

# 5. Summary of Results

## Introduction

This chapter presents a summary of values of Federal Government interventions in energy transformation and end use markets discussed in Chapters 2, 3, and 4. The estimates are then combined with the estimates for primary energy markets previously published by the Energy Information Administration (EIA),<sup>132</sup> to yield estimates of total subsidies to U.S. energy markets in fiscal year 1999. Summary comparisons are made with the estimates presented in EIA's 1992 subsidy report.<sup>133</sup> Data summarized from Chapters 2 and 3 compare Federal budget outlays for fiscal year 1999 with those for fiscal year 1992.<sup>134</sup> Summary estimates of support to the electricity programs described in Chapter 4 also appear here. Where it is feasible, those results compare data for years 1998 and 1990.

### Estimate of Transformation and End Use Subsidies, Fiscal Year 1999

The intent of this report is to identify Federal Government programs that directly seek to influence the allocation and pricing of electricity and end-use energy resources. Where it can be determined, a quantitative assessment of the cost of those programs is presented. Given the definitions specified by the Department of Energy's Office of Policy, it is estimated that Federal subsidies for energy transformation and end use totaled \$2.2 billion in fiscal year 1999 (Table 20). Direct expenditures, consisting of appropriations to LIHEAP and to DOE's two conservation programs, the Weatherization Assistance Program and the State Energy Program, amounted to \$1.4 billion. Thus, two programs specifically addressed to low-income households—LIHEAP and the Weatherization Assistance Program—accounted for 62 percent of all energy transformation and end use subsidies. The three income tax expenditures totaled \$0.370 billion. No excise tax subsidies related to energy transformation or end use were determined to be within the report's scope.<sup>135</sup> Research and development (R&D) outlays amounted to \$454 million in fiscal year 1999.

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<sup>132</sup>Energy Information Administration, *Federal Financial Interventions and Subsidies in Energy Markets 1999: Primary Energy*, SR/OIAF/99-03 (Washington, DC, September 1999).

<sup>133</sup>Energy Information Administration, *Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets*, SR/EMEU/92-02 (Washington, DC, November 1992).

<sup>134</sup>In preparing this update, values for a few previously reported fiscal year 1992 items were amended: LIHEAP received an additional appropriation of \$357 million, and R&D final outlays for fiscal year 1992 were used.

<sup>135</sup>There are several exemptions from motor fuel excise taxes dedicated to the Highway Trust Fund, including fuel used by State and local governments or nonprofit educational institutions. Fuel used by certain buses, including school buses, may be either exempt or taxed at reduced rates. There are minor exemptions from aviation fuel taxes. Currently, no estimate exists of the value of these primary energy exemptions. Source: Correspondence, Office of Tax Analysis, U.S. Department of the Treasury, January 27, 2000.

**Table 20. Summary of Energy Transformation and End Use Subsidy Elements in Federal Programs by Fuel and Program Type on a Budget Outlay Basis, Fiscal Year 1999**  
(Million 1999 Dollars)

Fuel	Type of Subsidy <sup>a</sup>				Total
	Direct Expenditures	Tax Expenditures		Research and Development	
		Income	Excise		
Oil . . . . .	255	0	0	0	<b>255</b>
Gas . . . . .	501	0	0	0	<b>501</b>
Renewables . . . . .	40	0	0	0	<b>40</b>
Electricity <sup>a</sup> . . . . .	459	155	0	0	<b>614</b>
Conservation <sup>b</sup> . . . . .	166	110	0	0	<b>276</b>
End Use <sup>b</sup> . . . . .	0	105	0	454	<b>559</b>
<b>Total . . . . .</b>	<b>1,421</b>	<b>370</b>	<b>0</b>	<b>454</b>	<b>2,245</b>

<sup>a</sup>Does not include supports to TVA, the Power Marketing Administrations, and the Rural Utilities Service, which are described in Chapter 4.

<sup>b</sup>Conservation programs are directed primarily at consumers of energy and often are supported by grants. End-use programs are oriented to the development and introduction of new technologies for use in specific sectors.

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

Source: Estimates presented in this report.

In 1999, subsidies for energy transformation were distributed across all fuel types (Table 20). Electricity<sup>136</sup> received subsidies valued at \$614 million, 75 percent of which were attributable to the LIHEAP program.<sup>137</sup> Natural gas received \$501 million and oil received \$255 million, for a total fossil fuel (oil and gas) subsidy of \$756 million. End-use activities<sup>138</sup> accounted for \$559 million, and conservation subsidies<sup>139</sup> were \$276 billion in fiscal year 1999. At \$40 million, renewable fuels<sup>140</sup> received less than 2 percent of the total.

## Summary of Supports to Electricity, 1998

Support to Federal electric utilities was substantial in 1998 (Table 21), regardless of the method of valuation.<sup>141</sup> In Chapter 4, several alternative approaches are used to estimate the manner and role of Federal support to electricity. The market price comparison is based on the difference between average revenues from sales for resale made by the Federal Power Marketing Administrations (PMAs) and the average wholesale revenues for privately owned utilities in surrounding regions. The interest rate approach measures the difference in borrowing costs for recipients of Federal support and what their borrowing costs would be under various benchmark rates. The return on assets, or historic cost, approach compares cost recovery at Federal utilities with that required in the private

<sup>136</sup>Refers to the electricity-related component of LIHEAP funding and the tax expenditure for “certain energy facilities.” Three types of projects are eligible for this tax exemption: facilities for the local furnishing of gas and electricity; district heating and cooling facilities; and certain environmental facilities located at hydroelectric dam sites. Thus, the characterization of this tax expenditure as “electricity” is somewhat arbitrary.

<sup>137</sup>An additional \$73 million subsidy to electricity—\$33 million for Advanced Turbine systems and \$40 million for New Technology Credit—was treated as primary energy in EIA’s September 1999 report. See also Table 25.

<sup>138</sup>“End use” includes all itemized R&D programs in this report and one tax expenditure for clean fuel vehicles.

<sup>139</sup>“Conservation” refers to three program elements, two sponsored by DOE’s Office of Energy Efficiency, the Weatherization Assistance Program and the State Energy Program, and a tax expenditure for utility-sponsored conservation.

<sup>140</sup>“Renewables” refers only to that portion of LIHEAP electricity consumption attributable to renewable generation sources, in this case, wood.

<sup>141</sup>See Chapter 4 for details concerning these estimates.

sector, where utilities generally recover their operating costs plus depreciation of capital assets, plus some allowance for cost of capital. Because of uncertainties in making financial comparisons between privately owned utilities and nonprofit Federal utilities, low and high estimates are provided for the interest rate and return on asset methods.

**Table 21. Summary of Federal Support to Electricity Estimated by Three Valuation Methods, 1998**  
(Million 1999 Dollars)

Program	Method				
	Market Price	Interest Rate		Return on Asset	
		Low Estimate	High Estimate	Low Estimate	High Estimate
Tennessee Valley Authority . . . . .	—	77	248	228	557
Bonneville Power Administration . . . . .	732	24	116	190	466
Western Area Power Administration . . . . .	407	4	90	167	335
Southeastern Power Administration . . . . .	152	54	94	45	128
Southwestern Power Administration . . . . .	106	23	41	25	66
Rural Utilities Service . . . . .	—	144	1,557	—	—
<b>Total . . . . .</b>	<b>1,397</b>	<b>325</b>	<b>2,145</b>	<b>655</b>	<b>1,553</b>

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

Source: Estimates presented in Chapter 4.

Supports made available in 1998 through preferential allocation of power (market price) totaled nearly \$1.4 billion (1999 dollars). Nearly half of that amount is attributed to the Bonneville Power Administration (BPA). Low rates of return on assets resulted in supports ranging from \$655 million to \$1.6 billion (1999 dollars). The Tennessee Valley Authority (TVA) and BPA accounted for most of that amount. Supports arising from access to lower priced capital ranged from \$325 million to \$2.1 billion (1999 dollars). Despite the nominal magnitude of these estimates, they are small when compared to total electricity revenues. The highest estimate, \$2.145 billion, amounts to only 1 percent of total electricity revenues in 1998; and the low estimate, \$325 million, amounts to only 0.1 percent of total electricity revenues in 1998.

## Summary Results for Total Federal Energy Subsidies, Fiscal Year 1999

The combined findings for fiscal year 1999 primary energy subsidies appearing in EIA's September 1999 report and subsidies for energy transformation and end use appearing in this report are shown in Table 22. The estimated total value for all energy subsidies is \$6.2 billion, excluding the supports directed through Federal utility electricity supply.<sup>142</sup> This \$6.2 billion constitutes only a small portion of total expenditures on energy nationally. In 1995, total expenditures on energy were estimated at \$547 billion (1999 dollars),<sup>143</sup> meaning that Federal subsidies to all energy are 1.1 percent of total energy expenditures.

<sup>142</sup>There are some inherent difficulties in making these comparisons between Federal programs and private suppliers of electricity. Consequently, the values developed by these methods are presented only as a rough indication of magnitude and are withheld from summary tables.

<sup>143</sup>Energy Information Administration, *State Energy Price and Expenditure Report 1995*, DOE/EIA-0376(95) (Washington, DC, August 1998), Table 5.

**Table 22. Summary of Primary Energy and Energy Transformation and End Use Subsidy Elements in Federal Programs by Fuel and Program Type on a Budget Outlay Basis, Fiscal Year 1999**  
(Million 1999 Dollars)

Fuel	Type of Subsidy				Total
	Direct Expenditures	Tax Expenditures		Research and Development	
		Income	Excise		
<b>Primary Energy</b>					
Oil . . . . .	0	263	0	49	<b>312</b>
Gas . . . . .	0	1,048	0	115	<b>1,163</b>
Coal . . . . .	0	85	0	404	<b>489</b>
Oil, Gas, and Coal Combined <sup>a</sup> . . .	0	205	0	0	<b>205</b>
Nuclear . . . . .	0	0	0	640	<b>640</b>
Renewables . . . . .	4	15	<sup>b</sup> 725	327	<b>1,071</b>
Electricity . . . . .	0	40	0	<sup>c</sup> 33	<b>73</b>
<b>Subtotal . . . . .</b>	<b>4</b>	<b>1,656</b>	<b>725</b>	<b>1,567</b>	<b>3,953</b>
<b>Energy Transformation and End Use</b>					
Oil . . . . .	255	0	0	0	<b>255</b>
Gas . . . . .	501	0	0	0	<b>501</b>
Renewables . . . . .	40	0	0	0	<b>40</b>
Electricity <sup>d</sup> . . . . .	459	155	0	0	<b>614</b>
Conservation . . . . .	166	110	0	0	<b>276</b>
End Use . . . . .	0	105	0	454	<b>559</b>
<b>Subtotal . . . . .</b>	<b>1,421</b>	<b>370</b>	<b>0</b>	<b>454</b>	<b>2,245</b>
<b>Total, All Energy . . . . .</b>	<b>1,425</b>	<b>2,026</b>	<b>725</b>	<b>2,021</b>	<b>6,198</b>

<sup>a</sup>The category Oil, Gas, and Coal Combined includes expenditures that were not allocated to any one of the three individual fuels.

<sup>b</sup>Alcohol fuels excise tax.

<sup>c</sup>Electricity research and development includes only Advanced Turbine Systems. Other generation technology research and development is distributed by fuel.

<sup>d</sup>Further estimates of Federal electricity subsidies, not included in this table, are presented in Chapter 4.

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

Sources: Energy Information Administration, *Federal Financial Interventions and Subsidies in Energy Markets 1999: Primary Energy*, SR/OIAF/99-03 (Washington, DC, September 1999), and estimates presented in this report.

Fossil fuels received nearly half of the total subsidies in fiscal year 1999 (Table 22). Nuclear and electricity subsidies each amounted to approximately 10 percent. Renewables received nearly \$1.1 billion, or 18 percent, but the ethanol excise tax expenditure of \$725 million constituted most of the total. End-use subsidies were about 9 percent of the total, most of which was directed to R&D programs. Conservation programs received a little more than 4 percent of the total.

## Comparisons With EIA's 1992 Report

Comparing these findings with those reported in 1992 reveals that subsidies to energy transformation and end use have declined about 10 percent (Table 23).<sup>144</sup> A 29-percent decline in direct expenditure subsidies is offset by the introduction of two new tax expenditures and an increase in R&D subsidies (Figure 6). Despite a reduction in the value of the interest exclusion on energy facility bonds, tax expenditures increased overall by 75 percent with the introduction of an exclusion from income of conservation subsidies provided by public utilities and tax credits and deductions for clean fuel vehicles. Overall, Federal funding for energy end use R&D increased by 59 percent.

**Table 23. Comparison of Estimates of Federal Financial Interventions and Subsidies in Energy Transformation and End Use on a Budget Outlay Basis: Values for Corresponding Categories From the 1992 and 1999 EIA Reports**

Subsidy Category	1992 Estimate (Million 1992 Dollars)	1992 Estimate (Million 1999 Dollars)	1999 Estimate (Million 1999 Dollars)
<b>Direct Expenditures</b>			
LIHEAP . . . . .	1,500	1,712	1,255
Weatherization Assistance and State Energy Programs . . .	262	299	166
<i>Subtotal (Direct Expenditures)</i> . . . . .	1,762	2,010	1,421
<b>Tax Expenditures</b>			
Interest Income Exclusion (Certain Energy Facilities) . . . .	185	211	155
Utility-Sponsored Conservation Exclusion <sup>a</sup> . . . . .	NI	NI	110
Credit/Deduction for Clean Fuel Vehicles <sup>a</sup> . . . . .	NI	NI	105
<i>Subtotal (Tax Expenditures)</i> . . . . .	185	211	370
<b>Research and Development</b>			
Building Technology, State and Community Programs . . . .	45	51	81
Industry <sup>b</sup> . . . . .	97	110	133
Transportation . . . . .	109	125	202
Unallocated . . . . .	3	3	38
Federal Energy Management Program Adjustment <sup>c</sup> . . . . .	-4	-5	NA
<i>Subtotal (Research and Development)</i> . . . . .	249	285	454
<b>Total</b> . . . . .	<b>2,196</b>	<b>2,506</b>	<b>2,245</b>

NI = not included. NA = not applicable.

<sup>a</sup>Program not in existence in 1992.

<sup>b</sup>Expenditures for Advanced Turbine Systems (\$33 million) were reported as primary energy.

<sup>c</sup>FEMP was not itemized separately in 1992 budget documents. It has been removed in this report.

Sources: Energy Information Administration, *Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets*, SR/EMEU/92-02 (Washington, DC, November 1992); *Federal Financial Interventions and Energy Subsidies in Energy Markets 1999: Primary Energy*, SR/OIAF/99-03 (Washington, DC, September 1999); and estimates presented in this report.

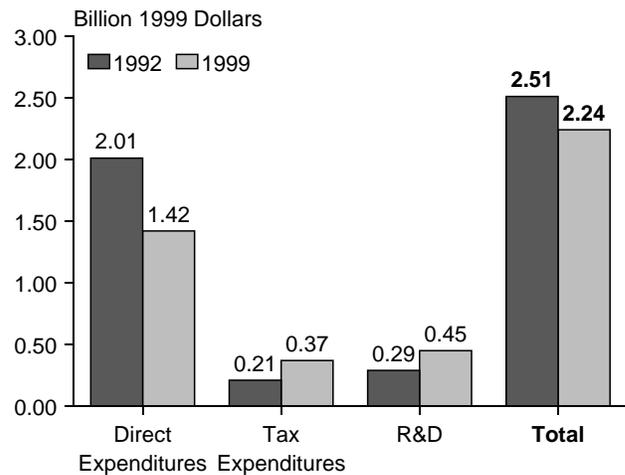
<sup>144</sup>The summary estimates shown here are for subsidies in a single year, fiscal year 1999. Comparisons with EIA's 1992 report rely on data for two years, fiscal year 1992 and fiscal year 1999. Consequently, comparisons across energy sources and uses may not adequately describe cumulative or historical effects, for which the allocations could differ.

In the 1992 report, total transformation and end use were dominated by two direct expenditures, the LIHEAP program and the DOE Conservation programs; but by 1999, subsidies showed greater distribution across program types (Tables 20 and 24). The share of total subsidies attributable to these two direct expenditure programs declined from 80 percent to 63 percent. The share attributable to tax expenditures increased from 8 percent to 16 percent, while the R&D share increased from 11 percent to 20 percent. Distribution of subsidies across fuels remained broad, with increases for electricity and end use, and decreases for conservation, oil, and gas.

Overall, Federal energy subsidies are estimated to have declined by 16 percent over the past 7 years, from \$7.3 billion in 1992 to \$6.2 billion in 1999 (Table 25 and Figure 7).<sup>145</sup> Contributing to the decline was a reduction in LIHEAP expenditures, from \$1.712 billion (1999 dollars) to \$1.255 billion, a decline of nearly 27 percent, and a significant reduction in DOE's Weatherization Assistance and State Energy programs. Over the range of energy subsidies addressed in fiscal year 1999, five items were eliminated entirely, resulting in a reduction of \$177 million, and four programs were introduced over the period, totaling \$464 million.

The largest tax expenditure in 1992, excess of percentage over cost depletion, exhibited the greatest decline both in absolute and percentage terms, dropping from \$1.2 billion to \$0.3 billion (Table 25). This decline, however, was accompanied by a significant reduction in oil prices over the period, suggesting that much of the reduction in real terms stems directly from the petroleum market. Certain subsidies, however, display noteworthy changes not attributable to macroeconomic changes or changes specific to energy markets (Figure 8). R&D funding for natural gas and end-use activities was significantly higher in 1999 than in 1992, whereas funding levels for programs in nuclear R&D, coal R&D, and direct expenditures for DOE's two conservation programs were significantly lower.

**Figure 6. Summary of Energy Transformation and End Use Subsidy Elements, 1992 and 1999**



Note: Totals for 1992 and 1999 exclude estimates of subsidies to Federal electricity suppliers. Totals may not equal sum of components due to independent rounding.

Sources: Energy Information Administration, *Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets*, SR/EMEU/92-02 (Washington, DC, November 1992), and estimates presented in this report.

<sup>145</sup>In 1992, EIA reported the following summary statistics (nominal 1992 billions): \$4.88 billion for total subsidy, which included \$1.409 billion for electricity budget outlays, against which an offset of \$3.132 billion was taken for excise taxes (primarily, motor gasoline taxes directed to the Highway Trust Fund). No offset is taken in this report. Federal excises on petroleum products in 1998 may be as much as \$30 billion (nominal dollars), of which motor gasoline accounts for more than two-thirds. With a short-run elasticity of around -0.05, the effect of the excise tax is negligible in reducing overall subsidy. In this report, electricity supports are analyzed separately, and no offset is made for excise taxes. Also, three 1992 values were adjusted—an additional \$357 million was appropriated to LIHEAP in fiscal year 1992 and regulatory elements of two R&D items (Buildings Research and Standards and FEMP) were excluded from program costs, about \$7 million in total. After applying these adjustments, the comparable total subsidy would be \$6.431 billion in nominal 1992 dollars or \$7.335 billion in 1999 dollars, as opposed to the \$6.198 billion reported in 1999. See Energy Information Administration, *Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets*, SR/EMEU/92-02 (Washington, DC, November 1992), Table 1, and Table 25 in this report.

**Table 24. Summary of Energy Transformation and End Use Subsidy Elements in Federal Programs by Fuel and Program Type on a Budget Outlay Basis, Fiscal Year 1992**  
(Million 1999 Dollars)

Fuel	Type of Subsidy				Total
	Direct Expenditures	Tax Expenditures		Research and Development	
		Income	Excise		
Oil . . . . .	392	0	0	0	<b>392</b>
Gas . . . . .	843	0	0	0	<b>843</b>
Coal . . . . .	4	0	0	0	<b>4</b>
Renewables . . . . .	94	0	0	0	<b>94</b>
Electricity . . . . .	205	211	0	0	<sup>a</sup> <b>416</b>
Conservation . . . . .	471	0	0	0	<b>471</b>
End Use . . . . .	0	0	0	<sup>b</sup> 285	<b>285</b>
<b>Total . . . . .</b>	<b>2,010</b>	<b>211</b>	<b>0</b>	<b>285</b>	<b>2,506</b>

<sup>a</sup>Excludes \$1,608 million attributed to TVA, the Power Marketing Administrations, and the Rural Utilities Service.

<sup>b</sup>In this report, research and development programs are attributed to energy end use. Total is adjusted for FEMP.

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

Sources: Office of Management and Budget, *Budget of the United States Government, Fiscal Year 1993* (Washington, DC, 1992); U.S. Department of Energy, *Appropriation History Tables, FY 2000 Budget*; and Energy Information Administration, *Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets, SR/EMEU/92-02* (Washington, DC, November 1992).

## Trends in Supports to Electricity, 1990 and 1998

The supports identified by the return on assets (historical cost) method show a significant decline over the period 1990 to 1998.<sup>146</sup> In 1990 (Table 26), it is estimated that the shortfall in recovering historical costs ranged from \$2.2 billion (1999 dollars) in the low estimate to \$3.3 billion (1999 dollars) in the high estimate.<sup>147</sup> In 1998 (Table 21), that shortfall had been reduced, ranging from \$655 million (1999 dollars) in the low estimate to \$1.6 billion in the high estimate. TVA's recent introduction of higher electricity rates has been important in reducing the overall level of this support.<sup>148</sup>

The market price methodology shows a decline as well. Estimates of that measure of support were \$1.9 billion (1999 dollars) in 1990, falling to about \$1.4 billion in 1998 (Tables 21 and 26). Again, TVA's higher wholesale rates reduced the overall level of support, but average revenues realized by all the PMAs approached revenues realized by investor-owned utilities, reflecting a reduction in wholesale prices generally, a gradual narrowing of the price differential, and the emergence of more competitive wholesale markets.

<sup>146</sup>Estimates for 1990 were recalculated in this report in order to facilitate valid comparison. See Chapter 4.

<sup>147</sup>The inclusion or exclusion of deferred assets and tax liability affected the Federal utilities differently as they were compared to privately owned utilities. See Chapter 4 for details.

<sup>148</sup>Most dollar values in the electricity analysis were converted to 1999 dollars using the Gross Domestic Product (GDP) deflator. The GDP deflator was applied to companies' prior year loan and interest data. Although the values on the companies' balance sheets and income statements do not change from year to year, the purpose of the calculation was to estimate Federal Government support in a consistent framework. The framework chosen was the value of Federal Government support in terms of its 1999 purchasing power. The 1999 GDP deflator was 22 percent higher than the 1990 value and 1 percent higher than the 1998 value.

**Table 25. Comparison of Estimates of Federal Financial Interventions and Subsidies in Energy Markets: Values for Corresponding Categories From the 1992 and 1999 EIA Reports**

Subsidy Category	1992 Estimate (Million 1992 Dollars)	1992 Estimate (Million 1999 Dollars)	1999 Estimate (Million 1999 Dollars)
<b>Direct Expenditures</b>			
Renewable Energy Production Incentive . . . . .	NI	NI	4
Synthetic Fuel Subsidies . . . . .	72	82	<sup>a</sup> NI
Low Income Home Energy Assistance Program . . . . .	1,500	1,712	1,255
DOE Conservation (Weatherization and State Energy) . . . . .	262	299	166
<i>Subtotal (Direct Expenditures)</i> . . . . .	1,834	2,093	1,425
<b>Tax Expenditures</b>			
Capital Gains Treatment of Royalties in Coal . . . . .	10	11	85
Expensing of Exploration and Development Costs . . . . .	-55	-63	-90
Exception From Passive Loss Limitation for Working Interests in Oil and Gas Properties . . . . .	100	114	35
Enhanced Oil Recovery . . . . .	<sup>b</sup> NI	<sup>b</sup> NI	245
Expensing of Tertiary Injectants . . . . .	20	23	<sup>a</sup> NI
Alternative Fuel Production Credit . . . . .	670	764	1,030
New Technology Credit . . . . .	65	74	40
Alcohol Fuel Credit . . . . .	80	91	15
Excess of Percentage Over Cost Depletion . . . . .	1,025	1,170	295
Exclusion of Interest Income on Bonds for Certain Energy Facilities . . . . .	185	211	155
Exclusion for Utility-Sponsored Conservation Measures . . . . .	NI	NI	110
Credit, Deduction for Clean Fuel Vehicles . . . . .	NI	NI	105
<i>Subtotal (Income Taxes)</i> . . . . .	2,100	2,396	2,026
Excise Taxes . . . . .	460	525	725
<i>Subtotal (Tax Expenditures)</i> . . . . .	2,560	2,921	2,751
<b>Research and Development</b>			
<b>Nuclear Power</b>			
New Nuclear Plants . . . . .	122	139	30
Waste/Fuel/Safety . . . . .	620	707	467
Unallocated . . . . .	148	169	143
<i>Subtotal (Nuclear Power)</i> . . . . .	890	1,015	640
<b>Coal</b>			
Preparation/Mining . . . . .	81	93	<sup>c</sup> NI
Coal Conversion . . . . .	51	58	<sup>d</sup> NI
Power Generation . . . . .	148	168	<sup>e</sup> NI
Clean Coal Technology Program . . . . .	415	474	183
Interagency National Acid Precipitation Assessment Program . . . . .	31	35	<sup>a</sup> NI
Advanced Clean Efficient Power Systems . . . . .	<sup>c</sup> NI	<sup>c</sup> NI	<sup>f</sup> 88
Advanced Clean Fuels . . . . .	<sup>d</sup> NI	<sup>d</sup> NI	<sup>g</sup> 16
Advanced Research and Technology Development . . . . .	<sup>e</sup> NI	<sup>e</sup> NI	<sup>h</sup> 20
Unallocated . . . . .	79	90	97
<i>Subtotal (Coal)</i> . . . . .	804	918	404
<b>Other Fossil Energy</b>			
Oil . . . . .	51	59	49
Natural Gas . . . . .	13	14	115
Shale Oil . . . . .	6	7	<sup>a</sup> NI
U.S. Geological Survey Energy Research and Development . . . . .	26	30	<sup>a</sup> NI
<i>Subtotal (Other Fossil Energy)</i> . . . . .	96	109	164
<b>Electricity</b>			
Advanced Turbine Systems/IRP <sup>i</sup> . . . . .	5	5	33
<i>Subtotal (Electricity, Primary Energy)</i> . . . . .	5	5	33
<b>Renewable Energy</b>			
Photovoltaic/Wind/Other Solar . . . . .	137	156	134
Biomass . . . . .	21	24	96
Geothermal . . . . .	27	31	29
Hydroelectric . . . . .	1	1	3
Electricity Technologies . . . . .	38	43	44
Unallocated . . . . .	19	22	22
<i>Subtotal (Renewable Energy)</i> . . . . .	244	277	327
<b>End Use</b>			
Building Technology, State and Community Programs . . . . .	45	51	81
Industry . . . . .	97	110	133
Transportation . . . . .	109	125	202
Unallocated . . . . .	3	3	38
Federal Energy Management Program Adjustment <sup>l</sup> . . . . .	-4	-5	NA
<i>Subtotal (End Use)</i> . . . . .	250	285	454
Clean Coal Technology Adjustment <sup>k</sup> . . . . .	-253	-289	—
<i>Subtotal (Research and Development including Clean Coal Technology)</i> . . . . .	2,036	2,321	2,022
<b>Total</b> . . . . .	<b>6,430</b>	<b>7,335</b>	<b>6,198</b>

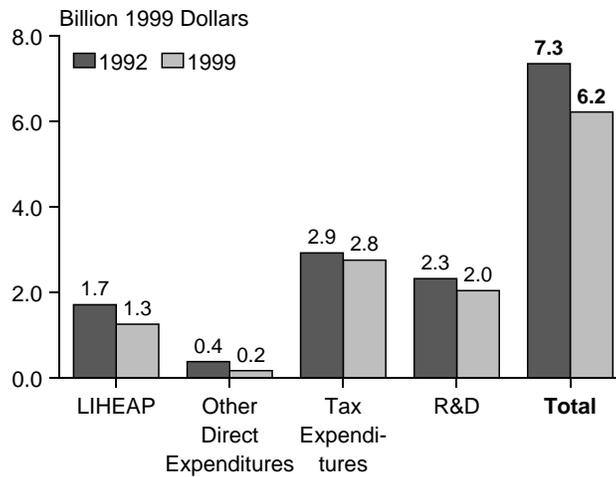
See notes on following page.

**Notes for Table 25:**

- <sup>a</sup>Program terminated.
  - <sup>b</sup>Introduced in 1992 but not reported in the Federal budget until 1994.
  - <sup>c</sup>Reclassified as Advanced Research and Technology Development.
  - <sup>d</sup>Reclassified as Advanced Clean Fuels.
  - <sup>e</sup>Reclassified as Advanced Clean and Efficient Power Systems.
  - <sup>f</sup>Replaces Power Generation category from 1992 EIA report.
  - <sup>g</sup>Replaces Coal Conversion category from 1992 EIA report.
  - <sup>h</sup>Replaces Preparation/Mining category from 1992 EIA report.
  - <sup>i</sup>Utility R&D for Integrated Resource Planning in 1992 budget documents.
  - <sup>j</sup>FEMP was not itemized separately in 1992 budget documents. It has been removed in this report.
  - <sup>k</sup>Value of appropriations from 1992 EIA report (1992) and value of outlays from September 1999 EIA report.
- NI = not included. NA = not available.

Note: Subtotals may not equal sum of components due to independent rounding.  
 Sources: Energy Information Administration, *Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets*, SR/EMEU/92-02 (Washington, DC, November 1992); *Federal Financial Interventions and Subsidies in Energy Markets 1999: Primary Energy*, SR/OIAF/99-03 (Washington, DC, September 1999); and estimates presented in this report.

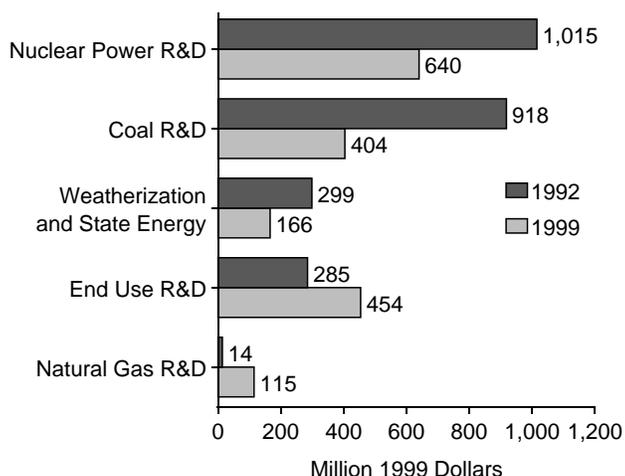
**Figure 7. Summary of Federal Energy Subsidy Elements, 1992 and 1999**



Note: Tax expenditures, direct expenditures, and research and development expenditures for 1992 include some amounts attributable to electricity as a fuel.

Sources: Energy Information Administration, *Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets*, SR/EMEU/92-02 (Washington, DC, November 1992); *Federal Financial Interventions and Subsidies in Energy Markets 1999: Primary Energy*, SR/OIAF/99-03 (Washington, DC, September 1999); and estimates presented in this report.

**Figure 8. Estimates of Selected Federal Financial Interventions and Subsidies, 1992 and 1999**



Sources: Energy Information Administration, *Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets*, SR/EMEU/92-02 (Washington, DC, November 1992); *Federal Financial Interventions and Subsidies in Energy Markets 1999: Primary Energy*, SR/OIAF/99-03 (Washington, DC, September 1999); and estimates presented in this report.

**Table 26. Summary of Federal Support to Electricity Estimated by Three Valuation Methods, 1990**  
(Million 1999 Dollars)

Program	Method				
	Market Price	Interest Rate <sup>a</sup>		Return on Assets	
		Low Estimate	High Estimate	Low Estimate	High Estimate
Tennessee Valley Authority . . . . .	440	—	—	1,257	1,993
Bonneville Power Administration . . . . .	357	—	—	481	671
Western Area Power Administration . . . . .	704	—	—	315	435
Southeastern Power Administration . . . . .	260	—	—	76	118
Southwestern Power Administration . . . . .	150	—	—	51	74
Rural Utilities Service <sup>b</sup> . . . . .	—	—	—	—	—
<b>Total</b> . . . . .	<b>1,912</b>	<b>—</b>	<b>—</b>	<b>2,179</b>	<b>3,290</b>

<sup>a</sup>Interest rate estimates for 1990 could not be reestimated using the methodology in this report due to lack of some historical data.

<sup>b</sup>Estimates of supports conferred through the Rural Utilities Service could not be reestimated due to lack of some historical data.

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

Sources: Estimates presented in Chapter 4.

Interest rate supports in 1990 could not be reestimated, because certain historical data were not available to EIA. Under a previous methodology, those supports were estimated to range from \$1 billion to \$1.4 billion (1999 dollars) for the Federal utilities.<sup>149</sup> In 1998, total interest rate supports to TVA, BPA, and the three smaller PMAs ranged from \$182 million to \$588 million,<sup>150</sup> an apparent reduction over the period that is likely attributable to refinancing programs undertaken by TVA and BPA.<sup>151</sup>

Reduced interest rates on loans extended or guaranteed by the Rural Utilities Service resulted in supports of \$985 million to \$1.4 billion (1999 dollars) in 1990.<sup>152</sup> The low estimate of support dropped to \$144 million in 1998, reflecting the low interest rates prevalent in capital markets, while the high estimate stayed about the same, at \$1.557 billion. However, risk to the portfolio of loans made or guaranteed by RUS may have increased greatly in the interim, and several large loans have been written off entirely.

## Energy Trust Fund Outlays

Energy trust funds were described in detail in EIA's September 1999 report on primary energy. The results are briefly summarized in this volume to consolidate all the findings. Total outlays for certain energy trust funds have increased since 1992.<sup>153</sup> Table 27 compares the outlays from seven energy trust funds as reported in the 1992 and 1999 EIA reports. Four show percentage increases, led by the Aquatic Resources Trust Fund (359 percent) and the Pipeline Safety Fund (157 percent). Three show percentage decreases, the largest of which is the Nuclear Waste Fund (down 39 percent). Altogether, outlays from the seven trust funds increased by 19 percent, from \$1.95 billion (1999 dollars) in fiscal year 1992 to \$2.3 billion in fiscal year 1999. The ultimate costs associated with these programs, storing high-level nuclear waste or repairing damage caused by leaking underground storage tanks, cannot be known with precision, and many of the costs may be realized far in the future. Therefore, costs associated with these programs are not included in summary totals.

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<sup>149</sup>Alaska Power Administration, included in the 1992 report, has since been sold and is therefore not included in these estimates. See Energy Information Administration, *Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets*, SR/EMEU/92-02 (Washington, DC, November 1992), Table 17, p. 60.

<sup>150</sup>The value of Federal interest rate support depends on the benchmark bond series chosen for comparison. See Chapter 4.

<sup>151</sup>See Chapter 4 for additional details.

<sup>152</sup>Energy Information Administration, *Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets*, SR/EMEU/92-02 (Washington, DC, November 1992), Table 14, p. 57. Because a new methodology is introduced in this report, RUS is not included in Table 26. Comparisons between 1990 and 1998 should be treated cautiously.

<sup>153</sup>Neither EIA's September 1999 report nor EIA's report of November 1992 evaluated the full costs of trust fund programs because of the difficulty in determining the actuarial sufficiency of the excise taxes.

**Table 27. Comparison of Outlays to Energy Trust Funds, Fiscal Years 1992 and 1999**  
(Million 1999 Dollars)

Energy Trust Fund	Fiscal Year 1992	Fiscal Year 1999	Percent Change
Black Lung Disability . . . . .	1,107	1,021	-7.8
Abandoned Mine Reclamation . . . . .	176	247	40.3
Nuclear Waste Fund . . . . .	301	185	-38.5
Oil Spill Liability . . . . .	176	178	1.1
Pipeline Safety Fund . . . . .	14	36	157.1
Leaking Underground Storage Tank Fund . . . . .	99	67	-32.3
Uranium Enrichment Decontamination and Decommissioning <sup>a</sup> . . . . .	NA	223	NA
Aquatic Resources <sup>b</sup> . . . . .	81	372	359.3
<b>Total . . . . .</b>	<b>1,953</b>	<b>2,329</b>	<b>19.3</b>

<sup>a</sup>The Uranium Enrichment Decontamination and Decommissioning Trust Fund was established by the Energy Policy Act of 1992.

<sup>b</sup>Includes amounts for boat safety, coastal wetlands, and sports fish restoration.

NA = not applicable.

Sources: Energy Information Administration, *Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets*, SR/EMEU/92-02 (Washington, DC, November 1992); and *Federal Financial Interventions and Subsidies in Energy Markets 1999: Primary Energy*, SR/OIAF/99-03 (Washington, DC, September 1999).