Appendix A
Fact Sheets

Tax Expenditures

1. 30-Percent Credit for Purchase of Residential Solar and Fuel Cells

Description

Section 1335 of the Energy Policy Act of 2005 (EPACT2005)(Public Law 109-58) 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, however, 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). The generator must have an efficiency rating of 30-percent and generate at least 0.5 kW of electricity. Installation expenditures, such as those for labor, are considered eligible for the credit. Solar water heating property must meet performance specifications certified by the Solar Rating Certificate Corporation.

Solar swimming pools are ineligible for the credit.

To be eligible for the credit, a system must be placed in service (activated) between January 1, 2006 and December 31, 2008.

Revenue Loss/Outlays

The lost revenue to the U.S. Treasury from this credit is $10 million (nominal) per year from Fiscal Year (FY) 2006 through FY 2008.[209] The "Revenue Loss" data in the tabulation were generated estimated by the Treasury Department (Table A1). The Revenue Loss is the difference between estimated Federal income tax payments in a reference case and estimated actual Federal income tax payments. The reference case assumes that royalties on coal are taxed at the regular rate. The actual case assumes that the royalties are taxed at the capital gains tax rate to the extent taxpayers so choose.

Table A1. Estimated Revenue Loss: Residential Solar and Fuel Cell Credit, 2006 to 2008 (million nominal dollars)

Fiscal Year	Revenue Loss-Individuals
2006	10
2007	10
2008	10

NOTE: All estimates have been rounded to the nearest $10 million. Provisions with estimates that rounded to zero in each year are not included in the table.

Source: Office of Management and Budget, *Analytical Perspectives, Fiscal Year 2008* (Washington, DC, 2007), Table 19-2.

Rationale

To reduce reliance on grid-connected electricity.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Residential distributed generation.

[209] *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2008*, Table 19-1, "Estimates of Total Income Tax Expenditures," Office of Management and Budget; http://www.whitehouse.gov/omb/budget/fy2008/pdf/spec.pdf; accessed August 13, 2007.

2. 84-Month Amortization of Certain Pollution Facilities

Description

To effect reductions in sulfur dioxide (SO_2) and nitrogen oxides (NO_X) emissions, Section 1309 of the Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) modified Section 169 of the Internal Revenue Code (IRC), 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 as of April 11, 2005. The Joint Committee on Taxation estimated the value of this expenditure to be $30 million for 2007. Certified pollution control facilities include identifiable treatment facilities used to reduce, alter, dispose, store, or prevent the emission of pollutants.

Revenue Loss/Outlay

There is no expected revenue loss associated with this program for 2007.

Rationale

To reduce electricity-related emissions.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Generation.

3. Alcohol Fuel Credit

Description

The Energy Tax Act of 1978 (Public Law 95-618) established a subsidy for alcohol-based fuels. Federal financial incentives for renewable fuels in the transportation sector, strictly speaking, are limited to ethanol. Ethanol is produced from grain crops, with corn being the primary feedstock. The main use of ethanol is for gasohol (a blend of 90 percent unleaded gasoline and 10 percent ethanol, E-10) and for lower blends of ethanol to meet oxygenated gasoline requirements. Ethanol used in gasohol and other oxygenated gasoline blends meets the definition of a replacement fuel, but not of an alternative fuel. Two higher blends of ethanol, E-85 and E-95, are being used as alternative fuels in limited amounts. The value of the tax expenditure for renewable transportation fuels is $50 million in fiscal year 2007.

The alcohol fuel income tax credit and its associated excise tax credit (which is now the Volumetric Ethanol Excise Tax Credit or VEETC, see Fact Sheet 20) were initially implemented in the late 1970s and early 1980s. The income tax credit was initially 40 cents per gallon minus the amount of excise tax exemption, which was 4 cents per gallon. Some modifications to the original legislation have subsequently been made. The Omnibus Budget Reconciliation Act of 1990 (OBRA) (Public Law 101-508) reduced the income tax credit from 60 cents per gallon to 54 cents per gallon. The 1990 OBRA also introduced the small producer income tax credit of 10 cents per gallon. These provisions went into effect on January 1, 1993. The value of the $3.0 billion excise tax exemption on taxable motor gasoline mixed with ethanol is far greater than the $50 million ethanol tax expenditure cited above.

Revenue Loss/Outlays

The “Revenue Loss” data were estimated by the Treasury Department. The Revenue Loss is the difference between estimated Federal income tax payments in a reference case and estimated actual Federal income tax payments (Table A2) is presented. The reference case assumes that no income tax credits are granted. The actual case assumes that the income tax credit exists and that the excise tax credit remains in effect.

Rationale

Reduced dependence on foreign sources of transportation fuels.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Ethanol production, and to a much smaller extent, petroleum production.

Table A2. Estimated Revenue Loss: Alcohol Fuel Credit, 1984 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss		
	Individuals	Corporations	Total
1984	([a])	([a])	([a])
1985	([a])	([a])	([a])
1986	([a])	([a])	([a])
1987	5	5	10
1988	5	5	10
1989	([a])	([a])	([a])
1990	([a])	([a])	([a])
1991	([a])	([a])	([a])
1992	([a])	([a])	([a])
1993	([a])	([a])	([a])
1994	10	5	15
1995	5	5	10
1996	5	5	10
1997	10	10	20
1998	5	10	15
1999	5	10	15
2000	10	10	20
2001	10	20	30
2002	10	20	30
2003	10	20	30
2004	10	20	30
2005	10	30	40
2006	10	40	50
2007	10	40	50
2008	10	50	60
2009	20	50	70
2010	20	50	70
2011	10	60	70
2012	0	0	0

NOTE: ([a]) indicates a value under $2.5 million

All estimates have been rounded to the nearest $5 from 1984 through 2001. Thereafter all estimates are rounded to the nearest $10 million. Provisions with estimates that rounded to zero in each year are not included in the table.

Sources: Office of Management and Budget, *Budget of the United States Government, Analytical Perspectives Fiscal Year 2008* (Washington, DC, 2007), Table 19-2, and earlier versions. Energy Information Administration, *Federal Financial Interventions and Subsidies in Energy Markets 1999: Primary Energy*, SR/OIAF/99-03, (Washington, DC, September, 1999).

4. Allowance for the Deduction of Certain Energy-Efficient Commercial Building Properties

Description

Section 1331, of the Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58), provides for a new formula-based tax deduction for energy-efficient commercial properties. The formula-based tax deduction was added to the Internal Revenue Code at Section 179D. under the new IRS Code, 179D. Section 1331 provides This tax provision allows for a tax deduction of $1.80 per square foot on new commercial property 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 American Society of Heating, Refrigerating (ASHRAE) Standard 90.1-2001. In the case of properties owned by Federal, State, or local governments, or political divisions thereof, the U.S. Treasury Department is responsible for issuing regulations to allocate the deduction to the primary designer of the property. Section 204 of the Tax Relief and Health Care Act of 2006 extended the credit to December 31, 2008.

For properties not fully meeting the 50 percent reduction, there is a provision for a deduction of $0.60 per square foot of property. Partial credit is allowed for qualified improvements to building envelope, hot water, heating, ventilation and air conditioning systems (HVAC), and lighting systems. These deductions apply to buildings placed in service between January 1, 2006, and December 31, 2007. Tax expenditures occasionally affect years outside the timeframe in which the law is in force. This may be due to reporting years not overlapping with fiscal years or it may be due to tax-loss carryforwards. When the availability of a tax deduction causes results in accelerated spending in the near-term, later-term revenue loses may result. The affect of this tax deduction is to reduced demand for electricity and natural gas by the commercial sector.

Revenue Loss/Outlays

Table A3. Estimated Revenue Loss: Energy-Efficient Buildings Deduction, 2006 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss		
	Individuals	Corporations	Total
2006	20	60	80
2007	50	140	190
2008	40	130	170
2009	20	70	90
2010	10	20	30
2011	0	(10)	(10)
2012	0	(10)	(10)

NOTE: All estimates have been rounded to the nearest $10 million. Provisions with estimates that rounded to zero in each year are not included in the table.

Source: Office of Management and Budget, *Analytical Perspectives, Fiscal Year 2008* (Washington, DC, 2007), Table 19-2.

Rationale

To improve the energy efficiency of commercial buildings.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Electricity and natural gas.

5. Alternative Fuels Production Tax Credit

Description

The Alternative (or nonconventional) Fuels Credit was established with the Windfall Profits Tax of 1980 (Public Law 96-223). It was originally codified as Internal Revenue Code (IRC or Code) Section 44D, but it was later redesignated as Section 29 which is what it is most commonly referred to today. The Alternative Fuels Credit is a production-based tax credit that originally applied to qualified fuels from wells drilled or facilities placed in service between January 1, 1980, and December 31, 1992, and sold through the year 2002. The qualified fuels were: (1) oil produced from shale and tar sands; (2) natural gas produced from geopressurized brine, Devonian shale, coal seams, tight formations, or biomass; (3) liquid, gaseous or solid synthetic fuels produced from coal liquefaction and pressurization; (4) fuel from qualified processed wood; and (5) steam from solid agricultural byproducts. The Alternative Fuel Production Credit is often referred as a Section 29 credit based upon its former IRS Code citation. A taxpayer is entitled to the credit under Section 29 in the taxable year in which the qualified fuel is sold. Section 29 cannot be used to offset the alternative minimum tax.

The principal additional changes that have occurred since the 1980 Act have been to extend the time limits by which wells or facilities must be placed in service and fuels sold in order to be eligible for the credit. 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 greatly eased the qualification for gas produced from tight sands after 1990. However, subsequently, the qualification had been sharply constrained by Executive Branch rulings and judicial decisions. The Energy Policy Act of 1992 (EPACT1992)(Public Law 102-486) expanded the credit for certain nonconventional fuels.

Synthetic coal is the largest recipient of the Section 29 tax credit. Under IRC Section 48 coal was qualified as a synthetic fuel as defined if it differs significantly in chemical composition from the alternative substance used to produce it. To qualify for this credit, a taxpayer must produce and sell qualified fuel from a production facility that was placed in service as of July 1, 1998, pursuant to a binding written contract in place as of January 1, 1997, and produced through December 31, 2007. The coal may be of any rank from lignite to anthracite although bituminous coals are most prominently used. In order to be classified as a synthetic fuel, coal must undergo a significant chemical change under the criteria of Internal Revenue Service Revenue Ruling 86-100. This measurement takes place in a lab where feedstock coal is compared to synthetic coal to confirm that the chemical makeup of the synthetic fuel is not predicted from the ingredients. The liquid binding agents used are often such items as diesel fuel emulsions, pine tars, or latex to the blend of coal feedstock. The tax credits are based on the Btu value of the synthesized coal. As a consequence, Section 29 qualified coal synfuels using Eastern bituminous coals as a feedstock is more valuable than synthetic coals using lower-Btu western lignite and sub-bituminous coals. Companies have been claiming the credits since as early as 1998.[210]

Section 710 of the American Jobs Creation Act of 2004 (Public Law 108-357) required that synthetic coal be sold by the taxpayer with the reasonable expectation that it will be used for purpose of producing steam. The American Jobs Creation Act also redefined synthetic coal to “refined coal.” Section 710 also introduced certain restrictions concerning what coal could qualify as “refined coal.” Qualified new facilities were to be eligible to receive a Section 45 tax credit, as discussed in the next paragraph, for the first 10 years of operation. Compared to Section 29 guidelines, which expire at the end of 2007, the revised guidelines for qualifying coal synfuel facilities are significantly more restrictive. Qualifying facilities under the new guidelines require: 1) 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.

[210] Energy Information Administration, Coal News and Markets, Week of August 10, 2003.

Section 1322 of the Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) appended 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. This allows credits to be carried forward 20 years, with a 1-year look back. Section 1301 of EPACT2005 extended the Section 45 tax credit to Indian coal production. The credit is good for a 7-year period beginning in January 1, 2006. Section 1321 of EPACT2005 expanded the credit to apply to coke and coke gas produced in certain facilities placed in service before January 1, 2010. The credit amount 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. The tax credit provisions set forth in the EPACT2005 extended the tax credit for "refined coal" and waste coal to new facilities coming on-line after October 22, 2004, and prior to January 1, 2009.Section 211 of the Tax Relief and Heath Care Act of 2006 (Public Law 109-432) removed the phase-out provision for coke and coke gas.

The tax credit for these fuels is $3-per-barrel of oil-equivalent produced. (Conversion factors are used to convert the various fuels into their crude oil equivalent for purposes of calculating the credit.) The credit is fully effective when the price of crude oil is $23.50 per barrel or less and phases out gradually as the price of oil rises to $29.50 per barrel when the subsidy disappears. 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. For 2006, the IRS reported the credit oil price caps at $50.06 when the cap began and $69.12 when the cap was complete.[211] Domestic first purchase price, the price to which the cap is applied, averaged $59.68 per barrel in 2006, indicating that the credit was phased down somewhat. The credit is also reduced if certain other energy subsidies, such as government grants and tax-exempt financing, are used. The credit applies only to fuel produced at a facility placed in service before July 1, 1998, and sold before January 1, 2008.

Revenue Loss/Outlays

The lost revenue to the Treasury related to Section 29 started to grow significantly in the early 1990s. Revenue losses are expected to peak in 2007 before falling to zero by 2011.The "Revenue Loss" data in Table A4 were generated by the Treasury Department. The "Revenue Loss" is the difference between estimated Federal income tax payments in a reference case and estimated actual Federal income tax payments) is presented. The reference case assumes that the alternative fuels receive no production credit. The actual case assumes that the credit is granted.

[211] Phone interview with Jamie Parks of the IRS, August 20, 2007.

Table A4. Estimated Revenue Loss: Alternative Fuel Production Tax Credit, 1987 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss		
	Individuals	Corporations	Total
1987	(a)	10	10
1988	(a)	10	10
1989	(a)	10	10
1990	(a)	10	10
1991	50	205	255
1992	90	360	450
1993	120	640	760
1994	140	760	900
1995	150	820	970
1996	150	850	1,000
1997	30	680	710
1998	45	815	860
1999	50	975	825
2000	40	930	970
2001	40	860	900
2002	60	1,500	1,560
2003	50	1,230	1,280
2004	40	1,000	1,040
2005	100	2,220	2,320
2006	120	2,860	2,980
2007	100	2,270	2,370
2008	30	750	780
2009	0	10	10
2010	0	10	10
2011	0	0	0
2012	0	0	0

NOTES: (a) $2.5 million or less.

All estimates have been rounded to the nearest $5 from 1984 through 2001. Thereafter all estimates are rounded to the nearest $10 million. Provisions with estimates that rounded to zero in each year are not included in the table.

Sources: 1987-1993: Office of Management and Budget, *Budget of the United States Government, Fiscal Year 1993* (Washington, DC, 1992) and earlier editions. 1994-2004: Office of Management and Budget, *Analytical Perspectives, Fiscal Year 2008*. (Washington, DC, 2007), Table 19-2.

Rationale

The alternative fuel tax credit is one of several measures adopted in the early 1980s to encourage the development of synthetic fuels produced by nonconventional means or sources. The credit is designed to encourage capital investment in alternative fuel production by protecting producers of those fuels against the effects of oil price reductions.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Coal bed methane and synthetic (refined) coal.

6. Biodiesel and Small Agri-Biodiesel

Description

Section 302 of The American Jobs Creation Act of 2004 (AJCA) (Public Law 108-357) amended the Internal Revenue Code (IRC or Code) of 1986 by adding a new Section 40A[212], which provides for a biodiesel mixture credit and a biodiesel credit.[213] The estimated value of this credit is $180 million for 2007. Initially, the credit was due to expire December 31, 2006. Section 1345 of the Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) further amended Section 40A to include a tax credit for the production and sale of agri-biodiesel by small producers and extended the sunset provision through December 31, 2008.

For purposes of determining general business takes credits under Section 38 of the Code, Section 40A defines the biodiesel fuels credit to be the sum of (1) the biodiesel mixture credit, (2) the biodiesel credit, and (3) with respect to small agri-diesel producers, the small agri-diesel producer credit.

Eligible taxpayers receive a 50-cents-per-gallon biodiesel mixture credit for each gallon of biodiesel used to produce a qualified biodiesel mixture. The taxpayer may sell the biodiesel mixture as a fuel or it may be used as a fuel by the taxpayer producing the mixture. The sale or use by the taxpayer must be in trade or business in which the taxpayer is engaged, and the credit is applicable in the year of the sale or use of the biodiesel mixture. The biodiesel tax credit is 50-cents-per-gallon for each gallon that is not mixed with diesel. It is available to taxpayers during the taxable year that use biodiesel in a business or trade or is sold by the taxpayer as motor vehicle fuel.[214] The same conditions apply for the agri-biodiesel credit except that it is increased to $1.00.

The small agri-biodiesel producer credit is available to any eligible producer of agri-biodiesel. The producer of qualified agri-biodiesel is eligible for a 10-cent-per-gallon credit for any taxable year if the product is sold (1) to another person engaged in the manufacture of a biodiesel mixture, (2) for use by the purchaser as a fuel in a trade or business, or, (3) sold at retail as vehicle fuel. The credit is limited to production not to exceed 15 million gallons per year and the producer may not have annual agri-biodiesel production capacity in excess of 60 million gallons.[215]

The tax credit is intended to stimulate production of renewable transportation fuels. Increased demand for agricultural commodities used as feedstock for the manufacture of biodiesel may increase the demand and prices. As a result, heightened demand for eligible feedstock commodities for biodiesel may increase the cost of food products (e.g., soybean products and vegetable oils).

Revenue Loss/Outlays

For fiscal year (FY) 2007, the Treasury estimates a $180 million revenue loss as a result of this tax credit. It is projected to grow to $200 million in FY 2008. Between FY 2009 and FY 2012, the cumulative revenue loss is projected to be $70 million.[216] The “Revenue Loss” data in the estimated by the Treasury Department. The Revenue Loss is the difference between estimated Federal income tax payments in a reference case and estimated actual Federal income tax payments. The reference case assumes that tax credits are not available for biodiesel mixture,

[212] 26 U.S.C. 40A (2006).
[213] A biodiesel mixture means a mixture of biodiesel and diesel fuel, without regard to the use of kerosene that is sold by the taxpayer as fuel to any person or used as a fuel by the taxpayer producing the mixture. A mixture contain at least 0.1 percent by volume of diesel fuel is considered a biodiesel mixture. Kerosene is not included in the volume for purposes of determining whether the mixture meets the minimum 0.1 percent diesel. Agri-biodiesel is defined as fuels derived solely from virgin oils including, but not limited to esters from corn, soybeans, cottonseeds, crambee, rapeseeds, safflowers, flaxseed, rice bran, mustard seeds and animal fat. See, 2005-35 I.R.B., Notice 2005-62 “Modification of Notice 2005-4; Biodiesel and Aviation-Grade Kerosene, pp. 446-447 (August 29, 2005).
[214] Taxpayers may not claim a credit for both the use and retail sale of biodiesel.
[215] EPACT2005, Section 1345 also modified Section 40A to provide for pass-through treatment of tax credits to S corporations and allocation of credits to patrons of sub-Chapter T cooperatives in proportion to their patronage with the organization.
[216] Office of Management and Budget, *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2008*, “Federal Collections and Receipts,” Table 19.1, p. 287. http://www.whitehouse.gov/omb/budget/fy2008/pdf/apers/receipts.pdf.

biodiesel or small agri-diesel. The actual case assumes that the credits are available to eligible taxpayers.

Rationale

The Section 40A tax credit provides financial incentives to producers and vehicular users of biodiesel mixtures, biodiesel, and agri-biodiesel.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

This subsidy affects the production and use of renewable transportation fuels.

7. Capital Gains Treatment of Royalties on Coal

Description

The capital gains treatment of royalties on coal was established by the 1951 Revenue Act (Public Law 82-183, Section 177 (j) and Section 117 (k)). 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 the lower individual capital gains tax rate of 15 percent rather than at the higher regular individual top tax rate of 35 percent. The capital gains tax rate dropped from 28 percent to 20 percent in 1997 and to 15 percent in 2003. This, and the gradual increase in coal prices starting in 2000, account for the higher estimated revenue loss beginning in 1997.

In order to claim capital gains treatment, the royalty owner must own the property for a minimum of 1 year and meet other simple requirements. Owners who elect the capital gains tax rate cannot also elect percentage depletion. The capital gains treatment of coal royalties, one of the oldest energy subsidies, is provided for by law and has been in effect since the early 1950s.

Revenue Loss/Outlays

For the year 2007, the value of this tax expenditure equals an estimated $170 million. The "Revenue Loss" is estimated by Treasury Department (Table A5) as difference between estimated Federal income tax payments in a reference case and estimated actual Federal income tax payments. The reference case assumes that royalties on coal are taxed at the regular rate. The actual case assumes that the royalties are taxed at the capital gains tax rate to the extent taxpayers so choose.

Rationale

The capital gains treatment of coal royalties was adopted for three reasons: (1) to encourage additional production, (2) to place coal on the same tax footing as lumber, and (3) to provide a benefit to long-term lessors who might not benefit substantially from percentage depletion.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Coal production.

Table A5. Estimated Revenue Loss: Coal Royalties Capital Gains Treatment, 1987 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss		
	Individuals	Corporations	Total
1987	45	5	50
1988	(a)	(a)	(a)
1989	0	0	0
1990	0	0	0
1991	5	0	5
1992	10	0	10
1993	10	0	10
1994	10	0	10
1995	15	0	15
1996	15	0	15
1997	50	0	50
1998	60	0	60
1999	65	0	65
2000	70	0	70
2001	100	0	100
2002	100	0	100
2003	100	0	100
2004	70	0	70
2005	90	0	90
2006	160	0	160
2007	170	0	170
2008	170	0	170
2009	170	0	170
2010	190	0	190
2011	180	0	180
2012	130	0	130

NOTES: (a) $2.5 million or less.

All estimates have been rounded to the nearest $5 million from 1984 through 2001. Thereafter, all estimates are rounded to the nearest $10 million. Provisions with estimates that rounded to zero in each year are not included in the table.

Sources: 1987-1993: Office of Management and Budget, *Budget of the United States Government, Fiscal Year 1993* (Washington, DC, 1992) and earlier editions. 1994-2004: Office of Management and Budget, *Budget of the United States, Analytical Perspectives, Fiscal Year 2008* (Washington, DC, 2007), Table 19-2.

8. Credit for Business Installation of Qualified Fuel Cells and Microturbine Power Plants

Description

Section 1336 of the Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) provides for 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. EPACT2005, Section 1336 amends Internal Revenue Code (IRC or Code) Section 48 (relating to energy credits) by adding qualified microturbines and fuel cells. In order to qualify for the credit, the plant must have an electricity-only efficiency of 30-percent or more and generate at least 0.5 kilowatts of power. For fuel cells the credit is scheduled to terminate on December 31, 2007. Qualified microturbine power plants are eligible for a 10-percent credit. In order to qualify, microturbine power plants need to have an electricity-only efficiency of 26 percent or greater and a capacity of less than 2,000 kilowatts. The credit shall not exceed $200 for each kilowatt of capacity. A qualified microturbine is “an integrated system comprised of a gas turbine engine, a combustor, a recuperator or regenerator, a generator or alternator, and associated balance of plant components which converts a fuel into electricity and thermal energy.”

Revenue Loss/Outlays

For the year 2007, the value of this tax expenditure is an estimated $90 million. The "Revenue Loss" data in Table A6 was prepared by the Treasury Department. The Revenue Loss is the difference between estimated Federal income tax payments in a reference case and estimated actual Federal income tax payments. The reference case assumes that there are no exceptions to the passive loss limitations.

Table A6. Estimated Revenue Loss: Qualified Fuel Cells and Microturbines, 2006 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss		
	Individuals	Corporations	Total
2006	20	60	80
2007	20	70	90
2008	30	100	130
2009	10	40	50
2010	0	(10)	(10)
2011	0	(10)	(10)
2012	0	(10)	(10)

NOTE: All estimates have been rounded to the nearest $10 million.

Sources: Office of Management and Budget, *Analytical Perspectives, Fiscal Year 2008* (Washington, DC, 2007), Table 19-2. Also earlier editions.

Rationale

Provide greater incentives for distributive power.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Natural gas, hydrogen, and diesel demand.

9. Credit for the Construction of New Energy-Efficient Homes

Description

Section 1332 of the Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) provides a tax credit of $2,000 for the construction of a qualified new energy-efficient home if the home achieves 50-percent energy savings over a comparable unit constructed to the International Energy Conservation Code (IECC). Energy savings must come from improved home heating and cooling efficiencies rather than from a more efficient hot water heater. The Secretary of the Treasury, in consultation with the Secretary of Energy, is to provide guidance in calculating the procedures and methods of estimating efficiency gains.

For new homes realizing 30-percent savings over a comparable unit constructed pursuant to the IECC, a $1,000 tax credit is provided. Initially, the tax credit was available for the period January 1, 2006, through December 31, 2007. However, the eligibility window was extended to December 31, 2008, by the Tax Relief and Health Care Act of 2006 (Public Law 109-432).

The credit is limited to properties within the United States used as residences and substantially completed by August 8, 2005.

Revenue Loss/Outlays

For the year 2007, the value of this tax expenditure is an estimated $20 million (Table A7). The "Revenue Loss" is calculated by the Treasury Department as the difference between estimated Federal income tax payments in a reference case and estimated actual Federal income tax payments. The reference case assumes there are no credits taken for qualified home construction. The actual case assumes that credits are taken for qualified home construction.

Table A7. Estimated Revenue Loss: Energy-Efficient Homes Credit, 2006 to 2009 (million nominal dollars)

Fiscal Year	Revenue Loss-Corporations
2006	10
2007	20
2008	10
2009	10

NOTE: All estimates have been rounded to the nearest $10 million.

Source: Office of Management and Budget, *Budget of the United States Government, Analytical Perspectives, Fiscal Year 2008* (Washington, DC, 2007), Table 19-2.

Rationale

To reduce home-related fuel consumption.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

The major fuels affected are natural gas, home heating oil, and electricity. The stage affected is end use.

10. Credit for Energy Efficiency Improvements of Existing Homes

Description

Section 1333 of the Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) provides a 10-percent tax credit for expenditures made to improve the energy efficiency of existing homes that are principal residences located within the United States. 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 per dwelling is capped at $500 for all taxable years with the following application. Labor costs are considered eligible for the credit. In case of jointly-held properties, special proration rules are applied. The credit amount for each respective item is summarized below:

Component	Maximum Credit
• Windows	$200
• Furnace	$150
• Boiler	$150
• Fan	$50

The effective date of the subsidy is January 1, 2006, through December 31, 2007. The effect of this credit is to reduce U.S. demand for electricity and natural gas.

Revenue Loss/Outlays

In 2007, the estimated revenue loss is expected to total $380 million (Table A8).

Table A8. Estimated Revenue Loss: Existing Home Efficiency Improvement Credits, 2005 to 2011 (million nominal dollars)

Fiscal Year	Revenue Loss-Individuals
2005	0
2006	220
2007	380
2008	150
2009	0
2010	0
2011	0

NOTE: All estimates have been rounded to the nearest $10 million.

Sources: Office of Management and Budget, *Analytical Perspectives of the U.S. Budget, Fiscal Year 2008* (Washington, DC, 2007), Table 19-2.; Internal Revenue Service, "Highlights of the Energy Policy Act of 2005 for Individuals," http://www.irs.gov/newsroom/article/0,,id=153397,00.html, accessed October 16, 2007.

Rationale

Improve the energy efficiency of existing homes.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Residential electricity and natural gas consumption.

11. Credit for Efficient Appliances

Description

Section 1334 of the Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) provides tax credits for the manufacturing of 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 three taxable years preceding the taxable year in which the credit occurs. For comparison purposes the appliance efficiency is measured against ENERGY STAR 2007 efficiency standards. ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy promoting the greater penetration of energy efficient appliances. The tax credits are calculated in the following manner:

Dishwashers: $3 X (2007 standard/ 2005 standard); up to $100 per dishwasher.

Clothes washers: $100 for each unit manufactured in 2006 and 2007 that meets ENERGY STAR standards.

Refrigerators: 15 to 20-percent energy savings receive a $75 credit if manufactured in 2006. Refrigerators that achieve a 20 to 25-percent increase in energy savings receive a $125 credit if manufactured in 2006 or 2007.

Individual manufactures are limited to claims no greater than $75 million for all years. Of the $75 credit, manufacturers are limited to $20 million for 2006.

Revenue Loss/Outlays

A reduction in corporate tax receipts of $80 million in 2007 (Table A9).

Table A9. Estimated Revenue Loss: Efficient Appliances Credit, 2006 to 2007 (million nominal dollars)

Fiscal Year	Revenue Loss Corporations
2006	120
2007	80

NOTE: All estimates have been rounded to the nearest $10 million.

Sources: Office of Management and Budget, *Analytical Perspectives of the U.S. Budget, Fiscal Year 2008* (Washington, DC, 2007), Table 19-2.

Rationale

To increase the energy efficiency of home appliances.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Residential electricity demand and to a lesser extent, natural gas demand.

12. Credit for Holding Clean Renewable Energy Bonds

Description

Section 1303 of the Energy Policy Act of 2005 (EPACT 2005) (Public Law 109-58) introduced a provision which provided for up to $800 million in aggregate issuance of Clean Renewable Energy Bonds (CREBs) through December 31, 2007. Tax payers holding CREBs on a credit allowance date are entitled to a tax credit.[217] Prior to passage of the Energy Incentives Act of 2005, only investor- owned utilities (IOUs) qualified to receive tax incentives for producing electricity from renewable energy resources. In essence, CREBS provide non-IOU electricity providers with interest free loans to finance qualified energy projects.

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.[218]

CREBs are non-interesting bearing obligations. The taxpayer holding CREBs on a credit allowance date is entitled to a tax credit, which, in effect, lowers borrowing costs for investments in certain energy facilities. The amount of the credit is determined by multiplying the bond's credit rate by the face amount on the holder's bond. The credit rate on the bonds is determined by the Secretary of the Treasury and is to be a rate that permits issuance of CREBs without discount and interest cost to the qualified issuer. The credit accrues quarterly and is included in gross income (as if it were an interest payment on the bond), and can be claimed against regular income tax liability and alternative minimum tax liability.

The provision also imposes a maximum maturity limitation on the CREBs. The maximum maturity is the term which the Secretary estimates will result in the present value of the obligation to repay the principal on a CREB being equal to 50-percent of the face amount of such bond. Moreover, the provision requires level amortization of CREBs during the periods such bonds are outstanding.

For purposes of the provision, "qualified issuers" include (1) governmental bodies (including Indian Tribal governments); (2) the Tennessee Valley Authority; (3) mutual or cooperative electric companies (described in section 501(c)(12) or section 1381(a)(c)(C), or a not-for-profit electric utility which has received a loan or guarantee under the Rural Electrification Act); and (4) clean energy bond lenders."[219] A qualified issuer is defined as a "clean renewable energy bond lender, a cooperative electric company or a governmental body.

CREBs are an unique debt instrument, as only one other tax credit bond program exists that is similar, i.e., investment tax credit used to finance the reconstruction of school facilities, Qualified Zone Academy Bonds, which allow schools and educational organizations to borrow at 0-percent interest, with holders receiving Federal tax credits in lieu of interest.

Revenue Loss/Outlays

Estimated revenue losses associated with this tax expenditure equal $60 million in 2007 (Table A10).

Rationale

CREBs are intended to extend to governmental bodies (such as State and local governments, the District of Columbia, Indian Tribal governments) and rural electric cooperatives access to interest free loans for investment in certain qualifying facilities. Qualified facilities eligible for CREBs financing are the same as those which qualify under Internal Revenue Code (IRC or Code) Section 45: geothermal, wind, biomass, landfill gas, municipal solid waste, refined coal production, and hydroelectric power. This incentive is similar to that of IRC Section 45provided to investor-owned utilities.

[217] Office of Management and Budget, Analytical Perspectives of the Budget of the United States Government, 2007.
[218] The U.S. House of Representatives Ways and Means Committee: http://waysandmeans.house.gov/media/pdf/taxdocs/hr6408taxdetailedsummary.pdf, accessed October 16, 2007.
[219] Joint Committee on Taxation, "Description and Technical Explanation of the Conference Agreement of H.R. 6, Title XIII, The Energy Tax Incentives Act of 2005," (JCX-60-50), July 28, 2005.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Geothermal, wind, biomass, landfill gas, municipal solid waste, refined coal production, and hydroelectric power.

Table A10. Estimated Revenue Loss: Clean Renewable Energy Bonds, 2006 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss		
	Individuals	Corporations	Total
2006	10	10	20
2007	30	30	60
2008	40	40	80
2009	50	50	100
2010	50	50	100
2011	50	50	100
2012	50	50	10

NOTE: All estimates have been rounded to the nearest $10 million.

Sources: Office of Management and Budget, *Analytical Perspectives, Fiscal Year 2008* (Washington, DC, 2007), Table 19-2. and earlier issues.

13. Credit for Investment in Clean Coal Technologies

Description

Section 1307 of the Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58), which applies to Internal Revenue Code Sections 46, 48a, and 48b, establishes a credit for advanced coal-fired power plants and qualified gasification projects. A 20-percent credit is applied to coal gasification projects using integrated gasification combined cycle (IGCC) technology and 15-percent for other advanced coal technologies. A tax credit ceiling of $1.3 billion was set with $800 million allocated towards IGCC projects, $500 million towards other advanced coal technologies and $350,000 towards industrial gasification facilities.

A qualified plant must have a designed heat rate of 8,530 Btu per kilowatt or have a 40-percent efficiency. In the case of retrofitted units, the resulting heat rate would achieve a minimum 35-percent efficiency rating. In order to qualify for the tax credit, the following emission performance must be met:

- 99-percent sulfur dioxide (SO_2) removal;
- 90-percent reduction in mercury;
- No more then 0.07 pounds per million Btu of nitrogen oxides (NO_x) emissions; and
- No more then 0.015 pounds per million Btu of particulate matter emissions.

The allocation of the tax credit by fuel rank is as follows:

- $267 million to bituminous coal (with no more than $134 million going to a single plant);
- $267 million to sub-bituminous coal (with no more than $134 million going to a single plant);
- $266 million to lignite coal (with no more than $133 million to a single project);
- The $500 million allocated towards other advanced coal technologies stipulates that no more than $125 million would go to a single project; and
- This tax credit is to be allocated in annual rounds over a 3-year time frame.

For non-IGCC projects, the selection will be based upon projects having the highest ratio of capacity to the requested allocation of the credit. For IGCC power projects, a priority pool will be created. The allocation will be based upon greenhouse gas reduction capability.

Revenue Loss

For the year 2007, the estimated revenue loss equals $30 million (Table A11).

Rationale

The objective of coal research and development is to provide scientific and engineering knowledge base to foster technological advances in the private sector. Also, coal-burning power plants are at the center of the controversies involving global warming.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Coal mining, combustion, liquefaction, and gasification.

Table A11. Estimated Revenue Loss: Clean Coal Investment Credit, 2006 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss-Corporations
2006	0
2007	30
2008	50
2009	80
2010	130
2011	180
2012	250

NOTE: All estimates have been rounded to the nearest $10 million.

Source: Office of Management and Budget, *Analytical Perspectives, Fiscal Year 2008* (Washington, DC, 2007), Table 19-2.

14. Credit for the Production from Advanced Nuclear Power Facilities

Description

Section 1306 of Title XIII of the Energy Policy Act of 2005 (Public Law 109-58) provides for a credit for the production of electricity from advanced nuclear power facilities under the new Section 45J of the Internal Revenue Code. This tax expenditure allows the Secretary of Treasury, in consultation with the Secretary of Energy, to permit a production tax credit (PTC) of 1.8 cents (not adjusted for inflation) per kilowatthour to qualified advanced nuclear power facilities for an 8-year period after the facility is placed in service after enactment of the Act and before January 1, 2021. The legislation limits the national megawatt capacity for production tax credits to 6,000 megawatts-electric (MWe). The credit limitation is based on the Secretary of Treasury's allocated capacity per facility with an annual limitation of $125 million per 1,000 MWe per taxable year with a total nationwide limit of 6,000 megawatts which would be allocated by the Secretary of Energy. The allowable credit is also reduced by reason of grants, tax exempt bond, subsidized energy financing, and other credits but such reduction cannot exceed 50 percent of the allowable credit. The Code defines “advanced nuclear power” as a unit technology that has been approved by the Nuclear Regulatory Commission after 1993.

The Energy Information Administration’s *Annual Energy Outlook 2008* (*AEO2008)* assumes that up to 9 gigawatts of new capacity will receive the Title 13 PTC and an additional 7 gigawatts of new capacity is expected to be built without the credit.[220]

Revenue Loss/Outlays

N/A.

Rationale

To promote the introduction of advanced nuclear technologies.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Nuclear power.

[220] Energy Information Administration, *Annual Energy Outlook, 2008*, Early Release, EIA/DOE-0383 (2007)(Washington, DC, 2008).

15. Tax Credit and Deduction for Clean-Fuel, Alternative-Fuel, and Electric Vehicles

Description

The Clean Air Act Amendments of 1990 (CAAA90) (Public Law 101-549) and the Energy Policy Act of 1992 (EPACT1992) (Public Law 102-486) mandate 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. CAAA90 includes measures directed at reducing the amount of pollutants emitted from vehicles. Petroleum-based gasoline and diesel fuels are acceptable under CAAA90, as long as the vehicles satisfy the prescribed emissions standards. EPACT1992 requires the use of vehicles that operate primarily on fuels other than gasoline or diesel (called alternative-fuel vehicles or AFVs). The Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) encourages Federal and State fleets to purchase fuel cell vehicles through 2015.

To encourage the use of clean-fuel vehicles and AFVs, Federal and State incentives are available, such as tax credits, deductions, and exemptions for purchases of AFVs, purchases of alternative fuels used in AFVs, and the costs of building and maintaining fueling and electric charging facilities. EPACT1992 provides Federal incentives for the purchase or conversion of individual AFVs through Federal income tax deductions for clean-fuel vehicles and income tax credits for electric vehicles (EVs).[221]

The amount of the tax deduction for qualified clean-fuel vehicles (in nominal dollars) is based on the gross vehicle weight (GVW) and vehicle type as follows:

- $2,000 for automobiles, small vans and pickup trucks, and other small vehicles (excluding off-road vehicles);
- $5,000 for trucks or vans with gvw 10,000 to 26,000 pounds;
- $50,000 for trucks or vans with gvw more than 26,000 pounds; and,
- $50,000 for buses with seating capacity of more than 20 adults.

The tax deduction for clean-fuel vehicles is available for business or personal vehicles, except for EVs, which are eligible for the separate Federal tax credit described below. The deduction is not amortized and must be taken in the year the vehicle is acquired. A tax deduction of up to $100,000 per location is available for qualified clean-fuel refueling properties and EV recharging properties, provided that the equipment is used in a trade or business.

EPACT1992 also provides an Electric Vehicle Tax Credit for purchases of qualified EVs and hybrid electric vehicles (HEVs). The amount of the credit is 10 percent of the cost of the vehicle, up to a maximum of $4,000. To qualify for the credit, the vehicle must be powered primarily by an electric motor drawing current from batteries or other portable sources of electric current. All dedicated, plug-in only EVs qualify for the tax credit. All series and some parallel HEVs meet these qualifications. The tax credit for EVs is available for business or personal vehicles.

Except for deductions for the purchase or conversion of AFVs and the Federal tax credits for EVs, most of the Federal incentives for advanced vehicle technologies are programmatic grants oriented toward large investments. The lead Federal agencies for AFV programs are the Department of Energy, the Department of Transportation, and the Environmental Protection Agency.

The Transportation Equity Act of the 21st Century (TEA-21) (Public Law 105-178) was signed into law by the President on June 9, 1998. TEA-21 authorizes a wide range of programs, including

[221] Federal Energy Regulatory Commission, Energy Policy Act of 1992, http://ferc.gov/legal/maj-ord-reg/epa.pdf. Accessed December 6, 2007.

Federal surface transportation programs for highways, highway safety, and mass transit, for the 6-year period from 1998 to 2003. It includes initiatives to promote infrastructure development in support of AFVs. The Highway Trust Fund (HTF) is the source of funding for most of the programs in TEA-21. Federal motor fuel taxes are the major source of income for the HTF. The full authorizations for the highway and transit programs in TEA-21 total almost $218 billion.

EPACT2005 contains number of provisions that affect clean-fuel, alternative-fuel, and electric vehicles.[222] Summaries of the major provisions follow:

Sections 721 – 723 establish a competitive grant program, administered by Clean Cities,[223] to fund up to 30 geographically-dispersed advanced vehicle demonstration projects. EPACT2005 authorizes $200 million (until expended) for this program. Grant recipients will be limited to State and local government agencies and metropolitan transportation authorities. Applications must include a registered participant in the Clean Cities initiative. Participants can be public or private entities. AFVs, including neighborhood electric vehicles, fuel cell vehicles, and ultra-low sulfur diesel vehicles are eligible grant recipients. Projects are limited to $15 million with a 50-percent cost share.

Section 1341 contains provisions for an 1) Alternative Motor Vehicle Credit; 2) Fuel Cell Motor Vehicle Credit; and 3) Hybrid Motor Vehicle Credit.

The Alternative Motor Vehicle Credit provides a tax credit to purchasers of new dedicated AFVs. The tax credit equals 50 percent of the incremental cost of the vehicle, plus an additional 30 percent of the incremental cost for vehicles with near-zero emissions (weight-based cost limits apply). The credit is available on the purchase of light-, medium-, and heavy-duty vehicles and fuel-cell, hybrid, and dedicated natural gas, propane, and hydrogen vehicles. Light-duty lean-burn diesel vehicles are also eligible. For non-tax-paying entities, the credit can be passed back to the vehicle seller. The tax credit can be applied to vehicle purchases made after December 31, 2005. It expires December 31, 2010. This legislation replaces the Clean Fuel Tax Credit, which expired December 31, 2005.

The Fuel Cell Motor Vehicle Credit provides a base tax credit of $8,000 for the purchase of light-duty fuel cell vehicles (less than 8,501 lb GVW). The $8,000 credit is valid until December 31, 2009. After that, the value of the credit is $4,000. To qualify, the vehicles must meet certain minimal emission levels.

Base tax credits are also available for medium- and heavy-duty fuel cell vehicles. The Internal Revenue Service will determine the credit amount based on a sliding scale by vehicle weight. The credit is available until December 31, 2014. For tax-exempt entities, the credit can be passed back to the vehicle seller.

The Hybrid Motor Vehicle Credit provides a fuel economy and conservation credit for light-duty hybrid vehicles and trucks (less than 8,501 lb GVW). The fuel economy credit, $400 to $2,400, is based on a sliding scale of efficiency gains over model year 2002 baselines. The conservation credit increases the fuel economy credit by $250 to $1,000 based on a sliding scale of lifetime fuel savings. Weight-based cost limitations apply for heavy-duty hybrid vehicles. In general, the credit phases out after a manufacturer has sold 60,000 qualified vehicles.

Revenue Loss/Outlays

The estimated 2007 revenue loss associated with this credit equals $260 million (Table A12).

[222] U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, State & Federal Incentives & Laws, http://www.eere.energy.gov/afdc/incentives_laws_epact.html, accessed December 6, 2007.
[223] U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, "Clean Cities,"http://www.eere.energy.gov/cleancities/, accessed December 6, 2007.

Table A12. Estimated Revenue Loss: Alternative-Vehicle Credit, 1998 to 2012 (million nominal dollars)

Fiscal Year	Tax Credit and Deduction for Clean-Fuel Burning Vehicles
1998	95
1999	105
2000	115
2001	130
2002	100
2003	90
2004	70
2005	70
2006	110
2007	260
2008	150
2009	130
2010	(20)
2011	(50)
2012	(60)

NOTE: All estimates have been rounded to the nearest $5 million from 1998 through 2001. Thereafter, all estimates are rounded to the nearest $10 million.

Sources: Office of Management and Budget, *Budget of the United States Government, Analytical Perspectives, Fiscal Year 2000; Analytical Perspectives, Fiscal Year 2004; Analytical Perspectives, Fiscal Year 2005; Analytical Perspectives, Fiscal Year 2006;* and *Analytical Perspectives, Fiscal Year 2008,* Table 19-2.

Rationale

EPACT1992 and EPACT2005 encouraged alternative fuels use (fuels other than gasoline or diesel) for domestic transportation in order to decrease the Nation's dependence on foreign oil, increase energy security through the use of domestically-produced alternative fuels, reduce the balance of payments deficit, and stimulate domestic employment. CAAA90 created several initiatives to reinforce one of the original goals of the Clean Air Act, to reduce vehicle emissions.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Energy Forms: alternative fuels (methanol, ethanol, and other alcohols; and fuels other than alcohol derived from biological materials, including neat biodiesel); natural gas; propane; hydrogen; electricity (including electricity from solar energy); and any other fuel the Secretary of Energy determines, by rule, is substantially not petroleum and would yield substantial energy security benefits and substantial environmental benefits.

Fuel Cycle Stages: Energy transformation (refining and blending) and end use (light-duty and heavy-duty vehicles).

16. Deferral of Gain from Disposition of Transmission Property to Implement Restructuring

Description

Section 909 of the American Jobs Creation Act of 2004 (Public Law 108-357) amended Section 451 of the Internal Revenue Service Code to permit taxpayers to realize a gain from qualifying electric transmission transactions ratably over an 8-year period. Section 909 states: "Sets forth a special rule for the recognition of gain from the sale of a qualifying electric transmission transaction. Taxpayer may elect to recognize gain from such sale ratably over an 8-year period if gain from the sale is reinvested in certain exempt utility property. A "'qualifying electric transmission transaction'" is defined as a sale or other disposition occurring before January 1, 2007, to an independent transmission company of: (1) property used in the trade or business of providing electric transmission services, or (2) any stock or partnership interest in such a trade or business. Section 1305 of the EPACT 2005, extended of the deferral of gains to December 30, 2007."

Section 909 defers tax on gain realized from the sale of qualified assets. The deferred taxes are recovered ratably. This results in some front loading of investment, which in time will reverse. The Treasury Department expects transactions that will result in a net deferral of tax revenue through 2008, which fully reverses in 2009.

Revenue Loss/Outlays

The revenue loss associated with this tax expenditure is estimated to equal $530 million in 2007 (Table A13).

Table A13. Estimated Revenue Loss: Deferred Gain on Transmission Asset Sales, 2005 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss-Corporations
2005	490
2006	620
2007	530
2008	230
2009	(100)
2010	(360)
2011	(510)
2012	(540)

NOTE: All estimates have been rounded to the nearest $10 million.

Source: Office of Management and Budget, *Budget of the United States Government, Analytical Perspectives, Fiscal Year 2008* (Washington, DC, 2007), Table 19-2.

Rationale

To improve the efficiency of bulk power markets and non-discriminatory open access transmission service.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Electricity transmission.

17. Enhanced Oil Recovery

Description

Taxpayers are able to claim a general business credit allowing for the expensing of enhanced oil recovery investment. The credit was provided by Section 11511 of the Omnibus Budget Reconciliation Act of 1990 (Public Law 101-508). The enhanced oil recovery credit applies to 15-percent of the costs of one or more tertiary recovery methods. A credit equal to 15-percent of the taxpayer's costs is provided for tertiary oil recovery on U.S. projects. 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. Enhanced oil recovery (EOR) is the extraction of the oil that can be produced from a petroleum reservoir greater than that which can be economically recovered by conventional primary and secondary methods. EOR methods usually involve injecting heated fluids, pressurized gases, or special chemicals into an oil reservoir in order to produce additional oil.

The American Jobs Creation Act of 2004 (Public Law 108-357) applied the 15-percent credit to the construction of a natural gas treatment plant in Alaska to prepare Alaska for natural gas pipeline transportation.

Revenue Loss/Outlays

After oil prices began increasing in 2002, revenue losses from the enhanced oil recovery tax credit began to diminish. That is because the amount of the allowed credit declines as oil prices rise and vanishes completely when the inflation-adjusted price of oil exceeds $28-per-barrel (in 1991 dollars). This happened in 2005, when nominal crude oil prices went above $40-per-barrel. By 2006, revenue losses on this credit dropped to zero, where it is expected to remain unless oil prices drop significantly (Table A14).

Rationale

Significant amounts of oil and natural gas can be left in reservoirs after a field is abandoned. The use of enhanced oil and natural gas production methods allows for greater recovery of those resources. The purpose of the credit for enhanced oil recovery is to boost levels of domestically-produced oil and natural gas bypassed by conventional production.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Oil and natural gas production.

Table A14. Estimated Revenue Loss: Enhanced Oil Recovery Credit, 1993 to 2011 (million nominal dollars)

Fiscal Year	Revenue Loss		
	Individuals	Corporations	Total
1993	NA	NA	NA
1994	5	80	85
1995	5	80	85
1996	5	75	80
1997	5	90	95
1998	10	130	140
1999	20	205	225
2000	30	280	310
2001	30	280	310
2002	30	300	330
2003	40	360	400
2004	30	300	330
2005	30	270	300
2006	NA	NA	NA
2007	NA	NA	NA
2008	NA	NA	NA
2009	NA	NA	NA
2010	NA	NA	NA
2011	NA	NA	NA

NOTES: NA = Not available.

All estimates have been rounded to the nearest $5 million from 1993 through 2001. Thereafter, all estimates are rounded to the nearest $10 million.

Sources: Office of Management and Budget, *Budget of the United States Government, Analytical Perspectives, Fiscal Year 2000; Analytical Perspectives, Fiscal Year 2004; Analytical Perspectives, Fiscal Year 2005; Analytical Perspectives, Fiscal Year 2006;* and *Analytical Perspectives Fiscal Year 2008,* Table 19-2.

18. Exception from Passive Loss Limitation for Working Interests in Oil and Natural Gas Properties

Description

The Tax Reform Act of 1986 (Public Law 99-514) allowed owners of working interests in oil and natural gas properties to be exempt from the “passive income” limitations, which limit the ability of individuals to offset their losses from passive activities against active income.

Passive income is income an investor derives from a rental property, limited partnership, or other enterprise in which he or she is typically not actively involved. A passive loss is a loss incurred in these investments. For income tax purposes, passive losses can normally be used to offset income generated only from passive activities, not active income. Active income comes from such things as wages and salaries.

Passive losses remaining after being netted against passive income normally can only be carried over to reduce passive income realized in future tax years. The exception allows passive losses from these activities to offset the investor’s active income. The passive loss limitation provision and the oil and natural gas exception to it apply principally to partnerships and individuals rather than to corporations.

The major impact of the exception from the passive loss limitation is on business organizations that develop oil and natural gas properties. A shift toward the partnership form (which has unlimited liability) is encouraged, because the exception applies mainly to that form. Any shift is likely to be small because of the increased risk associated with unlimited liability. Nevertheless, some increase in exploration and development of oil and natural gas properties is likely as the subsidy attracts new capital.

Revenue Loss/Outlays

The "Revenue Loss" data is estimated by Treasury Department (Table A15). It the difference between estimated Federal income tax payments in a reference case and estimated actual Federal income tax payments. The reference case assumes that there are no exceptions to the passive loss limitations. The actual case assumes that passive loss limitation exception applies to unincorporated taxpayers.

Rationale

Working interests in oil and natural gas properties were exempted from the loss limitations in the Tax Reform Act of 1986. Factors that contributed to the adoption of the exemption included concern about the availability of investment funds for oil and natural gas development, given the collapse in oil prices that occurred during the same year the Act was passed.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Crude oil and natural gas production.

Table A15. Estimated Revenue Loss: Oil and Natural Gas Passive Loss Limitation Exception, 1988 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss-Individuals
1988	55
1989	135
1990	180
1991	80
1992	80
1993	50
1994	90
1995	55
1996	60
1997	45
1998	30
1999	35
2000	20
2001	20
2002	10
2003	20
2004	20
2005	40
2006	30
2007	30
2008	30
2009	30
2010	30
2011	30
2012	30

NOTE: All estimates have been rounded to the nearest $5 million from 1988 through 2001. Thereafter, all estimates are rounded to the nearest $10 million.

Sources: **1987-1993:** Office of Management and Budget, *Budget of the United States Government, Fiscal Year 1993* (Washington, DC, 1992). Also earlier editions. **1994-2012:** Office of Management and Budget, *Analytical Perspectives*, *Fiscal Year* 2008 (Washington, DC, 2007), Table 19-2. Also earlier editions.

19. Excess of Percentage over Cost Depletion: Oil, Natural Gas, and Other Fuels

Description

Depletion on a discovery basis became an accepted practice between 1918 and 1926. Percentage depletion for oil and natural gas properties became law in 1926 with the 1926 Revenue Act. It was extended to most other minerals, including mineral fuels, in 1932. Whoever is eligible for percentage depletion must use it rather than cost depletion. Independent oil and natural gas producers and royalty earners, and all producers and royalty owners of certain other natural resources, including mineral fuels, may take percentage depletion deductions rather than cost depletion deductions to recover their capital investments. Under cost depletion, the annual deduction is equal to the unrecovered cost of acquisition and development of the resource multiplied by the proportion of the resource removed during that year. Under percentage depletion, taxpayers deduct a percentage of gross income from resource production at rates of 10 percent for coal; 15 percent for oil, natural gas, oil shale, and geothermal deposits; and 22 percent for uranium. However, two special provisions apply to oil and natural gas. First, percentage depletion for independent producers and royalty earners is limited to 1,000-barrels–per-day. Second, the 15-percent rate is increased by 1 percentage point for each dollar that the average wellhead price of domestically produced crude oil is less than $20 a barrel. The maximum increase allowed is 10 percentage points. This special provision applies only to oil and natural gas wells with marginal production, generally defined to include production from stripper wells from which substantially all of the production is heavy oil. Marginal production eligible for the higher rate has a prior claim on the 1,000-barrel-per-day limitation.

The percentage depletion deductions based on gross income have generally been subject to net income limitations. Since percentage depletion is based on gross income, the resultant allowances can exceed the actual acquisition and development costs for the property from which the resource is extracted. Oil and natural gas property has often received relatively favorable treatment. A limit on the annual deduction of 50-percent of net income from a property had applied both to oil and natural gas and to other mineral fuels, until the Omnibus Budget Reconciliation Act of 1990 raised the limit to 100-percent for oil and natural gas beginning in 1991. That Act also increased the percentage depletion rate for marginal wells-stripper wells and those where substantially all of the production is heavy oil to as much as 25 percent, depending on the price of crude oil (this has not applied during recent years with high oil prices). Further, the 100-percent-of-net income limitation on the deduction has at times been suspended completely, with extensions of this suspension most recently to the end of 2005 as a result of Section 314 of the Working Families Tax Relief Act of 2004 (Public Law 108-311), and again, until the end of 2007, by the Tax Relief and Health Care Act of 2006 (Public Law 109-432).

Excess preferences are preferences that are added back to the regular tax base in calculating income tax liability under the alternative minimum tax (AMT) system. The oil and natural gas provisions have been changed several times since they were first introduced in 1926. The Energy Policy Act of 2005 (EPACT2005) broadened this tax expenditure: while this provision is not available to vertically integrated producers, that is, those with refinery operations larger than a certain minimum size, EPACT2005 loosened the definition of a small refiner to include operations refining less than 75,000-barrels-per-day, up from 50,000-barrels-per-day. It also changed the calculation to a 75,000-barrel daily average over the course of the year rather than applying the limit to each day.

Percentage depletion has the effect of substantially increasing the development of existing property, because the total depletion claimed can exceed the original investment. The increase in output benefits producers (operators and royalty holders) through higher after-tax profits. The benefits to producers were considered so substantial that beginning in 1969 percentage depletion rates were reduced for oil and natural gas, and eventually major oil and natural gas companies were excluded from the percentage depletion provisions in 1975.

Revenue Loss/Outlays

The "Revenue Loss" data is estimated by the Treasury Department (Table A16). The difference between estimated Federal income tax payments in a reference case and actual Federal income tax payments is presented. The reference case assumes that cost depletion is used. The actual case assumes that percentage depletion is used. In 2007 the estimated loss was $790 million. Between 1968 and 2007, the estimated loss was equal to $102 billion in 2007 dollars.[224]

Table A16. Estimated Revenue Loss: Excess of Percentage of Cost over Depletion, 1987 to 2012 (million nominal dollars)

	Revenue Loss		
Fiscal Year	Individuals	Corporations	Total
1987	595	345	940
1988	385	205	590
1989	320	205	525
1990	550	245	795
1991	470	245	715
1992	490	255	745
1993	265	830	1,095
1994	265	845	1,110
1995	265	800	1,165
1996	275	830	1,105
1997	285	860	1,145
1998	50	200	250
1999	45	220	265
2000	50	290	340
2001	30	220	250
2002	510	100	610
2003	110	530	640
2004	110	1210	1320
2005	60	530	590
2006	80	680	760
2007	80	710	790
2008	80	710	790
2009	80	710	790
2010	80	700	780
2011	80	680	760
2012	70	670	740

NOTE: All estimates have been rounded to the nearest $5 million from 1987 through 2001. Thereafter, all estimates are rounded to the nearest $10 million.

Sources: **1987-1993:** Office of Management and Budget, *Budget of the United States Government, Fiscal Year 1993* (Washington, DC, 1992). Also earlier editions. **1994-2012:** Office of Management and Budget, *Analytical Perspectives*, *Fiscal Year* 2008 (Washington, DC, 2007), Table 19-2. Also earlier editions.

[224] Based upon estimates for 1968 to 2000 appearing in General Accounting Office publication, *Petroleum and Ethanol Fuels: Tax Incentives and Related GAO Work*, GAO/RCED-00-301R (Washington, DC, September 2000) and EIA estimates based upon data appearing in the Office of Management and Budget's *Analytical Perspectives of the U.S. Budget, Fiscal Years 2008, 2006, 2004*, and *2002*.

Rationale

To increase domestic oil and gas production and to reduce the nation's reliance on petroleum imports.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Crude oil, natural gas, and coal production, as well as minor energy forms, including uranium, oil shale, and geothermal.

20. Renewable Transportation Fuels and Volumetric Ethanol Excise Tax Credit (VEETC)

Description

At nearly $3 billion, the Volumetric Ethanol Excise Tax Credit (VEETC) is estimated to be the largest energy-related tax credit in 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) in order to address gasoline shortages. This exemption was replaced in 2004 with VEETC by Section 301 of the American Jobs Creation Act (AJCA) (Public Law 108-357). 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 billion in 2007. By 2010, the value of this credit is expected to approach $5 billion.

Although the value of this credit may not have changed due to the 2004 legislation, funds are no longer be diverted from the Highway Trust Fund but rather come from the Treasury's General Fund. A major effect of this credit has been a sizable boost in U.S. ethanol production and a significant redirection of corn production away from traditional uses.

Revenue Loss/Outlays

The lost revenue to the U.S. Treasury from the VEETC for Fiscal Year (FY) 2006 through FY 2012 is shown below. These values include the amount of the alcohol fuel credit and the foregone gasoline excise tax receipts (Table A17).

Table A17. Estimated Revenue Loss and Outlay Equivalent: VEETC, 2006 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss
2006	2,570
2007	2,990
2008	3,460
2009	4,280
2010	4,990
2011	1,440
2012	0

NOTE: All estimates have been rounded to the nearest $10 million.

The value (in millions) for the revenue loss from the alcohol (ethanol) fuel credits for each year is: FY06 = $50; FY07=$50; FY08=$60; FY09=$70; FY10=$80; FY11=$30.

Source: *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2008*, Table 19-1, "Estimates of Total Income Tax Expenditures," Office of Management and Budget; http://www.whitehouse.gov/omb/budget/fy2008/pdf/spec.pdf; accessed August 13, 2007.

Rationale

To reduce U.S. dependence on imported oil used as a transportation fuel.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Imported petroleum and ethanol-blended gasoline.

21. Exclusion of Utility-Sponsored Conservation

Description

Section 111 of the Energy Policy Act of 1992 (EPACT1992) (Public Law 102-486) amended the Section 136 of the Internal Revenue Code (IRC or Code) to allow taxpayers to exclude from their gross income utility-paid rebates and subsidies for participating in conservation programs for purposes of calculating tax liability. Utilities engaged in demand side management activities often pay consumers to purchase more efficient heating or cooling equipment in order to reduce the consumption of natural gas and electricity. However, the relatively small size of the subsidy, as compared with the billions of dollars spent on household appliances each year, results in only a minor impact on U.S. demand for electricity and natural gas.

Revenue Loss/Outlays

The value of this tax expenditure is an estimated $110 million for the year 2007.

Table A18. Estimated Revenue Loss: Utility-Sponsored Conservation, 1987 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss-Individuals
1987	NA
1988	NA
1989	NA
1990	NA
1991	NA
1992	NA
1993	50
1994	100
1995	130
1996	100
1997	70
1998	80
1999	90
2000	90
2001	70
2002	80
2003	80
2004	100
2005	80
2006	110
2007	110
2008	110
2009	110
2010	110
2011	110
2012	110

NOTE: All estimates have been rounded to the nearest $5 million from 1987 through 2001. Thereafter, all estimates are rounded to the nearest $10 million.

Sources: **1987-1993**: Office of Management and Budget, *Budget of the United States Government, Fiscal Year 1993* (Washington, DC, 1992). **1994-2012**: Office of Management and Budget, *Analytical Perspectives, Fiscal Year 2008* (Washington, DC, 2007).

Rationale

The rationale for the tax subsidy is to encourage consumers to take advantage of utility funds available for the upgrade of heating and cooling equipment or the operation of equipment without penalty.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Natural gas transformation, electricity end use.

22. Exclusion of Interest Income on Energy Facility and Local Bonds

Description

The Revenue Expenditure and Control Act of 1968 (Public Law 90-364) exempts interest on private activity bonds used to finance certain energy facilities from gross income for Federal tax purposes. There are three types of privately-used facilities for which such bonds may be issued: facilities for the local furnishings of natural gas and electricity; district heating and cooling facilities; and certain environmental facilities at hydroelectric dam sites.[225] Electric and natural gas services provided from facilities with bonds issued by eligible third parties are limited to providing service in no more than two adjacent counties (or one city and an adjacent county). The issuance of private activity bonds is subject to annual limits established for each State by the Internal Revenue Service (IRS), and State-specific allocation processes.

The tax exemption encourages investment in debt-financed energy projects. The subsidy lowers utility financing costs and results in product prices that are lower and product consumption that is greater than would be otherwise without the subsidy.

Revenue Loss/Outlays

The value for this expenditure is an estimated $40 million in 2007 (Table A19).

Rationale

The tax exemption is intended to encourage the development of specific types of energy facilities.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Natural gas transformation, electricity generation.

[225] Several other types of private activity bonds are also subject to these caps. The tax-free status of bonds for certain small-scale hydroelectric generating facilities, geothermal facilities, and alcohol production facilities was terminated in the 1980s.

Table A19. Estimated Revenue Loss: Interest Exclusion on Energy Facility Bonds, 1987 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss		
	Individuals	Corporations	Total
1987	0	305	305
1988	0	290	290
1989	0	315	315
1990	0	255	255
1991	0	125	125
1992	0	125	125
1993	100	65	165
1994	105	70	175
1995	105	70	175
1996	105	70	175
1997	105	70	175
1998	80	30	110
1999	85	30	115
2000	70	20	90
2001	70	20	90
2002	80	30	110
2003	70	20	90
2004	80	20	100
2005	60	20	30
2006	30	10	40
2007	30	10	40
2008	40	10	50
2009	40	10	50
2010	40	10	50
2011	40	10	50
2012	40	10	50

NOTE: All estimates have been rounded to the nearest $5 million from 1987 through 2001. Thereafter, all estimates are rounded to the nearest $10 million.

Sources: **1987-1993**: Office of Management and Budget, *Budget of the United States Government, Fiscal Year 1993* (Washington, DC, 1992). **1994-2012**: Office of Management and Budget, *Analytical Perspectives, Fiscal Year 2008* (Washington, DC, 2007). Also subsequent and earlier editions.

23. Exclusion of Special Benefits for Disabled Coal Miners

Description

Department of Labor, Health and Human Services, and Education and Related Agencies Appropriation Act of 1986, (Public Law 99-178) allows for non-taxable disability payments out of the Black Lung Trust Fund. The Departments of Labor, Health and Human Services, and Education, and Related Agencies Appropriation Act of 1993 (Public Law 102-394, Title II) provides that:

> "For carrying out title IV of the Federal Mine Safety and Health Act of 1977, and thereafter the payment of travel expenses on an actual cost or commuted basis to an individual, for travel incident to medical examinations, and when travel of more than 75 miles is required, to parties, their representatives, and all reasonably necessary witnesses for travel within the United States, Puerto Rico and the Virgin Islands."

Title II, also made appropriations to the Department of Health and Human Services for the Social Security payments to fund special benefits for disabled coal miners.

Revenue Loss/Outlays

The expected revenue loss associated with this tax expenditure is estimated at $40 million for 2007 (Table A20).

Table A20. Estimated Revenue Loss: Exclusion of Disabled Coal Miner Benefits, 2001 to 2011 (million nominal dollars)

Fiscal Year	Revenue Loss-Individuals
2001	70
2002	70
2003	60
2004	60
2005	50
2006	50
2007	40
2008	40
2009	40
2010	40
2011	0

NOTE: All estimates have been rounded to the nearest $10 million.

Sources: **2006-2012**: Office of Management and Budget, *Budget of the United States Government, Fiscal Year 2008* (Washington, DC, 2007). Also earlier editions.

Rationale

To reduce medical costs of coal miners and to allow them to seek treatment at appropriate medical care facilities.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Coal.

24. Expensing of Capital Costs with Respect to Complying with EPA Sulfur Regulations

Description

Sections 338 and 339 of the American Jobs Creation Act of 2004 (AJCA) (Public Law 108-357) created a new 5-cent-per-gallon tax credit for small petroleum refiners who must incur capital costs complying with the Environmental Protection Agency's (EPA) rules limiting the sulfur content of diesel fuel.[226] Eligible refiners may claim the credit until they have recovered 25-percent of such costs.[227]

For these purposes a small refiner is one that employs not more than 1,500 persons directly in refining and has less than 205,000-barrels-per-day (average) of total refining capacity.[228] The credit is reduced for refiners with a capacity between 155,000-barrels-per-day and 205,000-barrels-per-day.[229] The conferee's report states that when capacity "differs substantially" from average daily output of refined product, capacity should be measured by reference to daily average output.[230]

Cooperatives may also choose to pass some or all of this credit to their patrons. As with the small ethanol producer credit, any pass-through is to be apportioned among patrons on the basis of patronage, and any credit not passed through to patrons is treated as a general business credit by the cooperative.[231]

Section 1324 of the Energy Policy Act of 2005 (Public Law 109-58) allows small refiners to deduct 75-percent of qualified capital costs related to complying with EPA sulfur regulations. This provision applies to Section 338 of the AJCA.

Revenue Loss/Outlays

The estimated value of this credit was $10 million in 2007 (Table A21).

Table A21. Estimated Revenue Loss: Expensing EPA Sulfur Compliance Capital Costs, 2005 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss-Corporations
2005	10
2006	10
2007	10
2008	10
2009	10
2010	10
2011	10
2012	10

NOTE: All estimates have been rounded to the nearest $10 million.

Sources: **2006-2012**: Office of Management and Budget, *Budget of the United States Government, Fiscal Year 2008* (Washington, DC, 2007), Table 19-2, and earlier years; *Income Tax Treatment of Cooperatives: Patronage Refunds and other Income Issues*, Cooperative Information Report 44, Part 2, 2005 Edition, Donald A. Frederick. http://www.rurdev.usda.gov/RBS/pub/cir442.pdf, p. 120, accessed August 27, 2007.

[226] American Job Creation Act of 2004, Section 339, Pub. L. No. 108-357, 118 Stat. 1481 (codified at 26 U.S.C. Section 45H). See also, H.R. Conf. Rept. No. 755, 108th Cong., 2d Sess. At 538-539.
[227] I.R.C. Section 45H (b)(1).
[228] I.R.C. Section 45H (c)(1).).
[229] I.R.C. Section 45H (b)(2).
[230] H.R. Conf. Rept. No. 755, 108th Cong., 2d Sess. at 313.
[231] I.R.C. Section 45H (g).

Rationale

The purpose of this provision is to aid small refiners by way of financial assistance for capital costs incurred due to EPA rules limiting the sulfur content of diesel.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Diesel fuels.

25. Expensing of Exploration and Development Costs: Oil, Natural Gas, and Other Fuels

Description

Tax law allows energy producers, principally oil and natural gas producers, to write off, i.e., expense, certain exploration and development (E&D) expenditures rather than capitalizing them and depreciating them over time. The most important of these expenditures consist of intangible drilling costs (IDCs) associated with oil and natural gas investments. Integrated oil companies can expense 70 percent of their IDCs for successful domestic wells and 100 percent for unsuccessful domestic wells. The remaining 30 percent must be amortized over 5 years. Nonintegrated (independent) oil producers can expense 100 percent of their IDCs for all domestic wells. The 70-percent provision also applies to surface stripping and other selected expenditures for fuel minerals other than oil and natural gas (principally coal). The remainder must be amortized over 5 years. This tax expenditure, estimated at $860 million, was the fourth largest tax expenditure in 2007.

The option to expense IDCs (and dry hole costs) of oil and natural gas wells was originally based on regulations issued in 1916. A court invalidated the regulations in 1945, but Congress subsequently gave its approval to the treatment and it became law in 1954. The option to expense mine development expenditures and the option to expense mine exploration expenditures were formalized into law in 1951 and 1966, respectively.

Integrated oil companies were constrained to expensing only 85 percent of their IDCs by a 1982 tax law. The percentage was subsequently reduced to 80 percent by the Tax Reform Act of 1984 and to its present 70 percent by the Tax Reform Act of 1986.

Revenue Loss/Outlays

The “Revenue Loss” data are estimated by the Treasury Department (Table A22). They are the difference between estimated Federal income tax payments in a reference case and estimated actual Federal income tax payments. The reference case assumes that relevant IDCs and certain other E&D expenditures are cost-depleted. The actual case assumes that they are expensed.

The data in the table are mostly negative from fiscal year 1987 through 1999. The negative values imply a payment to the Federal government of funds that it had loaned (tax deferrals), mostly to oil companies, in earlier periods. In a normal growth situation, the values would be positive. However, as a result of the sharp drop in oil E&D expenditures resulting from generally lower oil prices during that period, repayments of old “loans” outweighed the receipt of new ones. That trend reversed itself starting in 2000, as oil prices started increasing in the late 1990s through the present. Since 1967, the total revenue losses associated with this expenditure are estimated to be roughly $53 billion.[232]

[232] Based upon estimates for 1968-2000 appearing in the General Accounting Office, *Petroleum and Ethanol Fuels: Tax Incentives and Related GAO Work*, GAO/RCED-00-301R (Washington, DC, September 2000) and EIA estimates based upon data appearing in the Office of Management and Budget’s *Analytical Perspectives of the U.S. Budget, Fiscal Year 2008, 2006, 2004*, and *2002*.

Table A22. Estimated Revenue Loss: Expensing of Exploration and Development Costs, 1987 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss		
	Individuals	Corporations	Total
1987	425	(1,065)	(640)
1988	455	(805)	(350)
1989	560	(590)	(30)
1990	(70)	(385)	(455)
1991	(95)	(185)	(280)
1992	(40)	(15)	(55)
1993	(15)	90	80
1994	0	(70)	(70)
1995	(70)	(215)	(285)
1996	(60)	(180)	(240)
1997	(35)	(115)	(150)
1998	(20)	(90)	(110)
1999	(10)	(70)	(80)
2000	0	20	20
2001	10	40	50
2002	20	130	150
2003	30	180	210
2004	30	230	260
2005	50	340	390
2006	90	590	680
2007	110	750	860
2008	110	730	840
2009	90	620	710
2010	80	520	600
2011	60	390	450
2012	40	270	310

NOTE: All estimates have been rounded to the nearest $5 million from 1987 through 2001. Thereafter, all estimates are rounded to the nearest $10 million.

Sources: **1987-1996**: Office of Management and Budget, *Budget of the United States Government, Fiscal Year 1996* (Washington, DC, 1996). Also earlier editions. **1997-2012**: Office of Management and Budget, *Analytical Perspectives, Fiscal Year 2008* (Washington, DC, 2007), Table 19-2. Also earlier editions.

Rationale

Intangible drilling costs were asserted by producers to be conventional operating expenses that therefore should be expensed. The provision is intended to encourage additional mineral exploration and development. It was explicitly codified to reduce uncertainty concerning its status in order to encourage further exploration and development.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Crude oil, natural gas, and coal production.

26. Natural Gas Distribution Pipelines Treated as 15-Year Property

Description

Section 1325 of the Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) provides that natural gas distribution pipelines be given a 15-year capital cost recovery period. Prior to this, natural gas distribution pipelines were assigned a 20-year recovery period. This 15-year cost recovery period applies to the original user of property which is placed in service before January 1, 2011. It does not apply to property contracted for before April 12, 2005.

Revenue Loss/Outlays

The "Revenue Loss" data are estimated by the Treasury Department (Table A23). The difference between estimated Federal income tax payments in a reference case and actual Federal income tax payments is presented. The reference case assumes that natural gas distribution pipelines have a 20-year capital cost recovery period. The actual case assumes that natural gas distribution pipelines have a 15-year capital cost recovery period.

Table A23. Estimated Revenue Loss: 15-Year Life for Natural Gas Pipelines, 2006 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss-Corporations
2006	20
2007	50
2008	90
2009	120
2010	150
2011	150
2012	120

NOTE: All estimates have been rounded to the nearest $10 million.

Source: Office of Management and Budget, *Analytical Perspectives, Fiscal Year 2008* Washington, DC, 2007), Table 19-2

Rationale

To increase natural gas distribution pipeline capacity.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Natural gas distribution pipelines.

27. New Technology Credit

Description

The New Technology Credit , also known as the Renewable Electricity Production Tax Credit (REPC),[233,234] as well as the Production Tax Credit (PTC), was first introduced as part of the Energy Policy Act of 1992 (EPACT1992) (Public Law 102-486). The corresponding Internal Revenue Service Code Section 45 credit was defined as a 1.5-cents-per-kilowatthour (kWh) payment (adjusted annually for inflation), payable for 10 years, to private investors as well as to investor-owned electric utilities for electricity from wind power and closed-loop (dedicated crops) biomass facilities placed in service after December 31, 1993, and before July 1, 1999.

The Tax Relief Extension Act of 1999 (Public Law 106-170) extended and modified the PTC. It expanded the tax credit to include poultry litter facilities and poultry waste facilities, landfill gas, and certain other biomass. These and wind power and closed-loop biomass facilities qualified for the PTC if placed in service before January 1, 2001. The poultry waste and poultry litter facilities must have been in service after December 31, 1999, and before January 1, 2001. The PTC expired at the end of 2001. The credit for electricity produced from poultry litter is available to the lessor/operator of a qualified facility that is owned by a government entity.

The PTC was extended in March 2002 through December 31, 2003, by the Job Creation and Worker Assistance Act of 2002 (Public Law 107-147). The PTC expired at the end of 2003 and lapsed until October 2004, when it was renewed as part of the Working Families Tax Relief Act of 2004 (Public Law 108-311), which extended it through December 31, 2005.

The American Jobs Creation Act of 2004 (AJCA) (Public Law 108-357) expanded the PTC to include open-loop biomass, geothermal energy, solar energy, small irrigation power, and municipal solid waste (landfill gas and trash combustion facilities).

The Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) expanded the credit to include certain hydropower facilities and Indian (Native American) coal and extended it through December 31, 2007. EPACT2005 also made solar facilities placed into service after December 31, 2005, ineligible for the PTC. Also, geothermal facilities that claim the 2005 Federal Business Energy Tax Credit (10 percent on equipment installed from January 1, 2006, through December 31, 2008) may not also claim the PTC. (The Business Energy Tax Credit is commonly known as the Investment Tax Credit.)

In December 2006, the credit was extended through the end of 2008 by the Tax Relief and Health Care Act of 2006 (Public Law 109-432).

The following resources are now eligible for the REPC:

- wind energy,
- closed-loop biomass,
- open-loop biomass (including agricultural livestock waste nutrients),
- geothermal energy,
- small irrigation power (150 kilowatts - 5 megawatts),
- municipal solid waste (trash combustion),
- landfill gas,

[233] New Technology Credit is the term used by the U.S. Department of Treasury to describe the production tax credit and an investment tax credit in Office of Management and Budget, *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2008*, http://www.whitehouse.gov/omb/budget/fy2008/pdf/spec.pdf, accessed December 11, 2007. Production tax credit (PTC) is the more commonly-used term.

[234] For a summary of the history of the renewable electricity production tax credit, see, Database of State Incentives for Renewable Energy, http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=US13F&State=Federal¤tpageid=1, accessed December 11, 2007. Details regarding the PTC as promulgated in EPACT2005 are contained in "Renewable Electricity Production Tax Credit," Northeast Regional Biomass Program, http://www.nrbp.org/pdfs/energy_policy_act_2005.pdf, accessed December 11, 2007.

- refined coal,
- Indian coal,
- solar energy, and
- hydropower.

Revenue Loss

The lost revenue to the Treasury related to this tax expenditure is estimated at $690 million in 2007 (Table A24). By 2008, the New Technology Credit is expected to be the second largest tax expenditure.

Table A24. Estimated Revenue Loss: New Technology Credit, 2006 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss		
	Individuals	Corporations	Total
2006	40	470	510
2007	50	640	690
2008	60	900	960
2009	60	1,060	1,120
2010	60	1,090	1,150
2011	60	1,090	1,150
2012	60	1,090	1,150

NOTE: All estimates have been rounded to the nearest $10 million.

Source: Office of Management and Budget, *Budget of the United States. Government, Fiscal Year 2008,* Office of Management and Budget, *Analytical Perspectives, Fiscal Year 2008,* Table 19-2, "Estimates of Total Income Tax Expenditures, "http://www.whitehouse.gov/omb/budget/fy2008/pdf/spec.pdf. Accessed August 9, 2007.

Rationale

This credit aims to improve the economics to developers of affected renewable generating technologies, such that they are cost-competitive in the electricity generating market.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Renewable generating technologies.

28. Nuclear Production Tax Credit

Description

Section 1306 of Title XIII of the Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) provides for a credit for the production of electricity from advanced nuclear power facilities by amending the Internal Revenue Code with the addition of Section 45J. This tax expenditure allows the Secretary of Treasury, in consultation with the Secretary of Energy, to permit a production tax credit (PTC) of 1.8 cents (not adjusted for inflation) per kilowatthour to qualified advanced nuclear power facilities for an 8-year period after the facility is placed in service after enactment of the Act and before January 1, 2021. The legislation limits the national megawatt capacity for PTCs to 6,000 megawatts-electric (MWe). The credit limitation is based on the Secretary of Treasury's allocated capacity per facility with an annual limitation of $125 million per 1,000 MWe per taxable year with a total nationwide limit of 6,000 megawatts which would be allocated by the Secretary of Energy. The allowable credit is also reduced by reason of grants, tax exempt bond, subsidized energy financing, and other credits but such reduction cannot exceed 50 percent of the allowable credit.

The Energy Information Administration's *Annual Energy Outlook 2008* (*AEO2008)* "assumes that up to 9 gigawatts of new capacity will receive the Title XIII PTC. *AEO2008* also assumes that participating utilities will be able to take all the tax credits in each of the first 8 years of their qualifying units' operation."

Revenue Loss/Outlay

The Treasury Department did not estimate the value of this tax expenditure as no nuclear power plants are expected to go into operation within the Treasury's forecasting horizon which goes out to the year 2012.

Rationale

Section 1306 of EPACT2005 is intended to remove investment barriers to the funding of the construction of new nuclear power plants. The intent is to reduce the chance that investors will be exposed to construction-delay-related risks

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Nuclear power.

29. Modification to Special Rules for Nuclear Decommissioning Costs

Description

Section 1310 of the Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) modifies the rules governing the funding of qualified Internal Revenue Code (IRC or Code) Section 468A decommissioning trust funds, which prior to the modification required utilities to make payments into a qualified fund over the life of the fund subject to a level funding (payment) requirement. The change in law permits utilities to transfer funds from non-qualified trust funds, i.e., Grantor Trusts, notwithstanding the level of funding requirement. Furthermore, it permits an additional exception for utilities to fully fund the present value of a Section 468A trust fund with a lump sum payment. Section 1310 of EPACT2005 also eliminated the requirement that a nuclear utility's rates be set on a cost-of-service basis in order to qualify for a tax deduction in the current period for amounts contributed to a qualified decommissioning trust fund.

Revenue Loss/Outlay

The Treasury Department did not estimate the value of this tax expenditure. The Joint Committee on Taxation estimated it to be $199 million in 2007, with a cumulative cost of $1.3 billion through 2015.[235]

Rationale

The amendments to IRC Section 468A allow utilities to transfer non-qualified funds to a qualified trust and make a one-time payment to fully fund the trust. These actions are taken by a nuclear power plant owner prior to the sale of the plant, in order to facilitate the sale of the plant. It facilitates the buyer assuming the decommissioning liability, with the Section 468A trust fully funded consistent with the Nuclear Regulatory Commission decommissioning assurance regulations.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Section 1310 is limited to the disposition of nuclear power plants. It mitigates tax liabilities that could have accrued under pre-existing law. As a result, it facilitates the sale of nuclear assets in instances where nuclear utilities are required to divest generation under State deregulation initiatives or when utilities make a business decision to sell nuclear assets.

[235] Joint Committee on Taxation, "Estimated Effects of the Conference Agreement for Title XIII of H.R. 6, The Energy Tax Incentives Act of 2005, " JCX 05-95, July 27, 2005.

30. Partial Expensing for Advanced Mine Safety Equipment

Description

Section 404 of the Tax Relief and Welfare Act of 2006 (Public Law 109-432) amended the Internal Revenue Code by addition Section 179E, which allows for 50-percent expensing of qualified new advance mine safety equipment property used in underground mines. This underground mine equipment must exceed the effectiveness of current safety equipment requirements. The equipment can include: communications technology, enabling continuous contact between miners and above ground personnel, electronic tracking devices, emergency breathing apparatuses, and monitoring equipment to detect levels of carbon monoxide, methane, and oxygen. The equipment must be placed in service after December 20, 2006, and before January 1, 2009. Section 405 also provides a business tax credit for mine rescue teams training costs.

Revenue Loss/Outlay

Estimated revenue losses associated with this tax expenditure equal $10 million in 2007 (Table A25).

Table A25. Estimated Revenue Loss: Partial Expensing of Mine Safety Equipment, 2006 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss-Corporations
2006	0
2007	10
2008	20
2009	0
2010	0
2011	0
2012	0

NOTE: All estimates have been rounded to the nearest $10 million.

Sources: Office of Management and Budget, *Analytical Perspectives, Fiscal Year 2008* (Washington, DC, 2007).

Rationale

Improve the safety of mine operations.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Coal production.

31. Temporary 50-Percent Expensing for Equipment Used in the Refining of Liquid Fuels

Description

Section 1323 of the Energy Policy Act of 2005 (Public Law 109-58) allows refineries to expense 50 percent of the cost of equipment used in the refining of liquid fuels. The deduction becomes available in the taxable year in which the refinery is placed in service. The remaining 50 percent of the cost remains eligible for regular depreciation treatment. This provision applies to the original user of the refinery property, for which construction must begin after June 14, 2005, and before January 1, 2008. The property must be placed in service before January 1, 2012.

Revenue Loss/Outlays

The "Revenue Loss" data were estimated by the Treasury Department (Table A26). The difference between estimated Federal income tax payments in a reference case and actual Federal income tax payments is presented. The reference case assumes that the temporary 50-percent expensing provision is in place. The actual case assumes that conventional capital cost recovery applies.

Table A26. Estimated Revenue Loss: Temporary 50-Percent Expensing of Refining Equipment, 2006 to 2012 (million nominal dollars)

Fiscal Year	Revenue Loss-Corporations
2006	10
2007	30
2008	120
2009	240
2010	260
2011	180
2012	(50)

NOTE: All estimates have been rounded to the nearest $10 million.

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

Rationale

To increased liquid fuels refinery capacity.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Liquid fuels.

32. Transmission Property Treated as 15-Year Property

Description

Section 1308 of the Energy Policy Act of 2005 (Public Law 109-58) amended subparagraph E of Section 168(e)(3) of the Internal Revenue Code by adding transmission property rated 69 kilovolts and above to property qualifying as 15-year property under the Modified Accelerated Cost Recovery System (MACRS). The tax law prior to passage of Section 1308 assigned a 30-year class life and 20-year amortization period for transmission facilities. This amendment to the Code is one of the tax-related transmission infrastructure incentives included in EPACT2005. Shortening the amortization period reduces taxable income in the current tax year and increases deferred taxes associated with the timing difference between book and tax depreciation. This increases internally generated funds that may be available for reinvestment in transmission facilities. The 15-year property rate is applicable to eligible facilities placed in service after April 11, 2005.

The North American Electric Reliability Corporation (NERC) projects an 8.8-percent (14,500 circuit miles) increase in transmission investment in the United States over the next 10 years. According to NERC, the current 10-year projection of transmission capacity additions amounts to more than a 30-percent increase from the prior year's assessment. NERC further states the pace of additions over the next 5 years "appears to be accelerating" relative to original schedules.[236] Some of the projected transmission additions will be made by tax-exempt transmission-owners (i.e., publicly-owned utilities and cooperatives). Thus, not all of the anticipated additions will be eligible for this tax benefit. Nor are there any data available to indicate that the acceleration of construction of already planned additions or the increase in planned additions that is for treatment as 15-year property is entirely a function of the change in the property classification from 20 years to 15 years.

Revenue Loss/Outlays

According to the Treasury Department, the estimated of the value of this tax expenditure is included in the total estimate of the cost of accelerated depreciation for machinery and equipment. The Treasury Department referred EIA to the estimate prepared by the Joint Committee on Taxation (JCT) of the cost of this provision.[237] JCT estimated that reclassifying transmission facilities from 20-year property to 15-year property cost $18 million in 2007, with a total cost of $1.2 billion between 2005 and 2015.[238,239]

Rationale

The rationale for the provision is to provide investor-owned utilities with a tax incentive to increase investment in critical transmission infrastructure facilities.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

This tax expenditure is targeted at increasing transmission capacity and improving system reliability. It is related to deliverability of electricity without consideration or preference to a particular fuel used in electricity production.

[236] North American Electric Reliability Corporation, "2007 Long-term Reliability Assessment 2007-2016," (Princeton, New Jersey), October 25, 2007, p. 18.
[237] Email correspondence with Curtis Carlson, Office of Tax Analysis, Department of the Treasury, November 2, 2007.
[238] Joint Committee on Taxation, Estimated Budget Effects of the Conference Agreement for Title XIII of H.R. 6, JCX-59-05, July, 27, 2005.
[239] This revenue loss is actually a tax deferral. Over time, there is no change in depreciation (except in present value terms). Depreciation taken earlier can no longer be taken later in the asset's life. If the rate of transmission investment is constant over time, the tax expenditure would fall to zero as the timing difference between book and tax depreciation reverses, such that the deferred tax is recovered.

33. Treatment of Income of Certain Cooperatives

Description

Section 319 of the American Jobs Creation Act of 2004 (Public Law 108-357) amended Section 501(c)(12) of the Internal Revenue Code to provide for the exclusion of certain non-member income from the calculation of the "85-percent test."[240] Section 319(a) allows cooperatives to exclude income from nuclear decommissioning trust fund transactions, income received for services provided to non-members under a Federal Energy Regulatory Commission (FERC) approved open access tariff[241] and income received from a FERC-approved independent transmission provider.[242] Nuclear decommissioning trust fund transactions are defined to include income realized from the transfer of the trust in connection with the sale of a cooperative's interest in a nuclear plant,[243] and trust fund distributions to pay for decommissioning expenses and earnings on trust fund investments. Section 319(a) also permits cooperatives to exclude from the 85-percent test any gain that would normally receive deferred recognition as income arising from a like kind exchange or involuntary conversion of generation, transmission, distribution and natural gas distribution property. Section 319(b) permits cooperative to treat wholesale and retail sales to non-member as member sales to the extent such sale mitigate member load lost as a result of competition. This provision applies to non-members that supplant member load lost as a result of the cooperative providing mandatory, non-discriminatory open access. Qualify sales are accorded this treatment for a 7-year period.

A sunset provision limited the benefit of Section 319 through December 31, 2006. The sunset provision was eliminated in Section 1304 of EPACT2005.

Eleven generation and transmission cooperatives own undivided interests in nuclear plants and may benefit from the exclusion of decommissioning trust income from the 85-percent test were decommissioning trust income to otherwise pose a challenge. Exclusion of trust fund income from the 85-percent test may lift a potential barrier for cooperatives to participate in new nuclear plants. With regard to the transmission-related provisions, some cooperatives voluntarily joined RTOs/ISOs prior to Congress amending Section 501(c)(12). There has not been a wave of transmission-owning cooperatives joining subsequent to the amendment. One could interpret the lack of activity to mean that while the elimination of potential tax liability associated with providing open access transmission reduces a cost, the costs providing open access transmission under a FERC-approved tariff, or joining an RTO/ISO, exceed the benefits.

[240] The 85-percent test is designed to ensure that organizations exempt under IRC 501(c)(12) provide services at cost to their members. Accordingly, each year a cooperative's income, with certain modifications, is determined and the total amount received from members for the sole purpose of meeting losses and expenses must be at least 85 percent of the income. The 85-percent test is applied on the basis of an annual accounting period. Failure to meet the requirement in a particular year precludes exemption for that year, but has no effect upon exemption for years in which the 85-percent test is satisfied. Rev. Rul. 65-99, 1965-1 C.B. 242. Source: Internal Revenue Service: http://www.irs.gov/pub/irs-tege/eotopicd94.pdf.

[241] In Order No. 888, the FERC required non-public utilities that own, operate or control transmission facilities, as a condition of receiving open access transmission service from a public utility under its Open Access Transmission Tariff (OATT), to provide reciprocal transmission service under comparable terms. FERC adopted a voluntary "safe harbor" process as one method of satisfying this reciprocity requirement. Non-public utilities (e.g., electric cooperatives participating in the Rural Utilities Service loan program) can file an OATT with the Commission under the voluntary "safe harbor" provision. Under this provision, the Commission issues a declaratory order finding the OATT appropriate for "safe harbor" status if its provisions "substantially conform or are superior to" the pro forma OATT. See, Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, Order No. 888, FERC Stats. & Regs. ¶ 31,036 (1996) at 31,760-61 (Order No. 888), order on reh'g, Order No. 888-A, FERC Stats. & Regs. ¶ 31,048 (1997), order on reh'g, Order No. 888-B, 81 FERC ¶ 61,248 (1997), order on reh'g, Order No. 888-C, 82 FERC ¶ 61,046 (1997), aff'd in relevant part sub nom. Transmission Access Policy Study Group v. FERC, 225 F.3d 667 (D.C. Cir. 2000), aff'd sub nom. New York v. FERC, 535 U.S. 1 (2002).

[242] For purposes of ensuring the applicability of the transmission-related provisions to electric cooperatives with in the Electric Reliability Council of Texas (ERCOT), the statute defines FERC to include the Public Utilities Commission of Texas with respect to cooperatives operating in ERCOT.

[243] The transfer of a nuclear decommissioning trust fund by a cooperative in conjunction with the sale of its interest in a nuclear plant can create a tax liability arising from the realized gain on trust fund assets and the discharge of the decommissioning liability assumed by the buyer. See Internal Revenue Service, PLR 2000334002, Release Date August 8, 2000.

Revenue Loss/Outlay

The Treasury Department did not estimate the value of this tax expenditure. The Joint Committee on Taxation estimated the value at $14 million for 2007. The cumulative value through 2010 is estimated at $93 million. The Joint Committee report does not provide a breakdown as to how the estimated tax expenditure is divided between the certain treatment provide to nuclear-related transactions, income received under FERC-approved open-access tariffs, revenue received from independent transmission providers, or loss of load mitigation.[244]

Rationale

Under Internal Revenue Code Section 501(c)(12) cooperatives' tax-exempt status is in part preserved by maintaining compliance with the 85-percent test, which requires that they conduct the bulk of their business with members. This places the promotion of competition through open access in direct conflict with providing open access transmission service to non-members. Similarly, mandatory retail access, which has been imposed on cooperatives in some States, could result in cooperatives facing either stranded costs or the loss of exempt status if they make sales to non-members to mitigate loss of member load induced by open access. Excluding income from these transactions from the calculation of the 85-percent test eliminates an income tax-related barrier in to cooperatives providing open access and participating in competitive markets.

The nuclear-related provision precludes the loss of tax-exempt status that may otherwise occur in the course of a cooperative meeting its decommissioning funding obligations. The provision also mitigates a tax-related barrier to the potential sale of nuclear assets.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

The portion of the provision pertaining to the treatment of nuclear decommissioning trust for purposes of computing the 85-percent test impacts that indirect cost associated with cooperatives' ownership of nuclear generation. It eliminates potential income tax liability to the extent it precludes non-member nuclear decommissioning trust income from causing cooperatives to lose their tax-exempt status based on the 85-percent test. Excluding decommissioning trust income from non-member decommission trust income for purposes of computing the test could factor into cooperatives' decisions to acquire an ownership interest in new nuclear plants.

The portion of the provision that provides for the exclusion of Regional Transmission Organization/Independent System Operator (RTO/ISO)-related income from the calculation of the test is intended to eliminate a barrier to transmission-owning cooperatives' participation in such organizations. The provision is neutral with regard to the fuels used in electric generation in the sense that cooperative participation in RTOs/ISOs increases the scope of transmission facilities over which all forms of generation would have non-discriminatory access to transmission services.

[244] Joint Committee on Taxation, "Estimated Effects of the Conference Agreement for Title XIII of H.R. 6, The Energy Tax Incentives Act of 2005, " JCX 05-95, July 27, 2005.

34. United States Department of Agriculture Energy Programs

Description

In Fiscal Year (FY) 2000, the United States Department of Agriculture (USDA) initiated the Commodity Credit Corporation (CCC) Bioenergy Program to alleviate crop surpluses and stimulate production of biofuels. The Agricultural Risk Protection Act of 2000 (Public Law 106-224) included the Biomass Research and Development Act, which directed the USDA and the Department of Energy (DOE) to cooperate and coordinate polices to promote research and development leading to the production of bioproducts.

The Farm Security and Rural Investment Act of 2002 (Public Law 107-171), the 2002 Farm Bill, contained the first energy title (Title IX) in farm bill history. The 2002 Farm Bill authorized a range of programs through 2007 to promote bioenergy and bioproduct production and consumption. Key provisions included the Federal Biobased Products Preferred Procurement Program (FB4P), which requires Federal agencies to procure bio-based products. Another program, the Biodiesel Fuel Education Program, awards competitive grants to educate government and private entities with vehicle fleets about the benefits of biodiesel fuel use.

The 2002 Farm Bill extended the CCC Bioenergy Program through FY 2006, expanded the Conservation Reserve Program (CRP) pilot biomass authority to a nationwide general authority, and authorized placement of wind turbines on land enrolled in CRP. The program was funded at $50 million annually.

The Biomass Research and Development Program is operated jointly by USDA and DOE. This program supports research and development of biomass-based products, bioenergy, biofuels, and related processes. Eligible entities are institutions of higher learning, national laboratories, Federal or State research agencies, private sector entities, and nonprofit organizations. Fiscal year 2006 funding for the Biomass Research and Development Program was $12 million.

USDA's Agricultural Research Service (ARS) is USDA's primary research agency. Specific energy-related work being conducted by ARS follows:

- The process of cellulose degradation is not well understood. This research provides new information on the regulation of cellulose degradation by an organism that shows particular promise for converting cellulosic biomass.
- Inhibitors formed during pretreatment of lignocellulosic material reduce the performance of ethanol-producing fermentation organisms. ARS scientists are using a method called directed adaptation, developing strains of organisms that have enhanced ability to convert toxic compounds into less toxic compounds. Development of these more tolerant organisms is a significant step toward achieving the technology necessary for commercial production of ethanol from cellulosic plant material.
- There is a need to identify genes that regulate cell wall composition of alfalfa so that new varieties can be developed that have greater potential as biofuel feedstocks. ARS scientists identified and characterized a gene, UDP-sugar pyrophosphorylase (USP), which plays an important role in cell wall biosynthesis in plants. The isolation of the USP gene and new knowledge learned about the protein it produces will allow cell walls of alfalfa plants to be modified to improve the value of this crop as a bioenergy feedstock.

USDA's Cooperative State Research, Education, Extension and Service (CSREES) provides funding for about 60 projects that include an energy-related objective.

USDA's Forest Service (FS) is working to increase production of all energy sources in an environmentally-sound manner, capitalizing on the potential of woody biomass as a renewable energy resource, and contributing to the improvement of infrastructure for transmitting energy across the country. Increasing domestic energy supply includes providing energy facility corridors,

ensuring that lands are available for energy mineral development and production, developing renewable energy resources such as woody biomass, wind, solar power, and geothermal energy, and re-licensing hydropower facilities.

The FS actively participates in a government-wide initiative aimed at promoting development and use of bio-based products and bioenergy. Programs include research on enhancing opportunities to use forest biomass to produce energy and other value-added products; developing economical, environmentally-acceptable woody cropping systems to produce energy and other value-added products; exploring new processes to convert wood into ethanol; and, identifying ways to increase energy conservation through changes in manufacturing technologies, harvesting technologies, building construction practices, and designed landscapes.

The focus of the FS biomass and bioenergy efforts is woody materials that are not part of the commercial forest product material flows. Woody biomass includes forest vegetation treatment residuals (tree limbs, tops, needles, leaves, and other woody parts) that are by-products of forest management and ecosystem restoration.

EPACT2005 authorized up to $50 million for grants to improve the commercial value of forest biomass for electric energy, useful heat, transportation fuels, and other commercial purposes. In FY 2006, 88 applications were received, totaling almost $18 million in requests. Eighteen proposals were funded at a Federal cost of $4.2 million. These projects leveraged approximately $9 million in non-Federal funds.

Between FY 2001 and FY 2005, USDA funds expended on bio-based products, bioenergy, and other energy-related programs totaled $1.4 billion. USDA outlays in FY 2006 on bio-based products, bioenergy, and other energy-related programs is estimated at $272 million. In addition, Federal and State income tax credits and other tax incentives that promote the use of ethanol and biodiesel reduce tax collections by over $2 billion annually.

The CCC Bioenergy Program began on December 1, 2000, and ended on June 30, 2006. Under the program, cash payments were made to bioenergy producers who increased their annual bioenergy production from eligible agricultural commodities. Eligible commodities included barley, corn, grain sorghum, oats, rice, wheat, soybeans, other oilseeds, cellulosic crops, and animal fats and oils. From December 2000 through March 2006, the program reimbursed bioenergy producers $537 million for 2.5 billion gallons of increased ethanol production, 146.4 million gallons of increased biodiesel production, and 26.7 million gallons of base biodiesel production.

Revenue Loss/Outlays

Expenditures for the various biomass and biofuels programs managed by USDA agencies totaled $41.8 million in FY 2007. Regarding the Rural Business Service (RBS) program, not all of the RBS programs focus exclusively on providing financial assistance for the development of energy infrastructure and promotion of energy efficiency or conservation. Therefore, it is difficult to precisely identify the budget subsidy for energy-related activities within particular loan programs. As a result, the budget subsidies, and authorized lending, grant, and guarantee levels discussed in this section do not reflect the totality of RBS loan and grant programs.

Rationale

Alleviate crop surpluses and to promote the development of biofuels.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Wind, solar, geothermal, bioenergy, biofuels for electric generation, transportation fuels, biomass co-products, and energy efficiency.

Direct Expenditures

35. Building Technology Assistance Program

Description

The U.S. Department of Energy (DOE) provides conservation assistance in a number of areas, primarily through the Building Technology Assistance Program, which complements DOE's research and development 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 Energy Conservation and Production Act (Public Law 94-385) and the Department of Energy Organization Act of 1977 (Public Law 95-91) provided the legislative framework for the weatherization program. The Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) authorized $500 million for fiscal year (FY) 2006, $600 million for 2007, and $700 million for FY 2008 for the weatherization program. EPACT2005 authorized funding of $100 million, successively, for FY 2006 and FY2007 and $125 million for FY 2008 for the State Energy Program

Revenue Loss/Outlays

Federal appropriations outlays for the Building Technology Assistance Program amounted to $278 million (nominal dollars) in FY 2006 versus $155 million in FY 1998. $242 million of this total was directed to the weatherization program while $36 million was directed to the State Energy Program.[245]

Rationale

To increase the efficiency of homes occupied by low-income citizens who least can afford rising energy bills.

The Building Technology Assistance Program subsidizes energy conservation and is designed to reduce energy consumption. Although the technologies supported often are cost-effective on their own, cost sharing with nonprofit and government agencies make the first-cost barrier less prohibitive.[246]

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Renewable fuels, oil, natural gas, and electricity end use.

[245] Department of Energy budget 2007.
[246] See http://www.eere.energy.gov/buildings/about/mypp.html.

36. Low Income Home Energy Assistance Program

Description

LIHEAP is a block grant program under which the Federal government gives States, the District of Columbia, U.S. territories, and Indian tribal organizations annual grants to provide home energy assistance for needy households. LIHEAP assistance does not reduce eligibility or benefits under other aid programs. LIHEAP grantees are, however, allowed some flexibility as the program allows "maximum policy discretion to grantees." Federal law permits income eligibility to be established at either 60 percent of the State's median income or 150 percent of the HHS poverty income guidelines, whichever is greater. Sixty percent of a State's median income is usually higher than 150 percent of the HHS poverty level. For a four-person family in Fiscal Year 2007, 60 percent of the median was estimated at $66,111.[247] [248] LIHEAP provides two sources of funds: regular funds, which are allocated to the states as prescribed by LIHEAP legislation; and, contingency funds, which are released and allocated at the discretion of the president and the Secretary of Health and Human Services.[249]

The year 2003 was the latest year for which disaggregated program data were available. In that year fifty States were provided heating assistance for that year in the amount of $1.1 billion while cooling assistance was provided to 15 States in the amount of $73 million.[250] Approximately, 4.4 million households received heating assistance and 494,000 households cooling assistance. In 2003, for residential units, space heating and cooling accounted for about 43 percent of low-income, energy expenditures. Households receiving heating assistance fell at 102 percent of the poverty line while those receiving cooling assistance, fell at 124 percent of the poverty line. Annual cooling assistance averaged $65 dollars while heating assistance amounted to $258.[251]

Although LIHEAP funds are available for both cooling and heating, a preponderance of expenditures goes to relatively cold-weather States. In 2007, the largest recipient states of LIHEAP funds were New York, Pennsylvania, Illinois, Michigan, and Ohio.[252] LIHEAP funds are only used by a fraction of eligible participants. In 2005, 34.8 million households were eligible for LIHEAP, while 5.3 million households received LIHEAP benefits, amounting to 15 percent of all eligible households.[253] By comparison, in 1983, 6.8 million households received LIHEAP benefits, which amounted to 31 percent of eligible households. The aging of the population and increased independence of handicapped persons means that these groups will account for a growing share of LIHEAP payments. For 2002, according to HHS:

> "of the 4.1 million households receiving heating assistance, approximately 1.4 million households had at least one household 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.'"[254]

[247] U.S. Department of Health and Human Services, Low Income Home Energy Assistance Program, State Median Income Estimates for Optimal Use in Federal Fiscal Year 2006 LIHEAP Programs and Mandatory Use in Federal Fiscal Year 2007 LIHEAP Programs, (Washington, DC, March 6, 2006): http://www.acf.hhs.gov/programs/liheap/guidance/information_memoranda/im06-05.html; accessed October 16, 2007.
[248] Ibid. Accessed October 16, 2007.
[249] Congressional Research Service, *The Low-Income Home Energy Assistance Program (LIHEAP): Program and Funding*, Order Code RL 31865 (Washington, DC, October 2007), p. 1.
[250] U.S. Department of Health and Human Services, Low Income Home Energy Assistance Program, http://www.acf.hhs.gov/programs/liheap/, accessed October 16, 2007.
[251] U.S. Department of Health and Human Services, LIHEAP, Executive Summary—Low Income Home Energy Assistance Report to Congress for Fiscal Year 2003, http://www.acf.hhs.gov/programs/liheap/data/execsum.html, accessed October 16, 2007.
[252] Department of Health and Human Services, LIHEAP, http://www.acf.hhs.gov/programs/liheap/guidance/information_memoranda/07-allotments.xls.
[253] Department of Health and Human Services. http://www.acf.hhs.gov/programs/liheap/data/notebook/figure_11.html.
[254] Department of Health and Human Services, http://www.acf.hhs.gov/programs/opre/acf_perfplan/ann_per/apr2005/apr_sg3_73.html.

Federal rules also require LIHEAP outreach activities, coordination with the U.S. Department of Energy's Weatherization Assistance Program, and annual audits. Grantees decide the mix and dollar range of benefits, choose how benefits are provided, and decide what agencies will administer the program components. In addition to funds used for heating and/or cooling assistance, however, a reasonable amount of the funds must be set aside by grantees for energy crisis intervention. Up to 15 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 home energy suppliers. Assistance may be provided in the form of cash, vouchers, or payments to third parties, such as utility companies or fuel dealers. In practice, the majority of the funds are paid directly to energy providers.

Revenue Loss/Outlay

In the early years of the LIHEAP program, funding ranged at around $3.5 billion. Since 1988, funding for the program, has generally ranged from $1 billion to $2.4 billion, with the exception of the year 2006 when funding exceeded $3 billion. Section 121 of the Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) authorized LIHEAP funding at $5.1 billion for the fiscal years 2005 through 2007. EPACT2005 also allowed LIHEAP funds to be use to purchase renewables fuel and requested that HHS conduct a study on how LIHEAP could reduce deaths related to extreme temperatures. In FY 2006, Congress appropriated an additional $1 billion in emergency LIHEAP expenditures due to high energy costs. A portion of the funding was also directed at Gulf Coast states most affected by Hurricane Katrina.

Rationale

To help lower income families, including the elderly and the handicapped, maintain their standard of living in the face of high energy costs.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

No. 2 fuel oil, natural gas, coal, and electricity end use.

37. Renewable Energy Production Incentive (REPI)

Description

The Renewable Energy Production Incentive (REPI) originated in the Energy Policy Act of 1992 (EPACT1992) (Public Law 102-486) with the purpose of promoting increases in the generation and utilization of electricity from renewable energy sources, and to advance renewable energy technologies. This program, authorized under Section 1212, provides financial incentive payments to electricity produced and sold by new qualifying renewable energy generation facilities. EPACT1992 designated eligible electricity production facilities that commenced operation between October 1, 1993, and September 30, 2003. Eligible electric production facilities that may be considered to receive REPI payments include not-for-profit electrical cooperatives; public utilities; State governments; Commonwealths; territories of the United States; the District of Columbia; Indian tribal governments, or a political subdivision thereof; or Native Corporations that sell the facility's electricity. The Code of Federal Regulations, Part 451.4 provides more information on qualifying facilities and who may apply.

As non-profits, REPI beneficiaries do not pay Federal income taxes. Therefore, they are ineligible for the investment energy tax credit available to investor-owned utilities. 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, subject to the availability of annual appropriations in each Federal fiscal year of operation. Criteria for qualifying facilities and application procedures were contained in the final rule for this program. Initially, qualifying facilities included solar, wind, geothermal (with certain restrictions as contained in the final rule), or closed-loop biomass (except for municipal solid waste combustion) generation technologies. The U.S. Department of Energy is responsible for managing REPI.

REPI expired in 2003 even though several projects continued to receive funding subsequently. REPI appropriations were reauthorized with Section 202 of the Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) for fiscal years 2006 through 2007. Section 202 also expanded the list of eligible technologies and facility owners and the procedure for which funds were distributed so that funding would sufficiently pay for all approved applications but with an allocation of 60 percent for Tier 1 customers and 40 percent for Tier 2 customers (see paragraphs below). Section 202 also extended the kilowatt subsidy to ocean and wave energy. REPI was extended through December 31, 2008 by Section 207 of the Tax Relief and Health Care Act of 2006 (Public Law 109-432). Section 202 included Indian tribal governments and subdivisions thereof among the owners of qualified renewable energy facilities.

REPI payments consist of Federal outlays of funds. Procedures for annual payments to qualifying facilities for the REPI program are contained in the final rule. Payments are dependent upon the availability of annual appropriations. If there are insufficient appropriations to make full payments for electricity production from all qualifying facilities, Tier 1 applicants receive incentive payments first. Tier 1 qualifying facilities include use solar, wind, geothermal, or closed-loop (dedicated energy crops) biomass technologies to generate electricity. Tier 1 receives either full payments or pro rata payments if funds are insufficient to cover all requests. If funds are available after making full payments to these facilities, payments from the remaining funds are then made to Tier 2 qualifying facilities. These facilities use open-loop biomass technologies, such as landfill methane gas, biomass digester gas, and plant waste material that is co-fired in a generation facility to generate electricity. If there are insufficient funds to make full payments to all Tier 2 qualifying facilities, payments are made to those facilities on a pro rata basis. Pro rata payments result in a portion of the electricity production being fully paid and the remainder not receiving payment. Electricity for which payment is not made may be added to the next fiscal year’s electricity production and submitted by the qualifying facility for payment consideration, providing the annual application is made in a timely manner within the 10-fiscal-year eligibility window.

Revenue Loss/Outlay

In the first year of the REPI program 1994 (payment year 1995), there were sufficient appropriations to make full production incentive payments of $693,120 (nominal dollars) to the owners of all qualifying facilities. In the second year of the REPI program, there were sufficient appropriations to make full production incentive payments of $2,398,472 (nominal dollars) to the owners of all qualifying facilities (Table A27). For the third year of the REPI program, the available funds of $2,490,893 (nominal dollars) were insufficient to make full production incentive payments to the owners of all qualifying facilities. Therefore, full payments were made for electricity produced by Tier 1 facilities, and partial payments on a pro rata basis were made for Tier 2 facilities. For the fourth year of the REPI program, the available funds of $2,853,997 (nominal dollars) were insufficient to make full production incentive payments to the owners of all qualifying facilities. Therefore, full payments were made for electricity produced by Tier 1 facilities and partial payments were made for Tier 2 facilities on a pro rata basis. The fifth year of the REPI program received $4,000,000 from Congress. This appropriation did not cover requests for reimbursement. Tier 1 was fully funded; Tier 2 funding was prorated on the basis of production. Underfunding of Tier 2 programs has continued since. Only in the first 2 years of the program were Tier 2 customers fully funded. Tier 2 funding fell to 87 percent in 1996 and to a low of 0 percent for 2003 and 2004. Funding for Tier 2 programs rose to 40 percent for 2005. Meanwhile, the years 2003 through 2005 saw funding for the Tier 1 group fall below 100 percent. In 2005 (payment year 2006), funding for Tier 1 customers was $6.3 million and just under $2.0 million for Tier 2 customers.[255]

Rationale

To promote increased generation from renewable energy and to improve the performance of renewable energy technologies.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Solar, wind, ocean wave energy, geothermal (with certain restrictions as contained in the rulemaking), or biomass (except for municipal solid waste combustion) generation technologies used to produce electricity by new generating facilities (which started operation between October 1, 1993, and September 30, 2003) owned by publicly-owned utilities.

[255] Net electricity production by qualified REPI facilities averaged 894,483 million kilowatthours between 2001 and 2005.

Table A27. REPI Appropriations (Dollars)

Year of Production (FY)	Year of Payment (FY)	Appropriated Funds	Tier 1 Paid	Tier 1 Unpaid	Percent Tier 1 Paid	Tier 2 Paid	Tier 2 Unpaid	Percent Tier 2 Paid
EPACT1992								
1994	1995	$693,120	$100,725	-	100%	$592,395	-	100%
1995	1996	$2,398,472	$218,604	-	100%	$2,178,217	-	100%
1996	1997	$2,490,893	$195,902	-	100%	$2,294,991	$347,038	87%
1997	1998	$2,853,997	$154,504	-	100%	$2,699,493	$6,519,682	29%
1998	1999	$4,000,000	$122,167	-	100%	$3,877,833	$9,747,420	28%
1999	2000	$1,500,000	$603,182	-	100%	$896,818	$15,664,879	5%
2000	2001	$3,991,000	$1,339,377	-	100%	$2,651,625	$24,755,332	10%
2001	2002	$3,787,000	$1,365,846	-	100%	$2,421,154	$33,679,732	7%
2002	2003	$4,815,033	$1,810,911	-	100%	$3,004,122	$40,211,074	7%
2003	2004	$3,714,911	$3,714,911	$1,091,206	77%	-	$58,145,027	0%
2004	2005	$4,960,000	$4,960,000	$2,205,009	69%	-	$43,393,560	0%
EPACT2005								
2005	2006	$4,925,375	$2,955,225	$6,323,364	60%	$1,970,150	$41,178,610	40%
2006	2007	$4,900,000	$2,940					
2007		$4,690,000						
2008		$4,690,000						
2009		$4,690,000						
2010		$4,690,000						
2011		$4,690,000						
2012		$4,690,000						
2013		$4,690,000						
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2019		$4,690,000						
2020		$4,690,000						
2021		$4,690,000						
2022		$4,690,000						
2023		$4,690,000						
2024		$4,690,000						
2025		$4,690,000						
2026		$4,690,000						

Sources: Department of Energy, Office of Energy Efficiency and Renewable Energy,http://www.eere.energy.gov/repi/projects.cfm, accessed October 16, 2007. Forecast*:* Department of Energy, Office of Energy Efficiency and Renewable Energy, *"Appendix J, "Weatherization and Intergovernmental Assistance Program (WIP) Inputs for FY 2008 Benefit Estimates. NREL/TP-620-39684.*

Research and Development

38. Advanced Turbine Systems

Description

There is a growing national need for increased electricity and reduced emissions from electric power generating plants. The objective of the Advanced Turbine Systems (ATS) program, which is currently being phased out, was to develop ultra-high-efficiency natural gas turbine systems for utilities, independent power producers, and industrial markets. The ATS program was striving for revolutionary, yet achievable advances that include: industrial turbine systems for distributed power generation that show a 15-percent improvement over today's best natural gas turbine systems; and large central power plants for utility systems that break the 60-percent barrier in net thermal efficiency.

Revenue Loss/Outlays

There was no funding for advanced turbine systems in 2007.

Rationale

The intent behind this program was to improve the fuel efficiency of electric turbine systems while reducing emissions.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Natural gas. Although the ATS program will demonstrate performance with natural gas fuel, advanced turbine design systems will make use of fuels other than natural gas, such as coal and renewable biomass.

Basic Research

39. Basic Energy Research

Description

The Basic Energy Sciences (BES) program supports research and operates facilities to provide the foundation for new and improved energy technologies and for understanding and mitigating the environmental impacts of energy use. There are two BES subprograms. Materials Sciences and Engineering supports basic research to explore the scientific foundations for the development of materials that improve their efficiency, economy, environmental acceptability, and safety for energy generation, conservation, transmission, and use. Applications include lighter, stronger materials to increase fuel economy in automobiles, alloys and ceramics that improve the efficiency of combustion engines, and more efficient photovoltaic materials for solar energy conversion. The Department of Energy (DOE) Chemical Sciences, Geosciences and Energy Biosciences program, supports research crucial for improving combustion systems, solar photo-conversion processes, and for applications to renewable fuel resources, environmental remediation, and photosynthesis. The $1.4 billion (total project cost) Spallation Neutron Source at Oak Ridge National Laboratory, the world's most powerful neutron scattering facility, will be in its first full year of operations in fiscal year (FY) 2007. Four of the five Nanoscale Science Research Centers, part of the National Nanotechnology initiative, will be fully operational in FY 2007. Construction is also underway on the next -generation $379 million (total project cost) Linac Coherent Light Source at the Stanford Linear Accelerator Center (SLAC).

Revenue Loss/Outlays

The operating plan for basic energy sciences excluding fusion is about $1.3 billion in fiscal FY 2007. About $1.1 billion is funding for Basic Energy Sciences. Construction is funded at $125 million and science laboratories infrastructure is funded at $42 million.

Rationale

To undertake basic research where commercial payoffs are uncertain, long-term, or unavailable to the public.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

All forms of energy.

40. Building Technology, State and Community Programs Research and Development

Description

Section 109 of the Energy Policy Act of 2005 authorized the Department of Energy (DOE) to develop, test, and demonstrate advanced Federal and private building efficiency standards. The mission of the DOE building technology (BTS) research and development (R&D) program, within the Office of Energy Efficiency and Renewable Energy, is to make buildings more efficient and affordable and communities more livable. The goal of the Building Research and Standards program is to accelerate the introduction of highly efficient building technologies and practices through R&D and increase the minimum energy efficiency of buildings and equipment through appliance standards, building codes, and guidelines. The building technology R&D (non-grant) programs complement other DOE grant programs that help demonstrate and increase consumer awareness of the benefits and costs of energy-efficient technologies. The program develops technologies, techniques and tools for making residential and commercial buildings more energy efficient, productive, and affordable. The portfolio of activities includes efforts to improve the energy efficiency of building components and equipment, including the advancement of solid state lighting technologies for general illumination, and their effective integration using whole -building-system-design techniques; the development of energy efficient building codes and equipment standards; and integration of clean renewable energy systems into building design and operation.

Revenue Loss/Outlays

Appropriations for the BTS program appropriations were $68 million per year for fiscal year (FY) 2007 and $77 million in FY 2008.

Rationale

To increase energy efficiency and reduce the carbon footprint of residential and commercial buildings.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Oil, natural gas, and electricity end use.

41. Clean Coal Power Initiative

Description

The Clean Coal Power Initiative (CCPI), an industry/government cost-shared partnership, responds to the government's commitment to increase investment in Clean Coal Technology (CCT). CCPI provides the means to demonstrate those technologies proven through research and development to have commercial potential. Demonstrations are at a commercial scale in actual operating environments, which is essential to moving them to the threshold of commercialization. The CCPI provides government co-financing for new coal technologies that can help utilities meet the President's Clear Skies Initiative to cut sulfur dioxide (SO_2), nitrogen oxides (NO_2) and mercury pollutants from power plants by nearly 70 percent by the year 2018. Also, some of the early projects are showing ways to reduce greenhouse emissions by boosting the efficiency at which coal plants convert coal to electricity or other energy forms.

Eight projects were selected under the first-round CCPI solicitation, of which two were withdrawn. Of the remaining six projects supported by the first round of the CCPI, three projects are currently in the operational phase, two are in the construction phase, and one is still in the pre-award phase.

Four projects were recently selected from the second-round CCPI solicitation and are in various stages of development. Of the four projects recently chosen, two will demonstrate advanced integrated gasification combined cycle (IGCC) technology; one will demonstrate an innovative multi-pollutant control process for NOx, SOx, and mercury; and one will demonstrate a neural-network control process for advanced multi-pollutant controls by means of plant optimization.

Revenue Loss/Outlays

The fiscal year (FY) 2007 operating plan for coal research and development appropriations is $60.5 million.

Rationale

The objective of the program is to sharply reduce the air emissions and other pollutants from coal-burning power plants.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Coal.

42. Fusion Energy Sciences

Description

The Fusion Energy Sciences (FES) program is the national research effort to advance plasma science, fusion science, and the fusion technology knowledge-base required for an economically- and environmentally-attractive fusion energy source. Facilities include the DIII-D at General Atomics in San Diego, the Alcator C-Mod at the Massachusetts Institute of Technology, and the National Spherical Tokamak Experiment at the Princeton Plasma Physics Laboratory (PPPL). Assembly of the National Compact Stellarator Experiment (NCSX) is ongoing at PPPL. The Department of Energy is also participating in the President's initiative on ITER (Latin, for "the way") , an international burning plasma fusion experiment.

The goal of the FES program is to "acquire the knowledge base for an economically and environmentally attractive fusion energy source." Although there is not a schedule for developing and deploying fusion energy systems, the availability of fusion as an option for large central station power plants could eventually provide valuable insurance against possible environmental concerns related to fossil and nuclear energy. In addition, there may be nearer-term applications of fusion in transmutation of wastes and isotope production.

Revenue Loss/Outlays

The fiscal year 2007 operating plan for this appropriation was $319 million.

Rationale

To further the understanding of fusion energy.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Nuclear energy.

43. FutureGen

Description

FutureGen was initiated on February 27, 2003, in response to the National Energy Policy Report of May 2001, prepared under the National Energy Policy Developmental Group. The objective of FutureGen was to create a 275-MW coal-fired power plant that would be the world's first to produce electricity and hydrogen while sequestering carbon dioxide emissions. This prototype plant was to serve as a laboratory for clean-coal and hydrogen technology development. The latter being in connection with the development of technology to facilitate the transition to a hydrogen-based economy, including emission-free vehicles. The program was to be partially funded by the FutureGen Alliance, a consortium of major coal companies and electric companies. Other countries were urged to participate in the project. Four potential plant sites were considered by the FutureGen Alliance, which led to the December 2007 announcement of the selection of Matoon, Illinois as the site of the prototype plant.

The project will employ coal gasification technology integrated with combined-cycle electricity generation and the sequestration of carbon dioxide emissions. The project will be supported by the ongoing coal research program, which will also be the principal source of technology for the prototype. The project is expected to require 10 years to complete and will be led by the FutureGen Industrial Alliance Inc., a non-profit industrial consortium representing the coal and power industries, with the project results being shared among all participants and industry as a whole.[256]

Revenue Loss/Outlays

The funding for this program was $54 million in fiscal year 2007.

Rationale

To prove the technical feasibility and economic viability of the near-zero atmospheric emissions of sulfur dioxide, nitrogen oxides, mercury, particulates, and carbon dioxide.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Coal.

[256] The prospects for FutureGen grew uncertain when, in January 2008, the U.S. Department of Energy announced that it intended to restructure FutureGen. The DOE's new FutureGen vision called for "Federal-funding to demonstrate cutting edge CCS (Carbon Capture and Storage) at multiple commercial-scale integrated gasification combined-cycle (IGCC) demonstration plants…Under this new approach multiple plants would produce at least 3000 megawatts of electricity and jointly these projects will capture and safely sequester at least double the amount of carbon dioxide annually compared to the concept announced in 2003." Source: DOE, Fact Sheet, "DOE to Demonstrate Cutting-Edge Carbon Capture and Sequestration Technology at Multiple FutureGen Clean Coal Projects." The DOE cited higher than expected costs for the restructuring. The DOE also stated that the program would be revamped so that DOE would only fund the carbon sequestration element of the program. The restructuring cast strong doubts over whether the prototype plant, selected in December, 2007 for Mattoon, Illinois, would continue.

44. Fuel and Power Systems

Description

The Fuel and Power systems program provides research for FutureGen intended to reduce dramatically coal power plant emissions (especially mercury) and significantly improve efficiency to reduce carbon emissions, leading to a viable near-zero atmospheric emissions coal energy system.

The Innovations for Existing Plants (IEP) program has a near-to mid-term focus to improve overall power plant efficiency and develop advanced cost-effective environmental control technologies, with a focus on mercury, for retrofitting existing power plants and other coal technologies including those developed in support of the FutureGen project.

The Integrated Gasification Combined Cycle (IGCC) program is intended to develop technologies for gas stream purification to meet quality requirements for use with fuel cells and conversion processes.

The Advanced Turbines program is focused on creating the technology base for turbines that will permit the design of near-zero atmospheric emission IGCC plants and a class of FutureGen plants with carbon capture and sequestration

The Carbon Sequestration program's purpose is to develop a portfolio of technologies that would reduce greenhouse gas emissions. The program's goal is to research and develop a portfolio of safe and cost-effective greenhouse gas capture, storage, and mitigation technologies by 2012, leading to substantial market penetration beyond 2012.

The mission of the Fuels program is to conduct the research necessary to promote the transition to a hydrogen economy. Research is intent on targeting cost reduction and increased efficiency of hydrogen production from coal feedstocks.

Advanced Research projects seek a greater understanding of the physical, chemical, biological, and thermodynamic barriers that limit the use of coal and other fossil fuels. The program funds two categories of activity. The first includes applied research programs to develop the technology base needed for the development of super-clean, very high efficiency coal-based power and coal-based fuel systems. The second is a set of crosscutting studies and assessment activities in environmental, technical and economic analyses, coal technology export, and integrated program support.

The objectives of the Fuel Cells activity are to provide the technology-based development of low-cost, scalable, and fuel flexible fuel cell systems that can operate in central coal based power systems as well as having applications in other electric utility (both central and distributed), industrial, and commercial/residential markets.

Revenue Loss/Outlays

The fiscal year 2007 operating plan for coal research and development (R&D) appropriations, excluding the unallocated component, is $311.3 million.

Rationale

To provide an adequate scientific and engineering knowledge base to foster technological advances in the private sector. Also, coal-burning power plants are at the center of the controversies involving global warming.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Coal mining, combustion, liquefaction, and gasification.

45. Industrial Sector Research and Development

Description

The mission of the U.S. Department of Energy (DOE) industrial sector research and development (R&D) program, within the Office of Energy Efficiency and Renewable Energy (EERE), is to improve the energy efficiency, environmental performance, and productivity of energy-intensive industries by rapidly developing and delivering advanced science and technology options that will lower raw material and energy use per unit of output; improve labor and capital productivity; and reduce generation of wastes and pollutants. The energy-intensive industries include forest products, steel, glass, aluminum, chemicals, metal casting, agriculture, petroleum, and mining.

The fiscal year (FY) 2007 goal of this program is to reduce primary nonrenewable energy by 0.03 quadrillion Btu per year in 2010. Carbon dioxide emissions would be reduced by 0.7 million metric tons carbon equivalent per year in 2010.

Revenue Loss/Outlays

The industrial sector program appropriations were $56.6 million in FY 2007.

Rationale

To improve energy efficiency in the industrial sector.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

All fuels, end use.

46. Nuclear Energy Research Initiative and Energy Policy Act of 2005 Related Research and Development

Description

The Department of Energy (DOE) created the Nuclear Energy Research Initiative (NERI) with the intent to address and help overcome technical and scientific obstacles to the future use of nuclear energy in the United States. There are several programs that have been implemented as part of NERI. They include the Generation IV Nuclear Energy Systems Initiative (Gen IV), Nuclear Hydrogen Initiative (NHI), Advanced Fuel Cycle Initiative (AFCI), and Nuclear Power 2010.[257,258]

The goal of Gen IV is to address fundamental research and development issues necessary to establish the viability of next-generation nuclear energy system concepts. The 2007 operating plan provides $45.6 million for the Gen IV initiative to expand research and development that could help achieve the desired goals of sustainability, economics, and proliferation resistance.

The NHI, with funding of $19.3 million, is intended to conduct research and development on enabling technologies, demonstrate nuclear-based hydrogen production technologies, and develop technologies that will apply heat from Gen IV nuclear energy systems to produce hydrogen.

The Advanced Fuel Cycle Initiative, which is an element of the Gen IV effort, is intended to develop a better, more efficient, and proliferation-resistant nuclear fuel cycle. This research and development program focuses on methods to reduce the volume and long-term toxicity of high-level waste from spent nuclear fuel, to reduce the long-term proliferation threat posed by civilian inventories of plutonium in spent fuel, and to provide for proliferation-resistant technologies to recover the energy content in spent nuclear fuel. The focus of this initiative is to be the Global Nuclear Energy Partnership (GNEP). It is funded at $167.5 million in the 2007 operating plan.

GNEP is intended to accelerate work being done under the AFCI program. Advanced recycling technologies are expected to be able to extract highly radioactive elements of commercial spent nuclear fuel and use that material as fuel in fast spectrum reactors to generate additional electricity. The extracted material, which includes all transuranic elements (e.g., plutonium, neptunium, americium, and curium), would be consumed by fast reactors to significantly reduce the quantity of material requiring disposal in a repository with the further benefit of producing power. The plutonium would remain bound with other highly radioactive isotopes, thereby preserving its proliferation resistance and reducing security concerns. With the transuranic materials separated and used for fuel, the volume of waste that would require disposal in a repository would be reduced by 80 percent.

The Nuclear Power 2010 program is funded at $80.3 million in FY 2007 to complete the issuance of three Early Site Permits by the U.S. Nuclear Regulatory Commission (NRC). In addition, the program will complete the industry cost-shared project initiated in FY 2003 to develop generic guidance for the Construction and Operating License (COL) application preparation, to resolve generic COL regulatory issues and to continue the implementation phase of the two New Nuclear Plant Licensing Demonstration Projects awarded in FY 2005.

The Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) contained several provisions intent on promoting current and future nuclear programs.

Subtitle C of Title 5 of EPACT 2005 funds a prototype Next Generation Nuclear Plant Project to produce both electricity and hydrogen. The prototype nuclear reactor and associated hydrogen plant is to be sited at the Idaho National Laboratory (INL) in Idaho. A consortium of industrial

[257] The following objectives have been established for the NERI program: develop advanced reactor and fuel cycle concepts and scientific breakthroughs in nuclear technology to overcome scientific and technical obstacles to expanded future use of nuclear energy in the United States, including issues involving nuclear proliferation, unfavorable economics, and nuclear waste disposition; advance the state of U.S. nuclear technology to maintain a competitive position in overseas and domestic markets; and promote and maintain nuclear science and engineering infrastructure to meet future technical challenges and improve the performance, efficiency, reliability, economics, and other attributes to enhance nuclear energy applications.
[258] Source: U.S. Department of Energy, Nuclear Energy, www.ne.doe.gov/neri/neNERIresearch.html.

partners is to carry out the cost-shared research, development, design, construction and operations of the integrated plant.[259]

Section 951 of Title IX cites eight objectives of nuclear energy research and development. They are: enhancing nuclear power's viability; reducing the likelihood of proliferation; maintaining a cadre of nuclear scientists and engineers; maintaining national laboratory and university programs, supporting individual and multidisciplinary researchers; developing, planning, constructing, acquiring, and operating special research equipment/facilities; supporting technology transfer; and, reducing the environment impact of nuclear energy-related activities.

Section 952 of Title IX (Research and Development) lists the Office of Nuclear Energy's core programs as the Nuclear Energy Research Initiative, Nuclear Energy Systems Support Program, Nuclear Power 2010 Program, Generation IV Nuclear Energy Systems Initiative, and the Reactor Production of Hydrogen. The Nuclear Power 2010 program shall include the use of expertise and capabilities of industry, higher education, and the national laboratories. The Generation IV initiative must examine advanced proliferation-resistant and passively-safe reactor designs that are economically competitive, high in efficiency, low in cost, and improved safety and instrumentation.

Section 953 provides for an Advanced Fuel Cycle Initiative under Title IX (Research and Development, Subtitle E - Nuclear Energy). This section authorizes the Secretary of Energy to conduct an advanced fuel recycling technology, research, development, and demonstration program to evaluate proliferation-resistant fuel recycling and transmutation technologies that minimize environmental and public health and safety impacts.

Section 954 - University Nuclear Science and Engineering Support under Title IX - Research and Development, Subtitle E - Nuclear Energy authorizes the Secretary of Energy to conduct a program to invest in human resources and infrastructure in the nuclear sciences and related fields. This section references the requirements in the program to conduct an undergraduate/graduate fellowship program to attract new talent; conduct a junior faculty research initiation grant program; support fundamental nuclear sciences, engineering, and health physics research; encourage collaborative nuclear research; and, support communication and outreach related to these areas. This section also requires the Secretary of Energy to conduct a fellowship program for university professors and to set up a visiting scientist program at the national laboratories.

Revenue Loss/Outlays

The operating plan for these programs is $319.2 million in FY 2007: $302.6 million for NERI and $16.5 million for university research.

Rationale

To improve the commercial prospects of nuclear power.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Nuclear energy.

[259] Source: U.S. Department of Energy, Nuclear Energy. http://www.ne.doe.gov/energyPolicyAct2005/neEPACT2a.html, accessed October 16, 2007.

47. Oil Technology Research and Development

Description

This program is being phased out. The overall approach of oil technology research and development (R&D) was, first, to identify those types of oil deposits that have both the greatest potential for improved oil recovery and the greatest risk of abandonment within the next 5 to 10 years and, second, to apply available technologies. The technologies to be further investigated are called secondary and enhanced oil recovery. The first generally involves drilling and improved production methods based on sophisticated geological and geophysical interpretation. Enhanced oil recovery includes the injection of chemicals, gases, or heat to overcome physical barriers in the reservoir.

Revenue Loss/Outlays

Oil R&D appropriations were $2.7 million in fiscal year 2007 for the management of the closeout of this program.

Rationale

The enhanced oil recovery research was aimed at capturing a significant portion of the estimated 300 billion barrels left in the ground from past recovery rates and methods. The goal is to preserve access to identified deposits while developing and testing technologies designed to overcome the specific problems that prevent increased oil recovery.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Crude oil production.

48. Renewable Energy Technology Research and Development

Description

The Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy (EERE) energy supply and conservation activities promote the development and use of clean, reliable, efficient, and cost-effective power technologies to meet growing national energy needs, to reduce dependence on foreign energy sources, and to enhance energy security.

The Hydrogen Technology Program, aligned with the Energy Policy Act of 2005 (EPACT2005), focuses on hydrogen production, delivery, storage, and fuel cell technologies. This program supports a $1.2 billion Hydrogen Fuel Initiative to accelerate the development of hydrogen fuel cell vehicle and infrastructure technologies. The program is intended to enable a commercialization decision by industry on fuel cell vehicles and hydrogen infrastructure by 2015. A positive commercialization decision in 2015 could lead to market introduction of hydrogen fuel cell vehicles by 2020. The overall request in fiscal year (FY) 2007 is $289.5 million. Other organizations also contribute to this Presidential Initiative, including:

- Basic hydrogen research in the Office of Science;
- Coal-based hydrogen production research in the Office of Fossil Energy;
- Nuclear-based hydrogen production research in the Office of Nuclear Energy, Science and Technology; and,
- Hydrogen safety-related activities at the U.S. Department of Transportation.

The Biomass and Biorefinery Systems Research and Development (R&D) program intends to accelerate critical research, development and deployment resulting in industrial-scale validation of biorefinery pathways. The program focuses on three areas: (1) platforms R&D, to reduce the cost of outputs and byproducts from biochemical and thermochemical processes; (2) utilization of platform outputs, to develop technologies and processes that co-produce liquid and gaseous fuels, chemicals and materials, and/or heat and power, and integrate those technologies and processes into biorefinery configurations; and (3) feedstock infrastructure, to develop cost-effective biomass harvesting, storage and delivery systems, and to develop energy supply crops suitable for diverse regions and climates.

The Solar Energy Program focuses on R&D to enable cost effective development of solar power that will reduce U.S. demand for natural gas and promote a cleaner environment. Through the Department's new Solar America Initiative (SAI), the Solar Energy Program intends to accelerate the market competitiveness of solar electricity from photovoltaic (PV) systems

The Wind Energy Program intends to develop and promote the use of advanced technologies to harness wind resources. The program focus is on developing low-wind-speed utility scale technology, through leveraged partnerships with industry, to substantially increase the economically viable wind resource base across the country.

Since 1974, the Geothermal Technology Program has worked in partnership with U.S. industry to establish geothermal energy as an economically competitive contributor to the U.S. energy supply. The Department planned to conclude the Geothermal Technology program in FY 2007 and transfer results of its research and development work related to geothermal technology to industry and state and local governments. However, the program was resuscitated with appropriations in 2008 and an appropriation request in 2009.[260]

The Vehicle Technologies Program supports the Freedom CAR and Fuel Partnership and the 21st Century Truck Partnership, to enable light-and heavy-duty highway transportation to become more efficient. Technology research includes advanced lightweight materials, advanced batteries, improved power electronics, electric motors, and advanced combustion engines and fuels.

[260] A Massachusetts Institute of Technology report prepared under a Idaho National Laboratories Subcontract sponsored by the Department of Energy's Assistant Secretary for Energy Efficiency and Renewable Energy, Office of Geothermal Technologies, concluded that Enhanced Geothermal Systems could provide 100,000 Megawatts of base-load electric-generating capacity by 2050. Source: "The Future of Geothermal Energy, Impact of Enhanced Geothermal Systems (EGS) in the United States in the 21st Century," Massachusetts Institute of Technology, ISBN: 0-615-13438-6, 2006.

Building Technologies (BT) Program develops technologies, techniques and tools for making residential and commercial buildings more energy efficient, productive, and affordable. The portfolio of activities includes efforts to improve the energy efficiency of building components and equipment , including the advancement of solid state lighting technologies for general illumination, and their effective integration using whole -building-system-design techniques; the development of energy efficient building codes and equipment standards; and integration of clean renewable energy systems into building design and operation.

Industrial Technologies Program (ITP) works to reduce the energy intensity of the U.S. industrial sector through a coordinated program of research and development, validation, and dissemination of energy -efficiency technologies and operating practices.

The Federal Energy Management Program (FEMP) advances energy efficiency and water conservation and promotes the use of renewable energy in federal agencies, including the Department of Energy. FEMP also evaluates and reports the progress in these areas to the President and Congress.

The Facilities and Infrastructure activity supports capital investments to support research and development program at the National Renewable Energy Lab (NREL). The Weatherization and Intergovernmental Activities program deploys energy efficient and renewable energy products into the marketplace, and funds Weatherization Assistance and State Energy Program grants.

The Program Support account provides for program measurement and strategic direction, as well as for technology advancement and outreach. Technical Advancement and Outreach activities provide the public with accurate information on energy efficiency and renewable energy technologies to help the public make better energy choices.

Revenue Loss/Outlays

The fiscal year 2007 operating plan for Renewable Energy Technology R&D is $962.6 million.

Rationale

EERE conducts research, development, and deployment activities in partnership with industry to advance a diverse supply of reliable and affordable energy efficiency and clean power technologies and practices.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

The program includes wind, solar, hydrogen technology, biofuels and biomass, geothermal, hydroelectric, and electricity delivery and energy reliability.

49. Environmental Management

Description

After the Department of Energy (DOE) ceased most nuclear weapons production operations in the late 1980s, it established a program to manage the legacy of contamination resulting from the operation of the largest government-owned industry. DOE manages thousands of contaminated areas and buildings, huge waste volumes, and nuclear materials left over from the nuclear weapons production and process and nuclear-related research efforts. This program supports activities that manage and address the environmental legacy resulting from civilian nuclear energy research. The nuclear energy research and development of DOE and its predecessor agencies generated waste and contamination that pose unique problems, including large quantities of contaminated soil and groundwater and a number of contaminated structures. Upon completion of cleanup activities, these sites or portions of a site will be turned over to other DOE program landlords or to the Office of Legacy Management for long-term surveillance and maintenance.

Non-Defense Environmental Cleanup provides funding in several accounts: Fast Flux Test Reactor Decontamination and Decommissioning (D&D), Gaseous Diffusion Plants, Small Sites, and the West Valley Demonstration Project. Funding for the Small Sites account includes projects at Argonne National Laboratory, Brookhaven National Laboratory, the Energy Technology Engineering Center (ETEC), Idaho National Laboratory, the Inhalation Toxicology Laboratory, Los Alamos National Laboratory, Moab, and the Stanford Linear Accelerator Center.

Revenue Loss/Outlays

The Non-Defense Environmental Management fiscal year 2007 budget in the operating plan is $349.7 million.

Rationale

To clean up and close contaminated nuclear weapons sites. After cleanup there will be no further DOE presence, with the exception of long-term surveillance and maintenance.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Nuclear contamination.

50. Clean Cities Program

Description

The Clean Cities program, sponsored by the Department of Energy's Office of Energy Efficiency and Renewable Energy's FreedomCAR and Vehicle Technologies Program (FCVT), was established in 1993 to advance the economic, energy, and environmental security of the United States by partnering with local jurisdictions to reduce petroleum consumption in the transportation sector. Clean Cities works through a network of 80 volunteer, community-based coalitions, which develop public/private partnerships to promote the use of alternative fuels and vehicles, expand the use of fuel blends, encourage the use of fuel economy practices, increase the acquisition of hybrid vehicles by fleets and consumers, and advance the use of idle-reduction technologies in heavy-duty vehicles.

The Clean Cities program provides its coordinators support in the following areas: market and technology analysis; tools and information; technical assistance; funding; partnerships and alliances; and training; and events. Clean Cities has a sister program "Clean Cities International."

Clean Cities coalitions have increased the number of alternative-fuel vehicles (AFVs) on the road every year since 1993, with gains averaging 15-percent in recent years. In 2005, the program reached the milestone of displacing one billion gallons of petroleum.

Rationale

Reduce petroleum consumption in urban transportation.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Petroleum end use.

51. Army Corps of Engineers/Bureau of Reclamation Hydropower Projects

Description

The Department of the Interior's Bureau of Reclamation and the Army Corps of Engineers are both engaged directly and indirectly in hydroelectric power. Both agencies are charged with the construction, operation, and maintenance of Federal hydroelectric facilities. The Corps of Engineers operates nationwide, whereas the Bureau of Reclamation conducts its activities only in 17 western States.

The direct costs of maintenance and operation in producing hydroelectricity are paid by the Power Marketing Administrations (PMAs), which purchase and resell the power; however, the indirect costs of the projects are not allocated to electricity production. Typically, construction of dams has been primarily for the benefits of irrigation, municipal water supply, and flood control, and only secondarily for the production of power. Construction costs incurred for flood control, recreation, and fish and wildlife purposes are nonreimbursable and are borne by users of irrigation, municipal water supply, and power generation. Thus, the costs of construction for power generation need to be pro-rated accordingly. Moreover, when the Corps of Engineers dredges a waterway to facilitate navigation, and that waterway flows to a hydroelectric facility, silting at the dam is reduced, increasing the life of the dam and reducing maintenance costs. The costs are registered not for hydroelectric power generation but for navigation.

Essentially, most of the fixed costs of developing the hydroelectric sites have been paid by the Federal government for other reasons. It may well be that, were it not for the other reasons, electric power would not have been available until later in the affected areas. The value of the economic development, although difficult to estimate, can be seen as resulting from the availability of relatively inexpensive hydropower.

Revenue Loss/Outlays

The direct costs of power are reimbursed by the PMAs. The imputation of indirect costs borne by the Corps of Engineers or the Bureau of Reclamation for electricity production is difficult to estimate, in part because Federal reclamation law allows cross-subsidization among projects. Thus, users of the electricity reimburse not only the construction costs allocated to power generation but also some portion of the construction costs incurred for irrigation.

Rationale

The original rationale for Federal involvement with hydroelectric plants was that the cost of adding hydroelectric capability to dams was small in comparison with the perceived benefits of economic development.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Hydropower, electricity generation.

52. ENERGY STAR Program

Description

According to the Department of Energy: “ENERGY STAR is a voluntary labeling program sponsored by the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA). The ENERGY STAR label helps businesses and consumers easily identify highly efficient products, homes, and buildings that save energy and money, while protecting the environment.”

DOE works with manufacturers and standards organizations to develop technical requirements and qualifications defining ENERGY STAR status. A number of manufacturers have redesigned their products to achieve maximum energy and even water savings. ENERGY STAR-labeled clothes washers, for example, use 35 percent to 50 percent less water and 50 percent less energy per load than conventional washers.

More than 100 lighting manufacturers produce ENERGY STAR-qualified compact fluorescent bulbs (CFLs). With advanced technology, CFLs use 75 percent less energy than a standard incandescent bulb and last up to 10-times longer. Likewise, over 350 manufacturers produce ENERGY STAR-qualified windows and window components. ENERGY STAR-qualified windows can save 15-percent on a household's total energy bill. All together, the ENERGY STAR label appears on over 30 categories of products.

ENERGY STAR retail partners promote recognition and purchase of ENERGY STAR-labeled products. In 2001, they sold more than 1.7 million ENERGY STAR-labeled appliances sold. Many retail partners also support a wide range of ENERGY STAR promotional activities such as radio ads, in-store displays, and appliance rebates to educate consumers about the benefits of ENERGY STAR.

The typical U.S. household spends about $1,300 on home energy bills. ENERGY STAR states that its approved products can save consumers up to 30 percent on those energy bills, without sacrificing features, style, or comfort.

Rationale

Promotes energy efficiency, lower energy costs to consumers and environmental quality.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Electricity and residential natural gas.

53. Federal Energy Management Program

Description

The Federal Energy Management Program (FEMP) was established in 1974 to provide direction, guidance, and assistance to Federal agencies in planning and implementing energy management programs. The mission of FEMP is to reduce the cost of the Federal government by advancing energy and water efficiency, promoting renewables, and managing utility costs. Section 543 of the National Energy Conservation Policy Act, as amended by the Energy Policy Act of 1992 (EPACT1992), requires each agency to achieve: a 10-percent reduction in energy consumption in its Federal buildings by fiscal year (FY) 1995, when measured against a FY 1985 baseline on a Btu-per-gross-square-foot basis; and a 20-percent reduction in Btu per gross square foot by FY 2000. Furthermore, agencies were required to achieve a 30-percent reduction by fiscal year FY 2005 per Executive Order 12902, issued in 1994.Executive Order 13123, issued in June of 1999, "Greening the Government Through Efficient Energy Management" supersedes Executive Order 12902. Executive Order 13123 encourages effective energy management in the Federal government and builds on work begun under EPACT1992 and previous Executive Orders. The goals of the order include:

- Through life-cycle cost-effective energy measures, each agency shall reduce its greenhouse gas emissions attributed to facility energy use by 30 percent by 2010, compared to such emissions levels in 1990.
- Through life-cycle cost-effective energy measures, each agency shall reduce energy consumption per gross square foot of its facilities, excluding facilities covered in other sections of this order, by 30 percent by 2005 and 35 percent by 2010 relative to 1985.
- Through life-cycle cost-effective energy measures, each agency shall reduce energy consumption per square foot, per unit of production, or per other unit as applicable by 20 percent by 2005 and 25 percent by 2010 relative to 1990.
- Each agency shall try to expand the use of renewable energy within its facilities and in its activities by implementing renewable energy projects and by purchasing electricity from renewable energy sources. In support of the Million Solar Roofs initiative, the Federal government shall strive to install 2,000 solar energy systems at Federal facilities by the end of 2000 and 20,000 solar energy systems at Federal facilities by 2010.
- Through life-cycle cost-effective energy measures, each agency shall reduce the use of petroleum within its facilities.
- The Federal government shall strive to reduce total energy use and associated greenhouse gas and other air emissions, as measured at the source.
- Through life-cycle cost-effective measures, agencies shall reduce water consumption and associated energy use in their facilities to reach the goals set in the Order.

Section 104 The Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) provides further direction to Federal agencies implementation of FEMP. Specifically, it directs Federal agencies to purchase ENERGY STAR and FEMP-designated products, except when it is not cost-effective or does not meet functional requirements.

Revenue Loss/Outlays

Funding for FEMP, $23.8 million in FY 1999 and zero in FY 2007, is not included in the tables of this report, although it appears in the End Use R&D category of the Department of Energy budget, because the impact of the program is primarily internal to the Federal government. Funds are used for education, training, and encouragement of third-party investments.

Rationale

The purpose of FEMP is to reduce the Federal government's total cost of utility services, i.e. energy and water through adoption of energy efficiency measures evaluated on a life-cycle cost basis. The program also promotes the expanded use of renewable technologies.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Energy and water efficiency, renewable energy technologies, end-use.

54. Loan Guarantees for Innovative Technologies

Description

Title XVII of the Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) provides loan guarantee incentives for Innovative Technologies. This title allows the Secretary of Energy to provide loan guarantees for up to 80 percent of eligible project costs after consultation with the Secretary of the Treasury. The guarantee is applicable for projects that avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases and employ new or significantly improved technologies as compared to commercial technologies in service in the United States today. No guarantee shall be made unless an appropriation for the cost has been made or the Secretary of Energy has received from the borrower a payment in full for the cost of the obligation and deposited the payment into the Treasury. The incentive covers a broad range of technologies and also includes advanced nuclear energy facilities. Other projects eligible for loans include wind, photovoltaic, biomass, hydropower facilities, and advanced fossil energy technologies, such as integrated gasification combined cycle, industrial gasification, petroleum coke gasification. Efficiency improvements to end-use technologies also qualify for loans. These may include: hydrogen fuel technology for residential, industrial, or transportation applications, carbon capture and sequestration technologies, and agriculture and forestry technologies that reduce carbon dioxide emissions.

On February 15, 2007, Section 20320(a) of the Revised Continuing Appropriations Resolution (Public Law 110-5) authorized the Department of Energy (DOE) to issue loan guarantees under Title XVII of EPACT2005 for loans in the total principal amount of $4 billion. EPACT2005 also required that not later than 120 days after the date of enactment of this division, and annually thereafter, the Secretary of Energy shall transmit to the Committees on Appropriations of the House of Representatives and the Senate a report containing a summary of all activities under Title XVII of the Energy Policy Act of 2005. On May 16, 2007, DOE issued a Notice of Proposed Rulemaking (NOPR, 72 FR 27471) to establish regulations for the loan guarantee program. On October 4, 2007, DOE invited 16 project sponsors, who submitted pre-applications in late 2006, to submit full applications for loan guarantees. The projects submitted included advanced technologies including biomass, fossil energy, industrial energy efficiency, electricity deliverability, and energy reliability, hydrogen, and alternative-fuel vehicles. On October 23, 2007, DOE issued final rules (10 C.F.R.609) establishing policies, procedures, and requirements for the loan guarantee program in the Federal Register. The final regulation specified DOE decision to guarantee up to 100 percent of a qualifying loan, as long as the loan does not exceed 80 percent of the cost of a project. The guaranteed portion of a partially guaranteed loan may be separated from or “stripped” from the non-guaranteed portion, except in cases where the guarantee exceeds 90 percent of the loan amount.

The final regulation also required that eligible projects must deploy new or significantly improved technologies that avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases as compared to commercial technologies in service in the United States at the time the loan guarantee agreement is executed. DOE also stipulated that a project’s receipt of other government assistance does not disqualify a project from receiving a Title XVII loan guarantee; however, when evaluating a projects application for a loan guarantee, DOE will consider the extent to which the project will receive other government assistance, e.g., grants, tax credits, other loans.

In a report released in April of 2007, the Government Accountability Office (GAO) noted that the DOE will “have to estimate the subsidy costs to determine the fees to charge borrowers." GAO also noted that “estimated subsidy costs could be difficult because the program targets innovative technologies whose future success is uncertain, and loan performance could depend heavily on future economic conditions, including energy prices, which are hard to predict accurately.”[261]

[261] Government Accountability Office, *Department of Energy Observations on Actions to Implement the New Loan Guarantee for Innovative Technologies*, GAO-07-798T (Washington, DC, April 2007).

Revenue Loss/Outlay

No loans were guaranteed in fiscal year (FY) 2007. Therefore, there were no costs associated with default risk and the only expenses were administrative. FY 2006 administrative budget amounted to roughly $503,000. In the full-year Continuing Resolution that was enacted into law on February 15, 2007, Congress provided DOE with $7 million to fund the operation of its Loan Guarantee Office, and authority to issue guarantees for up to $4 billion in loans. The President has requested $8.4 million for operation of the DOE Loan Guarantee Office in FY 2008.

Rationale

To promote innovative technologies in energy production and energy usage.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Projects eligible for loans include advanced nuclear, wind, photovoltaics, biomass, hydropower facilities, solar and advanced fossil energy technologies, such as integrated gasification combined cycle, industrial gasification, and petroleum coke gasification. Efficiency improvements to end-use technologies also qualify for loans. These may include: hydrogen fuel technology for residential, industrial, or transportation applications, carbon capture and sequestration technologies, and agriculture and forestry technologies that reduce carbon dioxide emissions. Also included are alternative-fuel vehicles, electricity reliability investments, industry energy efficiency projects, and pollution control equipment.

55. Nuclear Power Plant Construction Delay Support

Description

Section 638 under Title VI of the Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) provided standby support for certain nuclear power plant delays. This section allows the Secretary of Energy to enter into contracts for standby support for delays for up to a total of six reactors of no more than three different reactor designs. Covered delays include the failure of the Nuclear Regulatory Commission (NRC) to comply with schedules for review and approval of inspections or the conduct of hearings, in addition to litigation that delays full-power operation. The Secretary of Energy would pay 100 percent of the covered costs for the first two reactors that have received a combined license and for which construction has begun. However, the Department of Energy would not cover any costs that result in a failure of the project sponsor to take any action required by law or regulation or any events within the sponsor's control. Covered costs would include principle or interest on debt coverage, and the difference on the fair market price of purchase power and contractual price of power from the plant, up to a total of $500 million. For the next four reactors, the Secretary would pay 50 percent of the covered costs (principal and interest and purchase power difference) of a delay, up to $250 million. Covered costs are subject to the Secretary of Energy receiving appropriations or payments from project sponsors sufficient to pay such covered cost.

Revenue Loss/Outlays

NA.

Rationale

To remove barriers to new nuclear power investment related to uncertainty regarding construction time horizons.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Nuclear power.

56. Nuclear Waste Fund[262]

Description

The Nuclear Waste Policy Act of 1982 (NWPA)(Public Law 97-425) established the Federal government's responsibility and statutory framework to provide for permanent disposal of commercially-generated spent nuclear fuel and the high-level radioactive waste generated by the Nation's nuclear defense activities. The Department of Energy (DOE), as directed by the Act, initially undertook a national screening exercise to evaluate candidate repository sites. In 1986, at the conclusion of this scientific screening activity, DOE recommended three sites to the President for further study as potential repositories. Congress, however, in the Nuclear Waste Policy Amendments Act of 1987, directed DOE to investigate only one site at Yucca Mountain, Nevada, for possible development as a geologic repository.

The Conference Report to the fiscal year 1997 Energy and Water Appropriations Act directed DOE to complete a Viability Assessment for the Yucca Mountain site. This report was completed and sent to Congress in December 1998. In 2002, Congress approved and the President signed into law the Yucca Mountain Development Act (House Joint Resolution 87, Public Law 107-200) which completed the site selection process mandated by the Nuclear Waste Policy Act and approved the development of a repository at Yucca Mountain. In 2006, DOE announced that it had plans to submit to the Nuclear Regulatory Commission a license application for a Yucca Mountain repository by June 2008. Currently, under the DOE's "best-achievable" schedule, the repository will open in 2017. The Yucca Mountain Project is the primary activity of the Office of Civilian Radioactive Waste Management. DOE studied Yucca Mountain for 20 years to determine its potential as a repository.

In March 2007, the Secretary of Energy announced that he would send to Congress a legislative proposal to improve the Nation's ability to manage and dispose of defense-related and commercially-produced nuclear waste.

Revenue Loss/Outlays

The fund is paid for by the users of the disposal service. The NWPA provides for two types of fees to be paid by utilities for management and disposal of commercial spent nuclear fuel: an ongoing fee of 1 mill (one tenth of a cent) per kilowatthour (kWh) of electricity generated and sold on or after April 7, 1983, and a one-time fee for electricity generated and sold prior to April 7, 1983. The NWPA directed that the utility fees be paid into the Nuclear Waste Fund, a separate account established in the U.S. Treasury. The funding for the program's activities consist of appropriations principally from two sources: the Nuclear Waste Disposal Appropriation and the Defense Nuclear Waste Disposal Appropriation. The budget requests a total of $651 million in budget resources for the Civilian Radioactive Waste Management Program in fiscal year (FY) 2006. Appropriations totaled $495 million. The FY 2007 request was $545 million with appropriations of $445 million. (All figures are expressed in nominal dollars.) In early 2007, payments and interest credited to the fund were approximately $28 billion.

Rationale

To develop a permanent repository site that will enable the Nation to advance its plans for the disposition of nuclear waste.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Nuclear power waste storage.

[262] In addition to the direct expenditures, tax expenditures, R&D expenditures, and government support for Federal electricity discussed in the body of this report, the Federal government intervenes in energy markets through its sponsorship of trust funds, which are related to energy production. These funds are intended to be self supporting. However, the Federal government faces potential risks in the event that these funds should face revenue shortfalls.

57. Power Marketing Administrations

Description

In the past, the Federal government has sought to advance development in rural areas through its Power Marketing Administrations (PMAs): Bonneville (BPA), Southeastern (SEPA), Southwestern (SWPA), and Western Area (WAPA). The Alaska Power Administration was sold in 1998, more than 10 years after privatization of all the PMAs was first proposed by the Executive Branch. The sale of the Alaska Power Administration was achievable largely because of its small size (by far the smallest of the PMAs) and because it operated strictly as an electricity generator, with no transmission operations or non-energy activities, such as flood control, irrigation, or recreation. Much of the activity of the PMAs consists of marketing power produced by the U.S. Army Corps of Engineers and Bureau of Reclamation hydropower projects. The four PMAs sell electricity primarily generated by hydropower projects located at Federal dams. Preference in the sale of power is given to public entities and electric cooperatives. Support to the PMAs include: (1) low-interest loans; (2) preferential repayment schedules; (3) debt forgiveness; and (4) no primary taxation, such as property or income tax.

Bonneville Power Administration

BPA, by far the largest PMA, can be used as an example to describe Federal support. As part of the New Deal, BPA was created by Congress to sell the power generated from Federal dams in the Columbia Basin. Publicly-owned utilities were given preferential customer status to the power. The law called for the PMAs to be self-supporting by offsetting their cost from the fees charged for power; however, even if BPA always repaid its debt on time and covered all its other accounting (historical) costs, the rates charged for electric power still would not cover the true cost of providing the power.

BPA serves 3 million customers and supplies about half of all power in the Northwest. Its 15,000 mile transmission network accounts for 75 percent of the bulk transmission system in the Northwest. BPA markets power from 31 dams and 1 nuclear power plant. [263] Its service territory includes Oregon, Washington, Idaho, Western Montana, and small parts of California, Eastern Montana, Nevada, Utah, and Wyoming. BPA provides about 35 percent of the power consumed in the Pacific Northwest. BPA's service territory covers 300,000 miles and 12 million people. BPA serves 57 electric cooperatives, 41 municipalities, 29 public utility districts, 7 Federal agencies, 6 investor-owned utilities (IOU), 5 direct-service industries, 1 port district and 2 Indian tribes.[264] Forty-seven percent of BPA's power sales goes to public utilities, 18 percent is sold outside the Northwest, and 13 percent is sold to IOUs.

Southeastern Power Administration

SEPA markets electricity in 11 States: Alabama, Florida, Georgia, Illinois, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. In 2005, the utility had 22 hydroelectric projects with 3,392 megawatts of generating capacity and sold 8.7 billion kilowatthours of electricity to 494 wholesale customers for $220 million. It sold power to 293 public bodies, 199 electric cooperatives, and 2 IOUs.[265] Unlike the other PMAs, SEPA does not own a transmission system.

Southwestern Power Administration

SWPA markets power from 24 hydroelectric power plants operated by the Army Corps of Engineers to customers in Arkansas, Kansas, Louisiana, Missouri, Oklahoma, and Texas. SWPA has 2,174 megawatts of generation capacity and operates 1,380 miles of transmission lines. In 2006 it marketed and delivered 2.3 billion kilowatthours of electricity, 57 percent of which went to electric cooperatives, 25 percent to municipalities and 2 percent to government agencies.[266]

[263] All of these dams were completed prior to 1977, the first to be completed in 1909.
[264] BPA fast facts, http://www.bpa.gov/corporate/about_BPA/Facts/FactDocs/BPA_Facts_2006.pdf, accessed October 11, 2007.
[265] Southeastern Power Administration, Southeastern Power Administration 2005 Annual Report, p 2.
[266] Southwestern Power Administration 2004-2006 Annual Report, pp. 4 and 15.

Western Area Power Administration

WAPA was established by the Congress in the 1977 under Section 302 of the Department of Energy Organization Act (Public Law 95-91) to manage power marketing and transmission operations that previously were under the responsibility of the U.S. Department of Interior's Bureau of Reclamation. WAPA markets power in Arizona, California, Colorado, Iowa, Kansas, Montana, Minnesota, Nebraska, Nevada, New Mexico, North Dakota, South Dakota, Texas, Wyoming, and Utah. It operates 17,000 miles of transmission lines and sells power from 56 hydroelectric generation facilities owned and operated by the Army Corps of Engineers, the Bureau of Reclamation, and the International Boundary and Water Commission.[267] In 2005, WAPA sold 36 billion kilowatthours of electricity, 25 percent to municipalities, 23 percent to State agencies, 20 percent to cooperatives, and the remaining 32 percent to various other users. The utility receives annual appropriations from the Congress to cover all expenses associated with its power and other activities. Its power rates are set to recover those costs, along with all costs associated with debt servicing.[268]

Similar to the Tennessee Valley Authority (TVA), WAPA also engages in some non-Federal capital acquisition. In some cases, WAPA has relied on customers as a source of funds for expanding its electric power capacity through customer advance payments on power under co-sponsoring arrangements with entities for construction, operation and maintenance.[269] WAPA has also received loans from State governments.

Revenue Loss/Outlays

In 2006, the Treasury's estimated net financing costs for the PMAs ranged from $89 million (2007 dollars) to $393 million.

Rationale

PMA were intended to promote economic development in areas where it was felt that private enterprise would not offer electric power and in part because of the nature of the regional economy. The flexible repayment approach was adopted in view of the significant variability in revenues associated with hydroelectric power, a major source of power for some PMAs. The PMAs calculate and repay interest expenses, and all other expenses, in accordance with their statutes and applicable DOE orders.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Electricity generation, transmission, distribution, and end use.

[267] The one thermal plant that WAPA markets power from is the Navajo Generating Station. This unit is, however, not owned by WAPA, and is therefore not added into the subsidy calculation. Source: Western Area Power Administration, Western Area Power Administration 2006 Annual Report, p. 35.
[268] Western Area Power Administration 2005 Western Profile, p. 5.
[269] Western Area Power Administration 2006 Annual Report, p. 39.

58. Price-Anderson Fund[270]

Description

A Federal regulation that continues to have a cost-reducing effect on the nuclear power industry is the Price-Anderson Act of 1959, which placed a limit of $560 million on the liability of individual nuclear power plants for damage resulting from any one accident This limit provides a subsidy to the nuclear industry to the extent that insurance premiums paid by the operators of individual plants are reduced.

The Energy Policy Act of 2005 (EPACT2005) (Public Law 109-58) introduced significant modifications to Price-Anderson. Section 602 of EPACT2005 extends the indemnification authority of the Atomic Energy Act. The indemnification of certain Nuclear Regulatory Commission licensees is extended from December 31, 2003, to December 31, 2025. The indemnification of department contractors is extended from December 31, 2006, to December 31, 2025, and the indemnification of nonprofit educational institutions is extended from August 1, 2002, to December 31, 2025. This is the fifth time that the Price Anderson Act has been extended since it inception in 1957.

For commercial nuclear power plants, the Price-Anderson Act provides for a two-layer compensation system to pay public liability claims. The first layer consists of a set amount of insurance for each reactor site currently available from the private insurance market. Licensed reactors in the United States. are also required to carry private insurance which is now valued at $300 million.[271] The second is provided by funds made available through an assessment on each licensed reactor of a pro-rated share not to exceed a specified amount. EPACT2005 raised the maximum total charge per reactor per accident to $95.8 million from $63 million and added an inflation adjustment factor. Section 603 of EPACT2005 also raised the annual secondary level payout from $10 million to $15 million, which will be adjusted for inflation.

This is not the first time that the insurance premiums have been raised. In order to make a larger pool of money available to pay public liability claims, the 1988 amendments to the Act increased maximum secondary insurance assessments from the $5 million (nominal dollars) established in 1975 to $63 million per reactor per incident, which was to be adjusted for inflation at 5-year increments effective in August. The 1988 amendments also increased potential liability limits to $7.34 billion ($200 million primary insurance and $7.14 billion secondary insurance coverage) per accident. The 1988 amendments extended the Price-Anderson Act for 15 years, to August 1, 2002.

The Department of Energy (DOE) is required by the Price-Anderson Amendments Act, a Federal law, to protect its contractors from legal claims that may arise as the result of a nuclear accident that occurs at a DOE facility. Price-Anderson also allows the DOE to establish nuclear safety rules that its contractors must follow, and gives DOE authority to fine contractors for violating those rules.

Section 604 of EPACT2005 limits the indemnity provided by the DOE for its contractors to $10 billion, subject to adjustment for inflation, for each nuclear incident, including legal costs.

Section 608 of the EPACT2005 clarifies the treatment of modular reactors as a single facility or multiple facilities. Two or more facilities located at a single site, each having a rated capacity of 100,000 electrical kilowatts or more but not more than 300,000 electrical kilowatts, will be considered a single facility, with a combined rated capacity of not more than 1,300,000 electrical kilowatts.

In a 1983 study, the Nuclear Regulatory Commission concluded that the liability limits established by the Price-Anderson Act constitute a subsidy; however, the subsidy was not quantified. At issue are the probability distributions for various kinds of accidents on a plant-by-plant basis. From

[270] In addition to the direct expenditures, tax expenditures, R&D expenditures, and government support for Federal electricity discussed in the body of this report, the Federal government intervenes in energy markets through its sponsorship of trust funds, which are related to energy production. These funds are intended to be self supporting. However, the Federal government faces potential risks in the event that these funds should face revenue shortfalls.

[271] Congressional Research Service, *Energy Policy Act of 2005: Summary and Analysis of Enacted Provisions* (Order Code RL33302) (Washington, DC, March 2005), p.39.

those distributions, the amount of the subsidy can be estimated by calculating the effect of the liability limit on the operators' insurance premiums.

There is an implied subsidy in the form of reduced insurance premiums per operating unit which reduces the operating costs of commercial nuclear power plants. The Federal government acts as an insurer for DOE contractors against any finding of liability arising from nuclear activities of the contractor within the scope of the contract. Price-Anderson coverage could become more critical with the significant increase in potential radioactive waste shipments which can be anticipated in both the near- and long–term horizon. An increase in shipments is likely to stem from a variety of sources, including the decommissioning and decontamination of nuclear reactors, DOE and Department of Defense environmental restoration activities, and shipments of spent nuclear fuel and high-level radioactive waste under the Nuclear Waste Disposal Act.

Revenue Loss/Outlays

There are no associated revenue losses or budgetary outlays at this time. However, Federal outlays could rise if the Federal government is forced to clean up a nuclear incident in excess of individual liability limits. As the Act limits liability, it reduces the cost of insurance to the owners of nuclear power plants and nuclear activities at DOE sites and, hence, reduces the cost of nuclear power and other nuclear activities.

Rationale

To meet two basic objectives: remove the deterrent to private-sector participation in atomic energy presented by the threat of potentially enormous liability claims in the event of a catastrophic nuclear accident, and ensure that adequate funds are available to the public to satisfy liability claims if such an accident were to occur.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Nuclear power production and other nuclear activities.

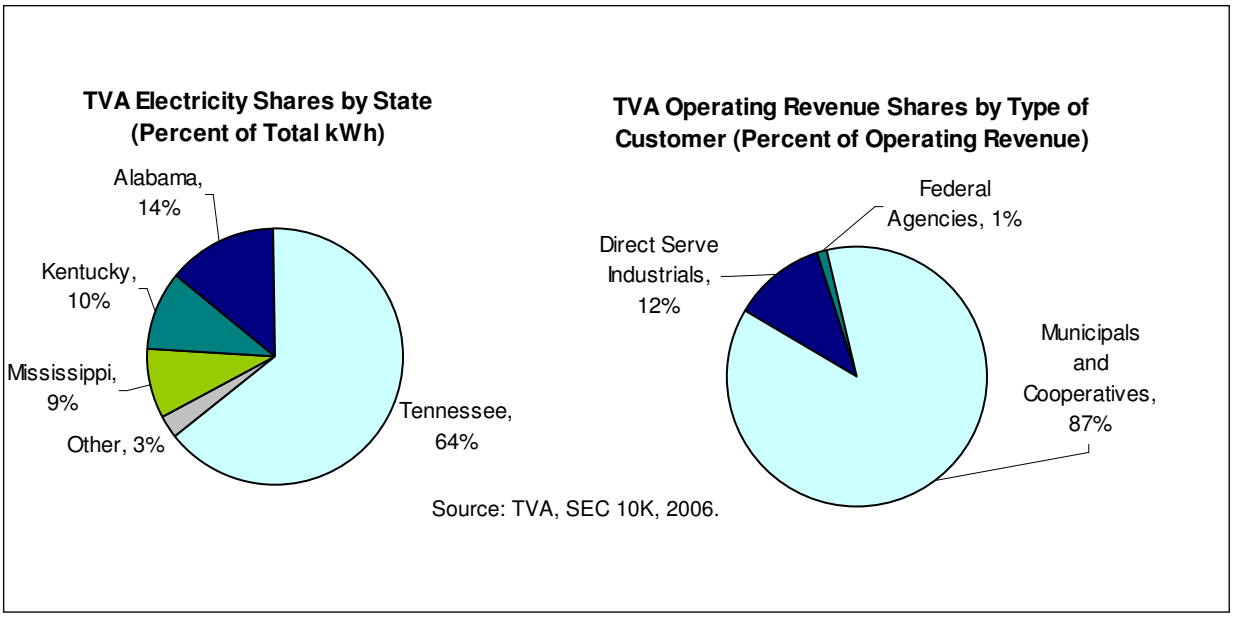
59. Tennessee Valley Authority

Description

The Tennessee Valley Authority (TVA) was established in 1933 under the Tennessee Valley Act (Public Law 73-17, 48 Stat. 58). Its original purpose was to promote economic development in the Tennessee Valley, to improve navigation, and to aid in flood control. TVA is far and away the largest of the Federal utilities, having an asset base greater than that of the four PMAs combined. TVA is operated as an independent government-owned corporation for the unified development of the Tennessee River Basin, which comprises parts of 7 States . The company's retail customers include 62 large industrial concerns and Federal agencies. In 2006, it operated 17,000 miles of transmission lines and 29 hydropower dams, 11 fossil fuel plants, 5 nuclear units, 6 combustion turbine plants, and 8 diesel units. With the restart of Browns Ferry I in 2007, TVA now operates 6 nuclear units at 3 plants with a total nuclear generation capacity of 7,000 megawatts (MW). In total, TVA has 34,951 MW of winter generating capacity[272] and is one of the Nation's largest wholesalers of electricity, with sales of 156 billion kilowatthours in 2006. TVA's operating revenues totaled $9.2 billion in 2006.

TVA's service territory covers 8.7 million people located in nearly all of Tennessee and parts of Alabama, Kentucky, North Carolina, Mississippi, Georgia, and Virginia. Tennessee accounted for 64 percent of TVA's electricity sales. Its wholesale customers include 108 utilities and 20 electric cooperatives. TVA received 87 percent of its revenue from cooperatives. In 2006, generation from fossil fuels accounted for 64 percent of TVA's total generation in 2006, while nuclear generation accounted for 29 percent, and hydroelectric generation accounted for 6 percent of the total.[273]

Figure A1. TVA Electricity Shares by State & Operating Revenue Shares by Customer



The Stewardship Program includes maintaining a system of dams, reservoirs, and navigational facilities and, among other things, maintaining and managing 230,000 acres of public land and 11,000 miles of shoreline. TVA operates and maintains the navigation channel from Paducah, Kentucky, to Knoxville, Tennessee; operates a system of multipurpose reservoirs to retain excessive seasonal runoff and regulate discharges at flow rates that can be accommodated by downstream channels and reservoirs (resulting in the reduction of flood crests); performs dam safety modifications and maintenance activities; operates dewatering areas associated with TVA's

[272] Tennessee Valley Authority, Tennessee Valley Authority 10-K, 2006, p. 14.
[273] Tennessee Valley Authority, Tennessee Valley Authority 10-K, 2006, pp. 6, 14, 11, 18.

reservoir system; and performs environmental research services at its Muscle Shoals Reservation.

The Water and Land Program is intended to aid conservation. TVA operates an air-quality monitoring network, monitors water quality, promotes the wise use of forest resources in the region, and prepares maps for its own needs and to help the U.S. Geological Survey.

The Power Program provides power to an area of 80,000 square miles in the seven Tennessee Valley States. TVA owns and operates a substantial mix of hydroelectric, coal, natural gas turbine, and nuclear power plants.

Revenue Loss/Outlays

The TVA has a complicated financial structure, historically funded through a combination of power and nonpower revenues, borrowing, and direct Federal appropriations. In comparison with the interest rates paid by investor-owned utilities (IOUs), TVA is estimated to have benefited from Federal government support of $65 million to $189 million (2007 dollars) in 2006 because of the utility's artificially low borrowing costs.

Although TVA is unregulated and was committed early on to hydropower, the cost of debt associated with its nuclear program caused its rates to rise to a level close to the average of neighboring IOUs. According to the 2000 Federal budget, "Prior to 2000, appropriations provided for public services to maintain and operate public resources—navigable channels, flood control, recreation and non-regulatory, community-based programs that protect the water quality of the Tennessee river system... .The Budget proposes that beginning in 2000, these services be funded entirely by TVA's power revenues, user fees, and sources other than appropriations, except for Land Between the Lakes National Recreation Area."

How the TVA Sets Rates

Section 15 d. (f) of the TVA Act requires it to "charge rates for power which will produce gross revenues sufficient to provide funds for operation, maintenance, and administration of its power system; payments to States and Counties in lieu of taxes; debt service on outstanding bonds… the Corporation's power business having due regard for the primary objectives of the Act, including the objective that power shall be sold at rates as low as feasible." In order to derive its revenue requirements, the TVA employs a debt-service coverage (DSC) methodology.[274] The DSC method gauges an organization's ability to cover its operating costs and to satisfy its obligations to pay principal and interest on debt. The TVA states that is revenue requirements (or projected costs) are typically calculated under the DSC method as the sum of the following components: fuel and purchased power costs, operating and maintenance costs, taxes, and debt service coverage. The TVA then compares its revenue requirements to the projected revenues for the test year at existing rates to determine whether the result will be a shortfall or surplus. Rates are than adjusted so as to remove the short fall or surplus.

Rationale

According to President Franklin Roosevelt's promotion of the TVA, "[The] potential usefulness of the Tennessee River... transcends mere power development; it enters the wide fields of flood control, soil erosion, afforestation, elimination from production use of marginal agricultural lands, and distribution and diversification of industry."

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Hydropower, coal, natural gas, and nuclear electricity generation, transmission, distribution and end use.

[274]Tennessee Valley Authority, Tennessee Valley Authority 10-K, 2006, p. 10.

60. Uranium Facilities Maintenance and Remediation Fund[275]

Description

Two programs are contained within the Uranium Facilities Maintenance and Remediation fund: The Uranium Enrichment Decontamination and Decommissioning and Other Uranium Activities. The Uranium Enrichment Decontamination and Decommissioning Fund was established by the Energy Policy Act of 1992 (EPACT1992), (Public Law 102-486) to carry out environmental management responsibilities at the Nation's three gaseous diffusion plants, located in the East Tennessee Technology Park in Tennessee, at the Portsmouth site in Ohio, and at the Paducah site in Kentucky. EPA1992 also directs that this fund be used to reimburse licensees operating uranium or thorium processing sites for the costs of environmental cleanup at those sites, subject to a site-specific reimbursement limit. The Oak Ridge Operations Office is charged with carrying out the fund's mandates. EPACT1992 required that annual contributions to the fund would be made for 15 years, terminating at the earlier of 2007 or the collection of $2.25 billion (adjusted for inflation), from annual assessments to domestic utilities. (The costs are recorded as a fuel cost by the licensees and are recovered through electricity customer rates.) The annual assessment is not to exceed $150 million, adjusted for inflation, with Federal appropriations making up the difference when expenditures exceed the assessed values.

The Department of Energy's (DOE) Office of Environmental Management was charged with the responsibility for managing the fund and operational control over the three clean-up facilities through 2003. In October 2003, the DOE transferred these responsibilities to a new office in Lexington, Kentucky, although the Oak Ridge Operations Office was left with responsibility for cleanup activities at the Oak Ridge plant.

The other uranium activities program involves the management of highly-enriched uranium at the Paducah and Portsmouth sites. It also involves the management of the DOE's inventory of depleted uranium hexafluoride and other uranium inventories. This responsibility was transferred to the Office of Environmental Management in 2001 from the Office of Nuclear Energy's Science and Technology program. Operations at the Portsmouth site ceased in 2001, although the clean-up effort is expected to take several years.

The Uranium Enrichment Decontamination and Decommissioning Fund is an integral component of legislation to privatize uranium enrichment activities in the United States. The fund addresses the cleanup liabilities at the three gaseous diffusion plants that are attributable to past DOE operations for weapons and commercial fuel. The future operations of the enrichment facilities are managed by the commercial United States Enrichment Corporation (USEC). The Decontamination and Decommissioning Fund includes contributions from annual budget appropriations and contributions from commercial utilities based upon historical enrichment services, measured in "separative work units."

In a 2004 study, the General Accounting Office found that funding will be: "insufficient to cover the cleanup activities at the three plants. Specifically, our Baseline model demonstrated that by 2044, the most likely time frame for completing cleanup of the plants, costs will have exceeded revenues by $3.5 billion to $5.7 billion."[276]

Revenue Loss/Outlays

Cash income is estimated at $556 million for fiscal year 2007 and $574 million for 2008.

[275] In addition to the direct expenditures, tax expenditures, R&D expenditures, and government support for Federal electricity discussed in the body of this report, the Federal government intervenes in energy markets through its sponsorship of trust funds, which are related to energy production. These funds are intended to be self supporting. However, the Federal government faces potential risks in the event that these funds should face revenue shortfalls.

[276] Government Accounting Office, *Uranium Enrichment, Decontamination and Decommissioning Fund is Insufficient to Cover Cleanup Costs*, GAO-04-692 (Washington, DC, July 2004), Summary.

Rationale

The goal of the Uranium Enrichment Decontamination and Decommissioning Fund is to clean-up the surplus enrichment plants as soon as possible and reimburse licensees for their remediation activities at uranium and thorium sites. The enrichment plants include valuable facilities and equipment, and the clean-up costs will be offset to the extent that DOE is able to recover the value from these surplus assets.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Nuclear power waste storage.