

### THE EFFECT OF TAXES AND SUBSIDIES ON COSTS

The introduction of taxes and subsidies into the abatement programs examined in this chapter requires modifying program cost accounting concepts. When utilities pay taxes and receive subsidies to control pollution, the market value of the resources consumed in the abatement effort may differ from the amount the utilities actually pay. The amount of resources purchased to control pollution, including the value of the subsidies, approximates the overall economic cost of the emission reduction efforts (assuming key variables--such as output, demand, interest rates, and cost to other industries--remain unaffected). On the other hand, the net amount actually spent by utilities--total resource costs plus taxes, minus subsidies--represents the costs utilities will face when choosing control alternatives. Relevant definitions used in this chapter are explained below.

**Annual net utility cost** is the cost that governs utility choices in the National Coal Model and determines electricity rates for consumers (see the appendix). It is defined as the total resources expended by the utility sector to meet the specified pollution reduction targets, plus taxes paid to finance trust funds, minus subsidies given to install scrubbers. Annual net utility cost is the same as the annual utility cost described in Chapter II only neither subsidies nor taxes are included in the options, such as the polluter pays alternatives.

**Discounted program cost** is similar to the term used in Chapter II, except that the annual costs discounted in this chapter represent all resources, including subsidies, expended in excess of current law to achieve the desired emission reductions over the 1986-2015 period. For example, for all options in this chapter, 100 percent of the annual capital costs for scrubbers is included when calculating discounted program cost, even though 90 percent of the capital costs may be subsidized by an electricity fee. While such subsidies may lower a utility's net cost (see above), they do not lower the overall cost of the program (the subsidized portion of the program still represents money spent by society). Taxes and fees are excluded in this measure since they are assumed to be pure transfers--that is, money transferred to and held by the government and not resources consumed.

**Cost-effectiveness** is similar to the definition used in Chapter II: discounted program cost is simply divided by the discounted stream of annual emissions reductions measured over the same period. It is important only to note that in this chapter cost-effectiveness represents the total discounted dollars (including subsidies) needed to reduce SO<sub>2</sub> from base case levels over the 1986-2015 period.

TABLE 15. ANNUAL UTILITY COSTS AS OF 1995 OF 8 MILLION TON SO<sub>2</sub> ROLLBACK WITH TAX AND SUBSIDY OPTIONS COMPARED WITH POLLUTER PAYS OPTION, BY STATE (In millions of discounted 1985 dollars)

State	Base Case 1995	Polluter Pays Option II-1A	Option III-1A	Option III-1B	Differences from Polluter Pays (Option II-1A)	
					Option III-1A	Option III-1B
Alabama, Mississippi	4,224	4,307	4,324	4,340	17	33
Arizona	1,944	1,930	1,944	1,961	15	32
Arkansas, Oklahoma, Louisiana	9,591	9,698	9,804	9,895	106	198
California	10,565	10,722	10,812	10,913	90	191
Carolinas, North and South	4,759	4,886	4,910	4,940	24	54
Colorado	1,093	1,097	1,112	1,130	15	33
Dakotas, North and South	567	565	572	578	7	13
Florida	6,127	6,202	6,256	6,308	53	105
Georgia	2,555	2,618	2,641	2,647	23	29
Idaho	221	221	234	246	12	25
Illinois	4,189	4,312	4,313	4,225	1	-87
Indiana	3,095	3,202	3,223	3,258	22	56
Iowa	1,230	1,288	1,320	1,299	32	11
Kansas, Nebraska	1,854	1,860	1,883	1,906	23	45
Kentucky	3,103	3,170	3,199	3,231	29	61
Maine, Vermont, New Hampshire	1,123	1,119	1,124	1,128	4	9
Maryland, Delaware	1,885	1,853	1,872	1,866	19	13
Massachusetts, Connecticut, Rhode Island	3,513	3,633	3,657	3,672	24	39

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TABLE 15. (Continued)

State	Base Case 1995	Polluter Pays Option II-1A	Option III-1A	Option III-1B	Differences from Polluter Pays (Option II-1A)	
					Option III-1A	Option III-1B
Michigan	2,817	2,874	2,899	2,915	25	40
Minnesota	1,186	1,184	1,210	1,227	26	43
Missouri	2,024	2,137	2,184	2,132	47	-5
Montana	676	675	686	694	10	19
Nevada	1,096	1,122	1,132	1,144	11	22
New Mexico	1,158	1,138	1,146	1,154	8	16
New York (Downstate), New Jersey	4,878	4,902	4,946	4,961	43	58
New York (Upstate)	2,395	2,443	2,462	2,486	19	43
Ohio	4,239	4,397	4,463	4,521	66	124
Pennsylvania	5,512	5,711	5,766	5,741	55	30
Tennessee	2,078	2,118	2,160	2,220	41	102
Texas	15,852	15,834	15,995	16,129	161	295
Utah	1,345	1,367	1,378	1,381	10	14
Virginia, District of Columbia	1,884	1,923	1,947	1,981	24	58
Washington, Oregon	4,219	4,147	4,176	4,186	29	39
West Virginia	1,784	1,936	1,933	1,874	-4	-63
Wisconsin	1,572	1,671	1,683	1,697	12	26
Wyoming	<u>1,026</u>	<u>1,034</u>	<u>1,040</u>	<u>1,044</u>	<u>6</u>	<u>10</u>
Total Net Utility Costs	117,380	119,298	120,403	121,029	1,104	1,731

SOURCE: Congressional Budget Office.

TABLE 16. ANNUAL UTILITY COSTS AS OF 1995 OF 10 MILLION TON SO<sub>2</sub> ROLLBACK WITH TAX AND SUBSIDY OPTIONS COMPARED WITH POLLUTER PAYS OPTION, BY STATE (In millions of discounted 1985 dollars)

	Base Case 1995	Polluter Pays Option II-2A	Option III-2A	Option III-2B	Option III-2C	Differences from Polluter Pays (Option II-2A)		
						Option III-2A	Option III-2B	Option III-2C
Alabama, Mississippi	4,224	4,364	4,363	4,341	4,382	-1	-23	18
Arizona	1,944	1,943	1,945	1,961	1,952	2	19	10
Arkansas, Oklahoma, Louisiana	9,591	9,723	9,814	9,910	9,872	91	187	149
California	10,565	10,822	10,913	11,013	10,959	91	191	136
Carolinas, North and South	4,759	4,895	4,926	4,963	4,925	30	67	29
Colorado	1,093	1,100	1,113	1,132	1,124	13	31	24
Dakotas, North and South	567	565	572	578	575	7	13	10
Florida	6,127	6,198	6,251	6,307	6,455	53	109	257
Georgia	2,555	2,622	2,640	2,651	2,704	17	28	82
Idaho	221	221	234	246	240	12	25	19
Illinois	4,189	4,432	4,441	4,448	4,436	8	16	3
Indiana	3,095	3,233	3,165	3,257	3,299	-69	23	66
Iowa	1,230	1,327	1,343	1,370	1,332	16	43	5
Kansas, Nebraska	1,854	1,862	1,895	1,900	1,899	33	38	37
Kentucky	3,103	3,499	3,567	3,579	3,471	68	80	-29
Maine, Vermont, New Hampshire	1,123	1,123	1,130	1,130	1,128	7	7	5
Maryland, Delaware	1,885	1,654	1,727	1,708	1,689	73	54	35
Massachusetts, Connecticut, Rhode Island	3,513	3,678	3,706	3,713	3,714	27	35	35

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TABLE 16. (Continued)

	Base Case 1995	Polluter Pays Option II-2A	Option III-2A	Option III-2B	Option III-2C	Differences from Polluter Pays (Option II-2A)		
						Option III-2A	Option III-2B	Option III-2C
Michigan	2,817	2,944	2,980	2,989	2,996	36	45	53
Minnesota	1,186	1,228	1,253	1,272	1,293	26	45	65
Missouri	2,024	2,206	2,223	2,196	2,274	17	-11	68
Montana	676	675	684	694	690	9	19	15
Nevada	1,096	1,122	1,132	1,144	1,138	10	22	16
New Mexico	1,158	1,144	1,146	1,154	1,150	2	10	6
New York (Downstate),								
New Jersey	4,878	5,200	5,221	5,228	5,238	21	28	38
New York (Upstate)	2,395	2,236	2,273	2,289	2,282	38	54	46
Ohio	4,239	4,271	4,348	4,344	4,490	76	73	218
Pennsylvania	5,512	6,056	5,995	5,891	6,105	-61	-165	49
Tennessee	2,078	2,028	2,014	2,060	2,352	-14	32	324
Texas	15,852	15,844	16,002	16,135	16,074	158	291	229
Utah	1,345	1,368	1,377	1,381	1,384	10	14	16
Virginia, District of Columbia	1,884	1,926	1,950	1,983	1,973	24	57	47
Washington, Oregon	4,219	4,068	4,093	4,109	4,106	25	41	38
West Virginia	1,784	2,278	2,265	2,257	2,226	-13	-21	-52
Wisconsin	1,572	1,734	1,757	1,770	1,777	23	36	42
Wyoming	<u>1,026</u>	<u>1,039</u>	<u>1,045</u>	<u>1,053</u>	<u>1,045</u>	<u>6</u>	<u>15</u>	<u>6</u>
Total Net Costs	117,380	120,630	121,503	122,156	122,746	873	1,526	2,116

SOURCE: Congressional Budget Office.

while the addition of an O&M subsidy appears to encourage further scrubber investment, the maximum amount invested under both emission reduction programs is almost identical--about \$11 billion to \$12 billion. This is the reason that the fee level remains the same for similar subsidy programs under different emission control targets. This also suggests that for these options the practical limit of scrubber use is quickly reached with the highest subsidy case under the 8 million ton SO<sub>2</sub> rollback, and that any further abatement beyond this level will almost exclusively be obtained through coal-switching. To achieve the same additional reductions through use of scrubbers would simply cost more.

The Importance of the Tax and Subsidies on Net Utility Costs. The subsidies provided through distribution of the electricity tax would help lower the utilities' net costs below their actual expenditures needed to satisfy the program. For the 8 million ton reduction case, the subsidies would range from \$239 million (Option III-1A) to \$1.1 billion (Option III-1B) per year; Option III-1B would cost more because it funds both capital and O&M expenses. For the 10 million ton program, the annual subsidies would range from \$368 million (Option III-2A) to about \$1.1 billion (Option III-2B). Requiring controls for the 50 highest emitting powerplants (Option III-2C) would use roughly \$922 million in annual capital subsidies (see Table 17). <sup>6/</sup>

Net utility costs would fall considerably after 1995 when the electricity fee would expire. The annual net costs for the 8 million ton program would fall to between \$900 million and \$1.6 billion, and those for the 10 million ton program, to between \$2.0 billion and \$3.4 billion. Once the fee expires but subsidies continue, net annual costs would be lower than even the polluter pays approach, which had net annual costs ranging from \$1.9 billion to \$2.1 billion for an 8 million ton SO<sub>2</sub> rollback and from \$3.2 billion to \$4.7 billion for a 10 million ton SO<sub>2</sub> rollback.

Trust Fund Revenues and Outlays. Before the electricity taxes expired in 1995, they would raise substantial revenue, with their largest annual proceeds occurring in 1995. In that year, the 0.5 mill tax (used in Options III-1A and III-2A) should raise approximately \$1.2 billion; the 0.75 mill tax (Option III-2C) should raise about \$1.8 billion; and the 1.0 mill tax should raise about \$2.4 billion (see Table 18).

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6. Unless specific exclusions were included, the various tax and subsidy options using trust funds would become subject to the Balanced Budget and Emergency Deficit Control Act of 1985 (P.L. 99-177). Under the Balanced Budget Act, outlays (subsidies) from the trust funds would be subject to sequester action through fiscal year 1991, although revenue to the fund probably would not be affected. If trust fund outlays are sequestered, or cut, the trust fund balances would continue to grow and would be available for future obligations. Because future sequester needs cannot now be determined, estimates in this report assume full subsidies.

TABLE 17. ANNUAL SUBSIDIES PROVIDED TO UTILITIES AS OF 1995 UNDER TWO ROLLOBACK PROGRAMS AND THREE SUBSIDY OPTIONS, BY STATE (In millions of 1985 dollars)

State	8 Million Ton Rollback		10 Million Ton Rollback		
	Option III-1A	Option III-1B	Option III-2A	Option III-2B	Option III-2C
Alabama, Mississippi	0	22	7	104	41
Colorado	0	2	0	2	0
Florida	0	0	0	0	45
Georgia	0	5	0	13	37
Illinois	127	259	50	64	103
Indiana	4	24	5	38	131
Kansas, Nebraska	0	0	0	32	0
Kentucky	1	1	1	73	58
Maine, Vermont, New Hampshire	0	0	3	5	0
Maryland, Delaware	0	51	4	102	0
Massachusetts, Connecticut, Rhode Island	0	22	10	22	0
Michigan	1	23	1	5	32
Missouri	0	144	55	115	132
New York (Downstate), New Jersey	1	2	1	31	1
New York (Upstate)	0	0	0	18	0
Ohio	2	23	5	18	56
Pennsylvania	86	242	187	281	132
Tennessee	14	69	14	21	60
Texas	1	53	5	53	2
Utah	0	10	0	10	0
Washington, Oregon	0	1	0	1	0
West Virginia	0	151	20	45	90
Wisconsin	<u>1</u>	<u>0</u>	<u>0</u>	<u>22</u>	<u>0</u>
Total	239	1,102	368	1,077	922

SOURCE: Congressional Budget Office.

Note: States not shown receive no subsidies.

TABLE 18. REVENUES FROM ELECTRICITY TAX IN 1995  
(In millions of 1985 dollars)

State	Option III-1A 0.5 mill per kwh	Option III-1B 1.0 mill per kwh	Option III-2A 0.5 mill per kwh	Option III-2B 1.0 mill per kwh	Option III-2C 0.75 mill per kwh
Alabama	34.2	68.4	34.2	68.3	51.3
Arizona	14.9	29.7	14.8	29.7	22.3
Arkansas, Oklahoma, Louisiana	86.2	172.4	86.2	172.4	130.0
California	90.5	181.0	91.0	182.0	136.5
Carolinas, North and South	48.0	96.0	48.0	96.0	72.0
Colorado	18.9	37.8	18.9	37.8	28.4
Dakotas, North and South	6.5	12.9	6.5	12.9	9.7
Florida	61.0	121.3	60.7	121.3	91.0
Georgia	27.4	54.9	27.4	54.9	41.1
Idaho	12.4	24.8	12.4	24.8	18.6
Illinois	36.2	73.4	36.5	73.0	54.7
Indiana	43.5	88.4	43.6	87.1	65.5
Iowa	18.0	35.9	18.0	36.0	27.0
Kansas, Nebraska	20.4	40.7	20.4	40.7	30.5
Kentucky	42.2	84.3	42.2	84.4	63.0
Maine, Vermont, New Hampshire	2.7	5.4	2.7	5.4	4.0
Maryland, Delaware	25.1	50.2	24.5	49.0	36.4
Massachusetts, Connecticut, Rhode Island	25.9	51.7	25.8	51.6	38.7
Michigan	31.1	60.8	31.1	62.1	46.6

(Continued)

TABLE 18. (Continued)

State	Option III-1A 0.5 mill per kwh	Option III-1B 1.0 mill per kwh	Option III-2A 0.5 mill per kwh	Option III-2B 1.0 mill per kwh	Option III-2C 0.75 mill per kwh
Minnesota	16.3	32.6	16.4	32.8	24.7
Missouri	28.1	55.9	28.1	56.3	42.2
Montana	8.1	16.2	8.1	16.2	12.2
Nevada	11.0	22.1	11.0	22.1	16.5
New Mexico	8.2	16.3	8.2	16.3	12.2
New York (Downstate), New Jersey	32.3	64.6	33.4	66.8	51.2
New York (Upstate)	18.0	36.0	16.9	33.8	24.2
Ohio	83.5	167.0	83.4	166.8	118.3
Pennsylvania	56.1	112.3	56.9	113.8	85.7
Tennessee	35.9	71.9	36.0	72.0	53.9
Texas	146.9	293.8	146.9	293.8	220.4
Utah	10.7	21.5	10.7	21.5	16.1
Virginia, District of Columbia	30.0	60.0	30.0	60.0	45.0
Washington, Oregon	20.8	41.5	20.3	40.5	30.4
West Virginia	17.2	34.4	17.0	34.0	32.2
Wisconsin	21.8	43.6	21.7	43.4	32.5
Wyoming	<u>6.6</u>	<u>13.2</u>	<u>6.6</u>	<u>13.2</u>	<u>9.9</u>
Total	1,197	2,393	1,196	2,393	1,795

SOURCE: Congressional Budget Office.

NOTE: Fee revenues may differ under similar tax rates because of slight changes in electricity generation patterns under different options.

Each tax and subsidy system also could leave a significant trust fund balance at the end of the program, if static assumptions about electricity demand and interest rates hold.<sup>7</sup> The 0.5 mill fee would provide a closing balance of \$15.7 billion in 2015 for Option III-1A and a balance of \$11.2 billion for Option III-2A. The 0.75 mill tax should leave about \$4.4 billion in the trust fund when Option III-2C ends. The 1.0 mill tax program should close with a balance of \$12.5 billion under Option III-1B and \$13.3 billion under Option III-2B.

The balances remaining in the trust funds would actually be smaller if viewed in terms of today's dollars. When discounted by an annual real rate of 3.7 percent to reflect the time-value of money (a dollar today is worth more than a dollar tomorrow), none of the balances under any option would exceed \$5.5 billion (in 1985 discounted dollars). When the funds expire, essentially two options exist for disposal of the balance: retain the balance and add it to general revenues, or return it to consumers according to some prorated formula that considers relative contributions to the fund. In the case of small amounts, it might be most practical for the Treasury to retain the balance or earmark it for certain uses, such as acid rain research or enforcement of the program itself. Outlays might also be targeted for mitigating the effects of acid rain--such as treating lakes with lime to reduce acidity--or to help develop newer control technology that would reduce SO<sub>2</sub> emissions for less cost than scrubbers or that would control other pollutants such as nitrogen oxides. Finally, if the remaining balance was sufficiently large, refunds to consumers in states most burdened by the tax might be practical. Many of the bills proposed during the 98th Congress included a refund clause.

Effect on Electricity Prices. Under an 8 million ton reduction program, nationwide electricity prices could rise between 1.3 percent (Option III-1A) and 1.8 percent (Option III-1B) over projected 1995 levels under current law. Naturally, a 10 million ton program would increase prices somewhat more: Option III-2A prices would be 2.3 percent higher than expected; Option III-2B would be 2.9 percent higher, and Option III-2C would raise

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7. It is important to note that key macroeconomic variables affecting trust fund balances are held constant in this analysis. Thus, factors such as electricity generation (as prompted by demand) and interest rates all remain unchanged. In fact, these factors can change over time because of a variety of economic conditions, some possibly arising from the tax and subsidy programs themselves.

nationwide prices an average of 3.7 percent.<sup>8/</sup> In each of the estimated price increases, the electricity tax plays only a small role, since the highest rate assessed would be 1 mill per kwh. Even after accounting for transmission losses, a 1 mill per kwh tax would raise delivered prices by no more than 1.1 mill per kwh.<sup>9/</sup>

Electricity prices in most regions would be somewhat higher under the tax and subsidy schemes compared with the polluter pays approach. But in some of the states most affected by the emission reduction requirements--Illinois, Indiana, Ohio, Missouri, and Pennsylvania--prices would be somewhat lower as a result of the subsidy options, which were designed to transfer funds from other regions to those undergoing most of the cleanup (see Tables 19 and 20). The one exception is Option III-2C, which tends to increase control costs even in the states subject to greatest reductions (except Illinois). After 1995, electricity prices should fall below even those of the polluter pays option in most regions as the tax would have expired but subsidies would continue, reducing the utilities' net costs.

### Effect on Coal Markets

The five cases examined in this chapter would have little national effect on the total expected increase in coal use between 1985 and 1995. In fact, coal production would rise very slightly under each tax and subsidy option, mostly from the use of more low-sulfur western coal. Because western coal has a

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8. In many cases, electricity price increases in 1995 might surpass the basic increases predicted in annual utility costs for that year. This stems from differences between what the 1995 annual utility costs represent and what is embodied in the electricity price estimates. The annual utility costs reported by the model represent (in 1985 dollars) the average yearly expenses a utility might face for investments made through 1995. It thus averages costs over a 20- to 30-year period--including any real price inflation that might occur over the useful life of the investments made in 1995. In contrast, the electricity price estimates for 1995 represent only the costs the consumer might face for that year. Therefore, it only reflects the real costs experienced for that year, including how capital is scheduled for inclusion in the rate base; in most cases, the capital components of price are quite high in the early years and lower in later years.
  9. Since the generation tax is a tax on the generation of electricity--not its consumption--the final cost of the tax to the electricity consumer can be higher than that to the generator because of losses along the transmission system, usually amounting to no more than 10 percent. Since fossil fuel-fired electricity rarely accounts for 100 percent of all power in a given region, however, the extra cost of transmission losses alone would be kept to less than 10 percent in most cases.

TABLE 19. ELECTRICITY PRICE CHANGES BY 1995 UNDER AN 8 MILLION TON SO<sub>2</sub> ROLLBACK PROGRAM AND SEVERAL OPTIONS, BY STATE (in mills per kwh)

State	Base Case 1995	Polluter Pays Option II-1A	Option III-1A	Option III-1B	Percent Differences from Polluter Pays (Option II-1A)	
					Option III-1A	Option III-1B
Alabama, Mississippi	46.6	46.9	47.2	47.8	0.6	1.7
Arizona	55.9	55.5	55.9	56.3	0.7	1.3
Arkansas, Oklahoma, Louisiana	77.5	78.5	79.2	79.8	0.8	1.5
California	78.3	78.3	78.7	79.0	0.5	1.0
Carolinas, North and South	50.3	51.2	51.4	51.6	0.3	0.7
Colorado	57.4	57.6	57.8	58.4	0.4	1.4
Dakotas, North and South	32.1	31.4	31.9	32.3	1.7	3.1
Florida	75.2	76.0	76.5	76.7	0.6	0.9
Georgia	54.2	56.1	56.3	56.8	0.4	1.2
Idaho	43.0	43.3	43.8	44.3	1.3	2.4
Illinois	59.3	60.8	59.9	59.7	-1.4	-1.7
Indiana	53.9	55.0	54.3	55.0	-1.4	-0.1
Iowa	59.3	61.1	61.8	61.7	1.3	1.0
Kansas, Nebraska	57.9	58.1	58.6	59.1	0.9	1.8
Kentucky	55.0	55.9	56.2	56.7	0.4	1.3
Maine, Vermont, New Hampshire	80.9	80.4	80.6	80.9	0.3	0.6
Maryland, Delaware	66.4	67.6	67.9	67.7	0.4	0.1
Massachusetts, Connecticut, Rhode Island	80.6	83.0	83.4	83.5	0.5	0.6

(Continued)

TABLE 19. (Continued)

State	Base Case 1995	Polluter Pays Option II-1A	Option III-1A	Option III-1B	Percent Differences from Polluter Pays (Option II-1A)	
					Option III-1A	Option III-1B
Michigan	57.7	58.4	57.7	57.9	-1.1	-0.7
Minnesota	54.2	54.4	55.1	55.6	1.3	2.1
Missouri	59.6	62.3	63.1	61.8	1.3	-0.8
Montana	41.1	41.0	41.6	42.0	1.5	2.7
Nevada	48.8	47.1	47.8	48.5	1.6	3.1
New Mexico	68.2	66.9	63.4	63.9	-5.2	-4.5
New York (Downstate), New Jersey	99.3	100.0	100.2	100.6	0.3	0.6
New York (Upstate)	53.1	53.7	54.0	54.4	0.6	1.3
Ohio	57.8	59.8	59.9	60.1	0.2	0.5
Pennsylvania	58.2	59.3	58.6	58.5	-1.2	-1.4
Tennessee	46.9	47.3	46.5	46.2	-1.9	-2.4
Texas	79.4	79.4	79.1	79.7	-0.4	0.3
Utah	39.0	44.7	45.2	46.0	1.3	2.9
Virginia, District of Columbia	58.7	60.0	60.3	60.7	0.5	1.2
Washington, Oregon	35.4	35.3	35.5	35.6	0.5	0.9
West Virginia	27.2	26.8	27.1	28.4	1.0	5.8
Wisconsin	52.7	55.1	55.2	55.5	0.1	0.7
Wyoming	<u>43.0</u>	<u>43.3</u>	<u>43.8</u>	<u>44.3</u>	<u>1.3</u>	<u>2.4</u>
U.S. Average	62.0	62.8	62.8	63.1	0.1	0.5

SOURCE: Congressional Budget Office.

TABLE 20. ELECTRICITY PRICE CHANGES BY 1995 UNDER A 10 MILLION TON SO<sub>2</sub> ROLLBACK PROGRAM AND SEVERAL OPTIONS, BY STATE (In 1985 mills per kwh)

State	Base Case 1995	Polluter Pays Option II-2A	Option III-2A	Option III-2B	Option III-2C	Percent Differences from Polluter Pays (Option II-2A)		
						Option III-2A	Option III-2B	Option III-2C
Alabama, Mississippi	46.6	45.6	45.8	44.9	46.9	0.3	-1.5	2.8
Arizona	55.9	55.9	55.9	56.3	56.1	0.1	0.7	0.4
Arkansas, Oklahoma, Louisiana	77.5	78.8	79.3	79.9	79.7	0.7	1.5	1.1
California	78.3	78.3	78.7	79.1	78.9	0.5	1.0	0.7
Carolinas, North and South	50.3	51.2	51.4	51.7	51.5	0.6	1.1	0.6
Colorado	57.4	57.7	57.8	58.4	58.2	0.2	1.2	0.8
Dakotas, North and South	32.1	30.4	31.0	31.6	32.1	1.9	4.0	5.5
Florida	75.2	75.9	76.3	76.8	77.4	0.6	1.2	1.9
Georgia	54.2	56.2	56.4	54.6	57.9	0.4	-2.8	3.0
Idaho	43.0	43.5	44.0	44.6	44.2	1.3	2.7	1.7
Illinois	59.3	62.4	61.1	61.4	61.8	-2.0	-1.5	-0.9
Indiana	53.9	55.5	55.0	54.9	58.3	-1.0	-1.2	5.0
Iowa	59.3	62.3	62.8	63.4	62.5	0.8	1.7	0.2
Kansas, Nebraska	57.9	58.4	58.9	59.5	59.0	0.8	1.9	1.0
Kentucky	55.0	55.0	55.5	54.9	57.2	0.9	0.0	4.0
Maine, Vermont, New Hampshire	80.9	80.3	80.1	80.4	80.3	-0.2	0.1	0.0
Maryland, Delaware	66.4	69.2	69.4	68.4	69.7	0.2	-1.1	0.7
Massachusetts, Connecticut, Rhode Island	80.6	84.7	84.6	85.0	85.2	-0.1	0.4	0.6

(Continued)

TABLE 20. (Continued)

State	Base Case 1995	Polluter Pays Option II-2A	Option III-2A	Option III-2B	Option III-2C	Percent Differences from Polluter Pays (Option II-2A)		
						Option III-2A	Option III-2B	Option III-2C
Michigan	57.7	58.2	57.9	58.1	58.3	-0.4	-0.1	0.1
Minnesota	54.2	55.1	55.8	56.1	55.5	1.3	1.7	0.7
Missouri	59.6	63.8	62.5	62.6	67.3	-2.0	-1.8	5.6
Montana	41.1	41.0	41.5	42.0	41.8	1.3	2.6	2.1
Nevada	48.8	47.0	47.9	48.5	48.2	1.8	3.2	2.5
New Mexico	68.2	67.2	63.4	63.9	67.8	-5.7	-4.9	0.9
New York (Downstate), New Jersey	99.3	100.3	100.5	100.2	100.6	0.1	-0.1	0.3
New York (Upstate)	53.1	55.3	56.0	56.3	56.0	1.3	1.7	1.3
Ohio	57.8	62.2	62.2	63.6	63.7	0.1	2.2	2.4
Pennsylvania	58.2	60.0	57.2	58.0	61.3	-4.6	-3.3	2.3
Tennessee	46.9	50.7	49.5	50.8	49.0	-2.4	0.1	-3.3
Texas	79.4	79.4	79.1	79.7	79.4	-0.4	0.3	0.0
Utah	39.0	44.7	45.2	46.0	45.6	1.2	2.9	2.0
Virginia, District of Columbia	58.7	60.7	60.7	61.3	61.1	0.0	0.9	0.6
Washington, Oregon	35.4	35.4	35.6	35.7	35.7	0.4	0.9	0.6
West Virginia	27.2	46.7	45.4	49.5	56.6	-2.7	6.0	21.3
Wisconsin	52.7	57.9	58.2	58.5	59.6	0.6	1.1	3.0
Wyoming	<u>43.0</u>	<u>43.5</u>	<u>44.0</u>	<u>44.6</u>	<u>44.2</u>	<u>1.3</u>	<u>2.7</u>	<u>1.7</u>
U.S. Average	62.0	63.5	63.4	63.8	64.3	-0.2	0.4	1.2

SOURCE: Congressional Budget Office.

lower energy content than midwestern and eastern coal, more must be burned to produce the same power output.

Tables 21 and 22 compare the coal-market effects of the tax and subsidy options with that of the polluter pays option with no restrictions on fuel switching, (Option II-2A). As expected, the subsidy schemes--which encourage greater scrubber use--offer some limited protection to the chief high-sulfur coal-producing states (Illinois, Indiana, Ohio, and Pennsylvania). The most significant differences occur under the scenarios that require a 10 million ton SO<sub>2</sub> emission rollback. For example, in Pennsylvania, coal production is expected to reach 82.3 million tons annually by 1995 under current policy. Under Option II-2A, production could fall to 56.3 million tons. A subsidy system for scrubbers would temper this loss. Option III-2A would bring the 1995 production level in Pennsylvania to 67.8 million tons (11.5 million tons more than Option II-2A), and Option III-2B would bring production up to 69.7 million tons (13.4 million tons more than Option II-2A). Moreover, by simply requiring more scrubbing--as in Option III-2C--the higher coal production figure of 69.7 million tons per year could be maintained without adding an O&M subsidy.

Effect on Direct Coal Mining Jobs. As Chapter II pointed out, mandated emission rollbacks using the polluter pays approach of Option II-2A could lead to losses in expected 1995 job slots in the high-sulfur coal states (see Tables 23 and 24). Sulfur dioxide rollback programs coupled with subsidies for scrubber use could retard this trend, however. For example, without a change in current policy, Pennsylvania might expect mining employment to reach 29,300 jobs in 1995, rising from 23,100 in 1985.<sup>10</sup> But under a 10 million ton reduction program with no subsidies or restrictions on fuel choice, 1995 employment levels could fall to 20,000 (see Table 24). In contrast, Option III-2A could keep 1995 employment levels from falling below 24,100, and Option III-2B could hold employment to 24,800 in 1995. Option III-2C could also hold employment to 24,800 in 1995, but would cost more overall.

Although regional shifts would occur, national coal employment would change little under each option. However, predicted changes in national employment shown in Tables 23 and 24 do not always vary proportionally to the coal production figures shown in Tables 21 and 22. While employment generally tends to rise or fall with production, western low-sulfur coal requires much less labor to mine than the high-sulfur coal in the Midwest and East. Thus, as more low-sulfur coal was used in place of high-sulfur coal, national employment could fall even if national tonnage rose or stayed the same.

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10. See Tables 11 and 12 in Chapter II for estimates of 1985 coal mining employment.

TABLE 21. COAL PRODUCTION CHANGES AS OF 1995 UNDER AN 8 MILLION TON SO<sub>2</sub> ROLLBACK PROGRAM AND VARIOUS OPTIONS, BY STATE (In millions of tons per year)

State	Base Case 1995	Polluter Pays Option II-2A	Option III-1A	Option III-1B	Differences from Polluter Pays (Option II-2A)	
					Option III-1A	Option III-1B
Alabama	23.8	25.5	25.7	23.8	0.2	-1.7
Arizona	14.2	13.8	13.8	13.8	0.0	0.0
Arkansas	0.0	0.0	0.0	0.0	0.0	0.0
Colorado	19.1	20.3	20.4	19.9	0.0	-0.4
Illinois	56.4	46.2	48.4	56.9	2.3	10.8
Indiana	29.2	24.3	25.8	28.2	1.5	3.8
Iowa	1.5	0.5	0.7	1.5	0.2	1.0
Kansas	2.5	0.4	1.4	2.5	1.0	2.0
Kentucky	208.9	211.6	197.3	188.6	-14.3	-23.0
Maryland	2.5	1.6	2.1	2.3	0.5	0.7
Missouri	8.1	5.4	7.1	8.1	1.7	2.7
Montana	34.0	26.0	30.0	32.6	4.0	6.6
New Mexico	31.9	31.8	31.8	31.8	0.0	0.0
North Dakota	22.7	22.7	22.7	22.7	0.0	0.0
Ohio	24.3	4.0	12.0	19.9	8.0	15.8
Oklahoma	7.7	7.0	7.1	7.7	0.1	0.7
Pennsylvania	82.3	69.4	69.7	73.6	0.2	4.2
South Dakota	0.0	0.0	0.0	0.0	0.0	0.0
Tennessee	5.3	6.9	6.8	6.8	-0.2	-0.2
Texas	109.4	108.8	110.6	110.2	1.8	1.4
Utah	31.6	31.8	31.8	31.8	0.0	-0.1
Virginia	50.6	57.2	57.2	57.2	0.0	0.0
Washington	0.5	0.5	0.5	0.5	0.0	0.0
West Virginia	232.2	261.7	258.4	253.8	-3.2	-7.9
Wyoming	<u>130.5</u>	<u>151.7</u>	<u>150.8</u>	<u>138.0</u>	<u>-0.9</u>	<u>-13.7</u>
Total	1,128.9	1,129.1	1,132.0	1,131.8	2.9	2.7

SOURCE: Congressional Budget Office.

TABLE 22. COAL PRODUCTION CHANGES AS OF 1995 UNDER A 10 MILLION TON SO<sub>2</sub> ROLLBACK PROGRAM AND VARIOUS OPTIONS, BY STATE (In millions of tons per year)

State	Base Case 1995	Polluter Pays Option II-2A	Option III-2A	Option III-2B	Option III-2C	Differences from Polluter Pays (Option II-2A)		
						Option III-2A	Option III-2B	Option III-2C
Alabama	23.8	22.1	21.2	23.0	23.0	-0.9	0.9	0.9
Arizona	14.2	13.9	13.8	13.8	13.8	-0.2	-0.2	-0.2
Arkansas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Colorado	19.1	23.5	23.5	22.3	22.0	0.0	-1.3	-1.5
Illinois	56.4	37.6	43.7	47.4	51.0	6.1	9.8	13.4
Indiana	29.2	19.7	23.2	25.8	28.2	3.5	6.0	8.4
Iowa	1.5	0.5	0.5	0.5	1.5	0.0	0.0	1.0
Kansas	2.5	0.4	0.4	1.4	1.4	0.0	1.0	1.0
Kentucky	208.9	195.9	195.4	193.6	192.0	-0.5	-2.4	-4.0
Maryland	2.5	1.5	1.5	2.1	2.3	0.0	0.6	0.8
Missouri	8.1	5.3	5.4	5.8	7.1	0.1	0.5	1.8
Montana	34.0	26.0	30.1	31.9	30.5	4.1	6.0	4.5
New Mexico	31.9	31.9	31.8	31.8	31.8	0.0	0.0	0.0
North Dakota	22.7	22.7	22.7	22.7	22.7	0.0	0.0	0.0
Ohio	24.3	4.0	4.0	11.6	14.7	0.0	7.5	10.6
Oklahoma	7.7	7.0	7.0	7.1	7.7	0.0	0.1	0.7
Pennsylvania	82.3	56.3	67.8	69.7	69.7	11.5	13.3	13.3
South Dakota	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tennessee	5.3	4.9	6.3	4.8	6.8	1.3	-0.2	1.8
Texas	109.4	108.8	108.9	108.2	110.6	0.1	-0.6	1.8
Utah	31.6	32.8	31.8	31.8	31.8	-1.0	-1.0	-1.0
Virginia	50.6	56.0	56.0	55.7	56.0	0.0	-0.3	0.1
Washington	0.5	0.5	0.5	0.5	0.5	0.0	0.0	0.0
West Virginia	232.2	274.6	258.5	250.0	250.0	-16.1	-24.6	-24.6
Wyoming	<u>130.5</u>	<u>191.2</u>	<u>183.2</u>	<u>175.7</u>	<u>159.7</u>	<u>-7.9</u>	<u>-15.4</u>	<u>-31.5</u>
Total	1,128.9	1,137.1	1,137.0	1,137.0	1,134.5	0.0	0.0	-2.6

SOURCE: Congressional Budget Office.

TABLE 23. COAL MINING EMPLOYMENT CHANGES BY 1995 UNDER AN 8 MILLION TON SO<sub>2</sub> ROLLBACK PROGRAM AND VARIOUS OPTIONS, BY STATE (In number of job slots)

State	Base Case 1995	Polluter Pays Option II-1A	Option III-1A	Option III-1B	Differences from Polluter Pays (Option II-1A)	
					Option III-1A	Option III-1B
Alabama	8,124	8,714	8,773	8,117	59	-597
Arizona	1,177	1,141	1,141	1,141	0	0
Colorado	3,288	3,510	3,511	3,437	1	-73
Illinois	14,733	12,068	12,658	14,880	591	2,812
Indiana	5,342	4,446	4,713	5,149	267	703
Iowa	344	110	164	346	54	237
Kansas	753	129	441	753	311	624
Kentucky	63,014	63,818	59,508	56,881	-4,310	-6,937
Maryland	695	447	597	650	150	203
Missouri	1,948	1,297	1,705	1,941	408	644
Montana	1,251	956	1,104	1,198	148	242
New Mexico	2,846	2,844	2,844	2,844	0	0
North Dakota	1,375	1,374	1,374	1,374	0	0
Ohio	7,136	1,183	3,525	5,840	2,342	4,657
Oklahoma	2,344	2,146	2,187	2,347	41	200
Pennsylvania	29,299	24,701	24,789	26,180	88	1,479
Tennessee	2,010	2,616	2,550	2,550	-66	-66
Texas	6,890	6,855	6,966	6,944	111	89
Utah	7,978	8,040	8,034	8,019	-6	-21
Virginia	19,339	21,852	21,851	21,836	-1	-16
Washington	48	48	48	48	0	0
West Virginia	89,473	100,811	99,563	97,775	-1,248	-3,035
Wyoming	<u>5,768</u>	<u>6,706</u>	<u>6,667</u>	<u>6,102</u>	<u>-38</u>	<u>-604</u>
Total	275,172	275,812	274,714	276,352	-1,098	540

SOURCE: Congressional Budget Office.

TABLE 24. COAL MINING EMPLOYMENT CHANGES BY 1995 UNDER A 10 MILLION TON SO<sub>2</sub> ROLLBACK PROGRAM AND VARIOUS OPTIONS, BY STATE (In number of job slots)

State	Base Case 1995	Polluter Pays Option II-2A	Option III-2A	Option III-2B	Option III-2C	Differences from Polluter Pays (Option II-2A)		
						Option III-2A	Option III-2B	Option III-2C
Alabama	8,124	7,543	7,223	7,844	7,844	-320	302	302
Arizona	1,177	1,155	1,141	1,141	1,141	-13	-13	-13
Colorado	3,288	4,062	4,062	3,842	3,797	0	-220	-265
Illinois	14,733	9,823	11,409	12,392	13,325	1,586	2,569	3,502
Indiana	5,342	3,611	4,245	4,713	5,149	634	1,103	1,538
Iowa	344	110	110	110	339	0	0	230
Kansas	753	129	129	441	441	0	311	311
Kentucky	63,014	59,098	58,944	58,383	57,901	-154	-715	-1,197
Maryland	695	417	425	597	650	8	179	233
Missouri	1,948	1,276	1,296	1,402	1,705	20	126	429
Montana	1,251	955	1,107	1,175	1,122	152	220	167
New Mexico	2,846	2,846	2,844	2,844	2,844	-2	-2	-2
North Dakota	1,375	1,374	1,374	1,374	1,374	0	0	0
Ohio	7,136	1,183	1,183	3,401	4,316	0	2,218	3,133
Oklahoma	2,344	2,146	2,146	2,187	2,347	0	41	200
Pennsylvania	29,299	20,042	24,119	24,789	24,789	4,078	4,747	4,747
Tennessee	2,010	1,859	2,361	1,796	2,550	502	-63	691
Texas	6,890	6,854	6,859	6,817	6,966	4	-37	112
Utah	7,978	8,282	8,034	8,021	8,039	-248	-260	-243
Virginia	19,339	21,375	21,374	21,278	21,401	-1	-96	26
Washington	48	48	48	48	48	0	0	0
West Virginia	89,473	105,792	99,590	96,300	96,300	-6,202	-9,493	-9,493
Wyoming	<u>5,768</u>	<u>8,451</u>	<u>8,100</u>	<u>7,769</u>	<u>7,060</u>	<u>-351</u>	<u>-682</u>	<u>-1,390</u>
Total	275,172	268,431	268,125	268,665	271,448	-306	234	3,017

SOURCE: Congressional Budget Office.