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Energy Tax Provisions That Expired in 2016 ("Tax Extenders")

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October 23, 2017

Congressional Research Service
7-....
www.crs.gov
R44990

CRS REPORT
Prepared for Members and
Committees of Congress

Summary

Sixteen temporary energy tax provisions expired at the end of 2016. Most of the expired provisions were last extended in 2015 as part of the Protecting Americans from Tax Hikes (PATH) Act of 2015, signed into law as Division Q of the Consolidated Appropriations Act, 2016 (P.L. 114-113). Under this law, all tax provisions that had expired at the end of 2014 were retroactively extended. Most expired energy tax provisions were extended for two years, through 2016. Division P of P.L. 114-113 also included longer-term extensions with scheduled phaseouts for wind and solar tax credits.

This report briefly summarizes and discusses the economic impact of energy-related tax provisions that expired at the end of 2016, including the following:

Renewable energy property provisions

- Production Tax Credit (PTC) for Non-Wind Facilities
- Energy Credit for Non-Solar Facilities
- Five-Year Cost Recovery for Certain Energy Property
- Credit for Residential Energy Property

Alternative and renewable fuels provisions

- Incentives for Biodiesel and Renewable Diesel
- Incentives for Alternative Fuel and Alternative Fuel Mixtures
- Alternative Fuel Vehicle Refueling Property
- Second Generation (Cellulosic) Biofuel Producer Credit
- Special Depreciation Allowance for Second Generation (Cellulosic) Biofuel Plant Property

Vehicles provisions

- Alternative motor vehicle credit for qualified fuel cell vehicles
- Credit for two-wheeled plug-in electric vehicles

Building energy efficiency provisions

- Credit for Construction of Energy-Efficient New Homes
- Energy-Efficient Commercial Building Deduction
- Credit for Section 25C Nonbusiness Energy Property

Other provisions

- Special Rule to Implement Electric Transmission Restructuring
- Credit for Production of Indian Coal

This report does not include provisions that in the past have been classified as individual or business related. For a general overview of tax provisions that expired in 2016, see CRS Report R44677, *Tax Provisions that Expired in 2016 ("Tax Extenders")*, by (name redacted) . For an overview of individual and business provisions, see CRS Report R44925, *Recently Expired Individual Tax Provisions ("Tax Extenders"): In Brief*, coordinated by (name redacted) ; and CRS Report R44930, *Business Tax Provisions that Expired in 2016 ("Tax Extenders")*, coordinated by (name redacted) .

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Introduction

In the past, Congress has regularly acted to extend expired or expiring temporary tax provisions.[1] Collectively, these temporary tax provisions are often referred to as "tax extenders." Of the 34 temporary tax provisions that expired at the end of 2016, 16 are energy tax provisions.

The expired energy tax provisions are diverse in purpose, providing various types of tax incentives for renewable electricity, alternative and renewable fuels, vehicles, building energy efficiency, and other energy activities. Most expired energy tax provisions were last extended in the Protecting Americans from Tax Hikes (PATH) Act of 2015, enacted as Division Q of the Consolidated Appropriations Act, 2016 (P.L. 114-113). This law retroactively extended temporary tax provisions that had expired at the end of 2014. Unlike much of the previous tax extender legislation, this law did not temporarily extend most or all expired provisions. Instead, a number of temporary provisions were made permanent, while others were extended through 2016 or 2019. While certain business, individual, and charitable provisions were made permanent or extended through 2019, energy-related provisions were generally extended for two years, through 2016, in the PATH Act.

There were longer-term extensions for certain renewables in Division P of P.L. 114-113. Specifically, the law provided longer-term extensions with scheduled phaseouts of tax credits for wind and solar. The renewable electricity production tax credit (PTC) for wind was extended through 2019, with the phaseout starting for facilities beginning construction in 2017.[2] For wind facilities that begin construction during 2017, the credit is reduced by 20%. The credit is reduced by 40% for facilities that begin construction in 2018, and reduced by 60% for facilities that begin construction in 2019.

The 30% investment tax credit (ITC) for business solar was extended through 2019 and the deadline changed from a placed-in-service deadline to a construction start date.[3] The business solar ITC was set to be 26% for facilities beginning construction in 2020 and 22% for facilities beginning construction in 2021, so long as these facilities are placed in service before the end of 2023. The business solar ITC is scheduled to return to 10% in 2022. The tax credit for residential solar was extended through 2021, with a phaseout starting in 2020.

There are several options for Congress to consider regarding temporary provisions. Provisions that expired at the end of 2016 could be extended. The extension could be retroactive. The extensions also could be short-term, long-term, or permanent. Another option would be to allow expired provisions to remain expired.

Table 1 provides information on (1) the cost of the two-year extension of expired energy tax provisions in the PATH Act; and (2) the estimated reduction in federal revenues that would result from making expired energy tax provisions permanent.

[1] For an overview of tax extenders, see CRS Report R44677, *Tax Provisions that Expired in 2016 ("Tax Extenders")*, by (name redacted) .

[2] CRS Report R43453, *The Renewable Electricity Production Tax Credit: In Brief*, by (name redacted) .

[3] CRS In Focus IF10479, *The Energy Credit: An Investment Tax Credit for Renewable Energy*, by (name redacted) .

Table 1. Energy Tax Provisions that Expired at the End of 2016

	10-Year Cost Estimate of 2-Year Extension in P.L. 114-113 (billions)	Cost of Permanent Extension—CBO Policy Alternatives Baseline (billions)
Renewables		
Production Tax Credit (PTC) for Non-Wind Facilities	$1.4	$2.8
Energy Credit for Non-Solar Facilities	n/a	$3.9
Five-Year Cost Recovery for Certain Energy Property	n/a	$4.9
Credit for Residential Energy Property	n/a	$11.9
Alternative and Renewable Fuels		
Incentives for Biodiesel and Renewable Diesel	$2.6	$37.5
Incentives for Alternative Fuel and Alternative Fuel Mixtures	$0.9	$7.4
Alternative Fuel Vehicle Refueling Property	$0.1	$1.4
Second Generation (Cellulosic) Biofuel Producer Credit	-i-	$0.3
Special Depreciation Allowance for Second Generation (Cellulosic) Biofuel Plant Property	-i-	$0.0
Vehicles		
Alternative motor vehicle credit for qualified fuel cell vehicles	-i-	$0.1
Credit for two-wheeled plug-in electric vehicles	-i-	$0.0
Building Energy Efficiency		
Credit for Construction of Energy-Efficient New Homes	$0.8	$3.5
Energy-Efficient Commercial Building Deduction	$0.3	$2.1
Credit for Section 25C Nonbusiness Energy Property	$1.3	$6.5
Other		
Special Rule to Implement Electric Transmission Restructuring	—	$0.0
Credit for Production of Indian Coal	$0.1	$0.4

Source: CRS analysis of extending legislation; Joint Committee on Taxation, *List of Expiring Federal Tax Provisions 2016-2026*, January 4, 2017, JCX-1-17; Congressional Budget Office (CBO), *An Update to the Budget and Economic Outlook, Detailed Revenue Projections,* June 2017; and Joint Committee on Taxation, *Estimated Budget Effects of Division Q of Amendment #2 to the Senate Amendment to H.R. 2029 (Rules Committee Print 114-40), the "Protecting Americans from Tax Hikes Act of 2015,"* 114th Cong., December 16, 2015, JCX-143-15.

Notes: The cost of permanent extension is as reported by CBO for the 2018 to 2027 budget window. An -i- indicates an estimated revenue loss of less than $50 million between 2016 and 2025. An "n/a" means consideration of extension was not applicable, for reasons explained in the text. A "—" means JCT estimated no revenue effect.

Renewables

Production Tax Credit (PTC) for Non-Wind Facilities[4]

The renewable electricity PTC is a per-kilowatt-hour (kWh) credit for electricity produced by a qualified energy resource. Eligible facilities can claim the tax credit for the first 10 years of qualified production. Resources that qualify for the full credit amount, 2.4 cents per kWh in 2017, include wind, closed-loop biomass, and geothermal. Other resources are eligible for a half credit amount, including open-loop biomass, small irrigation power, municipal solid waste, qualified hydropower, and marine and hydrokinetic resources. Under current law, non-wind facilities must have begun construction before January 1, 2016, to be tax-credit eligible.[5]

The PTC was enacted in 1992 as part of the Energy Policy Act (EPACT92; P.L. 102-486). When first enacted, 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. Since 1999, the PTC has regularly been extended, often as part of "tax extenders" legislation. The credit has also been expanded to include additional qualifying resources. At several points in time, the PTC was allowed to lapse before a retroactive extension was enacted.

Taxpayers can elect to receive a 30% investment tax credit in lieu of the PTC. The ITC in lieu of PTC election was enacted in 2009 alongside the Section 1603 grants in lieu of tax credits that expired at the end of 2011.[6] In recent years, the option to elect the ITC in lieu of the PTC has been extended alongside the PTC in "tax extenders" legislation.

The PTC was enacted in 1992 to promote the "development and utilization of certain renewable energy sources."[7] The 1999 sunset was included to provide an "opportunity to assess the effectiveness of the credit."[8] 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.[9] Subsequent extensions of the PTC reflected a belief that the tax incentive contributed to the development of renewable-energy infrastructure, which advanced environmental and energy policy goals.[10]

A two-year extension of the PTC for non-wind technologies was included in the Protecting Americans from Tax Hikes (PATH) Act of 2015, enacted as Division Q of P.L. 114-113. Division P of the Consolidated Appropriations Act, 2016 (P.L. 114-113) included a two-year extension of

[4] Internal Revenue Code (IRC) Section 45(d). IRC Section 48(a)(5) for the investment tax credit (ITC) in lieu of PTC option.

[5] Wind facilities beginning construction after December 31, 2016, may qualify for the PTC at reduced rates. Wind facilities that begin construction after December 31, 2019, will not be eligible for the PTC.

[6] CRS Report R41635, *ARRA Section 1603 Grants in Lieu of Tax Credits for Renewable Energy: Overview, Analysis, and Policy Options*, by (name redacted) and (name redacted).

[7] 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.

[8] Ibid.

[9] 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.

[10] 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.

the PTC for wind (through 2016). The PTC for wind was also extended beyond 2016, through 2019, at reduced rates.

One policy rationale for supporting renewable electricity resources is to promote development of renewable-energy infrastructure that may not be technologically mature. With this policy rationale in mind, one question is when technologies have reached the point of maturity such that tax-related federal financial support can be eliminated.

Environmental considerations provide another policy rationale often used to support tax incentives for renewable electricity production. Some suggest that ongoing support for renewables can help address inefficiencies and market failures in energy production markets, where fossil-fuels-based electricity production and the associated pollution effects generate negative externalities. A more direct approach, however, would be to impose a price on pollution, as opposed to subsidizing a nonpolluting alternative.

For more information, see CRS Report R43453, *The Renewable Electricity Production Tax Credit: In Brief*, by (name redacted) .

Energy Credit for Non-Solar Facilities[11]

The energy credit is an investment tax credit (ITC) for certain qualifying energy property. The 30% ITC for fuel cell, hybrid solar lighting system, and small wind property, as well as the 10% ITC for microturbines, combined heat and power (CHP), and geothermal heat pump property, expired at the end of 2016.[12] The expiration date for these types of property is a placed-in-service deadline, meaning that any property coming online after 2016 will not be tax credit eligible, under current law.

Investment credits for energy property were first enacted in 1978 (the Energy Tax Act of 1978; P.L. 95-618). When first enacted, the temporary credit was 10% for business energy property and equipment using energy resources other than oil or natural gas. The credit has been extended and modified numerous times over the past four decades. The current form of the credit has its roots in the Energy Policy Act of 2005 (EPACT05; P.L. 109-58).

EPACT05 temporarily increased the tax credit rate to 30% for solar, added fuel-cell power plants as qualifying property, and provided a 10% ITC for microturbine power plants. The temporary components of the ITC and EPACT05 credit rates were extended through 2008 in the Tax Relief and Health Care Act of 2006 (P.L. 109-432). The Emergency Economic Stabilization Act of 2008 (P.L. 110-343) substantially expanded and provided a long-term extension of the temporary components of the energy credit. Expansions included a 10% credit for geothermal heat pump and CHP property and a 30% credit for qualified small wind energy property. The temporary portions of the credit were extended for eight years, through December 31, 2016.

In the past, Congress has extended temporary energy investment tax credits to promote the continued development of alternative energy resources, and provided a credit to technologies such as CHP that encourage more efficient use of fossil fuel power generation.[13] Environmental

[11] IRC Sections 48(a)(3)(A)(ii), 48(a)(3)(A)(vii), 48(c)(4), 48(c)(3)(A)(iv), 48(c)(1)(D), and 48(c)(2)(D).

[12] There is a permanent 10% tax credit for certain solar and geothermal energy property. Additionally, solar facilities that begin construction before the end of 2019 may qualify for a 30% ITC, with the ITC being reduced to 26% for solar facilities where construction begins in 2020, and 22% for a 2021 construction start date.

[13] U.S. Congress, Joint Committee on Taxation, *General Explanation of Tax Legislation Enacted in the 110th Congress*, committee print, March 2009, JCS-1-09, p. 288.

considerations are one motivation for providing tax incentives to clean-energy or energy-efficiency technologies. Tax credits can also support the development of alternative energy resources, encouraging investment in developing technologies where there may be positive learning-by-doing and knowledge-sharing effects.

Tax credits for clean energy technologies are generally not considered the most economically efficient policy option for addressing environmental concerns in the energy sector. Most energy-related environmental concerns are related to the use of fossil fuels. A tax credit for clean energy technologies does not directly address the environmental concerns associated with fossil fuels. Instead, tax credits for clean energy technologies reduce prices in the energy sector broadly, and can work counter to economic efficiency incentives. Further, since tax credits reduce federal revenue collections, taxes may have to be increased elsewhere in the system, if there are fixed federal revenue targets. An arguably more direct and economically efficient approach to addressing energy-related environmental concerns would be to price emissions or pollution (either through a tax or regulatory limitation).

For more information, see CRS In Focus IF10479, *The Energy Credit: An Investment Tax Credit for Renewable Energy*, by (name redacted) .

Five-Year Cost Recovery for Certain Energy Property[14]

Certain energy property is designated as five-year property, and therefore may be depreciated over a shorter period of time than would have been the case without the special designation.[15] Generally, property that qualifies for the renewable energy ITC (IRC Section 48) is treated as five-year property. Wind energy property is also treated as five-year property. The ability to treat energy credit property as five-year property expired at the end of 2016 for solar illumination property, qualified fuel cell property, microturbines, CHP property, small wind energy property, and geothermal heat pump systems.

Property that has been eligible for the ITC has generally been treated as five-year property for the purposes of cost recovery.[16] As Section 48 (the ITC) has been expanded over time to include additional types of energy property, this property has also become five-year property. As the ITC has expired for property other than solar and geothermal, five-year cost recovery has also expired.

Accelerated cost recovery for certain energy property reduces the effective tax rate on such investments, and can encourage taxpayers to shift investment to preferred energy property. Considerations as to whether such an incentive is desirable, or might improve upon market outcomes, are similar to those used when evaluating the ITC (see above).

Credit for Residential Energy Property[17]

Before 2017, taxpayers could claim a credit for a wide variety of renewable-energy-generation properties—including solar panels, geothermal heat pumps, small wind energy, and fuel cells—that taxpayers installed on their residence.[18] This credit was calculated as 30% of expenditures on technologies that generate renewable energy, including labor and installation costs. The maximum

[14] IRC Sections 168(e)(3)(B)(vi)(I) and 48(a)(3)(A).

[15] Most electricity generating property is depreciated over 20 years.

[16] Wind energy property is also allowed five-year cost recovery.

[17] IRC Section 25D.

[18] The renewable-energy-generating technology must have been placed in service before December 31, 2016.

value of the credit per taxpayer was not capped. This credit for most renewable-energy-generation technologies expired at the end of 2016. However, the credit for solar energy generation technologies is still in effect through the end of 2021,[19] though the percentage of expenditures that can be claimed for the credit drops from 30% to 22% in later years.[20]

The Energy Tax Act of 1978 (P.L. 95-618) introduced the first tax credit for renewable-energy-generation properties, which was subsequently expanded by the Crude Oil Windfall Profit Tax Act of 1980 (P.L. 96-223). This credit expired at the end of 1985. Twenty years later, the Energy Policy Act of 2005 (EPACT05; P.L. 109-58) created the 25D credit as a temporary provision in effect for 2006-2007.[21] The Emergency Economic Stabilization Act of 2008 (EESA; P.L. 110-343) extended the Section 25D tax credit for eight years, through 2016, modified it for existing technologies, and expanded it to new technologies. Specifically, the act eliminated the $2,000 maximum annual credit limit for qualified solar-electric property expenditures beginning in 2009. Subsequently, the American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5) temporarily removed the maximum credit caps for every type of technology except fuel cells for 2009 and 2010.[22] The ARRA changes expired as scheduled at the end of 2010. The credit for non-solar technologies expired as scheduled under EESA at the end of 2016.

Although the purpose of residential property tax credits is to motivate additional investment in residential renewable-energy-generating technologies, the amount of the investment resulting from these credits is unclear. This tax credit offsets some of the cost of these properties. If taxpayers' decisions to purchase renewable-energy-generation properties are highly sensitive to price, the credit would theoretically lead to an increase in investment. However, if taxpayers installed residential energy equipment and property primarily based on other factors than cost (perhaps homeowners are primarily motivated by concern for the environment), the credit would primarily be a windfall gain to claimants. Further, the fact that the incentive is delivered as a nonrefundable credit limits the provision's ability to motivate investment for low- and middle-income taxpayers—taxpayers that may be more sensitive to the price of these technologies.

Alternative and Renewable Fuels

Incentives for Biodiesel and Renewable Diesel[23]

There are three tax credits for biodiesel: the biodiesel mixture credit, the biodiesel credit, and the small agri-biodiesel producer credit. Each gallon of biodiesel, including agri-biodiesel (biodiesel made from virgin oils), may be eligible for a $1.00 tax credit. The mixtures tax credit may be claimed as an instant excise tax credit against the blender's motor and aviation fuels excise taxes. Credits in excess of excise tax liability may be refunded. The biodiesel and small agri-biodiesel

[19] Division P of P.L. 114-113 extended the 25D credit for solar technologies through 2021 and modified the credit formula for these technologies. The credit for all other technologies expired at the end of 2016 as scheduled under EESA.

[20] For more information on energy-related caps, see CRS Report R42089, *Residential Energy Tax Credits: Overview and Analysis*, by (name redacted) and (name redacted) .

[21] This nonrefundable credit was calculated as 30% of expenditures on qualified photovoltaic properties, solar water-heating properties (excluding those used for heating swimming pools and hot tubs), and fuel-cell generators, subject to annual limits.[21] The section 25D credit was extended for 2008 by the Tax Relief and Health Care Act of 2006 (P.L. 109-432).

[22] The credit for fuel cells was capped at $500 per 0.5W of power capacity.

[23] IRC Sections 40A, 6426(c)(6), and 6427(e)(6)(B).

credits may be claimed as income tax credits. The mixtures credit is proportionate to the fraction of biodiesel in the mixture—a blend of 80% diesel with 20% virgin biodiesel would qualify for a 20-cent-per-gallon tax credit. The tax credits for biodiesel expired on December 31, 2016.

Additionally, an eligible small agri-biodiesel producer credit of 10 cents is available for each gallon of "qualified agri-biodiesel production." An eligible "small agri-biodiesel producer" is defined as any person who, at all times during the taxable year, has annual productive capacity for agri-biodiesel not in excess of 60 million gallons. The number of gallons that may be taken into account for the small agri-biodiesel producer credit may not exceed 15 million. The eligible small agri-biodiesel producer credit is effective for taxable years ending after August 8, 2005, and sunsets after December 31, 2016.

The tax code generally treats renewable diesel fuel like biodiesel for the purposes of the biodiesel fuels credit. Thus, renewable diesel sold or used after December 31, 2005, is eligible for a $1.00 per gallon tax credit. Renewable diesel cannot qualify as agri-biodiesel.

The biodiesel tax incentives were introduced under the American Jobs Creation Act of 2004 (P.L. 108-357) and modified and extended by the Energy Policy Act of 2005 (P.L. 109-58). Subsequently, the credits have been extended, most recently through the end of 2016 by the PATH Act of 2015 (Division Q of P.L. 114-113).

Tax credits for biofuels are motivated by a desire to reduce dependence on petroleum imports (enhance national energy security), address environmental concerns, and maintain farm incomes. While the use of biofuels continues to increase, offsetting domestic petroleum consumption, it is not clear that the tax incentives are responsible for driving this change. Renewable fuel standards and blend mandates requiring certain amounts of biofuels may be boosting domestic production.[24] If nontax policies are responsible for enhancing biofuel production, and tax policies fail to induce additional production, the tax credits provide a windfall to taxpayers without necessarily resulting in additional use of biofuels.

Incentives for Alternative Fuel and Alternative Fuel Mixtures[25]

The tax code provides tax credits for alternative fuels and alternative fuel mixtures. Specifically, there is a 50-cents-per-gallon excise tax credit for certain alternative fuels used as fuel in a motor vehicle, motor boat, or airplane and a 50-cents-per-gallon credit for alternative fuels mixed with a traditional fuel (gasoline, diesel, or kerosene) for use as a fuel. Qualifying fuels include liquefied petroleum gas; P Series fuels (certain renewable, nonpetroleum, liquid fuels); compressed or liquefied natural gas (CNG or LNG); any liquefied fuel derived from coal or peat through the Fischer-Tropsch process which meets certain carbon-capture requirements; liquefied hydrocarbons derived from biomass; and liquefied hydrogen. For propane, CNG, and LNG sold after December 31, 2015, the tax credit is based on gasoline-gallon or diesel-gallon equivalent. No fuel produced outside of the United States is eligible for the alternative fuels tax incentives.

The incentives of alternative fuel and alternative fuel mixtures were introduced under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU; P.L. 109-59). Initially the credits were to be available through September 30, 2009 (September 30, 2014, for hydrogen). The credit, however, has subsequently been extended. Most recently the

[24] CRS Report R43325, *The Renewable Fuel Standard (RFS): An Overview*, by (name redacted)

[25] IRC Sections 6426(d)(5), 6427(e)(6)(C), and 6426(e)(3).

incentives were extended through the end of 2016 by the PATH Act of 2015 (Division Q of P.L. 114-113).

Tax credits for alternative fuels are motivated by a desire to reduce dependence on petroleum imports (enhance national energy security), address environmental concerns, and maintain farm incomes.

Alternative Fuel Vehicle Refueling Property[26]

A 30% tax credit is provided for the cost of any qualified alternative fuel vehicle refueling property installed by a business or at a taxpayer's principal residence. The credit is limited to $30,000 for businesses at each separate location, and $1,000 for residences.

Clean fuel refueling property is generally any tangible equipment (such as a pump) used to dispense a fuel into a vehicle's tank. Qualifying property includes fuel storage and dispensing units and electric vehicle recharging equipment. A clean fuel is defined as any fuel at least 85% of the volume of which consists of ethanol (E85) or methanol (M85), natural gas, CNG, LNG, liquefied petroleum gas, and hydrogen, or any mixture of biodiesel and diesel fuel, determined without regard to any use of kerosene and containing at least 20% biodiesel. For the purposes of the credit, electricity is also considered a clean fuel.

For business taxpayers, the taxpayer's basis in the property is reduced by the amount of the credit. The credit for business property is treated as a portion of the general business credit. As part of the general business credit, unused credits may be carried back for one year or carried forward for 20 years. For nonbusiness property, the credit cannot exceed the excess of an individual's income tax liability over the sum of nonrefundable personal credits and the foreign tax credit over the taxpayer's tentative minimum tax. No credit is available for property used outside the United States. For property sold to a tax-exempt entity, the seller of the property may be able to claim the credit.

The credit for alternative fuel vehicle refueling property was introduced under the Energy Policy Act of 2005 (EPACT05; P.L. 109-58). The credit replaced a previously available deduction for business investment in clean fuel refueling property. The credit has been extended multiple times since being enacted in 2005; most recently, the incentives were extended through the end of 2016 by the PATH Act of 2015 (Division Q of P.L. 114-113).

Tax credits for alternative fuel vehicle refueling property reduce after-tax capital costs to attract investment. Additionally, nontax federal incentives may also promote investment in alternative fuel vehicle refueling property. From an economic perspective, allowing special tax credits for selected technologies can distort the allocation of resources, and may create economic inefficiencies by encouraging investments in high-cost technologies, ones that would not otherwise be economical at current and expected prices and rates of return. However, the incentive may improve the allocation of resources, if it corrects a market failure.

Second Generation (Cellulosic) Biofuel Producer Credit[27]

The second generation biofuels producer credit is a nonrefundable income tax credit for each gallon of qualified second generation biofuel production. The amount of the credit per gallon is generally $1.01. Qualified second generation biofuel

[26] IRC Section 30C(g).

[27] IRC Section 40(b)(6)(J).

produced by the taxpayer and sold by the taxpayer to another person for use (1) in the production of a qualified biofuel fuel mixture in such person's trade or business (other than casual off-farm production), (2) as a fuel in a trade or business, or (3) as biofuel sold at retail to another person and placed in the fuel tank of such other person. Qualifying fuel must be produced and used in the United States. Cellulosic biofuel is produced using lignocellulosic or hemicellulosic matter available on a renewable or recurring basis. Qualified feedstocks for second generation biofuels include cultivated algae, cyanobacteria, or lemna.

The cellulosic biofuel producer credit was introduced by the Food, Conservation, and Energy Act of 2008 (P.L. 110-246). When introduced, the credit was scheduled to expire December 31, 2012. The American Taxpayer Relief Act of 2012 (ATRA; P.L. 112-240) modified the provision to algae-based fuels, changing the title of the provision to be the second generation biofuel producer credit at the same time. It has subsequently been extended as part of "tax extenders." Most recently the incentive was extended through the end of 2016 by the PATH Act of 2015 (Division Q of P.L. 114-113).

Tax credits for second generation biofuels are motivated by a desire to reduce dependence on petroleum imports (enhance national energy security), address environmental concerns, and maintain farm incomes. Renewable fuel standards and blend mandates requiring certain amounts of biofuels may be boosting domestic production, but until recently second generation cellulosic biofuels were not economically competitive with other renewable fuel standards options.[28]

Special Depreciation Allowance for Second Generation (Cellulosic) Biofuel Plant Property[29]

Second generation biofuel plant property allows for the immediate first-year bonus depreciation of 50% of the cost of facilities that produce eligible biofuels. Previous federal tax law limited the eligibility for first-year bonus depreciation of cellulosic biofuels to facilities producing ethanol; those producing nonethanol fuels from cellulosic feedstocks did not qualify for the allowance.

The special depreciation allowance for second generation biofuel plant property was introduced by the Tax Relief and Health Care Act of 2006 (P.L. 109-432). Most recently the incentive was extended through the end of 2016 by the PATH Act of 2015 (Division Q of P.L. 114-113).

Allowing half the cost to be expensed when incurred provides a benefit because a tax deduction today is worth more than a tax deduction in the future, due to the time value of money (interest). From an economic perspective, allowing a special depreciation allowance for selected technologies can distort the allocation of resources, and may create economic inefficiencies. However, this incentive may also increase economic efficiency to the extent it addresses a market failure.

[28] CRS Report R43325, *The Renewable Fuel Standard (RFS): An Overview*, by (name redacted)

[29] IRC Section 168(l).

Vehicles

Alternative Motor Vehicle Credit for Qualified Fuel Cell Vehicles[30]

Fuel cell vehicles (vehicles propelled by chemically combining oxygen with hydrogen to create electricity) may qualify for a federal tax credit. The credit is based on vehicle weight, with vehicles weighing 8,500 pounds or less having a base credit amount of $4,000. Heavier vehicles may be eligible for larger credits, with the highest credit amount being $40,000 for vehicles weighing more than 26,000 pounds. Cars and light trucks can qualify for an additional tax credit of $1,000 to $2,000 per vehicle depending on fuel economy.

The alternative technology vehicle tax credit was enacted as part of the Energy Policy Act of 2005 (P.L. 109-58). The credit replaced a previously available clean-fuel-vehicle deduction (IRC Section 179A). When enacted, the tax credit for fuel cell vehicles was available for vehicles placed in service during 2006 through 2014. Alternative technology vehicle tax credits were available for hybrid, advanced lean-burn technology, and alternative fuel vehicles. The credits generally expired in 2009 or 2010 for vehicles other than fuel cell vehicles. After 2014, the credit for fuel cell vehicles has been extended as part of "tax extenders." Most recently, the provision was extended through 2016 as part of the PATH Act of 2015 (Division Q of P.L. 114-113).

Tax incentives for fuel cell vehicles may help address market failures in automobile markets. Specifically, if consumers fail to consider the negative environmental and potential energy security concerns associated with conventional gasoline- and diesel-fueled vehicles, the market may provide an inefficiently high level of such products. One way to address the negative externalities associated with fuel consumption through automobile use is to reduce the price of alternative technology vehicles.

There are other barriers to adoption of alternative-technology vehicles a tax credit might address. These include, for example, (1) the high up-front cost associated with alternative-technology vehicles, (2) the volatility of fuel prices, (3) technology risks associated with new, unfamiliar, or unproven technologies, and (4) a lack of complementary infrastructure (such as hydrogen fueling stations).

Because tax credits for fuel cell vehicles reduce the price of such vehicles relative to gasoline- and diesel-powered alternatives, such tax credits are intended to address the previously noted market failures and market barriers. A tax credit approach, however, may not be the most economically efficient mechanism for addressing the negative externalities associated with gasoline consumption and market barriers to fuel cell vehicle adoption. Relative to tax credits, rising gas prices have played a larger role in increasing consumer demand for alternative technology vehicles. Taxing gasoline directly—the activity associated with the negative externality—is arguably more economically efficient than subsidizing the purchase of select vehicles.

Credit for Two-Wheeled Plug-In Electric Vehicles[31]

A credit is available for two-wheeled plug-in vehicles acquired during 2015 or 2016. The credit is equal to 10% of the vehicle's cost, up to $2,500. To be eligible for the tax credit vehicles must

[30] IRC Section 30B(k)(1).

[31] IRC Section 30D(g)(3)(E)(ii).

have a weight rating of less than 14,000 pounds; be propelled by a battery-powered electric motor with a battery capacity of at least 2.5 kilowatt hours; be manufactured for use on streets, roads, and highways; and be capable of achieving a speed of at least 45 miles per hour.

The American Recovery and Reinvestment Act (ARRA; P.L. 111-5) provided a tax credit for two- or three-wheeled vehicles, as well as low-speed four-wheeled vehicles. When enacted, the provision was scheduled to expire at the end of 2011. In ATRA, the provision was extended through 2013 for two- and three-wheeled vehicles, but not low-speed vehicles. No credit was available in 2014. The provision was reinstated for two-wheeled vehicles in the PATH Act of 2015 (Division Q of P.L. 114-113).

Credits for two-wheeled plug-in electric vehicles were enacted as a unique provision, since they do not qualify for other plug-in electric vehicle tax credits.[32] Tax credits for such vehicles can support emerging technologies, or encourage consumers to purchase vehicles that might be more energy efficient than conventional alternatives. Some have raised concerns regarding the equity of vehicles tax benefits, noting that they tend to be largely claimed by high-income taxpayers. If these taxpayers would have bought qualifying vehicles absent tax benefits, then the tax incentives are not leading to additional purchases and are providing a windfall benefit to purchasers.

Building Energy Efficiency

Credit for Construction of Energy-Efficient New Homes[33]

Before 2017, contractors building energy-efficient homes and producers of manufactured energy-efficient homes were eligible for a tax credit for each qualifying new home they built. The amount of the credit was equal to $2,000 per home for homes built by contractors and $1,000 per manufactured home.

To be eligible, an energy-efficient new home was required to have annual heating and cooling consumption that was at least 50% (30% in the case of manufactured homes) below a comparable unit. The home was also required to be in accordance with the standards of the 2006 International Energy Conservations Code.[34] Contractors and manufacturers claiming this credit were required to submit certification to an eligible certifier before claiming the credit. This credit was part of the general business credit and hence could be carried back one year and carried forward 20 years.

The tax credit for energy-efficient new homes was introduced under the Energy Policy Act of 2005 (P.L. 109-58). Initially, the credit was set to expire at the end of 2007. It was subsequently extended several times.[35] Most recently, the credit was extended through the end of 2016 in the PATH Act of 2015 (Division Q of P.L. 114-113).

[32] See the new qualified plug-in electric-drive vehicle credit, IRC Section 30D.

[33] IRC Section 45L(g).

[34] In addition, heating and cooling equipment efficiency must correspond to the minimum allowed under the regulations established by the Department of Energy pursuant to the National Appliance Energy Conservation Act of 1987 (P.L. 100-12) in effect at the time construction is completed. Qualified homes must be constructed such that building-envelope components contribute at least a fifth of the 50% in required energy consumption reduction (1/3 of 30% in required energy consumption reduction in the case of manufactured homes). Energy Star labeled homes may qualify for the tax credit.

[35] The Tax Relief and Health Care Act of 2006 (P.L. 109-432) extended the credit through December 31, 2008. The Emergency Economic Stabilization Act of 2009 (EESA; P.L. 110-343) extended the credit through December 31, 2009. The Tax Relief, Unemployment Insurance Reauthorization and Job Creation Act of 2010 (P.L. 111-312) extended the (continued...)

The tax credit is designed to encourage home builders to install energy-efficient technologies in new homes. Energy-efficient new homes tend to have higher up-front costs, and it is not clear if market prices accurately reflect or capitalize the value of energy-efficient improvements. If energy efficiency is not accurately reflected in housing prices, builders may underinvest in efficiency technologies absent the credit. On the other hand, if market prices do reflect the cost associated with these technologies, the credit may be a windfall gain to the builder.

Energy-Efficient Commercial Building Deduction[36]

A deduction is allowed for certain energy-saving property used in domestic commercial buildings.[37] Qualifying energy-efficient commercial building property includes property installed as part of (1) the interior lighting system; (2) the heating, cooling, ventilation, or hot water system; or (3) the building envelope. To be deductible, property must reduce a building's annual energy and power costs by 50% or more as compared to a similar reference building meeting the minimum energy standards described in Standard 90.1-2007 of ASHRAE/IESNA.[38] The maximum deduction allowed is $1.80 per square foot. A reduced deduction may be available if a single system is upgraded (lighting, heating and cooling, or building envelope) and the 50% reduction threshold is not met. Separate energy cost reduction percentage thresholds are specified for single-system upgrades. The maximum deduction for a single-system improvement is $0.60 per square foot. Government entities making energy-efficiency upgrades to public buildings, such as schools, can allocate the Section 179D deduction to designers of energy-efficient commercial building property.

The deduction for energy-efficient commercial building property was enacted in the Energy Policy Act of 2005 (EPACT05; P.L. 109-58). When first enacted, the deduction was scheduled to be available for the 2006 and 2007 tax years. The deduction was extended for one year, through 2008, in "tax extenders" legislation enacted late in 2006 (the Tax Relief and Health Care Act of 2006 [P.L. 109-432]). A longer-term (five-year) extension was enacted in the Emergency Economic Stabilization Act (P.L. 110-343). A stated rationale claimed

> [t]he Congress recognizes that a substantial portion of U.S. energy consumption is attributable to commercial buildings, and that the design and construction of commercial buildings is a multi-year process. Hence, the Congress believes that a long-term extension of the deduction for energy efficient commercial buildings is necessary to ensure that buildings currently in the design phase will be able to claim the deduction.[39]

Since 2014, short-term extensions of the deduction for energy-efficient commercial building property have been included in "tax extenders" legislation. Most recently, the provision was extended through 2016 as part of the PATH Act of 2015 (Division Q of P.L. 114-113).

(...continued)

credit through December 31, 2011. The American Taxpayer Relief Act of 2012 (P.L. 112-240) extended the credit until December 31, 2013, and adopted the 2006 International Energy Conservation Code.

[36] IRC Section 179D(h).

[37] For a more detailed overview, see CRS Committee Print CP10002, *Tax Expenditures: Compendium of Background Material on Individual Provisions — A Committee Print Prepared for the Senate Committee on the Budget, 2016*, by (name redacted) et al. , pp. 107-113.

[38] American Society of Heating, Refrigerating, and Air Conditioning Engineers and the Illuminating Engineering Society of North America standards.

[39] U.S. Congress, Joint Committee on Taxation, *General Explanation of Tax Legislation Enacted in the 110th Congress*, committee print, March 2009, JCS-1-09, p. 344.

The business profit maximizing (average cost minimizing) objective should, in theory, promote an economically efficient level of investment in energy-saving property. However, market outcomes may lead to less investment in building energy efficiency than is socially desirable if (1) consumption of energy has negative external costs, such as pollution, that are not considered when building owners make energy property decisions (there are "negative externalities" associated with building energy consumption); or (2) if the person choosing the energy equipment is not the same person responsible for paying the energy bills (there is a "principal-agent" issue), and energy-savings investments cannot be recouped via higher rents or appreciated asset value. In these circumstances, federal financial assistance, through a tax incentive, for example, may improve upon market outcomes. The tax deduction may not be the most economically efficient way to address market inefficiency. If building energy consumption is associated with pollution-related negative externalities, a direct price on pollution would arguably be a more economically efficient policy.

There are also some considerations related to the specifics of the deduction for energy-efficient commercial property. Most of the deduction is claimed by taxpayers constructing new buildings, since the energy-efficiency threshold is tied to recent efficiency standards, making it more difficult for older buildings to complete retrofits that meet energy-savings targets tied to recent building standards. Meeting certification requirements can also be costly and burdensome, potentially preventing certain taxpayers from claiming the deduction. Conversely, stringent certification requirements can help prevent fraudulent deduction claims.

Credit for Section 25C Nonbusiness Energy Property[40]

The nonbusiness energy property tax credit provides homeowners with a nonrefundable[41] tax credit for investments in both high-efficiency energy property (e.g., heating, cooling, and water-heating appliances) and investments in certain energy-efficiency improvements (e.g., energy-efficient insulation, windows, and doors).

For installations made during 2011 through 2016, the amount of the credit was calculated as 10% of expenditures on building-envelope improvements plus the cost of each energy-efficient property capped at a specific amount (ranging from $50 to $300), excluding labor and installation costs.[42] Given the price of high-efficiency heating, cooling, and water-heating appliances, taxpayers generally claimed the maximum amount of the credit for energy-efficient property. In addition, the credit was subject to a lifetime cap of $500 per taxpayer.

Residential energy-efficiency tax credits were first introduced in the late 1970s, but were allowed to expire in 1985. EPACT05 (P.L. 109-58) enacted the Section 25C credit as a temporary provision in effect for 2006 and 2007. This nonrefundable tax credit was equal to 10% of qualified expenditures, subject to certain limitations for specific types of property and a $500 lifetime limitation per taxpayer. At the end of 2007, the Section 25C credit expired. In 2008, the Emergency Economic Stabilization Act of 2008 (EESA; P.L. 110-343) reinstated and modified the Section 25C credit for the 2009 tax year. The American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5) further extended the credit for two years (2009 and 2010) as well as expanded it. Under ARRA, the credit equaled 30% of qualified expenditures for energy-efficiency

[40] IRC Section 25C(g).

[41] Nonrefundable tax credits cannot exceed a taxpayer's income tax liability, meaning those taxpayers with little to no tax liability generally cannot claim these tax benefits.

[42] For more information on energy related caps, see CRS Report R42089, *Residential Energy Tax Credits: Overview and Analysis*, by (name redacted) and (name redacted) .

improvements and energy property, eliminating the technology-specific credit amounts.[43] In addition, the lifetime credit cap was lifted from $500 to $1,500 for 2009 and 2010. These changes expired at the end of 2010 and the credit as structured *before ARRA* (10% of expenditures subject to a $500 lifetime cap) was subsequently extended several times on a temporary basis. Most recently the 25C credit was extended for two years—2015 and 2016—by the PATH Act of 2015 (Division Q of P.L. 114-113).

The amount of the investment resulting from the 25C credit is unclear. Some researchers found that tax incentives that reduced the price of energy-efficiency property would lead to additional investment.[44] Others found that the tax credits were instead more likely associated with windfall gains to credit recipients as opposed to additional energy-efficiency investment.[45] Further, the fact that the incentive is delivered as a nonrefundable credit limits the provision's ability to motivate investment for low- and middle-income taxpayers with limited tax liability. The administration of residential energy-efficiency tax credits has also had compliance issues, as identified in a Treasury Department Inspector General for Tax Administration (TIGTA) report.[46]

Other Expired Energy Tax Provisions

Special Rule to Implement Electric Transmission Restructuring[47]

IRC Section 451(i) permits taxpayers to elect to recognize any capital gain from the sale of qualifying electricity transmission property to an independent transmission company (ITC), pursuant to a Federal Energy Regulatory Commission (FERC) restructuring policy, evenly over eight years beginning with the year of the sale. The sale proceeds must be reinvested in other electricity assets within four years. This special tax incentive is available for sales made through December 31, 2016.

Generally, any gain realized from a sale or disposition of a capital asset is recognized in the tax year in which the gain was realized, unless there is a specific exemption or deferral. The recognition of gain over eight years, rather than in the year of sale, is a deferral, rather than a complete forgiveness, of tax liability. The economic benefit derives from the reduction in the present value of the tax owed below what the tax would otherwise be if it were required to be recognized in the year of sale.

The deferral of gain on the sale of transmission assets was enacted on a temporary basis as part of the American Jobs Creation Act of 2004 (P.L. 108-357), with the goal of encouraging energy transmission infrastructure reinvestment and assisting those in the industry who are restructuring. It is intended to foster a more competitive industry by facilitating the unbundling of transmission

[43] The changes that ARRA made to the Section 25C credit in 2009 superseded the 2009 changes that had been made to the credit by EESA.

[44] See Kevin A. Hassett and Gilbert E. Metcalf, "Energy Tax Credits and Residential Conservation Investment: Evidence from Panel Data," *Journal of Public Economics*, vol. 57, no. 2 (June 1995), pp. 201-217.

[45] See Michael J. Walsh, "Energy Tax Credits and Housing Improvement," *Energy Economics*, vol. 11, no. 4 (October 1989), pp. 275-284 and Jeffery A. Dubin; and Steven E. Henson, "The Distributional Effects of the Federal Energy Tax Act," *Resources and Energy*, vol. 10, no. 3 (1988), pp. 191-212.

[46] Treasury Inspector General For Tax Administration, *Processes Were Not Established to Verify Eligibility for Residential Energy Credits*, Reference Number: 2011-41-038, April 19, 2011, http://www.treasury.gov/tigta/auditreports/2011reports/201141038fr.pdf.

[47] IRC Section 451(i).

assets held by vertically integrated utilities. Under restructuring, states and Congress have considered rules requiring the separate ownership of generation and distribution and transmission assets. However, vertically integrated electric utilities still own a large segment of the nation's transmission infrastructure. The tax provision encourages the sale of transmission assets by vertically integrated electric utilities—the unbundling of electricity assets—to independent system operators or regional transmission organizations, who would own and operate the transmission lines. The provision is intended to improve transmission management and service, and facilitate the formation of competitive electricity markets. In recent years, this provision has been extended as part of "tax extenders" legislation. Most recently, the provision was extended through 2016 as part of the PATH Act of 2015 (Division Q of P.L. 114-113).

The restructuring of the electric power industry has resulted in significant reorganization of power assets, and may continue to do so. In particular, it may result in a significant disposition of transmission assets and possibly, depending on the nature of the transaction, trigger an income tax liability and interfere with industry restructuring. Under an income tax system, the sale for cash of business assets subject to depreciation deductions triggers a tax on taxable income in the year of sale to the extent of any gain. Corporations pay capital gains on sales of capital assets, such as shares of other corporations. But gains on the sale of depreciable assets involve other rules. For example, sales of personal property, such as machinery, are taxed partly as capital gains and partly as ordinary income. The overall taxable amount is the difference between the sales price and basis, which is generally the original cost minus accumulated depreciation. That amount is taxed as ordinary income to the extent of previous depreciation allowances (depreciation is "recaptured").

Credit for Production of Indian Coal[48]

The credit for Indian coal production provides a tax credit for Indian coal produced from reserves, which on June 14, 2005, were owned by an Indian tribe or held in trust by the United States for a tribe. The amount of the credit is $2.00 per ton (adjusted for inflation; $2.387 per ton in 2016). The credit is available for coal sold after December 31, 2005, and before January 1, 2017. The coal does not need to be sold for the production of electricity or any specific purpose. Before 2015, the credit was only available for Indian coal produced at facilities that were placed in service before January 1, 2009.

Indian coal was added to the production tax credit (PTC) as a new qualifying resource by the Energy Policy Act of 2005 (P.L. 109-58). When enacted, the credit was available for coal sold to an unrelated third party during the seven-year period beginning after December 31, 2005, and ending before January 1, 2013. The credit was $1.50 per ton of coal sold during the first four years of the period, and $2.00 per ton for coal sold during the last three years of the period. Congress extended the credit for Indian coal for one year in ATRA, reasoning such an extension would "encourage continued mining of coal resources on Indian lands."[49] The credit has subsequently been extended as part of "tax extenders." In addition to extending the credit through 2016, the PATH Act modified the provision, removing the January 1, 2009, placed-in-service requirement and modifying the third party sale requirement. The PATH Act also exempts the credit from the alternative minimum tax (AMT).

[48] IRC Section 45(e)(10)(A).

[49] U.S. Congress, Joint Committee on Taxation, *General Explanation of Tax Legislation Enacted in the 112th Congress*, committee print, February 2013, JCS-2-13, p. 211.

Proponents of the Indian coal production tax credit have argued the credit helps compensate Indian coal producers for more restrictive regulatory requirements faced by coal producers on Indian lands, and encourages investment and jobs on Indian lands.[50] Concerns related to the credit include environmental and social considerations related to the use of coal-fired power.[51]

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[50] Adam Lidgett, "Mont. Sens. Float Bill To Extend Indian Coal Tax Credit," *Law360*, April 28, 2017, available at https://www.law360.com/articles/918463/mont-sens-float-bill-to-extend-indian-coal-tax-credit.

[51] Valerie Volcovici, "In Montana's Indian country, tribes take opposite sides on coal," *Reuters*, August 21, 2017, available at http://www.reuters.com/article/us-usa-trump-energy-tribes-insight/in-montanas-indian-country-tribes-take-opposite-sides-on-coal-idUSKCN1B10D3.