy investment. Instead, tax incentives provided a windfall benefit without motivating additional investment in renewable energy.

To the extent that tax uncertainty prevents marginal projects from moving forward, and allows other projects to receive windfall benefits, tax uncertainty is inefficient and diminishes the cost-effectiveness of tax policies.

Effective energy tax incentives support technologies that would be competitive if energy prices reflected the full social cost of energy consumption and production

Subsidies for low-carbon energy resources can be viewed as compensating for the fact that polluting energy resources are under-priced. In other words, in a market where pollution is not priced, subsidies for clean energy can help level the playing field. Overly generous subsidies, however, might support technologies that would otherwise not be viable (or do not have the potential to become viable at some point in the future). Supporting technologies with limited viability can create economic distortions, diverting economic resources away from more promising alternatives.

Incentives made available to a broad range of technologies avoid "picking winners"

Renewable energy tax incentives may seek to achieve varied policy goals. One goal might be reduced CO_2 emissions. Another goal might be to strengthen domestic manufacturing and promote job creation. A third goal might be to enhance energy security. Ideally, energy tax policy should be designed to allow markets to choose which technologies best meet energy policy objectives. This point is illustrated by expanding on the policy goal of reducing CO_2 emissions.

If the policy goal is to reduce carbon emissions, a tax on carbon would create market incentives for businesses and individuals to find low-cost, low-carbon alternatives. A direct tax on carbon would avoid having policymakers make explicit choices regarding which low-carbon technologies should be employed. In contrast, subsidies for low-carbon technologies require that certain technologies explicitly be identified as being eligible for the subsidy. This may create a bias against newly emerging technologies, as it takes time to update the tax code to expand the list of qualifying technologies.[20]

[20] This point was made in U.S. Congress, House Committee on Ways and Means, Subcommittee on Select Revenue Measures, *Energy Policy and Tax Reform*, Statement of Donald B. Marron, 112th Cong., 1st sess., September 22, 2011.

If the goal is renewable energy production, incentives that reward production are preferred to those that reward investment

Production incentives reward generation of electricity using renewable energy resources. When production is rewarded, investors will strive to maximize the output of qualifying energy, given the resources available. Alternatively, investment tax incentives reward capital investment, instead of directly rewarding energy production. By rewarding investment rather than production, there is a concern that investments may not translate into maximum production capacity. Further, incentives that reward investment as opposed to production may lead firms to use more capital at the expense of labor.[21]

Energy tax policy does not exist in a vacuum; tax policies may interact with or be redundant to other policies supporting energy

Tax incentives are one of many tools that can be used to support energy policy objectives. One goal for the design of energy-related tax incentives should be to avoid policy redundancy: if policy goals are being achieved through the use of another policy instrument, tax incentives may not be achieving purported policy goals.

In the case of renewable energy tax credits, one concern is that state-level Renewable Portfolio Standards (RPS) might drive up the costs associated with federal tax incentives.[22] If state-level policies mandating renewable energy use are driving renewable energy investment, then tax expenditures for renewable energy incentives may increase without an associated increase in renewable energy investment. In other words, if investment is being driven by state-level renewable energy policies, tax credits might simply be rewarding existing activity.

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[21] This point was made in U.S. Congress, House Committee on Ways and Means, Subcommittee on Select Revenue Measures, *Energy Policy and Tax Reform*, Statement of Donald B. Marron, 112th Cong., 1st sess., September 22, 2011.

[22] Gilbert E. Metcalf, "Tax Policies for Low-Carbon Technologies," *National Tax Journal*, vol. 62, no. 3 (September 2009), p. 517.

Similar concerns have been raised with respect to tax incentives for biofuels under the Renewable Fuel Standard (RFS). Consumption of biofuels is largely driven by the RFS. To the extent that biofuel consumption is driven by this mandate, tax credits do not lead to additional production. While tax incentives for biofuels may have limited effects on production under the RFS, the tax credits still provide financial support to biofuel blenders, producers, as well as purchasers of blended fuel.[23]

Thank you again for inviting me to appear today. I am happy to respond to your questions.

[23] See Congressional Budget Office, *Using Biofuel Tax Credits to Achieve Energy and Environmental Policy Goals*, Washington , DC, July 2010, p. 18 and U.S. Government Accountability Office, *Biofuels: Potential Effects and Challenges of Required Increases in Production and Use*, GAO-09-446, August 2009, pp. 99-105, http://www.gao.gov/new.items/d09446.pdf.