Congressional Research Service
Informing the legislative debate since 1914

The Renewable Electricity Production Tax Credit: In Brief

Molly F. Sherlock
Specialist in Public Finance

July 14, 2015

Congressional Research Service
7-5700
www.crs.gov
R43453

CRS REPORT
Prepared for Members and
Committees of Congress

Summary

The renewable electricity production tax credit (PTC) expired on January 1, 2015. The renewable electricity PTC is a per-kilowatt-hour tax (kWh) credit for electricity generated using qualified energy resources. Whether the PTC should be extended, modified, or remain expired may be considered in the 114th Congress. The PTC was initially enacted to promote the development of renewable energy resources, and it has been extended multiple times in an effort to continue advancing this policy goal. While some Members of Congress support extension or modification of the PTC, others say that the PTC should be allowed to expire. Extension of the PTC may be considered as part of "tax extenders" legislation.

The PTC for wind and closed-loop biomass was first enacted in 1992. When first enacted, the PTC was scheduled to expire on July 1, 1999. Since 1999, the PTC has been extended nine times. On four occasions, the PTC was allowed to lapse before being retroactively extended. Including the present expiration, the PTC has been allowed to lapse five times.

In addition to being extended, the PTC has also been expanded over time to include additional qualifying resources. In 2014, wind, closed-loop biomass, and geothermal technologies qualified for the full credit amount of 2.3-cents per kWh. Other technologies (open-loop biomass, small irrigation power, landfill gas, trash, qualified hydropower, marine and hydrokinetic) qualified for a half-credit amount, or 1.1-cents per kWh in 2014. Credit amounts are adjusted annually for inflation.

The Joint Committee on Taxation (JCT) estimates that in 2014, foregone revenues (or "tax expenditures") for the PTC were $1.2 billion. Between 2014 and 2018, the JCT estimates that foregone revenues associated with the PTC for renewable electricity will total $16.4 billion, with another $0.1 billion each for Indian coal and refined coal over that same time period. Because these estimates are based on current law, any policy that extends or expands the PTC will increase the amount of foregone revenue.

The PTC has been important to the growth and development of renewable electricity resources, particularly wind. Tax incentives for renewables, however, may not be the most economically efficient way to correct for distortions in energy markets or to deliver federal financial support to the renewable energy sector. Tax subsidies reduce the average cost of electricity, increasing demand for electricity overall, countering energy efficiency and emissions reduction objectives. Subsidies delivered as non-refundable tax incentives often require those wishing to use the credit find "tax-equity" partners to provide equity investments in exchange for tax credits. The use of tax-equity reduced the amount of the incentive that flows directly to the renewable energy sector.

Several policy options for the PTC have been proposed in recent years. These include (1) allowing the PTC to remain expired (current law); (2) temporarily extending the PTC (as was done as part of the Tax Increase Prevention Act of 2014 (P.L. 113-295)); (3) temporarily extending the PTC but providing some form of phase-out (the PTC Certainty and Phaseout Act of 2013 (H.R. 2987)); (4) eliminating the inflation adjustment factor to phase-out the PTC then repealing (the Tax Reform Act of 2014 (H.R. 1) or the PTC Elimination Act (H.R. 1901)); (5) permanently extending the PTC and making refundable (the President's FY2016 Budget); or (6) fundamentally reforming the PTC to provide a "technology neutral" incentive (the Baucus Energy Tax Reform discussion draft from 2013).

Contents

Tables

Contacts

The renewable electricity production tax credit (PTC) expired on January 1, 2015. Thus, under current law, the credit will not be available for projects that begin construction after December 31, 2014. Whether the PTC should be extended, modified, or remain expired is an issue that may be considered in the 114th Congress. During the debate surrounding PTC extension in the 113th Congress, a number of Members signed letters taking a position on the issue of PTC extension.[1] In the 114th Congress, extension of the PTC may be considered as part of the "tax extenders" debate.[2] Most recently, the PTC was retroactively extended, through the end of 2014, as part of the Tax Increase Prevention Act of 2014 (P.L. 113-295).

This report provides a brief overview of the renewable electricity PTC. The first section of the report describes the credit. The second section provides a legislative history. The third section presents data on PTC claims and discusses the revenue consequences of the credit. The fourth section briefly considers some of the economic and policy considerations related to the credit. The report concludes by briefly noting policy options related to the PTC.

Description

The renewable electricity PTC is a per-kilowatt-hour tax (kWh) credit for electricity generated using qualified energy resources.[3] To qualify for the credit, the electricity must be sold by the taxpayer to an unrelated person. The credit can be claimed for a 10-year period once a qualifying facility is placed in service. The maximum credit amount for 2013, 2014, and 2015 is 2.3 cents per kWh. The maximum credit rate, set at 1.5 cents per kWh in statute, is adjusted annually for inflation.[4] Wind, closed-loop biomass, and geothermal energy technologies qualify for the maximum credit amount (see **Table 1**). Other technologies, including open-loop biomass, small irrigation power, municipal solid waste, qualified hydropower, and marine and hydrokinetic energy facilities qualify for a reduced credit amount, where the amount of the credit is reduced by one-half (see **Table 1**).[5]

---

[1] On November 14, 2013, 52 House Members sent a letter to House Ways and Means Committee Chairman Dave Camp stating that the PTC should not be extended (http://pompeo.house.gov/uploadedfiles/windptc2013letter.pdf). A December 13, 2013, letter to the chairman and ranking Member of the Senate Committee on Finance, signed by 10 Senators, also supported allowing the PTC to expire (http://www.nationaljournal.com/energy/manchin-alexander-call-for-expiration-of-wind-tax-credit-20131218). On December 16, 2013, seven Members of the House Sustainable Energy and Environment Coalition sent a letter to House Ways and Means Committee leadership supporting the extension of the PTC, along with other select expired and expiring energy-related provisions. A similar letter was sent by 24 Senators to Senate Committee on Finance leadership (http://www.nationaljournal.com/energy/dems-push-to-extend-clean-energy-tax-credits-20131216). On March 21, 2014, 26 Senators sent a letter to Senate Committee on Finance Chairman Ron Wyden and Ranking Member Orrin Hatch in support of extending the PTC (http://www.nationaljournal.com/library/128736). A similar letter, signed by 118 Members of the House of Representatives, was sent to House Speaker John Boehner (http://loebsack.house.gov/uploadedfiles/wind_ptc-itc_extension_letter_final_3.21.2014.pdf). On July 29, 2014, 54 House Members sent a letter to House Speaker John Boehner and Majority Leader-Elect Kevin McCarthy in support of expiration of the PTC (http://pompeo.house.gov/uploadedfiles/29jul2014_-_wind_ptc_letter_to_leadership.pdf).

[2] For background, see CRS Report R43898, *Tax Provisions that Expired in 2014 ("Tax Extenders")*, by Molly F. Sherlock.

[3] The renewable electricity production credit can be found in § 45 of the Internal Revenue Code (IRC).

[4] The inflation adjustment is based on the gross domestic product (GDP) implicit price deflator, where the 1992 GDP implicit price deflator is the base year.

[5] From 2012 through 2014, the half-credit amount was 1.1 cents per kWh. The half-credit amount increased to 1.2 cents (continued...)

Table 1. PTC Credit Rate and Eligible Renewable Technologies

2015

Full Credit		Half Credit	
Credit Rate (per kWh)	2.3¢	Credit Rate (per kWh)	1.2¢
Qualifying Technologies	Wind, Closed-Loop Biomass, Geothermal	Qualifying Technologies	Open-Loop Biomass, Small Irrigation Power, Municipal Solid Waste, Qualified Hydropower, Marine and Hydrokinetic

Source: IRC Section 45.

Under current law, only facilities for which construction began before January 1, 2015, can qualify for the PTC.[6] Before 2013, the PTC expiration date was a placed-in-service deadline, meaning that the electricity producing property had to be ready and available for use before the credit's expiration date.

The amount that may be claimed for the PTC is set to phase-out once the market price of electricity exceeds threshold levels. Since being enacted, market prices of electricity have never exceeded the threshold level and the PTC has not been phased out, nor is the PTC likely to be phased out under current law.[7]

The ability to claim the PTC may also be limited by the corporate alternative minimum tax (AMT). Currently, the PTC is available for taxpayers subject to the AMT for the first four years of the credit. While the PTC cannot be claimed against the corporate AMT, unused credits may be carried forward to offset future regular tax liability. While few firms are subject to the corporate AMT, this limitation may be significant for those affected.[8]

From 2009 through 2014, PTC-eligible taxpayers had the option of claiming the 30% energy investment tax credit (ITC) in lieu of the PTC. Property that was placed in service during 2009, 2010, or 2011 or which was placed under construction in one of these years also had the option of claiming an American Recovery and Reinvestment Act (ARRA) Section 1603 grant in lieu of tax benefits.[9]

(...continued)

per kWh for 2015.

[6] A taxpayer may establish the beginning of construction by starting physical work of a significant nature or by meeting the safe harbor provided in the IRS Notice 2013-60, available at http://www.irs.gov/pub/irs-drop/n-13-60.pdf. IRS guidance advises that facilities placed in service before January 1, 2017 will be considered to have satisfied the continuous construction or continuous efforts requirements for meeting the December 31, 2014, construction start date deadline (see IRS Notice 2015-15, available at http://www.irs.gov/pub/irs-drop/n-15-25.pdf).

[7] The threshold amount above which the PTC begins to phase-out is 8 cents in statute, adjusted for inflation. Thus, the adjusted threshold amount for phase-out in 2015 was 12.27 cents per kWh. The reference price for the purposes of the PTC phase-out is the annual average contract price per kWh of electricity generated from the same qualified energy resource and sold in the prior year. The reference price for wind in 2015 was 4.5 cents. Because the reference price (4.5 cents) did not exceed the threshold amount (12.27 cents), there was no PTC phase-out.

[8] For more, see Curtis Carlson and Gilbert E. Metcalf, "Energy Tax Incentives and the Alternative Minimum Tax," *National Tax Journal*, vol. 61, no. 3 (September 2008), pp. 477-491.

[9] 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.

There are also production tax credits for Indian coal and refined coal. Indian coal production facilities must have been placed in service before January 1, 2009, to receive credits. Under current law, credits are not available for coal produced after 2013. The base rate for Indian coal is $2.00 per ton, but with the inflation adjustment the credit was $2.308 in 2013. For refined coal, the base credit amount is $4.375 per ton, and the 2015 credit with the inflation adjustment is $6.71 per ton. Refined coal facilities must have been placed in service before January 1, 2012, to qualify for credits. Refined coal facilities that were placed in service before this deadline may still be receiving credits, as the credit was allowed for production over a 10-year period.

Legislative History

The PTC was first enacted in 1992 as part of the Energy Policy Act of 1992 (EPACT92; P.L. 102-486). Since 1999, the PTC has been extended nine times (see **Table 2**). In June 1999, and at the end of 2001, 2003, and 2013, the PTC was allowed to lapse before being retroactively extended. Including the present expiration, the PTC has been allowed to lapse five times.

When first enacted as part of the EPACT92, the PTC was available for electricity generated using wind or closed-loop biomass systems. The credit was initially set to expire on June 30, 1999. In addition to extending the PTC through December 31, 2001, the Ticket to Work and Work Incentives Improvement Act of 1999 (P.L. 106-170) added poultry waste as a qualifying technology. The PTC was again extended, through December 31, 2003, as part of the Job Creation and Worker Assistance Act (P.L. 107-147). The Working Families Tax Relief Act of 2004 (P.L. 108-311) included provisions extending the PTC through December 31, 2005.

Legislation enacted later in the 108th Congress substantially modified the PTC. The American Jobs Creation Act of 2004 (AJCA; P.L. 108-357) added new qualifying resources, including open-loop biomass (including agricultural livestock waste), geothermal energy, solar energy, small irrigation power, and municipal solid waste (landfill gas and trash combustion facilities). Instead of being able to claim the PTC for the first 10 years of production, these new qualifying resources were limited to a 5-year PTC period. Further, open-loop biomass, small irrigation power, and municipal solid waste facilities had their credit amount reduced by one half. The AJCA also introduced a PTC for refined coal, with a rate of $4.375 per ton (indexed for inflation after 1992), available for qualifying facilities placed in service before January 1, 2009.[10]

The PTC was extended twice during the 109th Congress. The Energy Policy Act of 2005 (EPACT05; P.L. 109-58) extended the PTC for all facilities except solar energy and refined coal for two years, through 2007. EPACT05 also added two new qualifying resources: hydropower and Indian coal. Hydropower was added as a half-credit qualifying resource. Indian coal could qualify for a credit over a seven year period, with the credit amount set at $1.50 per ton for the first four years, and $2.00 per ton for the last three years, adjusted for inflation. EPACT05 also extended the credit period from five years to 10 years for all qualifying facilities (other than Indian coal) placed in service after August 8, 2005. The Tax Relief and Health Care Act of 2006

[10] The AJCA also limited the reduction in credit for grants, tax-exempt bonds, or other subsidized financing to 50% for facilities other than closed-loop biomass. For certain closed-loop biomass facilities, the ACJA made it so there was no reduction in credit for taxpayers receiving other forms of subsidized financing. The AJCA also made changes to the corporate AMT, allowing taxpayers to claim the PTC against the AMT and stipulating that a taxpayer's tentative minimum tax be treated as zero for the purposes of determining the tax liability limitation with respect to the PTC for the first four years of production.

(P.L. 109-432) extended the PTC for one year, through 2008, for all qualifying facilities other than solar, refined coal, and Indian coal.

Table 2. Renewable Electricity PTC Expirations and Extensions

Legislation	Date Enacted	PTC Eligibility Window	Lapse Before Extension?
Energy Policy Act of 1992 (P.L. 102-486)	10/24/1992	1/1/1993 - 6/30/1999 (closed-loop biomass) 1/1/1994 – 6/30/1999 (wind)	—
Ticket to Work and Work Incentives Improvement Act of 1999 (P.L. 106-170)	12/17/1999	7/1/1999 – 12/31/2001	Yes 7/1/1999 – 12/17/1999
Job Creation and Worker Assistance Act (P.L. 107-147)	3/9/2002	1/1/2002 – 12/31/2003	Yes 1/1/2002 – 3/9/2002
Working Families and Tax Relief Act (P.L. 108-311)	10/4/2004	1/1/2004 – 12/31/2005	Yes 1/1/2004 – 10/4/2004
The Energy Policy Act of 2005 (P.L. 109-58)	8/8/2005	1/1/2006 – 12/31/2007	No
The Tax Relief and Health Care Act of 2006 (P.L. 109-432)	12/20/2006	1/1/2008 – 12/31/2008	No
The Emergency Economic Stabilization Act of 2008 (P.L. 110-343)	10/3/2008	1/1/2009 – 12/31/2010 10/3/2008 – 12/31/2011 (marine and hydrokinetic) 1/1/2009 – 12/31/2009 (wind)	No
The American Recovery and Reinvestment Act of 2009 (P.L. 111-5)	2/17/2009	1/1/2011 – 12/31/2013 1/1/2010 – 12/31/2012 (wind)	No
The American Taxpayer Relief Act of 2012 (P.L. 112-240)	1/2/2013	1/1/2013 – 12/31/2013 (wind)	No*
Tax Increase Prevention Act of 2014 (P.L. 113-295)	12/19/2014	1/1/2014 – 12/31/2014	Yes 1/1/2014 – 12/19/2014

Source: Information compiled by CRS using the Legislative Information System (LIS).

Notes: For all lapse periods, the PTC was retroactively extended. See text for full details on qualifying technologies during different time periods. *The PTC expired in January 1, 2013, before being extended on January 2, 2013.

The PTC was again extended and modified as part of the Emergency Economic Stabilization Act of 2008 (EESA; P.L. 110-343). The PTC for wind and refined coal was extended for one year, through 2009, while the PTC for closed-loop biomass, open-loop biomass, geothermal energy, small irrigation power, municipal solid waste, and qualified hydropower was extended for two years, through 2010. Marine and hydrokinetic renewable energy were also added as qualifying resources. A new credit for steel industry fuel was also introduced. This credit was set at $2.00 per barrel-of-oil equivalent (adjusted for inflation with 1992 as the base year). For facilities that were producing steel industry fuel on or before October 1, 2008, the credit was available for fuel produced and sold between October 1, 2008, and January 1, 2010. For facilities placed in service after October 1, 2008, the credit was available for one year after the placed-in-service date or through December 31, 2009, whichever was later.

The American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5) provided a longer-term extension of the PTC, extending the PTC for wind through 2012 and the PTC for other renewable energy technologies through 2013. Provisions enacted in ARRA also allowed PTC-eligible taxpayers to elect to receive a 30% investment tax credit (ITC) in lieu of the PTC. ARRA also introduced the Section 1603 grant program, which allowed PTC- and ITC-eligible taxpayers to receive a one-time payment from the Treasury in lieu of tax credits.[11] Under ARRA, the Section 1603 grant program was available for property placed-in-service or for which construction started in 2009 or 2010. The Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010 (P.L. 111-312) extended the Section 1603 grant program for one year, through 2011.

The PTC for wind, which was scheduled to expire at the end of 2012, was extended for one year, through 2013, as part of the American Taxpayer Relief Act (ATRA; P.L. 112-240). In addition to extending the PTC for wind, provisions in ATRA changed the credit expiration date from a placed-in-service deadline to a construction start date for all qualifying electricity-producing technologies. The PTC was retroactively extended through 2014 as part of the Tax Increase Prevention Act of 2014 (P.L. 113-295).

PTC Claims and Revenue Cost Estimates

In 2011, 230 taxpayers claimed the PTC (see **Table 3**). Most of the credits claimed were for production of renewable electricity, with only a few claims being made for refined coal, Indian coal, or steel industry fuel.[12] In total, in 2011, taxpayers claimed PTCs of $1.8 billion. Because the PTC is paid out for 10 years, most PTCs awarded in any given year are the result of previous year investments. Some taxpayers may not be able to use all of their tax credits to offset taxable income in a given tax year. In this case, taxpayers may carry forward unused credits to offset tax liability in a future tax year. In 2010, nearly $1.2 billion in PTCs were carried forward from previous tax years.[13]

The IRS data on PTC claims highlight the effect that policy actions taken in response to the economic downturn had on renewable energy tax credit claims. While the number of taxpayers claiming the PTC increased between 2008 and 2009, this number decreased between 2009 and 2011. With the Section 1603 grant option available, fewer taxpayers claimed the PTC. From 2009 through 2013, $14.3 billion was awarded in Section 1603 grants to recipients that might have otherwise claimed the PTC had the grant option not been available.[14] This amount is not directly

[11] For more on the Section 1603 grant program, 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.

[12] The IRS data do not identify the number of taxpayers claiming the PTC for individual energy resources. The tax expenditure figures presented below, in **Table 4**, provide estimates of the amount of PTCs being paid out to coal as opposed to renewable resources.

[13] Taxpayers with limited tax liability may not have the ability to claim tax credits in a given tax year. Under the general business credit, unused tax credits can be carried back one year (used to offset positive tax liability in the previous tax year), or carried forward for up to 20 years (used to offset positive tax liability in future tax years). Carryforward data is not available for 2011.

[14] This includes grants paid for wind, open- and closed-loop biomass, geothermal electricity, hydropower, landfill gas, and marine technologies through the end of 2013. A full list of awards can be found at http://www.treasury.gov/initiatives/recovery/Pages/1603.aspx.

comparable to the costs of the PTC over four years, because Section 1603 grants are a one-time payment, while projects can claim the PTC for 10 years of production.

Table 3. Internal Revenue Service Statistics on PTC Claims

billions of dollars

	2008	2009	2010	2011
Number of Claimants[a]	253	260	246	230
Total Amount Claimed	$1.2	$1.5	$1.7	$1.8
Credits Carried Forward	$0.2	$0.6	$1.2	n.a.

Source: CRS analysis of Internal Revenue Service (IRS) Statistics of Income (SOI) line counts data, various years. Available at http://www.irs.gov/uac/SOI-Tax-Stats-Corporation-Income-Tax-Returns-Line-Item-Estimates.

a. This is the number of taxpayers filing IRS Form 8835 to claim the Renewable Electricity, Refined Coal, and Indian Coal Production Credit. Credit amounts carried forward are not available for 2011.

The amount of PTCs being carried forward more than doubled between 2008 and 2009, then doubled again between 2009 and 2010. During the economic downturn, taxpayers had less net income to offset with tax credits. Further, weakness in tax equity markets made it harder for renewable energy project developers to establish partnerships to monetize tax credits.[15]

Estimates of the cost, or foregone revenue, associated with tax expenditure provisions can be found in the Joint Committee on Taxation (JCT) annual tax expenditure tables. Because JCT's figures are estimates, they may differ from the IRS claims data provided above. Between 2014 and 2018, estimated revenue losses associated with the PTC are $16.6 billion (see **Table 4**). Most of these revenue losses, $13.8 billion, are due to the PTC for wind energy. An estimated $1.9 billion is for PTCs for electricity produced using open-loop biomass. An estimated $0.7 billion is attributable to other renewable resources, including closed-loop biomass, geothermal, qualified hydropower, small irrigation power, and municipal solid waste. Over the same 5-year period, the estimated revenue losses associated with the production credits for refined coal and Indian coal are $0.1 billion each. JCT's tax expenditure estimates are based on current law. Thus, any policy that extends the PTC would increase these tax expenditure estimates.

[15] For a discussion of tax equity markets for renewable energy tax credits during the economic downturn, 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.

Table 4. PTC Tax Expenditures

billions of dollars

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Renewable Resources	0.2	0.3	2.1	1.1	0.9	1.3	1.4	1.4	1.6	1.7
Wind Only					*0.6*	*0.7*	*1.0*	*1.1*	*1.3*	*1.4*
Open-Loop Biomass Only					*0.3*				*0.3*	*0.3*
Indian Coal					-i-	-i-	-i-	-i-	-i-	-i-
Refined Coal					-i-	-i-	-i-	-i-	-i-	-i-
Total	**0.2**	**0.3**	**2.1**	**1.1**	**0.9**	**1.3**	**1.4**	**1.4**	**1.6**	**1.7**
	2014	**2015**	**2016**	**2017**	**2018**			**2014 - 2018**		
Renewable Resources	1.5	2.8	3.5	3.9	4.0			16.4		
Wind Only	*1.2*	*2.4*	*3.1*	*3.5*	*3.6*			*13.8*		
Open-Loop Biomass Only	*0.3*	*0.4*	*0.4*	*0.4*	*0.4*			*1.9*		
Indian Coal	-i-	-i-	-i-	-i-	-i-			0.1		
Refined Coal	-i-	-i-	-i-	-i-	-i-			0.1		
Total	**1.5**	**2.8**	**3.5**	**3.9**	**4.0**			**16.6**		

Source: Joint Committee on Taxation, annual tax expenditure tables, available at https://www.jct.gov/publications.html?func=select&id=5.

Notes: All figures are forward looking estimates and do not reflect actual revenue losses. An "-i-" indicates a positive revenue loss of less than $50 million. Before 2008, the JCT did not disaggregate the cost of the PTC for different energy resources.

Cost of Extending the PTC

Several estimates are available regarding the cost of extending the PTC. The one-year retroactive extension enacted as part of the Tax Increase Prevention Act of 2014 cost $6.4 billion over the 10-year budget window.[16] The two-year extension proposed in the Expiring Provisions Improvement, Reform, and Efficiency (EXPIRE) Act of 2014 (S. 2260) had an estimated revenue cost of $13.3 billion over the 10-year budget window.[17]

Other available estimates look at the cost of a long-term PTC extension. The Congressional Budget Office (CBO) estimates that a permanent PTC (or a PTC extended through the budget

[16] See U.S. Congress, Joint Committee on Taxation, *General Explanation of Tax Legislation Enacted in the 113th Congress*, April 1, 2015, JCS-1-15, available at https://www.jct.gov/publications.html?func=startdown&id=4741. In September 2013, the JCT estimated the cost of extending the PTC for wind only. A one-year extension of the PTC for wind only, not extending the PTC for other technologies, had an estimated revenue cost of $6.2 billion over the 2014 to 2023 budget window, while a five-year extension had an estimated revenue cost of $18.5 billion over the same time frame. See revenue estimate is available in http://oversight.house.gov/wp-content/uploads/2014/02/2013-10-02-Ser.-No.-113-62-SC-EP-Oversight-of-the-Wind-Energy-Prod.-Tax-Credit.pdf.

[17] See U.S. Congress, Joint Committee on Taxation, *Estimated Revenue Effects of an Amendment in the Nature of a Substitute to H.R. 3474, the "Expiring Provisions Improvement, Reform, and Efficiency (EXPIRE) Act of 2014," Scheduled for Consideration by the Senate*, 113th Cong., May 15, 2014, JCX-51-14, available at https://www.jct.gov/publications.html?func=startdown&id=4601.

horizon) would reduce revenues by $28.4 billion between 2014 and 2024.[18] The President's FY2016 budget proposed to permanently extend the PTC, add solar to the list of qualifying technologies, and make the credit refundable. In addition, the President's FY2016 budget proposed allowing the PTC for property that currently qualifies for the residential energy efficient property credit, and to make the investment tax credit (ITC) permanent.[19] The Treasury estimates that the permanent PTC extension coupled with the extension of other related incentives for renewables, as proposed by the President, would reduce revenues by $31.4 billion between 2016 and 2025.[20] In analysis of the President's FY2016 budget, the JCT estimated that making permanent the PTC and ITC would cost $35.8 billion between 2015 and 2025.[21]

Economic and Policy Considerations

The PTC was enacted in 1992 to promote the "development and utilization of certain renewable energy sources."[22] The 1999 sunset was included to provide an "opportunity to assess the effectiveness of the credit."[23] When the PTC was extended as part of a "tax extenders" package in 1999, Congress noted that the PTC had been important to the development of environmentally friendly renewable power, and extended the credit to promote further development of wind (and other) resources.[24] Recent extensions of the PTC reflect a belief that the tax incentives contribute to the development of renewable energy infrastructure, which advances environmental and energy policy goals.[25]

Research suggests that the PTC has driven investment and contributed to growth in the wind industry.[26] While further extension of the PTC may lead to further investment and growth in wind

[18] This estimate is provided as part of the CBO's alternative fiscal scenario, where current policies are assumed to be continued. Estimates are generally provided to CBO by JCT. Additional information and detailed estimates are available in the Congressional Budget Office, *The Budget and Economic Outlook: 2014 to 2024,* February 4, 2014, available at http://www.cbo.gov/publication/45010.

[19] For more information on the residential energy efficient property credit, see CRS Report R42089, *Residential Energy Tax Credits: Overview and Analysis*, by Margot L. Crandall-Hollick and Molly F. Sherlock.

[20] Department of the Treasury, *General Explanations of the Administration's Fiscal Year 2016 Revenue Proposals*, Washington, DC, February 2015, http://www.treasury.gov/resource-center/tax-policy/Pages/general_explanation.aspx.

[21] Joint Committee on Taxation, *Estimated Budget Effects of the Revenue Provisions Contained in the President's FY2016 Budget Proposal*, March 6, 2015, JCX-50-15, https://www.jct.gov/publications.html?func=startdown&id=4739.

[22] U.S. Congress, House Committee on Ways and Means, *Comprehensive National Energy Policy Act*, committee print, 102nd Cong., 2nd sess., May 5, 1992, H. Rept. 102-474, pp. 41-42.

[23] Ibid.

[24] U.S. Congress, Joint Committee on Taxation, *General Explanation of Tax Legislation Enacted in the 106th Congress*, committee print, April 19, 2001, JCS-2-01, p. 25.

[25] U.S. Congress, Joint Committee on Taxation, *General Explanation of Tax Legislation Enacted in the 112th Congress*, committee print, February 2013, JCS-2-13, pp. 212-213.

[26] Several empirical studies estimate the effects of the PTC on wind investment and development. See Gireesh Shrimali, Melissa Lynes, and Joe Indvik, "Wind energy deployment in the U.S.: An empirical analysis of the role of federal and state policies," *Renewable and Sustainable Energy Reviews*, vol. 43 (March 2015), pp. 796-806; Claudia Hitaj, "Wind Power Development in the United States," *Journal of Environmental Economics and Management*, vol. 65 (2013), pp. 394-410; Xi Lu, Jeremy Tchou, Michael B. McElroy, and Chris P. Nielsen, "The Impact of Production Tax Credits on the Profitable Production of Electricity from Wind in the U.S.," *Energy Policy*, vol. 39 (2011), pp. 4207-4214; Gilbert E. Metcalf, "Investment in Energy Infrastructure and the Tax Code," in *Tax Policy and the Economy*, ed. Jeffery R. Brown, vol. 24 (National Bureau of Economic Research, 2010), pp. 1-33. For a discussion of other policy factors affecting wind markets, see CRS Report R42576, *U.S. Renewable Electricity: How Does the*

(continued...)

infrastructure, this potential is limited in the case of short-term extensions. Further, retroactive extensions provide what are often characterized as windfall benefits, rewarding taxpayers that made investments absent tax incentives.

While the PTC has contributed to increased use of renewable electricity resources, research suggests that its contribution to reducing greenhouse gas emissions is small. In a 2013 report, the National Academy of Sciences estimated that removing tax credits for renewable electricity would result in a 0.3% increase in power-sector emissions.[27]

A common rationale for government intervention in energy markets is the presence of "externalities," which result in "market failures."[28] Pollution resulting from the production and consumption of energy creates a negative externality, as the costs of pollution are borne by society as a whole, not just energy producers and consumers. Because producers and consumers of polluting energy resources do not bear the full cost of their production (or consumption) choices, too much energy is produced (or consumed), resulting in a market outcome that is economically inefficient.

Tax subsidies for clean energy resources are one policy option for addressing the inefficiencies and market failures in the energy sector.[29] Here, the subsidies approach is not the most efficient way to achieve the policy objective.[30] Subsidies reduce the average cost of energy, encouraging energy consumption, countering energy conservation initiatives and offsetting emissions reductions.[31] Tax subsidies also reduce tax revenues. To the extent that these subsidies are financed by distortionary taxes on other economic activities, they reduce economic efficiency.[32]

A more direct and economically efficient approach to addressing pollution and environmental concerns in the energy sector would be a direct tax on pollution or emissions, such as a carbon tax.[33] This option would generate revenues that could be used to offset other distortionary taxes, achieve distributional goals, or reduce the deficit. A carbon tax approach would also be "technology neutral," not requiring Congress to select which technologies to subsidize.[34]

(...continued)

Production Tax Credit (PTC) Impact Wind Markets?, by Phillip Brown.

[27] William D. Nordhaus, editor, Stephen A. Merrill, editor, and Paul T. Beaton, editor, *Effects of U.S. Tax Policy on Greenhouse Gas Emissions*, National Academy of Sciences, Washington, DC, 2013, p. 68.

[28] For a more detailed discussion of the economic rationale for intervention in energy markets, see U.S. Congress, Joint Committee on Taxation, *Present Law and Analysis of Energy-Related Tax Expenditures*, committee print, 112th Cong., March 23, 2012, JCX-28-12.

[29] There are also non-tax options, such as regulations and mandates, which are beyond the scope of this report.

[30] Metcalf, Gilbert E. 2008. "Using Tax Expenditures to Achieve Energy Policy Goals." *American Economic Review*, 98(2): 90-94.

[31] The 2013 National Academy of Sciences report notes how tax credits for renewable electricity increase overall electricity demand.

[32] Gilbert E. Metcalf, "Federal Tax Policy towards Energy," Tax Policy and the Economy, vol. 21 (2007), pp. 145-184.

[33] For general background on the carbon tax option, see CRS Report R42731, *Carbon Tax: Deficit Reduction and Other Considerations*, by Jonathan L. Ramseur, Jane A. Leggett, and Molly F. Sherlock; and Donald Marron, Eric Toder, and Lydia Austin, *Taxing Carbon: What, Why, and How*, Tax Policy Center, Washington, DC, June 2015, http://www.taxpolicycenter.org/UploadedPDF/2000274-Taxing-Carbon-What-Why-and-How.pdf.

[34] The Baucus Energy Tax Reform discussion draft (discussed below) proposes "technology neutral" incentives for clean energy resources. For a discussion of the challenges associated with achieving technology neutrality using the subsidies approach, see testimony of Gilbert E. Metcalf before the Senate Committee on Finance, *Technology*

(continued...)

Tax incentives are also not the most efficient mechanism for delivering federal financial support directly to renewable energy developers and investors. Stand-alone projects often have limited tax liability. Thus, project developers often seek outside investors to "monetize" tax benefits using "tax-equity" financing arrangements.[35] The use of tax equity investors, often major financial institutions, reduces the amount of federal financial support for renewable energy that is delivered directly to the renewable energy sector.[36]

Another consideration is the interaction of the PTC with other policies designed to support the development of renewable electricity resources.[37] More than half of U.S. states currently have renewable portfolio standards (RPS) policies in place.[38] Subsidies for renewable energy at the federal level, including the PTC, reduce the cost of complying with state-level RPS mandates.

Policy Options and Proposals

Several policy options are related to the PTC (see **Table 5**). Without legislative action, the PTC will not be available to projects that began construction after December 31, 2014. One option is to allow the PTC to remain expired, not allowing any additional projects to qualify for the PTC. Under this option, projects that were placed in service before January 1, 2014, or qualifying projects for which construction began before the end of 2014, may still receive the PTC for their first 10 years of qualified production.

Another option would be to provide a temporary extension of the PTC, similar to what has been enacted in the past. With this option, the construction start date deadline could be extended by a set number of years (the Tax Increase Prevention Act of 2014 (P.L. 113-295) contained a one-year extension for the PTC, while the Expiring Provisions Improvement, Reform, and Efficiency (EXPIRE) Act of 2014 (S. 2260) proposed a two-year extension). Should Congress choose to enact a short-term "tax extenders" package, the PTC construction start date may be extended for the same number of years as other expired tax provisions (typically one or two years).

(...continued)

Neutrality in Energy Tax: Issues and Options, April 23, 2009, available at http://www.finance.senate.gov/imo/media/doc/042309gmtest.pdf; and testimony of Gilbert E. Metcalf before the Senate Committee on Finance, *Reforming America's Outdated Energy Tax Code*, September 17, 2014, available at http://www.finance.senate.gov/imo/media/doc/Testimony%20-%20Gilbert%20Metcalf.pdf. For a discussion of how the Baucus draft fails to achieve technology neutrality, see Martin Sullivan, "Economic Analysis: Why the Baucus Draft Falls Short," *Tax Notes*, January 6, 2013, pp. 59-64.

[35] For more on the use of tax-equity financing in the renewable energy sector, see Bloomberg New Energy Finance, *The Return - and Returns - of Tax Equity for US Renewable Projects*, November 21, 2011, http://about.bnef.com/white-papers/the-return-and-returns-of-tax-equity-for-us-renewable-projects/.

[36] Low-income housing tax credit (LIHTC) recipients have relied on "syndicators" to facilitate tax-equity partnerships since the credit was enacted in 1986. Carlson and Metcalf (2008) found that firms taking the PTC also tended to claim substantial amounts of LIHTCs, providing early evidence of the use of tax-equity in the renewable energy sector as well. Equity provided for LIHTCs tends to fluctuate between the mid-$0.80s to low-$0.90s per $1.00 tax credit. See CRS Report RS22389, *An Introduction to the Low-Income Housing Tax Credit*, by Mark P. Keightley and Jeffrey M. Stupak.

[37] In addition to other policies, market factors, such as natural gas prices affect wind development. See CRS Report R42576, *U.S. Renewable Electricity: How Does the Production Tax Credit (PTC) Impact Wind Markets?*, by Phillip Brown.

[38] For a map summarizing recent standards across states, see http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2014/11/Renewable-Portfolio-Standards.pdf.

Table 5. PTC Policy Options and Proposals

billions of dollars

Policy Option	Recent Proposals	Estimated Revenue Consequences (10-year)[a]
Allow the PTC to Remain Expired	Current Law	$0.0
Temporary Extension	Tax Increase Prevention Act of 2014 (P.L. 113-295)	-$6.4
	The Expiring Provisions Improvement, Reform, and Efficiency (EXPIRE) Act of 2014 (S. 2260)	-$13.3
Temporary Extension with Phase-Out	PTC Certainty and Phaseout Act of 2013 (H.R. 2987) and the No More Excuses Energy Act of 2013 (H.R. 2081)	n.a.
Eliminate Inflation Adjustment Factor and Repeal	The Tax Reform Act of 2014 (H.R. 1) and the PTC Elimination Act (H.R. 1901)	$9.6
Permanent Extension of the PTC and ITC	The President's FY2016 Budget Proposal	-$35.8

Source: CRS. See text for additional information and source details.

a. A negative (positive) figure indicates that the option would reduce (increase) federal revenues, relative to current law.

In the 113th Congress, some proposed that the PTC be extended, but that some form of phase-out accompany the extension.[39] The PTC Certainty and Phaseout Act of 2013 (H.R. 2987), for example, would have extended the PTC through 2019, but decreased the value of the PTC for projects that begin construction after 2014.[40] This approach has reportedly been considered by others in the 114th Congress, even if legislation has not yet been introduced.[41]

House Ways and Means Committee Chairman Dave Camp proposed a different form of PTC phase-out as part his tax reform proposal introduced late in the 113th Congress, the Tax Reform Act of 2014 (H.R. 1). Under this proposal, the construction start date would not have been extended, meaning that no new facilities would be eligible for the PTC. The PTC inflation adjustment factor would also have been eliminated. This would reduce the value of the PTC for renewable electricity to 1.5 cents per kWh, for all PTC-eligible properties still within the 10-year eligibility window. Thus, facilities that had received a 2.3 cent per kWh PTC in 2014, and were still within their 10-year PTC window in 2015, would have seen the value of the PTC fall to 1.5 cents per kWh for 2015 and beyond. Under Chairman Camp's proposal, the PTC would have been fully repealed after 2024. Because the value of the PTC would be reduced for existing

[39] While current law includes a phase-out should electricity prices exceed a certain threshold, this phase-out is very unlikely to occur in practice. For a discussion of various phase-out options, see CRS Report R43340, *Production Tax Credit Incentives for Renewable Electricity: Financial Comparison of Selected Policy Options*, by Phillip Brown.

[40] Similar provisions are included in the No More Excuses Energy Act of 2013 (H.R. 2081).

[41] Reportedly, Sen. Cantwell is involved in efforts to have the PTC reinstated and then phased-out over three to five years. See Ari Natter, "Cantwell Leading Efforts to Reinstate Expired Clean Energy Tax Credits," *Daily Tax Report*, April 27, 2015. A two-year extension followed by a phase-out was also reportedly considered in the 113th Congress before the one-year extension was enacted. See Ari Natter, "Wind Power Industry Seeks Phase-Out of Tax Credit Amid Republican Scrutiny," *Daily Tax Report*, January 15, 2015.

facilities, the JCT estimates that this proposal would raise $9.6 billion in additional federal revenues between 2014 and 2023, relative to current law. A similar proposal has been introduced in the 114th Congress as the PTC Elimination Act (H.R. 1901).

The President's FY2016 budget proposes a permanent extension of the PTC.[42] Additionally, the PTC would be made refundable, solar facilities would be added as qualifying property, and the credit would be modified such that renewable electricity consumed by the producer could qualify for tax credits. Property that currently qualifies for the residential energy efficient property credit would also be eligible for the PTC. Additionally, the investment tax credit (ITC) for renewable energy would be made permanent. In analysis of the President's FY2016 budget, the JCT estimated that making permanent the PTC and ITC, along with these other changes, would cost $35.8 billion between 2015 and 2025.[43]

A more fundamental or sweeping reform of energy tax incentives has also been proposed. In December 2013, then Senate Finance Committee Chairman Max Baucus released an Energy Tax Reform discussion draft.[44] The draft proposed a PTC at current levels (2.3 cents per kWh for 2013, adjusted for inflation) for zero emissions generation, with the option to elect a 20% ITC in lieu of the PTC. The credit amounts would be reduced for low emissions facilities, and facilities with emissions in excess of 372 grams of CO_2e per kWh would not be eligible for credits. The credit would remain available until the average annual greenhouse gas emissions rate for electrical production facilities in the United States reaches 372 grams of CO_2e per kWh (a 25% reduction from current levels), at which point the credit would phase-out.

Author Contact Information

Molly F. Sherlock
Specialist in Public Finance
msherlock@crs.loc.gov, 7-7797

Acknowledgments

The author would like to thank Jeffrey Stupak, Research Assistant in the Government Finance and Taxation Section at the Congressional Research Service, for assistance in updating this report.

[42] For more information, see Department of the Treasury, *General Explanations of the Administration's Fiscal Year 2016 Revenue Proposals*, Washington, DC, February 2015, http://www.treasury.gov/resource-center/tax-policy/Pages/general_explanation.aspx.

[43] Joint Committee on Taxation, *Estimated Budget Effects of the Revenue Provisions Contained in the President's FY2016 Budget Proposal*, March 6, 2015, JCX-50-15, https://www.jct.gov/publications.html?func=startdown&id=4739.

[44] For more information, see U.S. Congress, Joint Committee on Taxation, *Technical Explanation of the Senate Committee on Finance's Staff Discussion Draft to Reform Certain Energy Tax Provisions*, committee print, 113th Cong., December 18, 2013, JCX-21-13, available at https://www.jct.gov/publications.html?func=startdown&id=4537.