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Clean Coal Loan Guarantees and Tax Incentives: Issues in Brief

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Summary

Coal represents a major energy resource for the United States. Coal-fired power plants provided approximately 37% of U.S. generated electricity (about 1.5 billion megawatt-hours) in 2012, while consuming over 800 million tons of coal. Power plants that use coal are also a major source of greenhouse gas emissions in the United States, contributing approximately 28% of total U.S. CO_2 emissions in 2012.

As part of federal efforts to reduce greenhouse gas emissions, loan guarantees and tax incentives have been made available to support private sector investment in "clean coal." Both loan guarantees and tax incentives were included in the Energy Policy Act of 2005 (EPACT05, P.L. 109-58). Mitigating CO_2 emissions has also become the primary focus of U.S. Department of Energy (DOE) efforts within the clean coal research and development program (now Coal R&D) within its Office of Fossil Energy. At issue for Congress is the extent to which the private sector has used the financial incentive tools available, and whether they are the right tools for promoting the development of technology to reduce CO_2 emissions from fossil fuel power plants.

No loan guarantees have been issued to clean coal projects since enactment of Section 1703 of EPACT05. This legislation authorized the Secretary of Energy to make loan guarantees for projects that (1) avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases; and (2) employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time. Only two projects, both nuclear power-related, have obtained or are on track to obtain loan guarantees under Section 1703. A question for Congress to consider is why no loan guarantees have been issued for clean coal projects under Section 1703, despite several authorizations of appropriations and two solicitations for proposals since enactment of EPACT05.

Tax incentives for clean coal were first authorized in EPACT05. EPACT05 codified two new sections in the Internal Revenue Code: Section 48A was added to provide tax credits for qualifying advanced coal projects; and Section 48B provides tax credits to qualifying gasification projects. Additional tax incentives for clean coal were included in P.L. 110-343, the Emergency Economic Stabilization Act of 2008 (EESA). EESA provided additional funding for clean coal investment tax credits. EESA also included the Section 45Q CO_2 sequestration credit, under which taxpayers may claim up to a $20 per metric ton credit for qualifying domestic CO_2 that is captured and sequestered.

Regarding tax incentives, Congress might consider several options: (1) maintain the status quo, which would allow existing tax incentives to phase out; (2) authorize additional funding for existing tax incentives; or (3) redesign tax incentives for clean coal or carbon capture and sequestration related technologies. Several projects that were previously allocated tax credits have been cancelled. A question for Congress is whether there is demand for tax benefits in their current form. Further, are tax incentives an effective tool for encouraging investment in clean coal technologies?

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Introduction

This report discusses certain federal financial incentive mechanisms for "clean coal" commercial projects; namely, loan guarantees and tax incentives. Both loan guarantees and tax incentives have been available to the private sector for clean coal activities following enactment of the Energy Policy Act of 2005 (EPACT05, P.L. 109-58). At issue for Congress is the extent to which the private sector has used these financial tools—and whether they are the right tools—to develop the technology needed for reducing carbon dioxide (CO_2) emissions from fossil fuel power plants while continuing to use available domestic coal reserves for electricity generation.

Coal represents a major energy resource for the United States. Coal-fired power plants provided approximately 37% of U.S. generated electricity (about 1.5 billion megawatt-hours) in 2012, while consuming over 800 million tons of coal.[1] Power plants that use coal are also a major source of greenhouse gas emissions in the United States. Coal-fired electricity generation emitted approximately 1.5 billion metric tons of CO_2 in 2012, approximately 28% of total U.S. CO_2 emissions.[2]

The fraction of U.S. electricity generated by coal-fired plants declined from 2008 to 2012, as did the total coal consumption by coal-fired plants. Carbon dioxide emissions fell over the same period.[3] The use of coal for electricity generation complicates policy efforts to reduce U.S. greenhouse gas emissions. Congress has focused on two EPA regulatory proposals released in 2013 and 2014 that would limit greenhouse gas emissions from new and existing coal-fired power plants, respectively.[4] Some believe the EPA efforts to regulate CO_2 emissions from coal may affect both the short- and long-term future for coal-fired electricity generation in the United States. In the past, others have linked the viability of the U.S. coal-fired electricity industry to its ability to capture and sequester CO_2 emissions from coal-burning plants (carbon capture and sequestration, or storage, referred to as CCS), and allowing the continued use of coal while mitigating its contribution to rising CO_2 levels in the atmosphere.[5]

Mitigating CO_2 emissions has become the primary focus of U.S. Department of Energy efforts within the clean coal research and development program (now Coal R&D) within its Office of Fossil Energy. For example, the Coal R&D program accounted for $392 million of the total $562 million within Fossil Energy R&D at DOE in FY2014, or approximately two-thirds of the total. Moreover, the American Recovery and Reinvestment Act (P.L. 111-5) provided $3.4 billion for CCS R&D efforts beginning in 2009. Combined with Recovery Act funding, Congress has

[1] U.S. Energy Information Administration, *Electricity-Electric Power Annual Table 1.1 Total Electric Power Summary Statistics, 2012 and 2011,* Dec. 12, 2013, http://www.eia.gov/electricity/annual/html/epa_01_01.html; and *U.S. Coal Consumption by End-Use Sector, 2008-2014*. June 30, 2014, http://www.eia.gov/coal/production/quarterly/.

[2] U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2102*, Chapter 2, Trends in Greenhouse Gas Emissions, Table 2-1 and Table 2-13.

[3] Ibid.

[4] The proposed regulation for new coal-fired power plants was published in the *Federal Register* on January 8, 2014; the proposed standards for existing plants were released on June 2, 2014. For more information, see CRS Report R41212, *EPA Regulation of Greenhouse Gases: Congressional Responses and Options*, by James E. McCarthy, and CRS Report R43572, *EPA's Proposed Greenhouse Gas Regulations for Existing Power Plants: Frequently Asked Questions*, by James E. McCarthy et al.

[5] See, for example, MIT, *The Future of Coal, Options for a Carbon-Constrained World*, An Interdisciplinary MIT Study, 2007, http://web.mit.edu/coal/The_Future_of_Coal_Summary_Report.pdf.

appropriated approximately $6 billion for CCS R&D since 2008 at DOE. The appropriations, technology, and program activities are discussed in other CRS reports.[6]

For the purposes of this report, the term clean coal is used to describe activities supported by DOE that would reduce greenhouse gas and other emissions from coal combustion, such as carbon capture and sequestration (CCS). DOE notes that its clean coal R&D efforts are focused on developing and demonstrating advanced power generation and carbon capture, utilization, and storage technologies for existing facilities and new fossil-fueled power plants by increasing overall system efficiencies and reducing capital costs.[7] The term clean coal is used here for descriptive purposes only.

Loan Guarantees

Historically, loan guarantees have been used as a policy tool for many different purposes, including home ownership, university education, small business growth, international development, and others.[8] A loan guarantee might be defined as "a loan or security on which the federal government has removed or reduced a lender's risk by pledging to repay principal and interest in case of default by the borrower."[9] The DOE loan guarantee program for projects that reduce anthropogenic emissions of greenhouse gases was initially authorized in the EPACT05.

Incentives for Innovative Technologies

Title XVII of EPACT05 Section 1703 (42 U.S.C. 16511-16514) authorized the Secretary of Energy to make loan guarantees for projects that (1) avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases; and (2) employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time. Under Section 1703, EPACT05 included as categories, among others, for eligible projects (1) advanced fossil energy technology (including coal gasification); and (2) carbon capture and sequestration practices and technologies.[10]

EPACT05 Section 1703 elaborated on gasification projects eligible for loan guarantees, and included (1) integrated gasification combined cycle projects; (2) industrial gasification projects; (3) petroleum coke gasification projects; and (4) liquefaction projects (coal-to-oil). Eligible projects included under Section 1703 would be subject to emissions limits for sulfur dioxide, mercury, nitrogen oxide, and total particulates; however, no restrictions in the law were included on CO_2 emissions. For integrated gasification combined cycle (IGCC) plants eligible for loan

[6] For a more detailed discussion of CCS R&D at DOE, see CRS Report R42496, *Carbon Capture and Sequestration: Research, Development, and Demonstration at the U.S. Department of Energy*, by Peter Folger. For an in-depth discussion of CCS technology, see CRS Report R41325, *Carbon Capture: A Technology Assessment*, by Peter Folger.

[7] For more information on DOE clean coal R&D, see http://energy.gov/fe/science-innovation/clean-coal-research.

[8] For a more detailed discussion of loan guarantees for clean energy technologies, see CRS Report R42152, *Loan Guarantees for Clean Energy Technologies: Goals, Concerns, and Policy Options*, by Phillip Brown.

[9] Congressional Budget Office, "Loan Guarantees: Current Concerns and Alternatives for Control," August 1978, p. 3, http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/101xx/doc10184/78doc231.pdf.

[10] §1703 loan guarantees should not be confused with §1705 loan guarantees. §1705 of EPACT05 was added by enactment of the American Recovery and Reinvestment Act of 2009 (P.L. 111-5), and was a temporary loan guarantee program focused on deployment of renewable energy technologies and projects.

guarantees, Section 1703 required that the IGCC projects have a design that would *accommodate* equipment likely to be needed to capture CO_2 that would otherwise be emitted in flue gas.

Terms and Conditions

Under EPACT05 Section 1703, no loan guarantees would be made unless the loan guarantee costs of a project were paid for by (1) appropriated funds; or (2) the borrower. These costs include the loan guarantee credit subsidy cost, which is the estimated long-term amount that a direct loan or loan guarantee will cost the federal government, calculated on a net present value basis, excluding administrative costs.[11] This estimated cost reflects what the government expects to pay and be paid over the course of the loan: payments *by* the government to cover defaults and delinquencies, interest subsidies, and other requirements; and payments *to* the government, including origination and other fees, penalties, and recoveries.[12] Without a specific appropriation, Section 1703 applicants are responsible for paying their own credit subsidy costs.[13] For Section 1703 loan guarantees, Congress has not appropriated funds for credit subsidy costs, with one exception.[14]

In addition to the credit subsidy costs, Section 1703 projects would need to cover certain administrative costs: an application fee, which covers the costs associated with DOE's financial and technical reviews of proposed projects; a facility fee, which covers DOE's administrative expenses of due diligence, negotiation, and documentation; and a maintenance fee, which covers DOE's expenses in servicing and monitoring the loan guarantee agreement over the life of the loan.[15]

Also, EPACT05 stipulated that the face value of the debt guaranteed by DOE is limited to no more than 80% of the total project costs of the facility subject to the guarantee, as estimated by DOE, at the time the loan guarantee was issued. However, for purposes of calculating the loan guarantee credit subsidy costs, discussed above, the loan guarantee commitment is the full principal amount of the loan, not just the portion guaranteed by the federal government.[16] Although Section 1703 applicants would be fully responsible for the credit subsidy costs and administrative costs, EPACT05 does not disqualify projects that receive tax credits for "clean coal" technology from also receiving loan guarantees under Section 1703.

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[11] Office of Management and Budget Circular A-11, Part 5, Federal Credit, page 9 of section 185, http://www.whitehouse.gov/sites/default/files/omb/assets/a11_current_year/s185.pdf.

[12] For a brief discussion of what the credit subsidy costs are, see CRS Report IN10054, *DOE Section 1703 Vogtle Nuclear Project Loan Guarantees: How Can Credit Subsidy Fees Be Zero?*, by Phillip Brown and Mark Holt.

[13] In contrast to §1705 loan guarantees, for which Congress appropriated funds to pay credit subsidy costs in the Recovery Act, P.L. 111-5. §1705 loan guarantees involved renewable energy systems, electric power transmission systems, and biofuel projects. For more information on §1705 issues, see CRS Report R42152, *Loan Guarantees for Clean Energy Technologies: Goals, Concerns, and Policy Options*, by Phillip Brown.

[14] Congress provided $170 million in appropriations for credit subsidy costs for §1703 projects in P.L. 112-10, but made the appropriations available for projects which applied for guaranteed loans under §1705 of EPACT05. In an April 5, 2012, letter to Senators Bingaman and Murkowski, David Frantz, Acting Executive Director, DOE Loan Programs Office, explained that the $170 million appropriation would fund credit subsidy costs for §1705 projects that had not closed their loans and started construction prior to the September 30, 2011, deadline imposed on §1705 projects by the Recovery Act.

[15] U.S. Department of Energy, ENERGY.GOV Loan Programs Office, http://energy.gov/lpo/services/application-process/fees.

[16] Office of Management and Budget Circular A-11, Part 5, Federal Credit, page 13 of section 185.

Policies, procedures, and requirements for the Title XVII loan guarantee program are promulgated in rules under 10 C.F.R. Part 609—Loan Guarantees for Projects That Employ Innovative Technologies.

Loan Guarantee Authorizations and Solicitations

Following enactment of EPACT05, various appropriations bills have amended the authorization of loan guarantees under Title XVII Section 1703 and set loan authority limits for certain technology/project categories. DOE has offered several solicitations for projects to take advantage of the loan guarantee authorization since enactment of EPACT05.

Authorizations

FY2007—Under P.L. 110-5, the Revised Continuing Appropriations Resolution, 2007 (H.J.Res. 20), Congress stipulated that commitments to guarantee loans under title XVII of EPACT05 shall not exceed $4 billion, provided that the costs of the guaranteed loans—namely the credit subsidy costs discussed above—would be provided by the borrowers pursuant to Section 1702(b)(2) of EPACT05.[17] The amounts received from the borrowers would remain available until expended.

FY2008—The Consolidated Appropriations Act for FY2009, P.L. 110-161 (Division C, Title III), restated the loan guarantee authority provided in EPACT05, and made the authority available until the end of FY2009. In the explanatory statement accompanying the bill, Congress increased the allocation for coal-based power generation and industrial gasification activities for facilities that incorporate carbon capture and sequestrations, or other beneficial uses of CO_2, to $6 billion, and included an additional $2 billion for advanced coal gasification.

FY2009—The Omnibus Appropriations Act, 2009 (P.L. 111-8, Division C, Title III), also restated the loan guarantee authority provided in EPACT05, authorizing a maximum of $47 billion for eligible projects under the entire EPACT05 Title XVII program,[18] and restated that no appropriations would be made available to pay the credit subsidy costs of the loan guarantee for Section 1703 projects.

FY2011—The Department of Defense and Full-Year Continuing Appropriations Act, 2011 (P.L. 112-10, §1425), provided an additional $1.18 billion in loan guarantee authority to amounts previously authorized under EPACT05, Title XVII and in the appropriations bills discussed above. P.L. 112-10 also rescinded $18.18 billion in previous authority for Title XVII loan guarantees.[19]

Table 1 summarizes the current loan guarantee authority under Section 1703.

[17] The language in EPACT05, §1702(b)(2) is "No guarantee shall be made unless ... the Secretary has received from the borrower a payment in full for the cost of the obligation and deposited the payment into the Treasury."

[18] The statute did not specifically refer to coal-based power generation, industrial gasification, or coal gasification projects. The loan guarantee authority provided in P.L. 111-8 was amended by P.L. 111-32.

[19] The appropriations bill specified that the rescission was for loan guarantee authority committed to renewable and/or energy efficient systems and manufacturing, and distributed energy generation, transmission, and distribution projects.

Table 1. Current Guaranteed Loan Authority for Section 1703 Programs

billions of dollars

Technology Category	Loan Guarantee Authority
Energy efficiency and renewable energy	$1.5
Nuclear generation	$16.5
Nuclear front-end	$2.0
Fossil energy	$8.0
Mixed	$4.0
Total	**$34.0**

Source: GAO Report GAO-13-331R, March 15, 2013, http://www.gao.gov/products/GAO-13-331R.

Solicitations

DOE has offered two solicitations for clean coal project loan guarantees since enactment of EPACT05—one in 2008 and one in 2013. An earlier solicitation in 2006 invited submission of pre-applications seeking loan guarantees under Title XVII. The 2006 solicitation inviting pre-applications was in support of debt financing for projects that promoted President Bush's Advanced Energy Initiative.[20] However, the solicitation for pre-applications acknowledged that DOE's ability to enter into any loan guarantee agreement hinged on congressional authorization of appropriations for the loan guarantee. DOE stated that this requirement was necessary even though EPACT05 Title XVII allowed for the cost of a loan guarantee to be paid by the loan recipient.

Following enactment of P.L. 110-161, which provided the required authorization of appropriations, DOE issued its first solicitation on September 22, 2008, with Part I and Part II applications due on December 22, 2008, and March 23, 2009, respectively.[21] In its solicitation, DOE cited P.L. 110-161 as the authority for making $6 billion available for coal-based power generations and industrial gasification activities at new and retrofitted facilities that incorporate CCS or other beneficial uses, and for making $2 billion available for advanced coal gasification projects. The solicitation acknowledged that the authority to issue loan guarantees under P.L. 110-161 expired on September 30, 2009, and raised the possibility that the full loan guarantee process may not be completed by that date.

DOE issued its second solicitation on December 12, 2013.[22] In the solicitation, DOE cited P.L. 111-8, as amended by P.L. 111-32, as its authority for providing up to $8 billion in loan guarantees, to be available until expended. Projects eligible for loan guarantees under the solicitation would be those that use advanced fossil energy technology in one or more of the

[20] U.S. Department of Energy, Loan Guarantee Program Office, *Loan Guarantee Solicitation Announcement*, August 8, 2006, http://energy.gov/sites/prod/files/2014/03/f14/Solicitationfinal.pdf.

[21] U.S. Department of Energy, Loan Guarantee Program Office, Federal Loan Guarantees for Coal-Based Power Generation and Industrial Gasification Facilities that Incorporate Carbon Capture and Sequestration or Other Beneficial Uses of Carbon and for Advanced Coal Gasification Facilities, September 22, 2008, http://energy.gov/sites/prod/files/2014/03/f14/FE_Sol9_22_08.pdf.

[22] U.S. Department of Energy, Loan Guarantee Program Office, *Federal Loan Guarantees for Advanced Fossil Energy Projects*, December 12, 2013, http://energy.gov/sites/prod/files/2014/04/f14/Fossil-Solicitation-FINAL.pdf.

following technology areas: (1) advanced resource development; (2) carbon capture; (3) low-carbon power systems; and (4) efficiency improvements. Further, projects would have to meet both of two requirements: (1) avoid, reduce, or sequester anthropogenic emission of greenhouse gases; and (2) employ new or significantly improved technology as compared to commercial technology currently in service in the United States.

Projects Awarded Loan Guarantees

No loan guarantees have been issued to clean coal projects since enactment of EPACT05. According to the DOE Loan Programs Office, the portfolio of guaranteed loans totals $32.4 billion and over 30 projects, only two of which are projects under Section 1703. Both of the Section 1703 projects are nuclear power-related projects.[23] All the other projects in the current portfolio were issued under Section 1705 or under the Advanced Technology Vehicle Manufacturing (ATVM) program.[24] The Section 1705 loan program expired on September 30, 2011, and all loans under the Section 1705 program have been issued.

Tax Incentives

Clean coal investment tax credits were first authorized in EPACT05. These tax credits were authorized alongside new research spending and other financial incentives, such as the loan guarantees discussed above. Additional tax incentives for clean coal were provided in P.L. 110-343, the Emergency Economic Stabilization Act of 2008 (EESA). The following sections provide background on tax incentives for investments in clean coal technologies and carbon capture and sequestration.

Investment Tax Credits

EPACT05 codified two new sections in the Internal Revenue Code (IRC). IRC Section 48A provides tax credits for investment in qualifying advanced coal projects. Under EPACT05, $800 million was authorized for Section 48A tax credits for integrated gasification combined cycle (IGCC) projects. The tax credit rate for investments in IGCC was set at 20% of eligible project costs. Another $500 million was available for investments in other advanced coal-based electricity generation technologies (ACBGT), at a tax credit rate of 15% of eligible project costs.

The second clean coal investment tax credit established under EPACT05, IRC Section 48B, provides tax credits for investment in qualifying gasification projects.[25] EPACT05 authorized $350 million for qualified gasification projects qualifying for a tax credit under Section 48B. The credit rate for qualifying investments in gasification projects was 20% of eligible project costs.

[23] See U.S. Department of Energy, Loan Programs Office, Projects, http://energy.gov/lpo/georgia-power-company-gpc-oglethorpe-power-corporation-opc-municipal and http://energy.gov/lpo/areva.

[24] For more information on the ATVM program, see CRS Report R42064, *The Advanced Technology Vehicles Manufacturing (ATVM) Loan Program: Status and Issues*, by Bill Canis and Brent D. Yacobucci.

[25] Gasification technology includes "any process which converts a solid or liquid product from coal ... which [is] recovered for [the] energy value or feedstock value into a synthesis gas composed primarily of carbon monoxide and hydrogen for direct use or subsequent chemical or physical conversion."

The Department of the Treasury and DOE work together to evaluate projects seeking tax credits under IRC Sections 48A and 48B. Taxpayers investing in clean coal projects must apply for tax credits, as these tax credits are competitively awarded. Under Section 48A, taxpayers have five years to place in service projects for which tax credits are allocated.

In late 2006, the Internal Revenue Service announced that nearly $1 billion in investment tax credits had been awarded to nine clean coal projects, located in nine different states.[26] Two IGCC bituminous coal projects received credits worth $133.5 million each, an IGCC lignite project received a $133 million credit, two ACBGT projects received credits worth $125 million each, and four gasification projects received tax credits ranging in value from $40.7 million to $130 million.[27] Reportedly, 49 companies from 29 states had requested $5 billion in tax credits for projects that cost a total of $58 billion.[28] Credits were awarded to qualifying projects believed to be technologically and economically feasible. Funds authorized in EPACT05 that were allocated in "Phase I" of the program (allocation rounds in 2006 and 2007-2008) may be reallocated if recipients fail to meet the conditions of the initial allocation or otherwise forfeit their awards.

The Energy Improvement and Extension Act of 2008, enacted as Division B of EESA, authorized an additional $1.25 billion in investment tax credits for IGCC and ACBGT projects (§48A). An additional $250 million was also provided for qualified gasification projects (§48B). The tax credit rate for all qualified clean coal investments was increased to 30% (depending on the project type, the rate had been 15% or 20%). Beginning with the 2009 allocation, qualifying IGCC and other advanced coal projects must include equipment that separates and sequesters at least 65% of the project's total CO_2 emissions. Gasification projects must separate and sequester 75% of total CO_2 emissions. Credits continued to be awarded for certified projects, with certifications issued in a competitive bidding process by the Secretary of Treasury in consultation with the Secretary of Energy.[29] For Section 48B credits allocated starting in 2009, there is a seven-year placed-in-service requirement.

For allocations made after enactment of EESA, the Secretary of the Treasury is required to disclose the identity of taxpayers receiving credits and the amount of the award. The results of the 2009-2010 allocation round were announced in September 2010 (see **Table 2**).[30] More than $1 billion was awarded for Section 48A credits during the 2009-2010 allocation, leaving $240

[26] Internal Revenue Service, "$1 Billion in Tax Credits Allocated to Clean Coal Projects," press release, November 30, 2006, http://www.irs.gov/uac/$1-Billion-in-Tax-Credits-Allocated-to-Clean-Coal-Projects.

[27] Projects that received credits and chose to have their selection publicly announced are (1) Duke Energy—Edwardsport IGCC Project, Edwardsport, IN; (2) Tampa Electric Company, Polk County, FL; (3) Southern Company—Mississippi Power Company, Kemper County, MS; (4) Duke Energy Cliffside Modernization Projects, Cleveland and Rutherford County, NC; (5) E.ON U.S., Louisville Gas and Electric and Kentucky Utilities Co., Bedford, KY; (6) Carson Hydrogen Power, LLC: Carson Hydrogen Power Project, Carson, CA; and (7) TX Energy, LLC: Longview Gasification and Refueling Project, Longview, TX. See United States Department of Energy, "Energy Secretary and Secretary of the Treasury Announce the Award of $1 Billion in Tax Credits to Promote Clean Coal Power Generation and Gasification Technologies," press release, November 30, 2006, http://energy.gov/articles/energy-secretary-and-secretary-treasury-announce-award-1-billion-tax-credits-promote-clean.

[28] Meg Shreve, "$1 Billion Awarded in Clean Coal Tax Credits," *Tax Notes*, December 4, 2006.

[29] Under EESA, the Secretary of the Treasury is directed to give the highest priority to applicants who have a research partnership with an eligible educational institution. Additionally, the Secretary of the Treasury is directed to award tax credits to projects with the greatest separation and sequestration percentage of total carbon dioxide emissions.

[30] Internal Revenue Service, "Internal Revenue Bulletin: 2010-39." Announcement of the Results of 2009-10 Allocation Round of the Qualifying Advanced Coal Project Program and the Qualifying Gasification Project Program. September 27, 2010, http://www.irs.gov/irb/2010-39_IRB/ar09.html.

million available for subsequent allocation. All $250 million made available for gasification projects (§48B) under EESA was awarded in the 2009-2010 allocation round.

While $240 million in Section 48A credits were available for allocation in the 2010-2011 allocation round, none were made.[31] The 2011-2012 allocation round resulted in one allocation of $103.6 million in Section 48A credits (see **Table 2**).[32] The 2011-2012 allocation round concluded "Phase II" of the program.

In 2012, the Treasury announced that $658.5 million of Section 48A credits were available for allocation. The funding available for the 2012-2013 allocation round included funding that had previously been allocated to projects that had their certification revoked.[33]

Table 2. Clean Coal Tax Credit Allocations

Code Section	Project Name		Credit Awarded
	2009-2010 Allocation Round		
IRC §48A	Christian County Generation, LLC		$417,000,000
	Summit Texas Clean Energy, LLC		$313,436,000
	Mississippi Power Company		$279,000,000
		Total	*$1,009,436,000*
IRC §48B	Faustina Hydrogen Products		$121,660,000
	Lake Charles Gasification, LLC		$128,340,000
		Total	*$250,000,000*
	2011-2012 Allocation Round		
IRC §48A	Hydrogen Energy California LLC		$103,564,000
		Total	*$103,564,000*
	2012-2013 Allocation Round		
IRC §48A	STCE Holdings, LLC		$324,000,000
	SCS Energy California, LLC		$334,500,000
		Total	*$658,500,000*

Source: Internal Revenue Service.

Notes: Includes 'Phase II' and 'Phase III' allocations. 'Phase I' allocations, made before the enactment of EESA, did not require public disclosure.

The Joint Committee on Taxation (JCT) provides annual tax expenditure estimates, or estimates of the foregone revenue collections resulting from the clean coal investment tax credits. Between fiscal years 2014 and 2018, the JCT estimates that the clean coal tax credits will reduce revenue

[31] Internal Revenue Service, Announcement 2011-62, October 3, 2013, http://www.irs.gov/irb/2011-40_IRB/ar15.html.

[32] Internal Revenue Service, Announcement 2013-2, January 7, 2013, http://www.irs.gov/irb/2013-02_IRB/ar10.html.

[33] For example, delays at Southern Company's Kemper County project reportedly led to a loss of tax benefits. See Steven Mufson, "Intended Showcase of Clean-Coal Future Hits Snags," *Washington Post*, May 17, 2014, http://m.washingtonpost.com/business/economy/intended-showcase-of-clean-coal-future-hits-snags/2014/05/16/fc03e326-cfd2-11e3-b812-0c92213941f4_story.html.

collections by $1.0 billion (see **Table 3**).[34] From fiscal years 2006 through 2013, the JCT estimated that clean coal investment tax credits reduced federal revenue collections by $1.3 billion, bringing the total estimated cost of the credits to $2.3 billion through 2018. These figures might overstate the actual cost of the credits, as projects that initially received allocations have been cancelled and there appear to be few new or proposed projects in the pipeline.[35]

Table 3. Tax Expenditures for Clean Coal and CO_2 Sequestration Credits: FY2014-FY2018

billions of dollars

	2014	2015	2016	2017	2018	2014-2018
Credit for Investment in Clean Coal Facilities	0.2	0.2	0.2	0.2	0.2	1.0
Credit for CO_2 Capture and Sequestration	0.1	0.1	0.1	0.3	0.1	0.7

Source: U.S. Congress, Joint Committee on Taxation, *Estimates of Federal Tax Expenditures for Fiscal Years 2014-2018*, committee print, 113th Congress, August 5, 2014, JCX-97-14 and Office of Management and Budget, *Fiscal Year 2015 Analytical Perspectives: Budget of the U.S. Government*, Washington, DC, February 2014.

Notes: Rows may not sum due to rounding. Tax expenditure estimates for the clean coal investment credit come from the JCT. Tax expenditure estimates for the CO_2 sequestration credit were prepared by the Treasury.

Carbon Dioxide (CO_2) Sequestration Credit

The Section 45Q credit for carbon dioxide (CO_2) sequestration was added to the IRC as part of the Energy Improvement and Extension Act of 2008, enacted as Division B of EESA. Under Section 45Q, taxpayers may claim a $20 per metric ton credit ($21.51 in 2014, adjusted for inflation) for qualifying domestic carbon dioxide that is captured and sequestered. Qualified carbon dioxide is CO_2 that is captured from an industrial source, would otherwise have been released as an industrial greenhouse gas emission, and is measured at the source of capture and verified upon disposal or injection. A $10 per metric ton credit ($10.75 in 2014, adjusted for inflation) is available for taxpayers using captured CO_2 as a tertiary injectant in an enhanced oil or natural gas recovery project, so long as the qualified CO_2 is disposed of in secure geological storage.[36]

The Section 45Q credit is scheduled to terminate after 75 million metric tons of qualified CO_2 have been captured and taken into account for the purposes of the credit. As of June 1, 2014, 27 million metric tons of CO_2 had been taken into account for the purposes of the Section 45Q credit.[37] Previously, on May 14, 2013, the IRS had reported that nearly 21 million metric tons of CO_2 had been taken into account for the purposes of the credit.[38] Thus, over the course of the year

[34] The tax expenditure estimates do not directly correspond to the credit awards reported below, as credits are not paid out in full in the year they are awarded but instead are used to offset tax liability over time.

[35] In a 2012 report, the Congressional Budget Office (CBO) noted that a substantial portion of the clean coal investment credits will likely never be used. See Congressional Budget Office, *Federal Efforts to Reduce the Cost of Capturing and Storing Carbon Dioxide*, Washington, DC, June 2012, http://www.cbo.gov/publication/43357.

[36] The qualification that the CO_2 be stored in secure geological storage was added by the American Recovery and Reinvestment Act of 2009 (P.L. 111-5).

[37] Internal Revenue Service, Notice 2014-40, June 1, 2014, available at http://www.irs.gov/pub/irs-drop/n-14-40.pdf.

[38] Internal Revenue Service, Notice 2013-34, May 14, 2013, available at http://www.irs.gov/pub/irs-drop/n-13-34.pdf.

ending June 1, 2014, the Section 45Q credit was claimed for approximately 6 million metric tons of captured and sequestered CO_2.

When enacted, the CO_2 sequestration credit was estimated to cost $1.1 billion over the 10-year budget window including fiscal years 2009 through 2018.[39] The CO_2 sequestration credit is not included in JCT's recent tax expenditure tables.[40] The Treasury estimates that the CO_2 sequestration credit will reduce federal revenues by $0.1 billion in FY2014, and $0.7 billion between fiscal years 2014 and 2018 (see **Table 3**).[41]

Tax Treatment of Clean Coal Grants

Another area of concern has been the tax treatment of grants received from the Clean Coal Power Initiative (CCPI).[42] Corporate taxpayers can treat CCPI grants received as nonshareholder contributions to capital, meaning that such payments do not have to be included in gross income (and thus are not subject to tax).[43] If grant awards are excluded from gross income, the taxpayer must reduce their basis in the property. The reduction in basis reduces the amount that can be claimed as depreciation deductions over time.

Under proposed legislation, the Expiring Provisions Improvement, Reform, and Efficiency (EXPIRE) Act of 2014 (S. 2260), non-corporate taxpayers would be allowed to exclude CCPI grants and awards from gross income. Taxpayers would be required to reduce their basis in the property by the amount of the award. Grant recipients would also be required to pay an up-front interest charge equal to 1.18% of the value of the award.

Issues for Congress

Many issues, not all financial, influence the future of clean coal in the United States. These include the high-risk nature of large, complicated, technology-intensive and as-yet commercially unproven projects that capture and sequester large volumes of CO_2. In addition to the technological challenges, issues such as liability, ownership, and long-term stewardship of the captured CO_2 add risk and complexity to large clean coal projects. Congress may decide to view loan guarantees and tax incentives within the broader policy context that surrounds clean coal.

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

[40] In the 2013 tax expenditure tables, the CO_2 sequestration credit is listed as one for which "quantification is not available." See U.S. Congress, Joint Committee on Taxation, *Estimates of Federal Tax Expenditures for Fiscal Years 2012-2017*, committee print, 113th Cong., February 1, 2013, JCS-1-13. The CO_2 sequestration credit is also not included in the 2014 tax expenditure publication.

[41] Office of Management and Budget, *Fiscal Year 2015 Analytical Perspectives: Budget of the U.S. Government*, Washington, DC, February 2014, http://www.whitehouse.gov/omb/budget/Analytical_Perspectives.

[42] For more information, see CRS Report R42496, *Carbon Capture and Sequestration: Research, Development, and Demonstration at the U.S. Department of Energy*, by Peter Folger.

[43] Internal Revenue Service, Rev. Proc. 2011-30, April 14, 2011.

Loan Guarantees

A question for Congress to consider is why no loan guarantees have been issued for clean coal projects, despite several authorizations of appropriations and two solicitations. The most recent solicitation was issued in late 2013, and information is not publicly available about the number of proposals that may have been submitted pursuant to the most recent solicitation. Yet, only two Section 1703 projects, both nuclear power-related, have received or are on the path to obtaining loan guarantees since enactment of EPACT05 nearly 10 years ago.

It could be argued that a major distinction that encouraged projects under Section 1705—renewable energy systems, electric power transmission systems, leading edge biofuel projects—was the decision by Congress to provide appropriated funds to pay for some or all of the loan guarantee credit subsidy costs. DOE has not sought appropriations for Section 1703 projects although, notably, DOE deemed zero credit subsidy costs for both nuclear power related projects that are on track for the loan guarantees.[44] Thus, a common characteristic among all projects that received loan guarantees or are on track to receive loan guarantees is the removal of any requirement by the loan guarantee recipient to self-pay the credit subsidy costs, either through congressional appropriations or within the current regulatory framework (or through higher interest rates on the loan).

It is difficult to gauge the interest by industry in seeking guaranteed loans under Section 1703 without knowing how many applications for clean coal projects were submitted in response to the solicitations. Similarly, it is difficult to determine whether projects were not awarded loan guarantees because they failed to meet criteria required under the program, or were disqualified for some other reason.

An additional challenge for these projects is the requirement to employ new technology while at the same time achieving commercial viability. In addition, the EPA proposals to regulate CO_2 from new and existing coal-fired power plants have arguably introduced more uncertainty into the future of coal. Whether the 2013 and 2014 EPA proposals will create demand for loan guarantees, or have the opposite effect, is not clear.

Tax Incentives

When it comes to tax incentives for clean coal and carbon capture and sequestration, there are several options for Congress to consider. One option is to maintain the status quo, which would essentially allow existing tax incentives to phase out. Since existing tax incentives have limited funds or are volume capped, these incentives will not be available for new investments or CO_2 sequestration once available funds have been fully allocated.

A second option is for Congress to authorize additional funding for investment tax credits under Sections 48A and 48B. However, several projects that were allocated credits under Sections 48A or 48B have been cancelled, and given the lack of new or proposed projects, it is not clear that additional funds for Sections 48A or 48B could be allocated in the near term. Given these developments, a question for Congress is whether there is an appetite for these investment credits.

[44] This controversial decision by DOE is discussed in more detail in CRS Report IN10054, *DOE Section 1703 Vogtle Nuclear Project Loan Guarantees: How Can Credit Subsidy Fees Be Zero?*, by Phillip Brown and Mark Holt.

Further, are the tax credits considered an effective tool to further develop eligible technologies for clean coal?

Some technical changes also have been cited as potential improvements to existing tax benefits. Modifications to the Section 45Q credit have been proposed in the Carbon Capture and Sequestration Deployment Act of 2014 (S. 2287). Specifically, S. 2287 would change the current structure of Section 45Q. Credits would be allocated to applicants, so that applicants could be assured tax credits would be available before CO_2 is actually captured, with the goal of providing greater certainty to the industry.[45] S. 2287 would also allow credits to be transferred, at the discretion of the tax credit recipient that captured the CO_2, to the company storing the CO_2. Both of these proposals were included in a 2012 recommendation by the National Enhanced Oil Recovery Initiative.[46] Regarding Sections 48A and 48B investment credits, there are unresolved issues related to reallocations for forfeited credits and recertification for projects that have not met placed-in-service deadlines. These issues may be addressed through Treasury guidance.

Other changes in energy tax policy could also affect the outlook for clean coal and CCS technologies. For example, a tax on carbon emissions or regulations that otherwise increase the cost of carbon-intensive electricity production would make low-carbon coal options more competitive. Electricity produced at facilities equipped with CCS could also benefit from clean energy production and investment credits, such as those proposed by former Senate Finance Committee Chairman Max Baucus.[47]

Also at issue is whether tax incentives should be used to promote investment in clean coal, carbon capture and sequestration, or related technologies.[48] Generally, an efficient tax system is one that is free from incentives, where markets dictate where investments are made. There are, however, a number of exceptions to this general case. Tax incentives that result in investments that reduce pollution or emissions, for example, can improve the allocation of resources in the economy. Tax incentives that lead to investment in emerging technologies with spillover benefits can also improve the economy-wide allocation of resources. There are concerns regarding the structure of the clean coal tax credits, particularly the investment tax credits, where recipients are selected for and credit amounts carved out for specified technologies. Another drawback to nearly any form of tax credits is the limited benefit provided to firms that do not pay taxes.

[45] S. 2287 would also establish a new investment tax credit for carbon capture and sequestration equipment.

[46] National Enhanced Oil Recovery Initiative, *Recommended Modifications to the 45Q Tax Credit for Carbon Dioxide Sequestration*, Washington, DC, February 2012, http://www.c2es.org/docUploads/EOR-45Q.pdf.

Another proposal, the Expanding Carbon Capture through Enhanced Oil Recovery Act (S. 2288), would expand and substantively reform the existing tax incentives for carbon capture and sequestration, introducing a certification process for the allocation of redesigned §45Q credits.

[47] For details on this proposal, 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*, 113th Cong., December 18, 2013, JCX-21-13, available at https://www.jct.gov/publications.html?func=startdown&id=4537.

[48] For a general discussion of economic considerations, see Martin A. Sullivan, "Tax Credits Ease Economy's Shift to Coal," *Tax Notes*, September 11, 2006, pp. 901-907.

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