

2. Tax Expenditures and Direct Expenditures

Overview

This chapter focuses on Federal tax expenditures and Federal direct expenditures that subsidize activities of energy producers and consumers. For FY 2007, energy-related tax expenditures are estimated at \$10.4 billion (Table 1). This represents sizable growth in real terms from the estimated \$3.2 billion (2007 dollars) in energy-related tax expenditures conferred in 1999.²⁸ Another means by which the Federal government can intervene in energy markets is through Federal direct expenditures. The direct expenditures covered in this chapter that impact energy markets are the Low Income Home Energy Assistance Program (LIHEAP), the Building Technology and Assistance Program, and the Renewable Energy Production Incentive. Direct expenditures for FY 2007 are estimated at \$2.6 billion versus \$1.7 billion in 1999 (2007 dollars).

Tax Expenditures

Since the beginning of the last century, the United States has used the Internal Revenue Code (the Code, or IRC) as a tool for implementing energy policy.²⁹ Energy tax expenditures are broadly defined as provisions in the Code that provide beneficial tax treatment to taxpayers who produce, consume, or economize on energy in ways that are judged to be in the public interest.³⁰ Tax expenditures are not treated in budgetary terms as spending even though they have a similar impact on the budget. That is, the revenue foregone that is attributable to tax expenditures can be equated to direct appropriations included in the budget to achieve the same result.

The Federal budget lists tax expenditures, pursuant to the Congressional Budget Act of 1974 (Public Law 93-344), which defines them as “revenue losses attributable to provisions of Federal tax laws, which allow a special exclusion, exemption, or deduction from gross income or provide a special credit, preferential rate of tax, or deferral liability.”³¹ The concept of what constitutes a tax expenditure is widely understood. However, the determination of what exactly is a preferential provision is subject to interpretation. In preparing this section on energy-related tax expenditures, the EIA relied on the definitions of tax expenditures incorporated in the Federal budget and the associated tax expenditures estimated by the Treasury Department that are itemized in Section 19 of Budget of the United States Government, Fiscal Year 2008, Analytical Perspectives. To a lesser extent, this table includes data estimates by the congressional Joint Committee on Taxation (JCT).

Tax Expenditures Caveats

Each year the Treasury Department estimates tax expenditures for the upcoming fiscal year budget. The Treasury Department also publishes a forecast of tax expenditures, usually for about 5 years going forward. It is important to recognize that tax expenditure data are estimates

²⁸ Current and prior year's tax expenditures are expressed in 2007 dollars (2007 dollars) for comparative purposes.

²⁹ The option to expense intangible drilling costs (and dry hole costs) of oil and natural gas wells was originally established in 1916, based in Treasury regulation number 45, article 223, which stated such costs be treated as an ordinary operating expense. See, General Accounting Office, *Petroleum and Ethanol Fuels: Tax Incentives and Related GAO Work*, GAO/RCED-00-301R, (Washington, DC, September 2000), p. 8.

³⁰ The House of Representatives defines tax expenditures as: “loosely, a tax exemption or advantage, sometimes called an incentive or loophole; technically, a loss of governmental tax revenue attributable to some provision of Federal tax laws that allows special exclusion, exemption, or deduction from gross income or that provides a special credit, preferential tax rate, or deferral of tax liability. The tax exemption or advantage is usually intended to assist a certain group or to encourage a certain activity, such as the purchase of homes. In their impact on the Federal budget, tax expenditures are, in effect, subsidies provided through the tax system. Instead of making direct payments to beneficiaries, the government permits certain taxpayers to pay lower taxes than they otherwise would have to pay.” See: http://www.rules.house.gov/archives/glossary_fbp.htm. Accessed March 12, 2008.

³¹ Office of Management and Budget, *Budget of the U.S. Government Analytical Perspectives*, Fiscal Year 2008, p.285.

and forecasts. Furthermore, prior year tax expenditure estimates may be substantially revised. However, a particular year's revision will not necessarily affect all past estimates. Additionally, the methodology used to estimate tax expenditures is subject to periodic modification. These changes are not always applied to revisions of all historical tax expenditure data.

This report uses expenditure estimates for FY 2007, projections for the period 2008 through 2012, and historical data dating back to 1967 (see Appendix C). Although all of these estimates were produced by the Treasury Department and the JCT, some secondary sources of data were used to compile some of the historical data. Due to the limitations just cited, the historical tax expenditure data used in this report are less precise than more current data. However, historical data are useful in illustrating the magnitude of various tax programs affecting energy production and consumption over time. The value of particular tax expenditure programs can be compared to other energy-related tax expenditure programs and relative to where these expenditures stood historically.

For the most part tax expenditures are linked to either energy production, consumption, or investment. In many cases, the level of energy production or investment determines the potential value of the tax expenditure for qualified taxpayers. However, the value of the tax expenditure received by eligible taxpayers may not equal the potential value of the expenditure based upon production or investment. One factor mitigating the eligible party receiving the full value of the tax expenditure is the alternative minimum tax, from which most tax expenditures are not exempt. The alternative minimum tax becomes effective when deductions become too large relative to income. Another mitigating factor is that the expenditure, in many cases, may not be received in the year in which the investment or production took place, but may be "carried back or forward" a number of years.³²

Tax expenditures arise from special exclusions, exemptions, deductions, credits, and deferrals in Federal tax laws.

Tax Credit. A tax credit is an amount deducted directly from income tax liability.

Tax Deduction. A tax deduction is deducted from total income to arrive at taxable income.

Tax Deferral. A tax deferral allows for payment of a tax in a later year. The Office of Management and Budget (OMB) reports the cash value of deferrals as expenditures OMB notes that "although such estimates are useful as a measure of cash flow into the government, they do not accurately reflect the true economic cost of the provisions. For example, for a provision where activity levels have changed, so that incoming tax receipts from past deferral are greater than deferred receipts from new activity, the cash-basis tax expenditure estimate can be negative, despite the fact that in present value terms current deferrals have a real cost to Government."³³

Preferential Tax Rate. A preferential tax rate treats certain forms of taxable income more favorably than other income.

Tax Exclusion. A tax exclusion excludes a portion of income from taxation.

³² In many cases, tax deductions may be transferred to a year other than the current year because they exceed certain limits. These deductions may be carried back to earlier years or carried forward to later years until the eligibility period is valid or the deduction is used up.

³³ Office of Management and Budget, *Analytical Perspectives of the United States Budget, Fiscal Year 2008* (Washington, DC, 2007).

Sizable changes in the dollar value of particular expenditures over time can generally be viewed as an indication of the relative importance of these programs (Table 1). The historical data also reveal when particular energy programs were implemented and terminated. Although there are gaps in the data for some years, generalized trends in tax expenditures are still apparent. Readers of this report are cautioned that some of the tax expenditure data presented in this report will be revised in the future and that some of the historical data presented here have not been fully revised. Further, most of the tax expenditure data highlighted in this report reflect estimates for FY 2007, which are based upon incomplete Treasury tax receipts. In all likelihood, these estimates will be revised in subsequent years. This report sums annual tax expenditures across various programs. These summations should be treated with care as the Treasury Department cautions that there are interactions among tax expenditure provisions, which can result in some double counting.

Oil and natural gas royalty payments are an important source of Federal government revenue. To the extent that the Federal government is forgoing revenues by not “optimizing” royalty payments, the Federal government may be providing a subsidy similar to a tax expenditure. About 35 percent of U.S. oil and natural gas production is produced on Federally-owned or Native American lands.³⁴ To the extent that these payments treat resources extracted from Federal lands used in the production of energy differently from resources used for other purposes, a subsidy may be present. Further, to the extent that certain royalty payments from some resources used in the production of energy are treated differently from other resources used in the production of energy might also constitute a subsidy. However, royalty rates are based upon a number of factors. One critical factor involves the costs of extracting minerals from areas that are difficult to access, such as oil and natural gas lying in deepwater offshore sections of the Gulf of Mexico. In recent years, favorable royalty payments provided to offshore Outer Continental Shelf (OCS) oil and natural gas production have been targets of criticism because royalty payments have not kept pace with sharply higher oil and natural gas prices. However, designing “optimal” royalty payments should, in theory, be based upon a number of factors such as maximizing revenue and oil and natural gas production over the years during which production takes place. This makes estimating the value of “favorable” oil and gas leases dependent on forecasting future oil and gas prices and production. Moreover, the existence of “favorable” royalty payments—again, in theory—should be offset by higher bids for leases. Favorable royalty payments, to the extent that they exist, were not considered within the scope of this analysis. A Government Accountability Office study released in May 2007 reported that an increase in royalty rates by the Federal government on oil and natural gas production from 12.5 percent to 16.67 percent on future leases sold in the deepwater regions of the Gulf of Mexico will, according to the Minerals and Management Service, increase overall Federal revenues by \$4.5 billion over the next twenty years, but will also cause reductions in some fees and in oil and gas production. Offsetting revenue losses were reported at \$820 million.³⁵

³⁴ Government Accountability Office, *Royalty Revenues: Total Revenues Have Not Increased at the same Pace as Rising Oil and Natural Gas Prices due to Decreasing Production Sold*, GAO-060786R, (Washington, DC, June, 2006).

³⁵ Government Accountability Office, *Oil and Gas Royalties: A Comparison of the Share of Revenues Received from Oil and Gas Production by the Federal Government and Other Resource Owners*, GAO-07-676R (Washington, DC, May 2007).

Federal Financial Interventions and Subsidies in Energy Markets 2007

Table 1. Estimates of Tax Expenditures by Fiscal Year (million 2007 dollars)

Tax Expenditures	Historical Data				Forecasted Data		
	1999	2005	2006	2007	2008	2009	2012
Capital Gains Treatment of Royalties in Coal	79	95	164	170	174	177	143
Expensing of Exploration and Development Costs	(97)	410	695	860	859	739	340
Exception from Passive Loss Limitation for Working Interests in Oil and Natural Gas Properties	36	42	31	30	31	31	33
Enhanced Oil Recovery	273	316	-	-	-	-	-
Expensing of Tertiary Injectants	-	-	-	-	-	-	-
Alternative Fuel Production Credit	1,242	2,441	3,046	2,370	797	10	-
New Technology Credit	61	253	521	690	981	1,166	1,263
Alcohol Fuel Credit	18	42	51	50	61	72.8	-
Alternative Fuel and Fuel Mixture Credit	-	158	-	-	-	-	-
Excess of Percentage over Cost Depletion	321	621	777	790	807	822	813
Temporary 50-Percent Expensing for Equipment Used in the Refining of Liquid Fuels	-	-	10	30	123	250	(55)
Amortization of All Geological and Geophysical Expenditures Over 2 Years	-	-	10	60	92	73	11
Natural Gas Distribution Pipelines Treated as 15-Year Property	-	-	20	50	92	125	132
Exclusion of Interest on Bonds for Certain Energy Facilities	139	84	41	40	51	52	55
Exclusion for Utility-Sponsored Conservation Measures	103	84	112	110	112	115	121
Credit, Deduction for Clean Fuel Vehicles	103	74	112	260	153	135	(70)
Credit for Holding Clean Renewable Energy Bonds	-	-	20	60	82	104	110
Credit for Business Installation of Qualified Fuel Cells and Stationary Microturbine Power Plants	-	-	82	90	133	52	(11)
Credit for Production from Advanced Nuclear Power Facilities	-	-	-	-	-	-	-
Deferral of Gain from Disposition of Transmission Property to Implement FERC Restructuring Policy	-	516	634	530	235	(104)	(593)
Credit for Investment in Clean Coal Facilities	-	-	-	30	51	83	275
Pass Through Low-Sulfur Diesel Expensing to Cooperative Owners	-	42	-	-	-	-	-
Credit for Energy-Efficiency Improvements to Existing Homes	-	-	235	380	153	-	-
Credit for Energy-Efficient Appliances	-	-	123	80	-	-	-
Credit for Construction of New Energy-Efficient Homes	-	-	10	20	31	21	-
30-Percent Credit for Residential Purchases/Installations of Solar and Fuel Cells	-	-	10	10	10.2	-	-
Deduction for Certain Energy-Efficient Commercial Building Property	-	-	82	190	174	94	(11)
Partial Expensing for Advanced Mine Safety Equipment	-	-	-	10	20	-	-
Expensing of Capital Costs with Respect to Complying with EPA Sulfur Regulations	-	11	10	10	31	52	-
Biodiesel and Small Agri-Biodiesel Producer Tax Credits	-	32	92	180	204	31	11
Exclusion of Special Benefits for Disabled Coal Miners	-	-	51	50	41	42	44
Electric Transmission Property Treated as 15-Year Property	-	-	3	18	-	-	-
5-Year Net Operating Loss Carryover for Electric Transmission Equipment	-	-	74	43	-	-	-
Treatment of Income of Certain Electric Cooperatives	-	-	-	14	-	-	-
84-Month Amortization of Certain Pollution Control Facilities	-	2	10	30	-	-	-
Nuclear Decommissioning	-	-	123	199	-	-	-
Excise Taxes (Alcohol Fuels Exemption/Volumetric Ethanol Excise Tax Credit)	921	1,578	2,627	2,990	3,536	4,454	-
Total (Tax Expenditures)	3,199	6,798	9,775	10,444	9,035	8,596	2,613

NOTE: Total may not equal sum of components due to independent rounding.

Sources: Office of Management and Budget, *Analytical Perspectives, Budget of the United States Government, Fiscal Years 2001 and 2008*, Tables 5-1 and 19-1, respectively. Joint Committee on Taxation, "Description of the Technical Explanation of the Conference Agreement of H.R. 6, Title XIII, The Energy Tax Incentives Act of 2005," JCX-60-50 and JCX-59-05, July 28, 2005.

Historical tax expenditure data used in this report are taken from a number of government sources. For the FY 2007, the Treasury Department is the primary provider of estimates for tax expenditures, supplemented by data provided by the JCT. For earlier years, this report uses U.S. Treasury tax expenditure estimates appearing in the OMB publication *Analytical Perspectives of the U.S. Budget* for tax expenditures starting in 1995. A Congressional Budget Office publication, *Tax Expenditures: Current Issues and Five-Year Budget Projections for Fiscal Years 1982-1986*, was relied upon for data for the years 1967 through 1981, and values appearing in the EIA service report *Federal Energy Subsidies* for the years 1987 through 1992.³⁶

Background and Definitions

Energy-related tax expenditures take many different forms. One example is the immediate expensing of intangible drilling costs (IDCs). IDCs are geological and geophysical expenditures made by oil and natural gas companies incurred in connection with oil and natural gas exploration and development.³⁷ The intention behind this tax expenditure is that by accelerating the expensing of IDC, taxable income is lowered which increases internally generated funds which can be used for investment. This investment, in turn, stimulates additional production. This chapter presents a detailed discussion of some of the more significant energy-related tax expenditures in effect during FY 2007. Tax expenditures of smaller monetary value are discussed briefly. This latter group of tax expenditures is discussed at greater length in the Fact Sheets appearing in Appendix A.

Tax expenditures account for a large and rapidly growing proportion of the U.S. budget. In a 2005 study on tax expenditures, the Government Accountability Office (GAO) reported that the sum of tax expenditures exceeded discretionary spending for most years in the prior decade.³⁸ The GAO also noted that, since 1974, the number of tax expenditures more than doubled and the sum of tax expenditure revenue loss estimates tripled in real terms to nearly \$791 billion (2007 dollars) by 2004. In 2004, tax expenditures equaled about 7.5 percent of gross domestic product.³⁹

Tax Expenditures' Role in the Economy

At \$10.4 billion, energy-related tax expenditures are relatively small compared with other tax expenditures and overall Federal spending in FY 2007. For instance, the exclusion of employer contributions for medical insurance premiums and medical care for income tax purposes totaled \$144 billion in FY 2007. Second in size to the employer medical care deduction, the home mortgage interest rate deduction was valued at \$82 billion in FY 2007. Overall Federal on-budget spending in FY 2007 was expected to total over \$3 trillion, making energy tax expenditures equal to roughly 0.3 percent of total government expenditures. Energy expenditures, i.e., money spent by consumers to purchase energy, totaled \$1.3 trillion in FY 2007, making energy-related tax expenditures equal to roughly 1 percent of total energy expenditures for that year.⁴⁰

³⁶ Energy Information Administration Service Report, *Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets*, SR/EMEU/02-02 (Washington, DC, 1992). The values appearing in this report were obtained from United States budget documents. The original source data were not available for this report.

³⁷ These expenditures include some administrative costs, survey and seismic costs, drilling costs, equipment transportation costs, and road construction costs.

³⁸ Pursuant to the GAO Human Capital Reform Act of 2004 (Public Law 108-271), the General Accounting Office was renamed the Government Accountability Office. Citations to reports issued prior to the name change shall be attributed to the General Accounting Office. The acronym GAO is used interchangeably in this report.

³⁹ Government Accountability Office, Government Performance and Accountability, *Tax Expenditures Represent a Substantial Federal Commitment and Need to be Examined*, GAO-05-690, (Washington, DC, September 2005).

⁴⁰ Energy Information Administration, *Short Term Energy Outlook* (Washington DC, January 8, 2008, release), <http://www.eia.doe.gov/emeu/steo/pub/contents.html>.

Tax Expenditures in Energy

Both the value and the composition of energy-related tax expenditures have changed significantly since EIA's prior analyses of Federal subsidy and support programs specific to energy. Between 1992 and 2007, tax expenditures have grown from \$2.8 billion to \$10.4 billion, while there was relatively little change between the values reported in the 1992 and 1999-2000 reports. In 1992, the two biggest tax expenditures were excess of percentage over cost depletion (\$1.0 billion) and the alternative fuel production credit (\$618 million). In FY 2007, the largest tax expenditure was the Volumetric Ethanol Excise Tax Credit⁴¹ (VEETC), at \$3.0 billion, followed by the alternative fuel production credit (\$2.4 billion), and the expensing of oil and natural gas exploration and development costs (\$0.9 billion). VEETC's predecessor, the excise fuel tax exemption, though technically not a tax expenditure, had a value of \$747 million in 1992, which at the time was second only to the excess of percentage over cost depletion, whose value equaled \$1.0 billion. The excess of percentage over cost depletion⁴² was the fourth largest in FY 2007 at \$0.8 billion. The number of tax expenditures has increased since the first EIA subsidy analysis was performed. There were 10 tax expenditures identified in the 1992 EIA study, 12 in the 1999 and 2000 EIA reports, and 37 in the current study. In the past, some tax expenditures have come and gone. A number of the EPACT2005 tax provisions included sunset dates. Unless they are extended (as many tax expenditures' sunset dates have been in the past), the value of tax expenditures is expected to decline to \$2.6 billion by 2012.

The remainder of this chapter is organized as follows. First, an analysis of energy tax expenditures by fuel type is presented. This analysis includes a description of tax expenditures affecting both electricity and non-electricity, although energy-related sectors. After that, some of the highest-value tax expenditures are discussed, two of which affect the electricity sector (the new technology credit and the alternative fuel production sector). This is followed by a discussion of VEETC, a tax expenditure affecting transportation, which in FY 2007 is the largest energy-related tax expenditure. A discussion of Federal direct expenditures affecting electricity production and consumption follows.

Coal-Related Tax Expenditures

Coal production was estimated to be the largest recipient of electricity-related tax expenditures in FY 2007. Over 90 percent of coal is consumed by the electricity sector. Coal-related tax expenditures have an estimated value of \$2.7 billion in FY 2007. The alternative fuel production tax credit for refined coal was the largest tax expenditure related to coal use. The estimated value of this tax expenditure in FY 2007 is \$2.4 billion (Table 2).

⁴¹ OMB does not define VEETC as a tax expenditure. OMB presents this reduction in tax receipts as a footnote to the Tax Expenditure Table appearing in OMB, *Analytical Perspectives of the United States Budget 2008*. Table 19-1. Table 19-1 reports a \$50 million tax expenditure for fuel alcohol tax credits and \$2.99 billion in foregone excise tax revenue due to VEETC. See EIA's *Monthly Energy Review*, DOE/EIA-0035(200712) (Washington, DC, December 2007), Table 10.3 for fuel ethanol production data.

⁴² Under cost depletion, outlays are deducted over the productive life of the property based on the fraction of the resources extracted. Under percentage depletion, taxpayers can deduct a percentage of gross income from mineral production at rates of 22 percent for uranium; 15 percent for oil, natural gas, and shale oil; and 10 percent for coal. The deduction is limited to 50 percent of net income from the property, except for oil and gas where the deduction can be 100 percent of net property income. Production from geothermal deposits is eligible for percentage depletion at 65 percent of net income. Source: Office of Management and Budget, *Analytical Perspectives of the United States Budget, Fiscal Year 2008* (Washington, DC, 2007).

Table 2. Coal-Related Tax Expenditures (million 2007 dollars)

Tax Expenditure	Type	FY 1999	FY 2007
Exclusion of Special Benefits for Disabled Coal Miners	Exemption	-	50
Partial Expensing for Advanced Mine Safety Equipment	Expense Deduction	-	10
Credit for Investment in Clean Coal Facilities	Credit	-	30
Capital Gains Treatment of Royalties in Coal	Preferential Tax Rate	79	170
84-Month Amortization of Pollution Control Equipment	Expense Deduction	-	30
Subtotal Coal Tax Expenditures		79	290
Alternative Fuel Production Credit (Refined Coal)	Credit	-	2,370
Total Coal and Refined Coal Tax Expenditures		79	2,660

NOTE: Totals may not equal sum of components due to independent rounding.

Sources: Office of Management and Budget, *Analytical Perspectives, 2001 & 2008*, Tables 5-1 & 19-1.

The Alternative Fuel Production Credit was initiated with the passage of the Windfall Profit Tax of 1980 (Public Law 96-223). It was originally codified in the Code as Section 44(d), but it was later recodified as Section 29. The alternative fuel credit is production-based. At \$2.4 billion, it is estimated to be the second largest energy-related tax expenditure in FY 2007. The credit was designed to encourage the production of domestic energy from certain unconventional sources to reduce the Nation's dependence on energy imports. Barring its extension, which has occurred a number of times in the past, the value of this credit is expected to decline to about \$10 million in 2009 and then disappear. In EIA's 1999-2000 subsidy reports, the primary beneficiaries of this tax expenditure were coalbed methane producers. However, coalbed methane's eligibility for the credit expired December 31, 2002. Refined coal is now the largest beneficiary of this tax expenditure. Refined coal was defined in Section 710 of the American Jobs Creation Act of 2004 (AJCA) (Public Law 108-357). Prior to defining refined coal in the AJCA, the Section 29 credit was applied to synthetic fuels, one of which used coal as a fuel stock.⁴³

Other smaller tax credits affecting the coal sector include:

The Credit for Investment in Clean Coal Facilities was added to the Code with EPACT2005, Section 1307. This credit has an estimated value of \$30 million in FY 2007. A 20-percent credit is applied to coal gasification a project using integrated gasification combined-cycle (IGCC) technology and a 15-percent credit is applied to other advanced coal technologies. The credit is

⁴³ As a result of the AJCA, Section 29 was moved into Section 45(k), which defines refined coal as:

a liquid, gaseous, or solid synthetic fuel produced from coal (including lignite) or high carbon fly ash, including such fuel used as a feedstock, (ii) is sold by the taxpayer with the reasonable expectation that it will be used for purpose of producing steam, (iii) is certified by the taxpayer as resulting (when used in the production of steam) in a qualified emission reduction, and, (iv) is produced in such a manner as to result in an increase of at least 50 percent in the market value of the refined coal (excluding any increase caused by materials combined or added during the production process), as compared to the value of the feedstock coal.

Refined coal must meet certain emission reductions. Qualified emission reduction means a reduction of at least 20 percent of the emissions of nitrogen oxide and either sulfur dioxide or mercury released when burning the refined coal (excluding any dilution caused by materials combined or added during the production process), as compared to the emissions released when burning the feedstock coal or comparable coal predominantly available in the marketplace as of January 1, 2003. Prior to the AJCA, under Section 29, coal was deemed eligible for the credit if the refining process produced a "significant chemical change."

capped at \$1.3 billion of which \$800 million is allocated towards electricity-related IGCC projects and \$500 million towards other advanced coal technologies. An additional \$350 million is applied to coal gasification technologies for industrial use.

The Capital Gains Treatment of Royalties on Coal Credit was established with the 1951 Revenue Act (Public Law 82-183, Section 177 (j) and Section 117 (k)). The estimated value of this credit in FY 2007 was \$170 million. Owners of coal mining rights who lease their property usually receive royalties on mined coal. If the owners are individuals, these royalties can be taxed at a lower individual capital gains tax rate rather than at the higher individual top tax rate.

The Exclusion of Special Benefits for Disabled Coal Miners in the Department of Labor, Health and Human Services, and Education and Related Agencies Appropriation Act, 1986, (Public Law 99-178) allows for the payment of medical-related travel expenses. This expenditure involves payments to disabled miners out of the Black Lung Trust Fund. These benefits are excluded from taxable income. This provision is categorized by the Treasury Department as an Income Security tax expenditure. The value of this expenditure is estimated at \$50 million in FY 2007.

The Expansion of Amortization for Certain Atmospheric Pollution Control Facilities in Connection with Plants Placed in Service After 1976 was added with EFACT2005, Section 1309. This provision modifies Section 169 of the Code, which permitted a 60-month amortization of qualifying pollution control facilities used in connection with plants placed in service before January 1, 1976. The modification extends the amortization period to 84 months and eliminates the applicability of the provision to plants placed in service prior to the end of 1975. The revised amortization period is now applicable to qualifying pollution control facilities placed in service after April 11, 2005. The JCT estimated the value of this expenditure to be \$30 million for FY 2007.

The Partial Expensing of Mine Safety Equipment Section 404 of the Tax Relief and Welfare Act of 2006 (Public Law 109-432) allows qualified mine safety equipment to be expensed rather than capitalized. Its value for FY 2007 is estimated at \$10 million.

Electricity Transformation-Related Tax Expenditures

Overall, it is estimated that the electric power industry tax expenditures in FY 2007 have a value of \$735 million (Table 3). For purposes of this report, electricity-related tax expenditures include those applicable to all segments of electricity production and delivery (i.e., generation, transmission, and distribution of electricity), but not of the fuel used to produce electricity. Seven tax expenditures were directed at electricity transformation during FY 2007. One tax expenditure, the exclusion of interest on bonds for certain energy facilities, traces its origins back to 1968. The six remaining tax expenditures were enacted in the AJCA and EFACT2005, which amended the Code to provide utilities with incentives to (1) make infrastructure investments in transmission and pollution control facilities and (2) engage in transactions that will increase the amount of transmission facilities subject to non-discriminatory open access transmission. The Code was also modified to eliminate impediments to the transfer of ownership of nuclear plants arising from the tax treatment of qualified and nonqualified nuclear decommissioning trust funds. Because these particular revisions to the Code were not itemized by OMB, EIA relied on the estimates of the value of these tax expenditures prepared by the JCT.⁴⁴ One tax expenditure, the credit for the production from advanced nuclear power

⁴⁴ Joint Committee on Taxation, "Description of the Technical Explanation of the Conference Agreement of H.R. 6, Title XIII, The Energy Tax Incentives Act of 2005," JCX-60-50 and JCX-59-05, July 28, 2005.

facilities, had no value in 2007, as this credit does not go into effect until qualifying new nuclear power plants produce electricity.

The Deferral of Gain from Disposition of Transmission Property to Implement Federal Energy Regulatory Commission (FERC) Restructuring Policy is the largest tax credit directly affecting the provision of electricity, as opposed to an electricity-related fuel. This tax expenditure was provided for in Section 1305 of EPACT2005. The value of this deferral in FY 2007 is estimated at \$530 million. Tax deferrals are frontloaded benefits, which are offset in later years when the deferral reverses. The Treasury Department projects a \$1.4 billion cumulative deferral between 2006 and 2008. The deferral begins to reverse in 2009, as reflected by projected net revenue loss of \$104 million in 2009.⁴⁵

The Credit for Business Installation of Qualified Fuel Cells and Stationary Microturbine Power Plants (EPACT2005, Section 1336) has an expected value of \$90 million in FY 2007. EPACT2005 provides a 30-percent energy tax credit for the purchase of qualified fuel cells with a maximum of \$500 for each 0.5 kilowatt of capacity. For qualified microturbine property, the nameplate capacity must be less than 2000 kilowatts and the electricity-only efficiency must exceed 26 percent of International Standard Organization Conditions. For qualified fuel cells, in order to qualify for the credit, the plant must have an electricity-only efficiency of 30 percent or more and capacity of at least 0.5 kilowatts of power generation.

The Exclusion of Interest on Bonds for Certain Energy Facilities was established by the Revenue Expenditure and Control Act of 1968 (Public Law 90-364), which exempts from Federal income tax interest on private activity bonds issued by State or local governments to finance certain energy facilities. Private activity bonds may be used to finance a variety of infrastructure projects such as airports, port facilities, and public housing, as well as facilities for the local provision of electricity and natural gas. The IRS determines the maximum amount that each State may issue annually through a solicitation process. The States determine which eligible projects may issue bonds from their respective allocations. The Treasury has estimated that the value of this expenditure is \$40 million in FY 2007.

The Credit for the Production of Advanced Nuclear Generation was established under EPACT2005 (Section 1306) and has no value in FY 2007 due to the fact that no nuclear power plants are currently under construction. Over the Treasury Department's 2007 through 2012 tax expenditure forecast horizon, the value of this credit remains at zero as no eligible nuclear power plants are expected to come on line during that time frame. The credit is worth 1.8 cents per kilowatthour of electricity produced during the first 8 years of operation from plants having a NRC approved design. The legislation limits the capacity for this production tax credit (PTC) to 6,000 megawatts. The Secretary of Energy is responsible for the allocation of this credit by capacity. The provision has an additional limitation of \$125 million per thousand megawatts of capacity per taxable year.

The Transmission Property Treated as 15-Year Property set forth in Section 1308 of EPACT2005 modifies Section 168 of the Code by shortening the recovery period from 20 to 15 years for eligible assets used in the transmission of electricity following sale of the property or related land improvements. Specifically, this applies to Section 1245 property, i.e., personal property and real property, subject to depreciation or amortization, used in the transmission of electricity that is energized at 69 kilovolts or more. The provision applies to transmission

⁴⁵ A negative value for tax expenditures indicates that the Treasury actually gains more revenue than it would have in the absence of the tax expenditure.

facilities placed in service by the taxpayer after April 11, 2005, but excludes any transmission facilities for which the taxpayer or related party had entered into a binding construction contract for or initiated self-construction on or before April 11, 2005. For FY 2007, the estimated value of accelerating the recovery period by 5 years is \$18 million.

Table 3. Electricity Transformation-Related Tax Expenditures (million 2007 dollars)

Tax Expenditure	Type	FY 1999	FY 2007
Deferral of Gain from Dispositions of Transmission Property to Implement FERC Restructuring Policy	Deferral	-	530
Credit for Business Installation of Qualified Fuel Cells and Stationary Microturbine Power Plants	Credit	-	90
Credit for Production from Advanced Nuclear Power Facilities	Credit	-	-
Exclusion of Interest on Bonds for Certain Energy Facilities	Exemption	139	40
Transmission Property Treated as 15-Year Property	Expense Deduction	-	18
5-Year Net Operating Loss Carryover for Transmission Investment	Enhanced Tax Attribute	-	43
Treatment of Certain Electric Cooperative Income	Exemption	-	14
Total		139	735

NOTE: Totals may not equal sum of components due to independent rounding.

Sources: Office of Management and Budget, *Analytical Perspectives of the United States Budget Fiscal Year 2001 and 2008*, Tables 5-1 and 19-1, respectively. Joint Committee on Taxation, "Description of the Technical Explanation of the Conference Agreement of H.R. 6, Title XIII, The Energy Tax Incentives Act of 2005," JCX-60-50 and JCX-59-05, July 28, 2005.

The Five-Year Net Operating Loss Carryover for Electric Transmission Equipment (EPACT2005, Section 1311)

allows taxpayers the option to carry back a net operating loss (NOL) for each of the 5 years prior to the tax year in which the loss was incurred.⁴⁶ The 5-year carryover applies to losses included in 2003, 2004, and 2005. Regardless of the taxable year in which an eligible NOL arose, refund claims resulting from the extended carryover period can be made during any taxable year ending after December 31, 2005, and before January 1, 2009. The refund claimed during any one taxable year may not exceed the amount of the electric utility company's investment in electric transmission property and pollution control facilities. The amount of an NOL that may be carried back may not exceed 20 percent of the value of investment made in qualified transmission and pollution control facilities in the preceding year. The estimated value of this tax benefit for FY 2007 is \$43 million.

The Treatment of Income of Certain Electric Cooperatives (EPACT2005, Section 1304)

was enacted in the AJCA, Section 319. It contained a sunset provision, which would have applied in all years after December 31, 2006. Section 1304 of EPACT2005 eliminated the sunset provision. The provision applies to tax-exempt electric cooperatives that are organized under Section 501(c) (12) of the Code. Among the requirements to qualify for tax-exempt status is the 85-percent test. The 85-percent test provides that in order to qualify for tax-exempt status

⁴⁶ Carryback refers to the practice of using an NOL from taxable income for a prior tax period. Carryforward refers to using an NOL in a future taxable period. Normally, a taxpayer is permitted a 2-year carryback and a 20-year carryforward for NOLs to reduce taxable income during the carryback and carryforward period. NOLs must be applied on a first-in-first-out basis. NOLs expire if they are not used within the applicable periods.

a cooperative may receive no more than 15 percent of its income from business conducted with non-members (i.e., at least 85 percent of income must come from conducting business with members). It is a "bright-line" test. FERC Policy requires Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs) to be independent of market participants. Consistent with the requirement, the cost of, and the charges for, use of facilities placed under the operational control of an RTO/ISO are administered under the RTO/ISO's FERC-approved tariff. Therefore, if an exempt cooperative were to join an RTO/ISO, transmission-related income received from members would be reclassified as non-member income received from the RTO/ISO for purposes of computing the 85-percent test, potentially resulting in the loss of tax-exempt status. Similarly, any income from transmission and ancillary services a cooperative might provide voluntarily to a non-member would be classified as non-member income. The amendment to Section 501(c)(12) also excludes non-member income a cooperative may receive from providing transmission service under a nondiscriminatory open access tariff for purposes of calculating the 85-percent test. The provision also allows cooperatives to exclude nuclear decommissioning trust income, which is classified as non-member income for purposes of computing the 85-percent test. The JCT estimated the value of this tax expenditure at \$14 million for FY 2007.

The Modification to Special Rules for Nuclear Decommissioning Costs (EPACT2005 Section 1310). Section 1310 changes the IRS rules for qualified nuclear decommissioning trust funds by repealing the cost of service requirement for contributions to a qualified decommissioning trust fund created under IRC Section 468A. This change permits full present value funding of a qualified nuclear decommissioning fund and the transfer of pre-1984 decommissioning funds held in nonqualified trusts. The provision also requires that nuclear plant owners obtain a new schedule of ruling amounts from the IRS upon renewal of a plant's operating license by the NRC. In FY 2007, the estimated value of this tax expenditure is \$199 million. Modification of section 468A of the Code was done to eliminate an impediment to nuclear plant sales arising from the structural change in the electric utility industry. While the discussion of this tax expenditure is included with other electricity-related tax expenditures, it is not reported in Table 3. It is included as a subsidy to nuclear fuel in Table 1 and in the estimate of subsidies by fuel type in Chapter 5.

Renewable-Related Tax Expenditures

Renewable-related tax expenditures in FY 2007 are estimated at \$4.0 billion (Table 4). There were two tax expenditures directed at renewable-related electricity production and three non-electricity related tax expenditures directed at transportation.

Table 4. Renewable-Related Tax Expenditures (million 2007 dollars)

Tax Expenditure	Type	FY 1999	FY 2007
Excise Taxes/VEETC (ethanol fuel)	Credit	921	2,990
New Technology Credit	Credit	61	690
Biodiesel and Small Agri-Biodiesel Producer Tax Credit	Credit	-	180
Credit for Holding Clean Renewable Energy Bonds	Credit	-	60
Alcohol Fuel Credit	Credit	18	50
Total		1,000	3,970

NOTE: Totals may not equal sum of components due to independent rounding.

Sources: Office of Management and Budget, *Analytical Perspectives of the United States Budget, Fiscal Years 2001 and 2008*, Tables 5-1 and 19-1, respectively.

The Volumetric Ethanol Excise Tax Credit (VEETC) was implemented with the American Jobs Creation Act of 2004 (Public Law 108-357, Title 3, Sections 301-302). It is estimated to be the largest energy-related tax credit in FY 2007. Its predecessor, the alcohol fuel excise tax exemption, was estimated to be the largest tax-related benefit in the 1999-2000 EIA subsidy reports. VEETC is directed at the production of transportation-related fuels. The alcohol fuels excise tax exemption first appeared in Section 221 of the Energy Tax Act of 1978 (Public Law 95-618). This exemption was replaced in 2004 with VEETC by Section 301 of the AJCA. The AJCA extended the benefit through 2010. VEETC provides ethanol blenders/retailers with 51 cents per pure gallon of ethanol or \$.0051 per percentage point of ethanol blended in motor gasoline. The value of VEETC is estimated at \$3.0 billion in FY 2007. By 2010, the value of this credit is expected to exceed \$5 billion.

The New Technology Credit is the next largest energy-related tax credit. The new technology credit is also known as the production tax credit (PTC).⁴⁷ The new technology credit is estimated to be \$690 million in FY 2007. By 2008, the new technology credit is expected to be both the second largest energy-related tax expenditure and the second largest renewable energy tax expenditure. Wind power is estimated to be the primary beneficiary of the credit in FY 2007. Other eligible energy sources include: closed and open-loop biomass facilities, geothermal, solar, municipal solid waste, landfill gas resources, certain hydroelectric facilities, and coal produced on Indian (Native American) lands. Initially, tax benefits for renewable generation were established in the Energy Tax Act of 1978 (Public Law 95-618) via a 10-percent investment tax credit for solar, wind, geothermal, and ocean thermal technologies.

The Biodiesel and Small Agri-Biodiesel Producer Tax Credit has an expected value of \$180 million in FY 2007. Section 313 of the AJCA created a \$1-per-gallon credit for the sale of agri-biodiesel fuel. The credit applies to "virgin" agricultural feedstock such as soybeans or cottonseed. A 50-cent credit is provided to biodiesel produced from recycled grease. The credit was due to expire at the end of 2006. Section 1344 of EPACT2005 extended the credit though the end of 2008. This is primarily a transportation-related tax expenditure.

The Alcohol Fuel Credit is directed at the transportation sector. The alcohol fuel credit originated in the Crude Oil and Windfall Profit Tax of 1980 (Public Law 96-223). The credit has an estimated value of \$50 million in FY 2007.

The Credit for Holding Clean Renewable Energy Bonds was established in Section 1303 of EPACT2005. It provides for the issuance of Clean Renewable Energy Bonds (CREBs) through December 31, 2007. Taxpayers holding CREBs are entitled to a tax credit in lieu of interest payments from the bond issuer. Prior to passage of EPACT2005, only investor-owned utilities (IOUs) qualified to receive tax incentives for producing electricity from renewable energy resources. EPACT2005 placed an \$800 million cap on the issuance of CREBs. CREBS allows non-IOU electricity providers to issue interest free bonds to finance qualified energy projects. The value of this tax credit is estimated at \$60 million in FY 2007. Section 202 of the Tax Relief and Health Care Act of 2006 (Public Law 109-432) increased the allocation of CREBs to \$1.2 billion and extended the deadline to December 31, 2008.⁴⁸

⁴⁷ The new technology credit is a term defined by the Treasury Department. It appears in Office of Management and Budget, *Analytical Perspectives of the United States Budget Fiscal, Year 2008*, Table 19-1.

⁴⁸ The U.S. House of Representatives Ways and Means Committee: <http://waysandmeans.house.gov/media/pdf/taxdocs/hr6408taxdetailedsummary.pdf>, accessed October 16, 2007.

Natural Gas and Petroleum-Related Tax Expenditures

Of the 10 natural gas and petroleum-related tax expenditures identified, five are allocated to electricity production, one was not in effect in FY 2007, and three are primarily transportation-related in FY 2007. The alternative fuel production credit applied to natural gas in FY1999 (coalbed methane), but is now directed to refined coal, which for FY 20007 appears in Table 2. The total value of these tax expenditures is estimated at \$1.8 billion in FY 2007 (Table 5).

Table 5. Natural Gas and Petroleum-Related Tax Expenditures (million 2007 dollars)

Tax Expenditure	Type	FY 1999	FY 2007
Expensing of Exploration and Development Costs	Deferral	(97)	860
Excess of Percentage over Cost Depletion	Deferral	321	790
Amortization All Geological and Geophysical Expenditures over 2 Years	Deferral	-	60
Natural Gas Distribution Pipelines Treated as 15-Year Property	Deferral	-	50
Exception from Passive Loss Limitation for Working Interests in Oil and Natural Gas Properties	Deferral	36	30
Temporary 50-Percent Expensing for Equipment Used in the Refining of Liquid Fuels	Deferral	-	30
Expensing of Capital Costs with Respect to Complying with EPA Sulfur Regulations	Deferral	-	10
Enhanced Oil Recovery	Credit	273	-
Alternative Fuel Production Credit	Credit	1,242	-
Credit and Deduction for Clean Fuel Vehicles	Credit	103	260
Total		1,878	2,090

NOTE: Totals may not equal sum of components due to independent rounding.

Sources: Office of Management and Budget, *Analytical Perspective of the United States Budget, Fiscal Years 2001 and 2008*, Table 5 and 19-1.

The Expensing of Exploration and Development Costs Deferral originated in 1916. Federal tax law allows energy producers, principally oil and natural gas producers, to expense exploration and development (E&D) expenditures rather than capitalize and depreciate them over time. The most important of these expenditures consist of intangible drilling costs associated with oil and natural gas investments. In FY 2007, this tax expenditure is estimated at \$860 million.

The Excess of Percentage over Cost Depletion Deferral dates back to World War I. Depletion on a discovery basis became an accepted practice between 1918 and 1926. Percentage depletion for oil and natural gas properties became law with the passage of the 1926 Revenue Act. Under cost depletion, the annual deduction is equal to the non-recovered cost of acquisition and development of the resource times the proportion of the resource removed during that year. Under percentage depletion, taxpayers deduct a percentage of gross income from resource production. In FY 2007, the value of this tax expenditure is estimated at \$790 million.

The Tax Credit and Deduction for Clean-Fuel, Alternative Fuel, and Electric Vehicles was initiated with Section 1913 of the Energy Policy Act of 1992 (EPACT1992, Public Law 108-486). EPACT 1992 provided an electric vehicle (EV) tax credit for up to 10 percent of the vehicle cost

(capped at \$4,000) for purchases of qualified EVs and hybrid-electric vehicles (HEVs). Section 1913 also provided a tax deduction of \$2,000 for alternative fueled vehicles (AFVs) up to \$2,000 for light-duty vehicles (LDVs), and \$5,000 to \$50,000 for medium-duty vehicles (MDVs) and heavy-duty vehicles (HDVs). Section 1341 of EPACT2005 provides tax credits for fuel cell vehicles of \$8,000 to \$40,000, and advanced lean-burn technology vehicles (limited to LDVs) and hybrid motor vehicles of up to \$3,400. The value of the tax credit is estimated at \$260 million in FY 2007.

The Amortization of all Geological and Geophysical Expenditures Over 2 Years provides that geological and geophysical (G&G) expenditures for domestic exploration of oil and natural gas be amortized over 2 years. This tax expenditure was enacted in EPACT2005, Section 1329. This tax expenditure is estimated to be \$60 million in FY 2007. Section 503 of the Tax Increase Prevention and Reconciliation Act of 2005 (Public Law 109-222) scaled back this benefit by lengthening the amortization period for integrated petroleum companies to 5 years.

The Natural Gas Distribution Pipelines Treated as 15-Year Property Deferral was established by EPACT2005 (Section 1308) and is estimated to have a value of \$50 million in FY 2007. Section 1308 accelerates the recovery period for natural gas distribution lines from 20 years to 15 years.

The Exception from Passive Loss Limitation for Working Interest in Oil and Natural Gas Properties Deferral was established with the Tax Reform Act of 1986 (Public Law 99-519). The value of this tax credit in FY 2007 is estimated at \$30 million. The exception allows owners of working interests to offset their losses from passive activities against active income. Under normal rules, passive losses that remain after being netted against passive income can only be carried forward to apply against passive income in future years. The exception from passive loss limitation provisions on oil and natural gas properties applies principally to partnerships and individuals rather than corporations.

The Temporary 50-Percent Expensing of Equipment Used in the Refining of Liquid Fuels Deferral was established by Section 1323 of EPACT2005. It is estimated to be \$30 million in FY 2007. It is a transportation fuel subsidy.

The Expensing of Capital Costs with Respect to Complying with Environmental Protection Agency Sulfur Regulations Deferral was provided for in Section 1324 of EPACT2005. It allows small refiners to deduct 75 percent of qualified capital costs related to complying with EPA sulfur regulations. The estimated value of this tax expenditure is \$10 million in FY 2007. Section 1324 is a transportation fuel subsidy.

The Enhanced Oil Recovery Credit enables taxpayers to claim a general business credit for enhanced oil recovery (EOR) investment. The credit was provided by Section 11511 of the Omnibus Budget Reconciliation Act of 1990 (Public Law 101-508). The EOR credit applies to 15 percent of the cost of one or more tertiary recovery methods. EOR involves the extraction of the oil from a petroleum reservoir greater than that which can be economically recovered by conventional primary and secondary methods. The credit also applies to the construction of a natural gas treatment plant in Alaska to process Alaskan natural gas for pipeline transportation. The credit phases out when the inflation-adjusted price of oil exceeds \$28 per barrel (in 1991 dollars) or \$39 per barrel (in 2007 dollars) in the preceding year. Due to the average price of oil in 2007 being above the cap, the value of this credit was zero in FY 2007.

The Alternative Fuel Production Credit was established with the Windfall Profits Tax of 1980 (Public Law 96-223). The credit did not impact natural gas or petroleum-related expenditures in 2007, as the credit went mostly to producers of coalbed methane and natural gas from unconventional sources, whose eligibility expired at the end of 2002. The credit did, however, have an effect on refined coal production in 2007 (see Table 2).

The Credit for the Deduction of Clean Fuel Vehicles was established with the Clean Air Act Amendments of 1990 (CAAA90) (Public Law 101-549) and the Energy Policy Act of 1992 (EPACT1992) (Public Law 102-486), which mandated that vehicle fleets owned by fuel providers and State governments, as well as certain vehicle fleets operating in air quality nonattainment areas, gradually acquire and use low-emission vehicles in increasing percentages through the year 2010. The value of the credit was ascribed by EIA to transportation in 2007.

Energy Efficiency and Conservation-Related Tax Expenditures

EPACT2005 contained a number of provisions that are designed to promote energy conservation. One conservation-related tax expenditure dates back to EPACT1992. The provisions are primarily directed at individuals (residential) and commercial taxpayers in the form of tax expense deductions, tax credits or exclusion of certain receipts from gross income. Conservation-related tax expenditures are estimated at \$790 million in FY 2007 (Table 6).

Table 6. Conservation, Efficiency, and End-Use Tax Expenditures (million 2007 dollars)

Tax Expenditure	Type	FY 1999	FY 2007
Credit for Energy-Efficiency Improvements of Existing Homes	Credit	-	380
Allowance of Deduction for Certain Energy-Efficient Commercial Building Property	Deduction	-	190
Exclusion for Utility-Sponsored Conservation Measures	Exclusion	103	110
Credit for Energy-Efficient Appliances	Credit	-	80
Credit for Construction of New Energy-Efficient Homes	Credit	-	20
Pass Through Low-Sulfur Diesel to Cooperative Owners	Credit	-	-
30-Percent Credit for Residential Purchases/Installations of Solar and Fuel Cells	Credit	-	10
Total		103	790

NOTE: Totals may not equal sum of components due to independent rounding.

Sources: Office of Management and Budget, *Analytical Perspectives of the United States Budget Fiscal Years 2001 and 2008*, Tables 5-1 and 19-1, respectively; and, Joint Committee on Taxation, "Description of the Technical Explanation of the Conference Agreement of H.R.6, Title XIII, The Energy Tax Incentives Act of 2005," JCX-60-05 and JCX 59-05, July 22, 2005.

The Credit for Energy-Efficiency of Existing Homes (EPACT2005, Section 1333) has an estimated value of \$380 million in FY 2007. This credit applies to windows, furnaces, boilers, fans, and building envelope components, such as exterior doors and any metal roof that has appropriated pigmented coatings. The credit is available to houses constructed before December 31, 2007.

The Credit for Efficient Appliances (EPACT2005, Section 1334) has an estimated value of \$80 million in FY 2007. Appliance manufacturers receive a tax credit for manufacturing energy-efficient dishwashers, clothes washers, and refrigerators. The credits apply to appliances manufactured between December 31, 2005, and January 1, 2008. The tax credit is limited to 2

percent of the gross revenue for the 3 taxable years prior to the taxable year in which the credit occurs.

The Allowance of Deduction for Certain Energy-Efficient Commercial Building Property was established with EPACT2005 (Section 1331). Taxpayers are permitted to take a deduction of \$1.80 per square foot on new construction built after December 31, 2005, and before December 31, 2007, if annual energy and power costs of interior lighting systems, heating, cooling, ventilation, and hot water systems are 50 percent or more below the standards set by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE). The value of this credit is estimated at \$190 million for FY 2007. Section 201 of The Tax Relief and Health Care Act of 2006 extended the credit to December 31, 2008.

The Credit for Construction of New Energy-Efficient Homes was established by Section 1332 of EPACT2005. It provides home builders a tax credit of \$2,000 for the construction of a new energy-efficient home. To qualify, the home must achieve energy savings of 50 percent over a comparable unit constructed in conformance with the International Energy Conservation code. The value of this credit is estimated at \$20 million for FY 2007. Initially, the credit was available to houses constructed before December 31, 2007. The eligibility window was extended to December 31, 2008, in the Tax Relief and Health Care Act of 2006.

The Exclusion for Utility-Sponsored Conservation Measures was established by Section 136 of EPACT1992. Section 136 amended the Code to provide tax benefits to individual consumers for participating in utility-sponsored energy conservation programs. Payments individual consumers receive from utilities for investing in energy conservation measures may be excluded from gross income for purposes of calculating taxable income. For example, utilities engaged in demand-side management activities often pay rebates to consumers who purchase more efficient heating or cooling equipment in order to reduce the consumption of natural gas and electricity. The value of this credit is estimated at \$110 million for FY 2007.

The 30-Percent Credit for Residential Purchases/Installations of Solar and Fuel Cells has an estimated value of \$10 million in FY 2007. Section 1335 of EPACT2005 established a 30-percent personal tax credit, not to exceed \$2,000, for the purchase of solar electric and solar water heating property. A 30-percent tax credit up to \$500 per 0.5 kilowatt (kW) of capacity is also available for fuel cells. The fuel cell provision of EPACT2005 was due to expire at the end of 2007. It was extended through the end of calendar year 2008 by Section 206 of the Tax Relief and Health Care Act of 2006 (Public Law 109-432).

Alcohol and Biofuels Tax Provisions

At \$3.2 billion in 2007, Federal government support of alcohol fuels is estimated to be the largest energy-related tax expenditure for 2007. In 2006, ethanol accounted for 6 percent of U.S. energy consumption. Currently, the United States is the world's largest producer of ethanol in the world, having surpassed Brazil in 2005. (Unlike corn-based U.S. ethanol production, sugarcane is the primary feedstock for Brazilian ethanol production.) Support for alcohol fuels originated in the Energy Tax Act of 1978. Subsequently, at least seventeen pieces of legislation have been directed at this fuel (Table 7). Currently, there are three ethanol-related tax expenditures.⁴⁹

⁴⁹ The Federal government also promotes ethanol production through mandatory blending of ethanol with gasoline. EPACT2005 included a Renewable Fuels Standard that required that 4 billion gallons of renewable fuel be blended with gasoline in 2006, increasing to 7.5 billion gallons in 2012. The Energy Independence and Security Act of 2007 increased the volumes of renewable fuels to be blended with gasoline to 9 billion gallons in 2008, increasing to 36 billion gallons in 2022. Ethanol production is also supported by a 54-cent-per-gallon tariff on imported ethanol, exclusive of ethanol produced by countries participating in the Caribbean Basin Initiative. The tariff is slated to be lifted on December 31, 2008.

The Volumetric Ethanol Excise Tax Credit (VEETC) was established by the Energy Tax Act of 1978, which allowed for a 4-cent-per-gallon exemption from excise taxes for motor fuels that contained a minimum of 10-percent biomass-derived alcohol. Subsequent legislation both raised and lowered this exemption. In 2004, this exemption was replaced by AJCA Section 301. The AJCA replaced the excise tax exemption with VEETC and extended the benefit through 2010. The VEETC is available to ethanol blenders and is equal to an amount of 51 cents per gallon of ethanol blended with gasoline based upon the volume of ethanol, not on the blend rate. The value of this expenditure in FY 2007 is estimated at \$3 billion.

The Biodiesel and Small Agri-Biodiesel Producer Tax Credit was included in the AJCA. It provides a \$1-per-gallon credit for the sale of agri-biodiesel fuel. Section 313 of the Act applies the credit to "virgin" agricultural feedstock such as soybeans or cottonseed. A 50-cent credit was provided to biodiesel produced from recycled grease. Initially, the credit was due to expire at the end of 2006. EPACT2005 extended the credit through 2008. The value of this tax expenditure is estimated at \$180 million for FY 2007.

The Alcohol Fuel Credit is the third tax expenditure for ethanol production. This tax expenditure originated in the Crude Oil Windfall Profit Tax Act of 1980 (Public Law 96-223), which introduced an alcohol fuel blenders' tax credit. This credit was made available to blenders and to users or retail sellers of straight alcohol fuels. The credit was initially 40 cents per gallon for alcohol that was at least 190 proof and 45 cents per gallon for alcohol that was between 150 and 190-proof. The credit was available through December 31, 1992. The Deficit Reduction Act of 1984 (Public Law 98-369) increased the credit from 40 cents to 60 cents per gallon of blend for 190-proof alcohol. The Transportation Efficiency Act of the 21st Century of 1998 (Public Law 105-178) extended the credit through 2007 and reduced its value to 51 cents per gallon. This tax credit was not used to any significant degree until 2007. In FY 2007, it amounts to about \$50 million. Blenders generally use the excise tax exemption rather than the tax credit, because the excise tax exemption provides them with an immediate cash flow. When used, this credit is offset by the VTEEC described above.

Table 7. Laws Promoting Ethanol as a Transportation Fuel

Public Law	Name	Provisions
95-618	Energy Tax Act of 1978	Exempted 10-percent ethanol/gasoline blends from the 4-cents-per-gallon Federal gasoline excise tax. Provided 10-percent of the energy investment tax credit for biomass-ethanol conversion equipment.
96-126	Interior & Related Agencies Appropriation Act of 1980	Provided grants for the economic feasibility of commercial-scale alcohol fuel production and cooperative agreements.
96-223	Crude Oil Windfall Tax Act of 1980	Extended ethanol excise tax exemption through 1992. Established 40-cents-per-gallon tax credit for ethanol fuel use.
96-294	Energy Security Act of 1980	Authorized loan guarantees for ethanol production facilities.
99-499	Omnibus Reconciliation Tax Act of 1980	Placed a 54-cent-per-gallon tariff on imported ethanol.
96-304	Supplemental Appropriation & Rescission Act of 1980	Provided additional grants for feasibility studies and cooperative agreements.
97-424	Surface Transportation Assistance Act of 1982	Raised excise tax exemption for 10-percent ethanol blends to 5-cents-per-gallon.
98-369	The Deficit Reduction Act of 1984	Raised the excise tax exemption for 10-percent ethanol/gasoline blends to 6-cents-per-gallon and the ethanol tax credit to 60-cents-per-gallon.
100-494	Alternative Motor Fuels Act of 1988	Enacted Corporate Average Fuel Economy credits for alternative fuel vehicles.
100-647	Technical and Miscellaneous Revenue Act of 1988	Liberalized the excise tax rule.
101-508	Omnibus Budget Reconciliation Act of 1990	Reduced ethanol excise exemption to 5.4 cents per gallon; reduced ethanol tax credit to 54 cents per gallon. Extended ethanol fuel tax incentives thru 2000. Established small ethanol producers' tax credit of 10 cents per gallon.
101-549	Clean Air Act Amendments of 1990	Mandated winter use of oxygenated fuels in 39 nonattainment areas carbon monoxide (where EPA emissions standards for carbon dioxide had not been met); required year-round use of oxygenates in 9 severe ozone nonattainment areas in 1995.
102-486	Energy Policy Act of 1992	Modified excise tax exemption to accommodate blends of less than 10-percent ethanol resulting from more sophisticated blending strategies for pollution control. Tax exemption was set at 4.2-cents-per-gallon for mixtures containing 7.7-percent ethanol and 3.1-cents-per-gallon for mixtures containing 5.5 percent ethanol.
105-178	Transportation Equity Act for the 21st Century of 1998	Extended ethanol tax incentives thru 2007. Reduced value of the exemption to 5.1-cents-per-gallon and the tax credit to 51 cents per gallon.
108-357	The American Jobs Creation Act of 2004	Extended ethanol subsidies through 2010 and introduced VEETC.
109-58	Energy Policy Act of 2005	See Appendix C.
110-140	Energy Independence and Security Act of 2007	Expands existing biofuels programs including increasing the volume of alternative fuels blended with gasoline. Requires 36 billion gallons be blended by 2022.

Source: Library of Congress, <http://thomas.loc.gov/>

Section 29: The Alternative Fuel Production Credit

The Alternative Fuel Production Credit (IRC Section 29) was established by the Windfall Profit Tax of 1980 (Public Law 96-223) and became operational in the same year. The credit applied to qualified fuels from wells drilled or facilities placed in service between January 1, 1980, and December 31, 1992. Production from qualifying wells could receive the credit for volumes produced through December 31, 2002. Thus, producers operating qualifying wells or facilities were eligible for credits over a period of not less than 10 years or more than 22 years. The initial qualified fuels were:

- oil produced from shale and tar sands;
- natural gas from geopressurized brine, Devonian shale, coal seams, tight formations, and biomass;
- liquid, gaseous, or solid synthetic fuels produced from coal;
- fuel from qualified processed formations or biomass; and
- steam from agricultural products.

The principal changes that have occurred since 1980 include extending the qualifying in-service date for wells and other alternative fuel production facilities and the types of fuel that are eligible for the credit. The initial January 1, 1980, and December 31, 1992, qualification period has been extended several times by subsequent legislation. In 1989, legislation allowed a 1-year extension of the time limits. The Omnibus Budget Reconciliation Act of 1990 (Public Law 101-508) provided an additional 2-year extension. The 1990 Act also eased the qualifying requirements for natural gas produced from tight sands after 1990. The qualification has at times been sharply constrained by Executive Branch rulings and judicial decisions. However, EPACT1992 extended the placed-in-service deadline for synfuel facilities. For synfuel facilities placed in service after December 31, 1992, and before July 1, 1998, the credit can continue to be claimed for qualifying synfuel sold through December 31, 2007. Due to favorable private letter rulings (PLR) issued by the IRS in the late 1990s, an increasing number of coal synfuel facilities claiming the credit came into existence. By the beginning of 2007, 59 qualifying coal synfuel plants were producing about 140 million tons of coal synfuel per year. All of these plants meet the placed-in-service window of December 31, 1992, to July 1, 1998 and, therefore, are eligible for the credit through 2007. Because the credit expires for all of these facilities at the end of 2007, it is anticipated that most, if not all, of the 59 plants operating in 2007 will have shut down at the end of 2007.

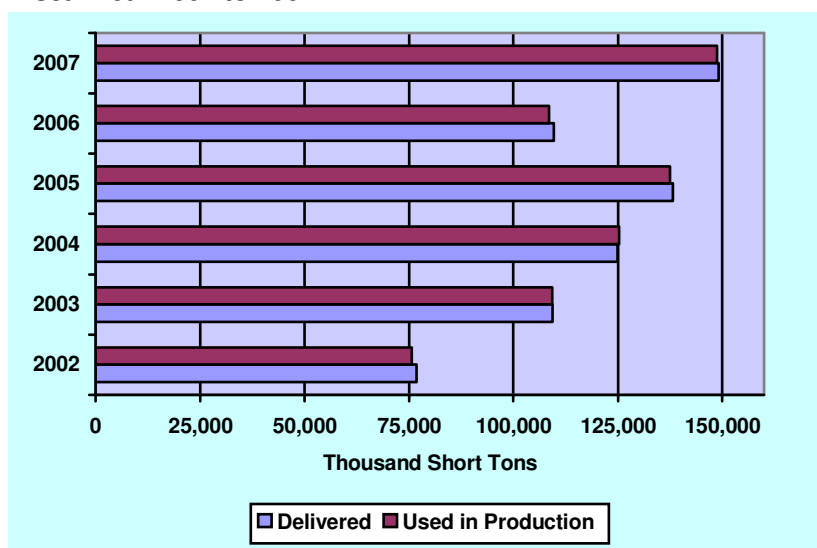
The tax credit for nonconventional fuels is \$3.00 (1979 dollars) per barrel of oil equivalent produced.⁵⁰ The credit is fully effective when the price of crude oil is less than \$55.06 (2006

⁵⁰ All prices as well as the credit are specified in 1979 dollars, but for actual use they are indexed for inflation relative to that base. Conversion factors are used to convert the various fuels into their crude oil equivalent for purposes of calculating the credit. The formula for calculating the credit for 2006 is as follows: $(\$3.00 * 2.3429) * [(\$59.68 - (\$23.50 * 2.2349)) / (\$6.0 * 2.2349)] = \$2.31$. Where:

- the benchmark oil price is \$59.68, the first purchase price of crude in 2006;
- the Section 29 credit is \$3 per barrel oil equivalent (1979 dollars);
- the inflation adjustment factor for 2006 is 2.3429;
- the upper factor cap is \$6, which is adjusted for inflation, and
- the inflation factor for 2006 is 2.3429.
- the \$2.31 is subtracted from the unadjusted tax credit of \$7.03 per barrel of oil equivalent to produce the adjusted tax credit for 2006 is \$4.72.

dollars) per barrel and phases out gradually as the price rises to \$69.12 in 2006 dollars⁵¹. The credit is reduced if the taxpayer receives certain other energy subsidies such as government grants and tax-exempt financing. Per IRS instructions, the credit is calculated in current dollars using the Commerce Department gross national product (GNP) implicit price deflator for the calendar year. In 2006, the maximum credit was \$3 times 2.3429 or \$7.03 per barrel of oil equivalent. For typical bituminous coal with 24 million Btu, the maximum credit for a ton of coal synfuel was the quotient of 24 million Btu and 5.8 million Btu times \$7.03 or \$29.08. The IRS defines a barrel of oil equivalent to mean an energy content of 5.8 million British thermal unit (Btu). The credit varies as actual coal Btu content varies relative to the 5.8 million Btu value. The credit in 2006 is reduced when the price of oil (average wellhead price for all domestic crude oil) exceeds \$55.06 per barrel.

Figure 1. Coal Delivered and Used in Refined Coal Production, Fiscal Year 2002 to 2007



For 2006, the Department of Energy (DOE) published an average wellhead price for all domestic crude oil of \$59.68 per barrel, which reduced the 2006 credit to \$19.53 per ton (assuming 24 million Btu per ton). In the middle of 2006, some coal synfuel plant operators incorrectly anticipated that rising oil prices would wipe out the entire credit, and they reacted by shutting down some operations, leading to a decline in synfuel plant output (Figure 1).

Sources: Energy Information Administration, *Quarterly Coal Report July-September 2007*, DOE-EIA-0121 (2007/3Q) (Washington, DC, 2007) and prior editions starting with 2002 fourth quarter report.

The credit expired for coalbed methane at the end of 2002. Credits for synthetic coal, landfill gas, and coke and coke oven gas were still in effect in 2007, but the synthetic coal credit for the 59 qualifying synfuel plants expired at the end of 2007. Most synthetic coal projects are owned by institutional investors such as insurance companies, banks, utilities, and large corporations with substantial net revenues against which the tax credits can be taken. Between 2002 and 2007, synthetic coal production nearly doubled (Figure 1). Production fell between 2005 and 2006 when high oil prices caused some plant operators into shutting down their facilities for part of the year.

Source: U.S. Internal Revenue Service, Notice 2007-38; 2007-18 I.R.B. 1103 (2007), Nonconventional Source Fuel Credit, Section 45K Inflation Adjustment Factor and Section 45K Reference Price (Washington, DC, April 30, 2007). EIA first published data on synthetic coal production in 2001.

⁵¹ The value of the credit is provided in this report in 2007 dollars based upon an estimate of the 2007 GNP implicit price deflator. At the time of this estimate, applicable IRS oil price band data were unavailable.

The American Jobs Creation Act of 2004 (AJCA, Section 710, Public Law 108-357) introduced additional criteria for facilities producing synthetic (also referred to as "refined coal").⁵² Under AJCA, qualifying facilities must meet two tests applicable to environmental performance and economic value: (1) a qualifying facility must achieve a 20-percent reduction in the emissions of nitrogen oxides and either sulfur dioxide or mercury compared to the emissions released when burning the original feedstock coal or comparable coal; and, (2) the refined coal product must be at least 50 percent higher in economic value than the feedstock. Under AJCA, new facilities placed in service after October 22, 2004, and prior to January 1, 2009 qualify for the tax credit if they meet the tests outlined in the previous paragraph. Qualified refined coal facilities are eligible to receive a tax credit for the first 10 years of operation. Compared to Section 29 guidelines, which expired at the end of 2007, the AJCA guidelines for qualifying facilities are more restrictive. Thus far, no facilities are receiving the refined coal credit.

Section 1322 of EPACT2005 moved Section 29 to Section 45 as a new section 45K. Section 45K allows old Section 29 credits to be combined with other general business credits. As an alternative fuel product credit, it may be carried forward 20 years and carried back one year. Section 1321 of EPACT2005 expanded the credit to coke and coke gas produced in certain facilities placed in service before January 1, 2010. The credit for coke or coke gas is \$3.00 per barrel of oil equivalent, indexed for inflation using 2004 as the base year with a credit-available production limit of an average barrel-of-oil equivalent of 4,000 barrels per day. Section 211 of the Tax Relief and Health Care Act of 2006 removed the phase-out provision for coke and coke gas.

New Technology Credit

The new technology credit promotes electricity production from renewable resources. The new technology credit is also referred to as the section 45 credit because it is codified in Section 45 of the Code. Renewable generating sources include conventional hydropower, wind, geothermal, biomass,⁵³ and solar thermal and photovoltaic energy. The primary energy sources for renewable generation tend to be intermittent (e.g., dependent on weather conditions). Renewable energy, excluding conventional hydropower, is a fairly new contributor to U.S. electricity supply. The electric power sector accounted for about 56 percent of renewable energy consumption in 2006.⁵⁴ Because of the intermittent nature of many forms of renewable generation, the per-unit production cost tends to be higher than conventional forms of generation that operate at higher capacities. This is exacerbated by the higher capital costs associated with emerging renewable generation technologies.⁵⁵ This differential has decreased over time. Renewable generating capacity has grown considerably over the last 4 decades (Table 8). Non-hydro renewables accounted for 3 percent of electricity production in 2006. EIA's *Annual Energy Outlook 2008 (Revised Early Release)* projects nonhydroelectric renewables to account for 7 percent of electricity production by 2030.⁵⁶

Renewable technologies, however, are acknowledged to have favorable environmental attributes (or fewer negative externalities) relative to conventional technologies; these include

⁵² Although the terms "synthetic" and "refined" have been defined somewhat differently in various legislative provision, they are used interchangeably in this report.

⁵³ Biomass includes wood/wood waste, biogenic municipal solid waste (MSW), landfill gas (LFG), agricultural byproducts/crops, sludge waste, and other biomass solids, liquids, and gases.

⁵⁴ Energy Information Administration, *Annual Energy Review 2006*, DOE/EIA-0384(2006) (Washington, DC, June 2007), p. 281.

⁵⁵ Capital costs include the cost of field development, plant construction, and plant equipment.

⁵⁶ Energy Information Administration, *Annual Energy Outlook 2008 (Revised Early Release)*, DOE/EIA-0383 (2008) (Washington, DC, March 2008), Table 8 and Table 16, <http://www.eia.doe.gov/oiat/aeo/index.html>.

low or zero emissions and a replenishable energy supply.⁵⁷ Over the years, incentives and mandates for renewable energy have been used to advance different energy policies, such as ensuring energy security or promoting environmentally benign energy sources.⁵⁸

Table 8. U.S. Renewable Fuels Electricity Generating Capacity (Gigawatts)

Fuel	1970	1980	1990	2000	2006	2007
Conventional Hydroelectric	64	82	74	79	78	78
Other Renewables (subtotal)	NA	NA	13	16	24	27
Wood	NA	*	6	6	6	6
Waste	NA	NA	3	4	4	4
Geothermal	*	1	3	3	2	2
Solar/PV	NA	NA	*	*	*	*
Wind	NA	NA	2	2	11	15
Total	64	83	87	95	102	105

NOTE: Total may not equal sum of components due to independent rounding.

The capacity values for 2007 are an EIA estimate based on renewable capacity additions reported for calendar year 2007 on the EIA, Form 860-M, "Monthly Update to the Annual Electric Generator Report."

NA=Not Available.

* Indicates less than .5 gigawatts of capacity.

Source: Energy Information Administration *Annual Energy Review, 2006*, DOE/EIA-0384 (Washington, DC, June 2007) Table 8.11a; Energy Information Administration, *Electric Power Monthly*, Historical Excel Tables, February 2008, http://www.eia.doe.gov/cneaf/electricity/epm/epm_ex_bkis.html

Tax incentives directed toward nonconventional electric generation originated with the Energy Tax Act of 1978 (Public Law 95-618), which established a business energy tax credit of 10 percent of investment in technologies such as solar, wind, geothermal, and ocean thermal. This was in addition to an existing standard 10-percent investment tax credit available to related technologies. The Tax Reform Act of 1986 (Public Law 99-514) eliminated the standard 10-percent investment tax credit and extended the energy tax credit to 1988, but it reduced that credit from 15 percent to 10 percent and eliminated wind as a candidate for any credits. The business tax credit was extended on a year-to-year basis until passage of EPACT1992. The term "new technology credit" was first introduced as part of EPACT1992 when it became a production tax credit. It was defined as a 1.5-cents-per-kilowatthour payment (adjusted annually

⁵⁷ Attempts to measure the value of such benefits and add them to the market price by regulatory fiat (known as "full-cost pricing") have been proposed but not implemented in the United States. Recently, some States have instituted Renewable Energy Certificate/Credit programs that monetize these environmental attributes.

⁵⁸ Energy Information Administration, *Renewable Energy 2000: Issues and Trends*, "Incentives, Mandates, and Government Programs for Promoting Renewable Energy," DOE/EIA-0628(2000) (February 2001, Washington, DC), pp. 1-17.

for inflation), available for 10 years to private investors, as well as to investor-owned electric utilities. The credit applied to electricity produced from wind and closed-loop (dedicated crops) biomass facilities placed in service between 1994 and June 30, 1999. Section 242 of EPACT2005 expanded the tax credit to include incremental hydroelectric generation for a 10-year period at 1.8 cents per kilowatthour. EPACT2005 also extended the in-service date to qualify for the credit by 2 years for closed-loop biomass, geothermal, landfill gas, irrigation-produced power, landfill gas municipal solid waste, open-loop biomass, and wind facilities. For qualifying open-loop biomass, geothermal, solar, and small irrigation power facilities, the credit period was expanded from 5 to 10 years.

Estimation of the Production Tax Credit

In order to estimate the energy effects of the production tax credit and allocate those impacts to renewable fuel groups, qualified capacity at the generating unit level was identified through the end of FY 2007.^A The portion of qualified capacity at each plant was assumed to produce electricity in proportion to its share of total plant capacity. Capacity eligible to claim the credit was determined for all years through FY 2007 and grouped by renewable technology. Renewable capacity placed in service in 2007 was identified from the latest available monthly information compiled from EIA survey data^B and FY 2007 net generation was reported to EIA.^C Applying the credit by technology type yields an estimate of the maximum credit which might be claimed by qualifying technology type. The credit shares for each technology type were applied to the Treasury Department's FY 2007 \$690-million estimated value for this tax expenditure to obtain an estimate for each technology (Table 9). With approximately 10 gigawatts of new capacity built or expected over the 3-year period ending in 2007, wind technology dominates the allocation of the credit, claiming about 97 percent of the total credit. Compared to wind, other major sources eligible for the credit saw relatively little incremental capacity additions during their eligibility window. Based on the reported wind generation for FY 2007, wind generators were eligible to claim at least an estimated \$526 million in tax credits, significantly less than the estimated \$666-million tax expenditure estimated by the Treasury Department, i.e., the value of credit used to reduce tax liability. One plausible explanation for the difference is that during the initial years of operation wind generators may be accumulating credits while incurring tax losses. This may occur because wind energy property has a 5-year life for tax depreciation purposes. Wind generators that have been in operation for more than 5 years, having fully depreciated their property for tax purposes, may now be realizing taxable income to which they are applying prior-period tax credits that they are permitted to carry forward.

For purposes of this report, the subsidy estimates are based on the Treasury Department's aggregate New Technology Credit estimated expenditures. EIA adopted the methodology described above to allocate the Treasury Department's aggregate estimate of the New Technology Credit to specific technologies because of the lack of publicly-available financial data and tax-related data from which fuel-specific estimates could be derived.

^A. Energy Information Administration, "Annual Electric Generator Report," Form EIA-860 (2006).

^B. Energy Information Administration, "Monthly Update to the Annual Electric Generator Report," Form EIA-860M (September 2007).

^C. Energy Information Administration, "Power Plant Report," Form EIA-906, and "Combined Heat and Power Plant Report," Form EIA-920.

Table 9. Fuel Allocation for New Technology Credit Fiscal Year 2007 Estimated Expenditure

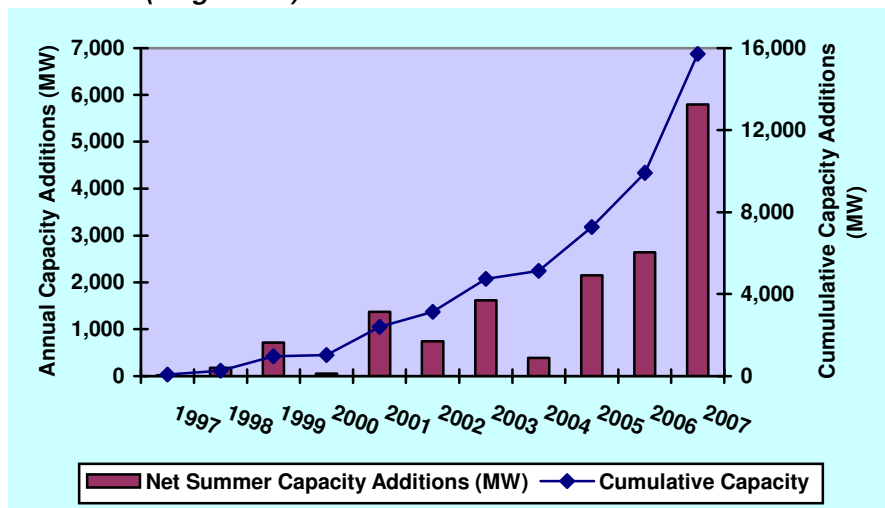
Renewable Technology	Estimated Qualified Capacity (Megawatts)	Estimated Eligible Generation (FY07 Megawatthours)	Average Capacity Factor (percent)	Value of Credit (cents per kilowatthour)	EIA Estimate Based on FY07 Generation (Thousand dollars)	Treasury's Estimated Credit Allowed (Thousand dollars)
Biomass (open loop)	188	351,139	21.3	0.95	3,336	4,223
Geothermal	68	346,945	58.7	1.90	6,592	8,345
Hydroelectric	44	85,318	22.3	0.95	811	1,026
Landfill Gas	193	705,341	41.7	0.95	6,701	8,482
Municipal Solid Waste	37	89,988	27.9	0.95	855	1,082
Solar	87	31,143	4.1	1.90	592	749
Wind	15,312	27,694,360	20.6	1.90	526,193	666,093
Total or Weighted Average	15,928	29,304,234	21.0	1.86	545,078	690,000

NOTE: Totals may not equal sum of components due to independent rounding.

Sources: Office of Management and Budget, *Analytical Perspectives of the United States Budget, Fiscal Year 2008*, Table 19-1. Energy Information Administration, "Power Plant Report," Form EIA-906, and "Combined Heat and Power Plant Report," Form EIA-920.

The historical growth of wind generation, which correlates with the periods in which the PTC has been available to wind power producers, supports the method EIA used to allocate the estimated \$690-million New Technology Tax credit to the various forms of renewable generation. Wind power has grown rapidly, especially since 1998 (Figure 2).

Figure 2. Annual and Cumulative Wind Power Capacity Additions, 1997-2007 (megawatts)



In part, this has been due to declining production costs, which has made wind more competitive as fuel costs have increased for conventional fossil-fired generation. In 2006, wind capacity increased at record levels both in terms of capacity additions and its share of total electricity production.

Sources: Energy Information Administration, Form EIA-860, "Annual Electric Generator Report" (2006); Form EIA-860, "Monthly Update to Annual Electric Generator Report," January-December, 2007; Form EIA-906, "Power Plant Report," and Form EIA-920 "Combined Heat and Power Plant Report," January-December, 2007.

The PTC for wind has expired and has been reinstated several times since it first went into effect in June of 1994 (Table 10). It has been estimated that the PTC reduces wind costs by roughly one-third. On the basis of megawatthours generated by fuel type, wind power was the second largest beneficiary of electricity-related subsidies after solar. Most of the subsidy allocated to wind is attributable to the \$666-million estimate of PTC tax expenditures.

Table 10. History of the New Technology (Production Tax) Credit and Related Development Activity

Legislation	Date Enacted	PTC Eligibility Window	Effective Duration (with lapses)	Wind Capacity Built in PTC Window (Megawatts)
Section 1914, Energy Policy Act of 1992 (P.L. 102-486)	10/24/92	1994-June 1999	80 Months	894
Section 507, Ticket to Work and Work Incentives Act of 1999 (P.L. 106-170)	12/19/99	July 1999-2001	24 Months	1,764
Section 603, Job Creation and Workers Assistance Act of 2002, (P.L. 107-147)	03/09/02	2002-2003	22 Months	2,078
Section 313, The Working Families Tax Relief Act of 2004, (P.L. 108-311)	10/04/04	2004-2005	15 Months	2,796
Section 1301, Energy Policy Act of 2005 (P.L. 109-58)	08/08/05	2006-2007	24 Months	5,454
Section 201, Tax Relief and Health Care Act of 2006 (P.L. 109-432)	12/20/06	2008	12 Months	3,000 ^E

Source: "Wind Power and the Production Tax Credit: An Overview of Research Results," Prepared Testimony of Dr. Ryan Wiser, Lawrence Berkeley National Laboratory, before the Senate Finance Hearing on Clean Energy: From the Margins to the Mainstream, March 29, 2007, p. 5.

E=Estimate

Unreported Tax Expenditures

The Congressional Budget Act of 1974 (Public Law 93-344) mandates reporting of tax expenditures. The Budget of the U.S. Government defines tax expenditures as "revenue losses due to preferential provisions of the Federal tax laws, such as special exclusions, exemptions, deductions, credits, deferrals, or tax rates." Although the concept of what constitutes a tax expenditure is clear, the determination of what exactly is a preferential provision is subject to interpretation. In preparing this chapter on energy-related tax expenditures, the EIA relied primarily on the definitions of tax expenditures presented in OMB documents. EIA relied on estimates of the value of certain tax expenditures contained in EPACT2005, which were prepared by the JCT. These provisions were described in the discussion on electricity-related tax expenditures. The JCT estimated the total value of these tax expenditures for FY 2007 to be \$304 million.

The Treasury Department does not provide estimates of de minimis tax expenditures, i.e., \$5 million or less. Therefore, the impact of these tax expenditures is not reported in either OMB budget documents or this report.

This report does not quantitatively address energy legislation that has recently been passed and for which the budgetary impact has not yet been assessed by the OMB for FY 2007 or for future years. A case in point is Section 1306 of EPACT2005 which provides a production tax credit for eligible nuclear power sales. This credit does not have a value before 2012 because no eligible plant is expected to be producing electricity before that time.

Direct Expenditures

There has been renewed growth in direct expenditures in recent years, as a result of higher levels of spending to assist low income consumers with rising energy costs (Table 11).

Table 11. Direct Expenditures in Energy (million 2007 dollars)

Direct Expenditure	FY 1999	FY 2007
Renewable Energy Production Incentive	5	5
Low Income Home Energy Assistance Program	1,545	2,188
DOE Conservation (Weatherization and State Energy)	191	256
Rural Business Service Programs and RUS High Energy Cost Grant Program	-	101
Total	1,741	2,550

Sources: Department of Energy Budgetary Documents and Department of Health and Human Service Budget Documents.

This is reflected in the increase in funding for LIHEAP. LIHEAP expenditures have increased from \$1.5 billion in FY 1999 to \$2.2 billion in FY 2007. Funding for DOE conservation programs has increased by 34 percent over the same period.

Renewable Energy Production Incentive

The Renewable Energy Production Incentive (REPI) is part of an integrated strategy to promote the generation of electricity from renewable energy sources and to advance renewable energy technologies. This program was authorized under Section 1212 of EPACT1992. It provides financial incentive payments for electricity produced and sold by new qualifying renewable energy generation facilities. DOE is responsible for managing REPI. EPACT1992 designated eligible electricity production facilities that started operations between October 1, 1993, and September 30, 2003, that are owned by State and local government entities (such as municipal utilities and Tribal governments) and not-for-profit electric cooperatives. The REPI provides not-for-profit entities with a financial incentive to invest in renewable generation technologies much like the incentive provided to for-profit entities eligible for Section 45 PTCs. Initially, qualifying facilities were eligible for annual incentive payments of 1.5 cents per kilowatthour (1993 dollars and indexed for inflation) for the first 10-year period of their operation. The availability of incentive payments is subject to the annual appropriations process. Criteria for qualifying facilities and the application procedures were contained in the rulemaking for this program.⁵⁹ Qualifying facilities were to use solar, wind, geothermal (with certain restrictions as contained in the rulemaking), or closed-loop biomass (except for municipal solid waste combustion) generation technologies. In FY 2007, the value of REPI was estimated to be \$4.9 million.

Low Income Home Energy Assistance Program

In FY 2007, the Federal government's Low Income Home Energy Assistance Program (LIHEAP) funding totaled \$2.2 billion. LIHEAP was established in 1981 as a block grant

⁵⁹ 10 C.F.R. 451 (2007) – Renewable Energy Production Incentives.

program. The Federal government gives States, the District of Columbia, U.S. territories, and Indian tribal organizations annual grants to provide home energy assistance to low-income households primarily to subsidize heating and cooling costs. LIHEAP is administered by the U.S. Department of Health and Human Services (HHS), but program implementation is generally managed by the grantees. LIHEAP assistance does not reduce eligibility or benefits under other aid programs.

LIHEAP establishes a standard of 60 percent of a State's median income to become eligible. LIHEAP grantees have some flexibility as the program allows "maximum policy discretion to grantees." For a four-person family in FY 2007, 60 percent of the mean national income is \$66,111.⁶⁰ Federal law defines income eligibility as the greater of 60 percent of the State's median income or 150 percent of the HHS poverty income guidelines.⁶¹

Federal rules also require outreach activities, coordination with DOE's Weatherization Assistance Program, and annual audits. Grantees decide the mix and dollar range of benefits, choose how benefits are provided, and select the agency or agencies responsible for administering the program. In addition to funds used for heating and/or cooling assistance, funds must be set aside by grantees for energy crisis intervention. Fifteen percent of grantees' allotments (up to 25 percent with a waiver) may be used for low-cost residential weatherization or other energy-related home repair.

Payments may be made directly to eligible households or to retail energy suppliers. Assistance may be in the form of cash, vouchers, or payments by the entity administering the program to retail energy suppliers such as utility companies or fuel dealers. In practice, the majority of the funds are paid directly to energy providers. LIHEAP funds are only used by a fraction of eligible participants. In 2004, between 5 and 6 million households were recipients of heating, cooling, and weatherization assistance out of an eligible population of 35.4 million households under the Federal LIHEAP income maximum standard and 24.1 million households under the States' LIHEAP maximum standard.⁶²

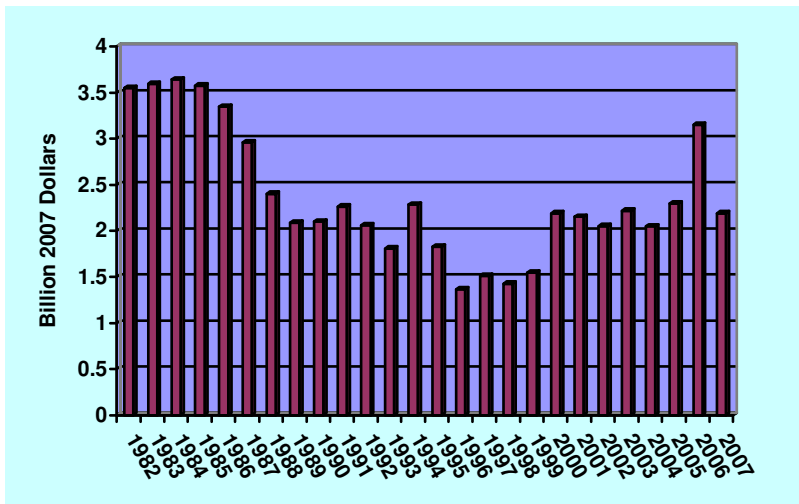
In the early years of the program, LIHEAP funding averaged around \$3.5 billion. Since 1998, annual funding for LIHEAP has ranged from \$1.4 billion to \$2.4 billion (Figure 3), with the exception of FY 2006 when funding exceeded \$3 billion. In 2006, Congress appropriated an additional \$1 billion in emergency LIHEAP expenditures due to the spike in energy prices. A portion of the funding was also directed at Gulf Coast States most affected by the Hurricane Katrina.

⁶⁰ In 2007, a family with annual income of under \$20,000 is considered to fall beneath the Federal Government's poverty level.

⁶¹ Department of Health and Human Services: Low Income Home Energy Assistance Program, LIHEAP Disaster Relief, http://www.acf.hhs.gov/programs/liheap/guidance/special_topics/disaster_relief.html, last updated: January 31, 2006.

⁶² Leon Lithow, Lead Program Analyst, Division of Energy Assistance, Low Income Home Energy Assistance Program, November 20, 2007.

Figure 3. LIHEAP Funding, Fiscal Years 1982-2007



Source: Department of Health and Human Services, Low Income Home Energy Assistance Program, <http://www.acf.hhs.gov/programs/liheap/funding/approp.html>.

The program sought to help lower-income families maintain their standard of living. The aging of the population and increased independence of handicapped persons means that these groups will account for a growing share of LIHEAP payments. In 2002, according to HHS, "of the 4.1 million households receiving heating assistance, approximately 1.4 million households had at least one member 60 years or older; approximately 1 million of these households had at least one child 5 years or

under. Some of these households contained both an elderly person and a young child. Although available, State data on households with disabled members are not comparable as each State can use its own definition of 'disabled.'"⁶³

Building Technology Assistance Program

Federal appropriations for the DOE conservation program increased from \$191 million in FY 1999 to \$256 million in FY 2007. DOE provides conservation assistance in a number of areas, primarily through the Building Technology Assistance Program. It complements DOE's R&D efforts and accelerates the deployment of new technologies and the adoption of advanced building practices through technical and financial assistance, outreach, and selective demonstration projects. According to the Office of Energy Efficiency and Renewable Energy, "The Building Technology Assistance Program works to improve the energy efficiency of the nation's buildings through innovative new technologies and better building practices." The Building Technology Assistance Program supports two grant programs: the Weatherization Assistance Program, which provides support for the weatherization of low-income homes, and the State Energy Program, which provides grants to promote innovative State energy efficiency and renewable energy activities.

The Weatherization Assistance Program engages State and local partners to increase the efficiency of homes occupied by low-income citizens who can least afford rising energy bills. The State Energy Program provides grants to State and local governments to create a network for energy efficiency.

⁶³ Department of Health and Human Services, http://www.acf.hhs.gov/programs/opre/acf_perfplan/ann_per/apr2005/apr_sg3_73.html.