

**U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY**

HEARING CHARTER

Federal Financial Support for Energy Technologies: Assessing Costs and Benefits

Wednesday, March 13, 2013
3:00 p.m. – 5:00 p.m.
2318 Rayburn House Office Building

PURPOSE

On Wednesday, March 13, at 3:00 p.m. in Room 2318 of the Rayburn House Office Building, the Subcommittee on Energy will hold a hearing titled, *Federal Financial Support for Energy Technologies: Assessing Costs and Benefits*. The Subcommittee will receive testimony regarding various forms of Federal financial support for the development and production of fuels and energy technologies, including tax incentives, loan guarantees, and direct spending on research, development, demonstration and commercialization activities.

WITNESS LIST

- **Dr. Terry Dinan**, Senior Analyst, Congressional Budget Office
- **Ms. Mary Hutzler**, Distinguished Senior Fellow, Institute for Energy Research
- **Mr. Malcolm Woolf**, Senior Vice President Policy & Government Affairs, Advanced Energy Economy

BACKGROUND

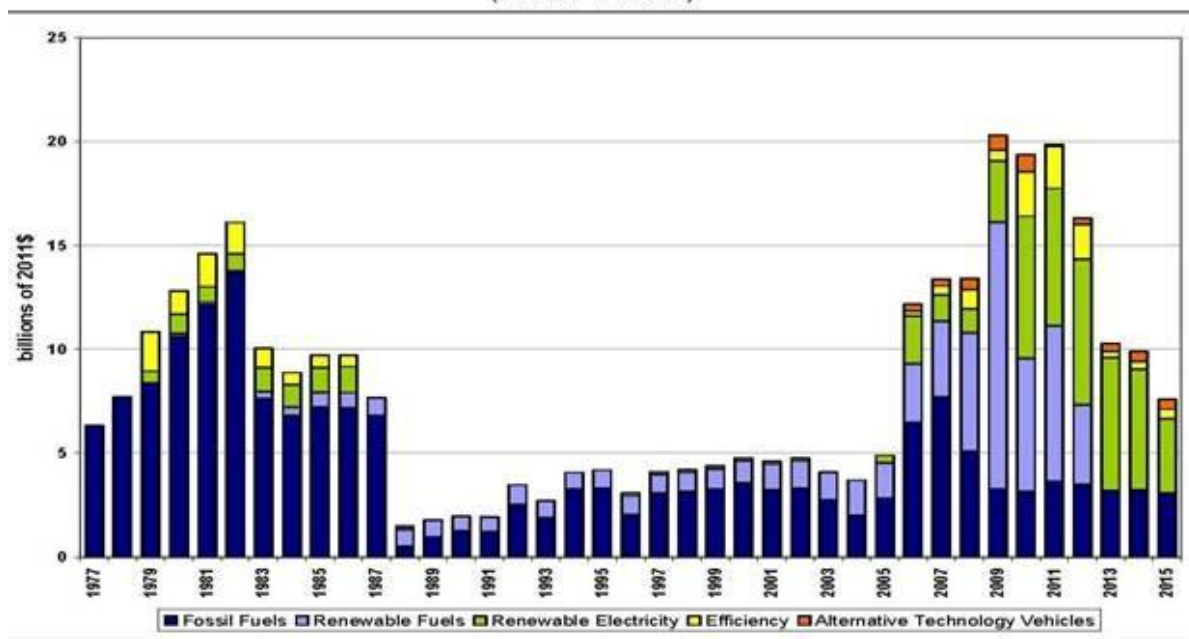
The Federal government supports the production and use of fossil, nuclear and renewable energy, while also seeking to improve energy efficiency use through various mandates, incentives and financial mechanisms. These support mechanisms include direct financial support to certain energy producers and consumers, as well as tax incentives that reduce the tax burden for producers and consumers of certain fuels and technologies.

Energy Tax Incentives and Related Trends

Tax incentives include special deductions or tax rates, tax credits, and cash grants in lieu of tax credits. Energy-related tax incentives were historically aimed at increasing fossil fuel production. Beginning in the late 1970s, this focus gradually shifted as tax incentives were added for energy efficiency and renewable energy technologies.

According to the Congressional Budget Office (CBO), energy-related tax incentives more than doubled in cost between 1977 and 1982 and then drastically fell in 1983 and again in 1988. See Figure 1. From 1988 to 2005, tax incentives gradually grew and averaged approximately \$4 billion per year from 2000 to 2005. Since then, those costs rose dramatically to an average of \$20 billion a year from 2009 through 2011.¹ The Joint Committee on Taxation and the Department of Treasury estimate the combined cost of reduced revenues and increased outlays amounted to approximately \$21.8 billion in 2011.²

Figure 1. Projected Annual Cost of Energy-Related Tax Incentives
(FY1977–FY2015)



Source: CRS using data from the Joint Committee on Taxation and Office of Management and Budget.

Notes: Annual cost estimates are the sum of individual tax expenditure provisions and do not reflect possible interaction effects. The estimates also do not reflect the revenue that could be raised should specific provisions be eliminated. For all years, tax expenditure estimates are projections, not actual revenue losses. The figure does

Overall, 68 percent (\$13.9 billion) of the energy-related tax incentives in 2011 were directed toward renewable energy technologies, and 10 percent (\$2.1 billion) were dedicated to energy efficiency.³ See Figure 2. The total cost of these expenditures was expected to decline in 2012 from \$20.5 billion to \$16.6 billion. This reduction of \$4 billion is attributable to the expiration of the ethanol tax credit and Section 1603 grants in lieu of tax credits program.

¹ Congressional Budget Office, *Federal Financial Support for the Development and Production of Fuels and Energy Technologies*, March 2012. Accessible at: http://www.cbo.gov/sites/default/files/cbofiles/attachments/03-06-FuelsandEnergy_Brief.pdf

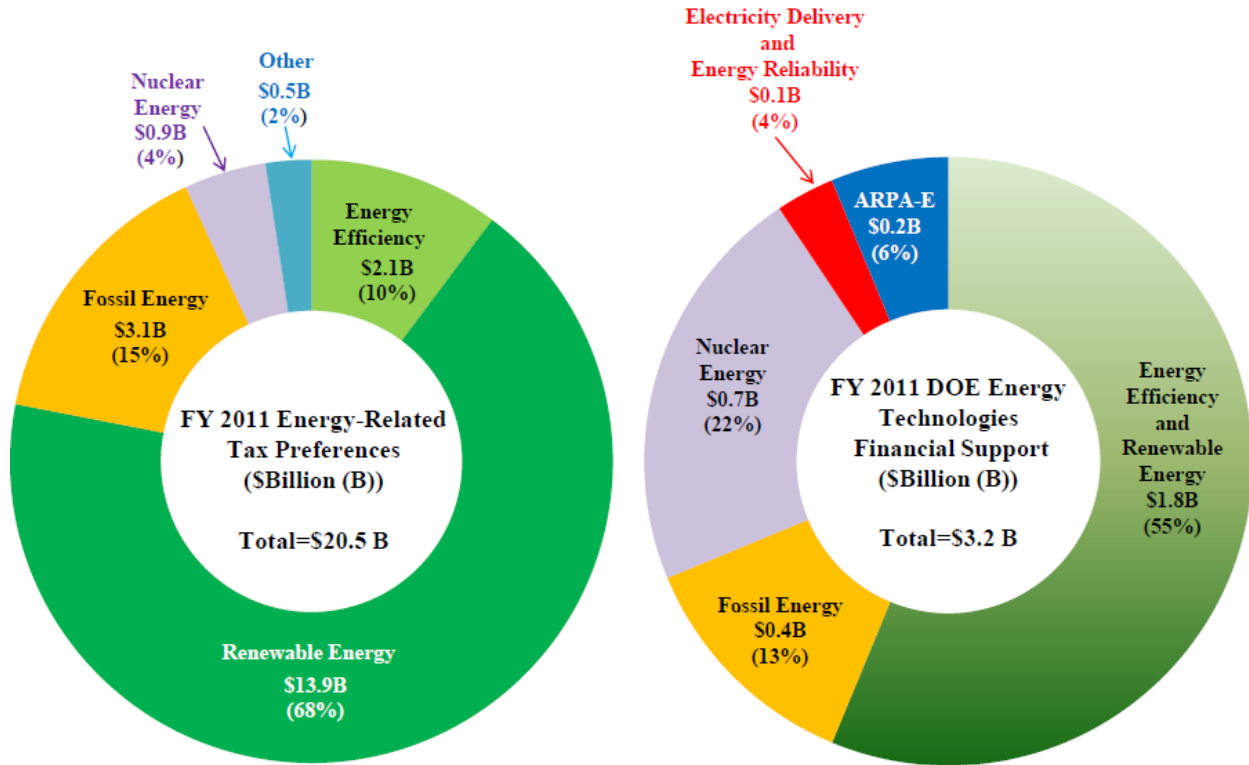
² Congressional Research Service, *Energy Tax Incentives: Measuring Value Across Different Types of Energy Resources*, September 2012. Accessible at: <http://www.crs.gov/Products/R/PDF/R41953.pdf>. NOTE: the CRS table presented in Figure 1 does not reflect the extension of several renewable energy tax credits that were included in the American Taxpayer Relief Act of 2012.

³ CBO, *Federal Financial Support*.

FIGURE 2

**FY 2011 Energy-Related Tax Incentives
(\$Billion (B))**

**FY 2011 DOE Energy Technologies
Financial Support (\$Billion (B))⁴**



Electricity Sector Tax Incentives

Several energy-related tax incentives are targeted to encourage the production of electricity from specific energy technologies. According to the Energy Information Administration, tax incentives for electricity production, excluding the Section 1603 grant program, totaled over \$3.3 billion in 2010. Of this amount, the largest share (\$1.2 billion) was accounted for by electricity generated by renewable energy technologies. The primary tax credits applicable to the electric sector are the Production Tax Credit (PTC), the Investment Tax Credit (ITC), and the Section 1603 grants in lieu of tax credits (Section 1603 program).

- The PTC is a per kilowatt-hour (kWh) tax credit, claimed for up to ten years, for utilities that generate electricity from qualified renewable energy resources. The PTC is a tiered credit that permits utilities to claim either 2.2 cents per kWh or 1.1 cents per kWh,

⁴ DOE's FY 2011 energy technologies financial support figures include budget authority (BA) for energy efficiency and renewable energy R&D and weatherization, fossil energy R&D, nuclear energy R&D and facilities management, electricity and energy reliability, and ARPA-E programs.

depending on the technology.⁵ This tax credit has expired and then been subsequently renewed or expanded by Congress on several occasions. Last January, the American Taxpayer Relief Act of 2012 extended the PTC for one additional year through the end of 2013. This one-year extension is estimated to cost \$12.1 billion.⁶

- The ITC allows eligible entities to claim a tax credit equal to either 30 percent or ten percent of expenditures, depending on the electric generation technology.⁷
- The American Recovery and Reinvestment Act (ARRA) created the Section 1603 program, which offers renewable energy project developers cash payments in lieu of the PTC or ITC. The award value equals 30 percent of the project's cost.⁸ The 1603 Program expired in 2012 (though the Department of Treasury continues to make payments to recipients five years after the initial award).

In 2012, the estimated costs of the PTC and ITC were \$1.6 billion and \$500 million, respectively. As of July 2012, the Treasury Department provided more than \$13 billion to 45,000 projects cumulatively under the Section 1603 program. The majority of those awarded projects were for solar technology, but the majority of the funding was awarded to large, capital-intensive wind technology projects.⁹

Fuel Tax Incentives

The majority of tax incentives available for non-electricity fuels are provided to biofuels. In 2010, biofuels accounted for 73 percent of non-electric tax incentives, with a total cost of \$6.3 billion growing to \$7.5 billion in 2011. Tax incentives available to biofuels include credits for alcohol fuels, as well as excise tax credits for alcohol fuels and biodiesel. Natural gas and petroleum liquids accounted for the second-largest share of fuel tax incentives, at 20.7 percent, or \$2.1 billion.¹⁰ A table detailing spending associated with these incentives is included in Appendix II.

⁵ Qualifying technologies for 2.2 cents per kWh include wind, closed-loop biomass, geothermal, and solar (pre-2006 facilities only). Qualifying technologies for 1.1 cents per kWh include open-loop biomass, small irrigation power, municipal solid waste, qualified hydropower, and marine and hydrokinetic.

⁶ The Joint Committee on Taxation, *Estimated Revenue Effects of the Revenue Provisions Contained in an Amendment in the Nature of a Substitute to H.R. 8, The "American Taxpayer Relief Act of 2012," As Passed by the Senate on January 1, 2013*, January 3, 2013.

⁷ Qualifying technologies for 30% credit rate include solar electric or solar hot water property, fuel cell property, and small wind electrical generation property. Qualifying technologies for ten percent credit rate include equipment to produce energy from a geothermal deposit, equipment to use ground or ground water for heating or cooling, microturbine property (<2Mw electrical generation power plants of >26% efficiency), and combined heat and power property (simultaneous production of electrical/mechanical power and useful heat > 60% efficiency).

⁸ Department of Treasury, *Overview and Status Update of the Sec. 1603 Program*, July 20, 2012. Accessible at: <http://www.treasury.gov/initiatives/recovery/Documents/STATUS%20OVERVIEW.pdf>

⁹ Ibid.

¹⁰ CRS, *Energy Tax Incentives*

48C Manufacturing Tax Credits

ARRA also created the Advanced Energy Manufacturing Tax Credit. This provision, commonly referred to as “48C”, allows for a credit amounting to 30 percent of investment in manufacturing facilities for clean energy technologies. The 48C program is administered by the Internal Revenue Service (IRS), though DOE reviews project applications and recommends specific projects.

The credit was originally awarded to 183 domestic clean energy manufacturing facilities for a total of \$2.3 billion. Last month, the IRS announced the availability of \$150 million for additional 48C allocations. This funding was not fully utilized by previous awardees, and is to be reallocated on a competitive basis. The DOE will provide its recommendations on applications to the Internal Revenue Service by October.

Energy Tax Provisions in the American Taxpayer Relief Act of 2012

The American Taxpayer Relief Act of 2012 extended a number of energy tax provisions that expired at the end of 2011 or were scheduled to expire at the end of 2012. These tax provisions included incentives for alcohol fuels and biodiesel and renewable diesel, credits for alternative fuel vehicle refueling property, and credit for non-business energy property.¹¹

As previously noted, the bill included a one year extension of the PTC and modified the definition of projects that qualify for the PTC.¹² Prior to this change, qualified projects had to be in service by the PTC expiration date, but the legislation modified the definition for qualifying projects to “the construction of which begins before January 1, 2014.” IRS has yet to issue guidance to clarify this revised definition.

CBO estimated the cost of the energy tax provisions contained in the American Taxpayer Relief Act of 2012 to be over \$18 billion.

Loan Guarantees

Section 1703 of the Energy Policy Act of 2005 (EPAAct) created a loan guarantee program to support investment in a breadth of energy technology areas and innovative clean-energy facilities. The 2009 ARRA legislation added what is known as the Section 1705 loan program to support loans for renewable energy technologies, electric power transmission, and biofuel projects. The authority for the Section 1705 loan program expired on September 30, 2011. Over the life of this program, DOE guaranteed loans to 26 projects amounting to \$16 billion in financial capital.¹³

¹¹ Congressional Research Service, *An Overview of the Tax Provisions in the American Taxpayer Relief Act of 2012*, February 4, 2013. Accessible at: <http://www.crs.gov/Products/R/PDF/R42894.pdf>

¹² P.L. 112-240, Sect 407(b)

¹³ Department of Energy, *Loan Programs Office Projects*. Accessible at: https://lpo.energy.gov/?page_id=45

The primary difference between the 1703 and 1705 versions of the loan guarantee program was that projects under Section 1705 were not required to pay the “credit subsidy cost” of a loan guarantee. The credit subsidy cost is an up-front payment that addresses the risk to the Federal government in case of default on a loan. Credit subsidy costs for the 1705 program were paid for by funds appropriated in ARRA.

In April 2011, the Department of Defense and Full-Year Continuing Appropriations Act provided \$170 million in appropriations for new loan commitments under the Section 1703 program. DOE has yet to award this funding. However, in April 2012, Acting Loan Program Office Director David Frantz sent a letter to Congress indicating DOE’s intention to award this funding soon, stating:

“The exact number of projects and the total dollar value of the loan guarantees in this §1703 pipeline will depend on the government’s assessment of the risk level of the projects selected. The Department expects to begin issuing conditional commitments over the next several months after completing a rigorous internal and external review of each application. This evaluation will build on the extensive work that had already begun last year prior to the applications being put on hold.”¹⁴

Direct Spending

DOE’s direct spending activities primarily consist of research, development, demonstration and commercial application of energy technology programs in four general technology areas: energy efficiency and renewable energy; electricity delivery and energy reliability; nuclear energy; and fossil energy. Additionally, the Advanced Research Projects Agency – Energy (ARPA-E) funds research and development projects across all energy technology areas. In Fiscal Year (FY) 2012, DOE spent approximately \$3.3 billion on applied energy research programs (Figure 2).¹⁵

ADDITIONAL READING

For additional information and background on Federal financial support for energy production and technologies see:

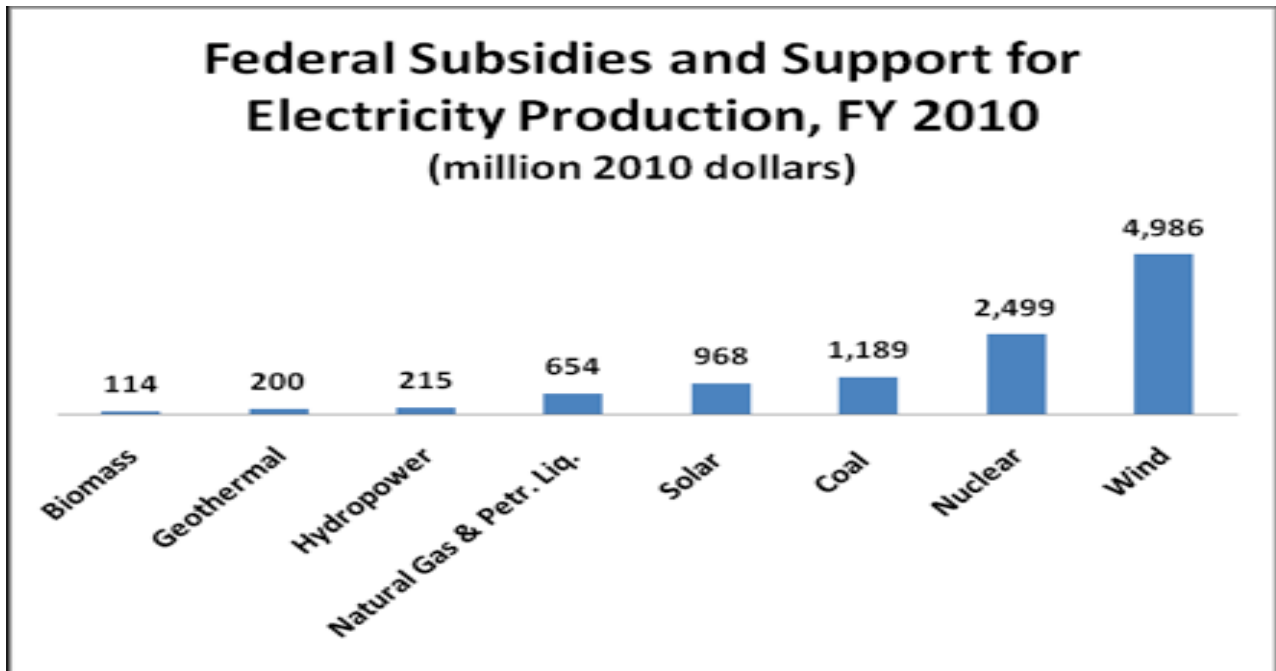
- Congressional Budget Office, [*Federal Financial Support for the Development and Production of Fuels and Energy Technology*](#), March 2012.
- Congressional Research Service, [*Energy Tax Incentives: Measuring Value Across Different Types of Energy Resources*](#), September 18, 2012.

¹⁴ Department of Energy, *Update on the 1703 Loan Program*, April 5, 2012. Accessible at: <http://energy.gov/articles/update-1703-loan-program>

¹⁵ CBO *Federal Financial Support*

- Energy Information Administration, [*Direct Federal Financial Interventions and Subsidies in Energy in Fiscal Year 2010*](#), July 2011.
- Congressional Research Service, [*An Overview of the Tax Provisions in the American Taxpayer Relief Act of 2012*](#), February 4, 2013.

Appendix 1 – CRS Graph on Technology Specific Subsidies



CRS: The value of federal tax support for the energy sector was estimated to be \$19.1 billion in 2010. Of this, roughly one-third (\$6.3 billion) was for tax incentives that support renewable fuels. Another \$6.7 billion can be attributed to tax-related incentives supporting various renewable energy technologies (e.g., wind and solar). Targeted tax incentives supporting fossil energy resources totaled \$2.4 billion.

Appendix 2 – CRS Summary Table of Energy Tax Provisions

**Table 2. Estimated Revenue Cost of Energy Tax Provisions:
Fiscal Years 2010 through 2012**
(\$ billions)

Provision	2010	2011	2012
Fossil Fuels			
Expensing of Exploration and Development Costs for Oil and Gas	0.7	0.8	0.8
Percentage Depletion for Oil and Gas	0.5	0.9	0.9
Amortization of Geological and Geophysical Costs for Oil and Gas Exploration	0.1	0.1	0.1
15-year Depreciation for Natural Gas Distribution Lines	0.1	0.1	0.1
Election to Expense 50% of Qualified Refinery Costs	0.7	0.8	0.7
Amortization of Air Pollution Control Facilities	0.1	0.2	0.2
Credits for Investments in Clean Coal Facilities	0.2	0.2	0.2
<hr/>			
Provision	2010	2011	2012
Excise Tax Credits for Alternative Fuel Mixtures	n.a.	0.2	0.2
<i>Subtotal, Fossil Fuels</i>	2.4	3.3	3.2
Renewables			
Production Tax Credit (PTC)	1.4	1.4	1.6
Investment Tax Credit (ITC)	(i)	0.5	0.5
Accelerated Depreciation for Renewable Energy Property	0.3	0.3	0.3
Section 1603 Grants in Lieu of Tax Credits ^a	4.2	3.5	4.1
Credit for Clean Renewable Energy Bonds (CREBs)	0.1	(i)	(i)
Residential Energy Efficient Property Credit	0.2	0.2	0.2
Credit for Investment in Advanced Energy Property	0.5	0.7	0.4
<i>Subtotal, Renewables</i>	6.7	6.6	7.1
Renewable Fuels			
Credits for Alcohol Fuels	0.1	0.2	0.1
Excise Tax Credits for Alcohol Fuels ^a	5.7	6.5	3.6
Excise Tax Credits for Biodiesel ^a	0.5	0.8	0.2
<i>Subtotal, Renewable Fuels</i>	6.3	7.5	3.9
Efficiency & Conservation			
Energy Efficiency Improvements to Existing Homes	1.7	1.5	1.3
Credit for Production of Energy Efficient Appliances	0.2	0.2	0.1
Energy Efficient Commercial Building Deduction	0.2	0.2	0.2
10-year Depreciation for Smart Electric Distribution Property	(i)	0.1	0.1
<i>Subtotal, Efficiency & Conservation</i>	2.1	2.0	1.7
Alternative Technology Vehicles			
Credits for Alternative Technology Vehicles	0.8	(i)	(i)
Credit for Plug-In Electric Vehicles	n.a.	0.1	0.3
<i>Subtotal, Alternative Technology Vehicles</i>	0.8	0.1	0.3
Other			
Percentage Depletion for Other Fuels	0.2	0.2	0.2
15-year Depreciation for Electric Transmission Property	0.1	0.1	0.2
Exceptions for Publicly Traded Partnerships with Qualified Income from Energy-Related Activities	0.5	0.2	0.2
Special Rule to Implement Electric Transmission Restructuring	(i)	1.8	-0.2
<i>Subtotal, Other</i>	0.8	2.3	0.4
Total	19.1	21.8	16.6

Sources: Joint Committee on Taxation and the Department of the Treasury.

Appendix 3 – CRS Table of Energy Tax Incentives and Production

**Table 3. Comparing Energy Production and Energy Tax Incentives:
Fossil Fuels and Renewables**
(2010)

	Production		Tax Incentives	
	Quadrillion Btu	% of Total	Billions of Dollars	% of Total
Fossil Fuels	58.5	78.0%	\$2.4	12.6%
Renewables ^a	8.1	10.7%	\$13.0	68.1%

	Production		Tax Incentives	
	Quadrillion Btu	% of Total	Billions of Dollars	% of Total
<i>Renewables (excluding hydro-electric)</i>	5.6	7.4%	\$13.0 ^b	68.1% ^b
<i>Renewables (excluding biofuels and related tax incentives)</i>	6.2	8.3%	\$6.7	35.1%
<i>Renewables (excluding hydro-electric and biofuels and related tax incentives)</i>	3.7	4.9%	\$6.7 ^b	35.1% ^b

Source: Calculated using data presented in Table 1 and Table 2 above.

- a. Renewables tax incentives include targeted tax incentives designed to support renewable electricity and renewable fuels.
- b. The value of total tax incentives for renewables excluding hydro-electric power is less than the total value of tax incentives when those available for hydro-power are included. However, the difference is small. JCT estimates that in 2010, the tax expenditures for qualified hydropower under the PTC are less than \$50 million. During 2010, two awards totaling \$88,000 were paid to hydropower facilities under the Section 1603 grant program. Hydropower has also received less in CREB financing than was awarded to solar and wind technologies. During 2010, the tax expenditure for CREBs was an estimated \$0.1 billion across all technologies.