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# **Pollution Abatement and Control** Expenditures, 1972-92

- Estimates for 1992
- Revised Estimates for 1972–91

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DEAL SPENDING for pollution abatement and  $oldsymbol{\mathcal{K}}$  control (PAC) increased 5.1 percent in 1992, in contrast to a 0.7-percent decrease in 1991 (table 1). Prices of PAC goods and services, as measured by the PAC fixed-weighted price index, increased 2.0 percent after increasing 2.6 percent in 1991.

Over nine-tenths of all PAC spending is for pollution abatement (PA); the rest comprises two components—regulation and monitoring expenditures and research and development expenditures. Real PA expenditures increased 5.4 percent in 1992 after a 0.9-percent decrease in 1991. Real spending for regulation and monitoring decreased 2.1 percent, following a 1.1-percent increase. Real spending for research and development decreased 2.6 percent after an 8.5-percent increase.1

In addition to the estimates for 1992, this article presents revised estimates of PAC expenditures for 1972-91. The revised estimates do not sub-

waste and are classified by function (for example, research and development), sector (for example, business), and type (for example, air). PA, which is the principal function, directly reduces pollutant emissions by preventing the generation of pollutants, by recycling the pollutants, or by treating the pollutants prior to discharge; regulation and monitoring is a government activity that stimulates and guides action to reduce pollutant emissions; research and development by business and government not only supports abatement but also helps increase the efficiency of regulation and monitoring.

The estimates of PAC spending cover most, but not all, PAC activities, which are defined as those resulting from rules, policies and conventions, and formal regulations restricting the release of pollutants into common-property media, primarily air and water. The estimates exclude (1) PAC activities that do not use productive resources (for example, plant closings due to PAC, delays in plant construction, curtailments in the use of chemicals in manufacturing and agriculture, and discontinuation of selected product lines) and (2) PAC activities that do use productive resources but that are nonmarket activities (for example, volunteer litter removal).

For the purpose of concise presentation, solid waste management—which includes the collection and disposal of solid waste and the alteration of production processes to generate less solid waste—is categorized as solid waste PAC in the tables in this article. These estimates mainly cover spending for collection and disposal by means acceptable to Federal, State, and local authorities; in the text, they are referred to as "solid waste disposal" spending.

Table 1.—Constant-Dollar Spending for Pollution Abatement and Control: Summary for Recent Years

|   |  |  |  | Mil  | lions of c   | onstant (1   | 987) doll  | ars   |   |   |  | Perce  | nt chang   | ge from p  | orecedin   | g year  |
|---|--|--|--|--|--|--|--|---|---|---|--|--|--|--|--|---|
|   |  |  | Le   | vel  |  |  |  | Change f  | rom prece   | eding year  | r  | 1988   | 1989   | 1000   | 1001   | 1000 n  |
|   | 1987   | 1988   | 1989   | 1990   | 1991   | 1992 <sup>p</sup>  | 1988   | 1989  | 1990  | 1991  | 1992 <i>p</i>  | 1900   | 1909   | 1990   | 1991   | 1992 <i>P</i>   |
| Pollution abatement and control   | 77,649   | 81,465   | 81,664   | 83,901   | 83,348   | 87,594   | 3,816  | 199   | 2,237   | -553  | 4,246  | 4.9  | 0.2  | 2.7  | -0.7   | 5.1   |
| Pollution abatement   | 74,349   | 78,030   | 78,128   | 80,706   | 80,002   | 84,328   | 3,681  | 98  | 2,578   | -704  | 4,326  | 5.0  | .1   | 3.3  | 9  | 5.4   |
| Personal consumption  | 11,075<br>8,799<br>2,276   | 12,067<br>10,039<br>2,028  | 10,438<br>9,467<br>971   | 8,657<br>8,460<br>197  | 6,755<br>6,755<br>0  | 7,019<br>7,019<br>0  | 992<br>1,240<br>–248   | -1,629<br>-572<br>-1,057  | -1,781<br>-1,007<br>-774  | -1,902<br>-1,705<br>-197  | 264<br>264<br>0  | 9.0<br>14.1<br>-10.9   | -13.5<br>-5.7<br>-52.1   | -17.1<br>-10.6<br>-79.7  | -22.0<br>-20.2   | 3.9<br>3.9  |
| Business On capital account Motor vehicle emission abatement Plant and equipment Other On current account Motor vehicle emission abatement Plant and equipment Public sewer systems <sup>1</sup> Cost recovered Other | 45,432<br>14,354<br>4,926<br>7,312<br>2,116<br>31,078<br>1,613<br>19,861<br>7,792<br>-1,473<br>3,285 | 47,805<br>14,854<br>5,791<br>7,285<br>1,778<br>32,951<br>1,437<br>21,321<br>8,269<br>-1,778<br>3,702 | 48,782<br>14,795<br>5,226<br>7,866<br>1,703<br>33,987<br>737<br>22,251<br>8,803<br>-1,609<br>3,805 | 51,881<br>16,622<br>5,276<br>9,742<br>1,604<br>35,259<br>218<br>23,282<br>9,430<br>-1,697<br>4,026 | 52,658<br>17,260<br>5,268<br>10,708<br>1,284<br>35,398<br>0<br>22,350<br>10,251<br>-1,404<br>4,201 | 55,994<br>18,233<br>5,244<br>11,572<br>1,417<br>37,760<br>0<br>23,710<br>10,934<br>-1,531<br>4,647 | 2,373<br>500<br>865<br>-27<br>-338<br>1,873<br>-176<br>1,460<br>477<br>-305<br>417 | 977<br>-59<br>-565<br>581<br>-75<br>1,036<br>-700<br>930<br>534<br>169<br>103 | 3,099<br>1,827<br>50<br>1,876<br>-99<br>1,272<br>-519<br>1,031<br>627<br>-88<br>221 | 777<br>638<br>-8<br>966<br>-320<br>139<br>-218<br>-932<br>821<br>293<br>175 | 3,336<br>973<br>-24<br>864<br>133<br>2,362<br>0<br>1,360<br>683<br>-127<br>446 | 5.2<br>3.5<br>17.6<br>4<br>-16.0<br>6.0<br>-10.9<br>7.4<br>6.1<br>20.7<br>12.7 | 2.0<br>4<br>-9.8<br>8.0<br>-4.2<br>3.1<br>-48.7<br>4.4<br>6.5<br>-9.5<br>2.8 | 6.4<br>12.3<br>1.0<br>23.9<br>-5.8<br>3.7<br>-70.4<br>4.6<br>7.1<br>5.5<br>5.8 | 1.5<br>3.8<br>2<br>9.9<br>-19.9<br>.4<br><br>-4.0<br>8.7<br>-17.3<br>4.3 | 6.3<br>5.6<br>5<br>8.1<br>10.4<br>6.7<br>6<br>6.1<br>6.7<br>9.0 |
| Government  | 17,842<br>10,035<br>7,807  | 18,158<br>9,629<br>8,529   | 18,908<br>9,412<br>9,496   | 20,169<br>9,822<br>10,347  | 20,589<br>9,340<br>11,249  | 21,315<br>9,305<br>12,010  | 316<br>-406<br>722   | 750<br>-217<br>967  | 1,261<br>410<br>851   | 420<br>-482<br>902  | 726<br>-35<br>761  | 1.8<br>-4.0<br>9.2   | 4.1<br>-2.3<br>11.3  | 6.7<br>4.4<br>9.0  | 2.1<br>-4.9<br>8.7   | 3.5<br>4<br>6.8   |
| Regulation and monitoring   | 1,519  | 1,643  | 1,657  | 1,636  | 1,654  | 1,619  | 124  | 14  | -21   | 18  | -35  | 8.2  | .9   | -1.3   | 1.1  | -2.1  |
| Research and development  | 1,781  | 1,792  | 1,879  | 1,560  | 1,692  | 1,648  | 11   | 87  | -319  | 132   | -44  | .6   | 4.9  | -17.0  | 8.5  | -2.6  |

P Preliminary

<sup>1.</sup> The expenditures discussed in this article are for goods and services that U.S. residents use to produce cleaner air and water and to manage solid

<sup>1.</sup> Spending to operate public sewer systems is classified in the national income and product accounts as busi-

<sup>2.</sup> Consists of government enterprise purchases of fixed capital (primarily for the construction of public sewer

systems), which is classified in the national income and product accounts as government spending.

NOTE.—The entries in this table are key components from tables 7 and 8; the "other" entries are consolidations of detail from those tables.

stantially alter the overall picture of PAC spending throughout the economy (chart 3). vised current-dollar estimates primarily incorporate revisions in estimates of nonmanufacturing spending for solid waste disposal, of residential business spending to install septic systems and laterals (that is, connectors to public sewer systems) for water PA, of manufacturing spending to operate air PA plant and equipment, and of private spending for research and development for air PA. The revised constant-dollar estimates reflect the current-dollar revisions and, to a lesser extent, improvements in price indexes, especially those affecting septic systems cleaning for water PA and the operation of electric utility air and water PA facilities.

The first section of this article examines real PAC spending and PAC prices in 1992. The second section describes trends in the estimates of PAC expenditures. The third section discusses the sources and the size of the revisions for 1972–91, and the fourth discusses the sources used in preparing the estimates.

### Recent estimates

Real PAC spending in 1992.—Real PAC spending increased \$4.2 billion, or 5.1 percent, to \$87.6 billion in 1992 after a 0.7-percent decrease in 1991 (table 1, with detail in table 7).

All major types of PAC—air, water, and solid waste—contributed to the growth in real spend-The largest increase was for solid waste disposal, which rose 9.4 percent to \$29.2 billion in 1992 after increasing 4.9 percent in 1991. The 1992 increase was attributable to growth in business spending to operate PA plant and equipment, primarily within nonmanufacturing establishments, and in State and local government spending for solid waste disposal. Air PAC rose 3.9 percent in 1992, following a 6.2-percent decrease. The increase reflected growth in business spending for PA plant and equipment, primarily by electric utilities. Water PAC increased 3.0 percent, following a decrease of 1.3 percent. The increase was mainly in business spending to operate PA plant and equipment, primarily within manufacturing establishments, and in government spending to construct public sewer systems. (See table 8 for detail on business and government spending for air and water PA.)

Within PA spending, all sectors—personal, business, and government—increased in 1992. Personal consumption increased for the first time since 1988, up 3.9 percent, or \$0.3 billion, after a decrease of 22.0 percent in 1991. Purchases of

motor vehicle emission abatement devices (for example, catalytic converters) increased in 1992, reflecting higher unit sales of vehicles.

Business PA expenditures increased 6.3 percent, or \$3.3 billion. Spending for PA capital—that is, capital-account expenditures—increased 5.6 percent, reflecting purchases of PA plant and equipment. Spending for operation of PA capital—that is, current-account expenditures—increased 6.7 percent, largely reflecting operation of PA plant and equipment within manufacturing and nonmanufacturing establishments and of public sewer systems. <sup>2</sup>

Government PA expenditures increased 3.5 percent, or \$0.7 billion. The increase was mainly for State and local government spending for solid waste disposal.

PAC prices in 1992.—The fixed-weighted price index for total PAC spending increased 2.0 percent in 1992, following a 2.6-percent increase in 1991 (table 2). Prices for air and water PAC increased less in 1992 than in 1991, and prices for solid waste disposal increased about the same in both years.

Real PAC spending in 1993.—According to the information available by May 1994, real PAC spending is expected to have increased in 1993 at the same rate as in 1992. The increase reflects growth in business spending to purchase and operate PA plant and equipment, business spending to operate public sewer systems, and

Table 2.—Percent Change in Spending and Prices for Pollution Abatement and Control

|  | 1972–92                             | (                 | Change fr           | om prece            | ding year           |                   |
|--|-------------------------------------|-------------------|---------------------|---------------------|---------------------|-------------------|
|  | average<br>annual<br>growth<br>rate | 1988              | 1989                | 1990                | 1991                | 1992 <i>P</i>     |
| Total:   |                                     |                   |                     |                     |                     |                   |
| Current dollars<br>1987 dollars<br>Fixed-weighted price        | 9.5<br>3.3                          | 7.9<br>4.9        | 4.3<br>.2           | 6.3<br>2.7          | 2.1<br>7            | 7.5<br>5.1        |
| index  | 5.8                                 | 2.9               | 4.0                 | 3.7                 | 2.6                 | 2.0               |
| Air: Current dollars   | 7.7<br>1.6<br>5.4                   | 7.7<br>5.4<br>2.3 | -6.7<br>-9.6<br>3.6 | -3.5<br>-5.6<br>3.7 | -3.7<br>-6.2<br>2.4 | 5.7<br>3.9<br>1.4 |
| Water: Current dollars 1987 dollars Fixed-weighted price index | 8.8<br>2.8<br>5.8                   | 2.1<br>6<br>2.7   | 7.0<br>3.2<br>3.7   | 10.3<br>7.5<br>2.5  | .4<br>-1.3<br>2.1   | 4.5<br>3.0<br>1.5 |
| Solid waste: Current dollars 1987 dollars Fixed-weighted price | 12.9<br>6.2                         | 18.6<br>13.8      | 15.0<br>9.4         | 12.7<br>6.8         | 8.4<br>4.9          | 13.2<br>9.4       |
| index  | 6.3                                 | 4.2               | 5.1                 | 5.6                 | 3.4                 | 3.5               |

<sup>&</sup>lt;sup>p</sup> Preliminary.

<sup>2.</sup> Operation of  $_{\rm PA}$  capital refers to operation, maintenance, and minor repairs of  $_{\rm PA}$  capital.

State and local government spending for solid waste disposal.

# Trends in real PAC spending, 1972-92

Total PAC spending increased at a 3.3-percent average annual rate during 1972–92; it increased faster (4.5 percent) during 1972–80 and slower (2.4 percent) during 1980–92. During 1972–80, real spending for PAC as a percent of gross domestic product increased from 1.5 percent in 1972 to 1.8 percent in 1975, before slipping to 1.7 percent during 1979–80. During 1980–92, this ratio was relatively constant, averaging 1.7 percent. The 1972–92 estimates of real spending are presented by sector in table 3 and by type in table 4.

Percent

П

Real spending by sector.—During 1972–92, real PAC spending increased \$41.6 billion. Business spending accounted for \$25.3 billion of the increase, government spending for \$12.7 billion, and personal consumption spending for \$3.6 billion (chart 1).

Within business PAC spending, most of the dollar increase was in current-account spending, which declined only during 1980–82. Current-account spending increased at an average annual rate of 4.3 percent during 1972–80 and 3.8 percent during 1980–92 (table 3). Capital-account spending increased at an average annual rate of 1.2 percent during 1972–80 and 1.4 percent during 1980–92; significant declines during 1980–83 were followed by a limited recovery that gained momentum after 1989. The declines for business PAC in the early 1980's were due to relatively weak general business conditions. PAC spending may

Millions of constant (1987) dollars

Table 3.—Constant-Dollar Spending for Pollution Abatement and Control, by Sector, 1972–92

|   |   | cent   | II   |  |  |   | WIIIIONS OF   | constant (198   | ii) uullais   |   |  |   |
|---|---|--|--|--|--|---|---|---|---|---|--|---|
|   | 1972–80<br>average<br>annual<br>growth rate   | 1980–92<br>average<br>annual<br>growth rate  | 1972   | 197  | 73 1   | 974   | 1975  | 1976  | 1977  | 1978  | 1979   | 1980  |
| Pollution abatement and control   | 4.5   | 2.4  | 46,0   | 32 49  | 9,683  | 52,098  | 57,246  | 60,139  | 61,703  | 64,680  | 65,878   | 65,590  |
| Personal consumption  | 9.8<br>21.1<br>1.2  | 3<br>3.6   |  | 94   | 4,543<br>1,425<br>3,118  | 4,950<br>1,394<br>3,555   | 6,172<br>2,528<br>3,644   | 6,736<br>3,199<br>3,536   | 7,158<br>3,606<br>3,552   | 7,426<br>3,795<br>3,631   | 7,165<br>4,001<br>3,164  | 7,297<br>4,602<br>2,694   |
| Business  | 3.0<br>1.2<br>23.9<br>0<br>-3.5<br>4.3<br>7.3<br>4.8<br>6.0<br>-2.8                         | 3.0<br>1.4<br>6.0<br>.7<br>-3.8<br>3.8<br>3<br>6.6<br>6.0                                  | 14,1;<br>44<br>10,66<br>3,00<br>17,5-<br>1,1;<br>10,6-<br>3,1!                             | 38 14<br>59<br>54 10<br>55 3<br>48 18<br>77 41 10<br>57 3                                  | 3,482<br>4,830<br>711<br>0,865<br>3,254<br>8,651<br>1,578<br>0,832<br>3,510<br>2,732       | 33,881<br>15,039<br>840<br>11,226<br>2,973<br>18,842<br>1,990<br>10,644<br>3,614<br>2,594 | 34,270<br>15,001<br>1,374<br>11,626<br>2,001<br>19,269<br>2,157<br>11,112<br>3,722<br>2,278 | 35,995<br>15,315<br>1,623<br>11,509<br>2,183<br>20,680<br>2,146<br>12,382<br>4,032<br>2,120 | 38,424<br>15,822<br>1,902<br>11,392<br>2,528<br>22,602<br>2,240<br>13,661<br>4,399<br>2,302 | 40,000<br>15,620<br>2,172<br>10,667<br>2,781<br>24,380<br>2,361<br>14,763<br>4,763<br>2,493 | 41,154<br>16,140<br>2,498<br>10,889<br>2,753<br>25,015<br>2,230<br>15,353<br>4,997<br>2,436      | 40,173<br>15,512<br>2,609<br>10,635<br>2,268<br>24,661<br>2,068<br>15,469<br>5,100<br>2,024 |
| Government Public sewer system fixed capital <sup>3</sup> Other <sup>4</sup>  | 6.6<br>9.8<br>3.4   | 2.2<br>7<br>5.0  | 4,80   | )1   | 1,658<br>5,136<br>6,522  | 13,267<br>6,451<br>6,816  | 16,803<br>9,426<br>7,377  | 17,409<br>9,945<br>7,464  | 16,122<br>8,456<br>7,666  | 17,254<br>9,508<br>7,746  | 17,558<br>9,710<br>7,848   | 18,121<br>10,148<br>7,973   |
|   |   |  |  |  | Mill   | ions of co  | onstant (1987   | ') dollars  |   |   |  |   |
|   | 1981  | 1982   | 1983   | 1984   | 1985   | 1986  | 6 198   | 7 1988  | 1989  | 1990  | 1991   | 1992 <i>p</i>   |
| Pollution abatement and control   | 63,613  | 61,714   | 63,836   | 68,913   | 72,813   | 77,   | ,487 77   | ,649 81,4   | 165 81,6  | 83,90   | 1 83,348   | 87,594  |
| Personal consumption  | 8,472<br>5,893<br>2,579   | 8,494<br>5,834<br>2,660  | 9,990<br>7,105<br>2,885  | 11,040<br>8,186<br>2,855   | 11,935<br>8,961<br>2,973   | 9,  | ,710 8  | ,075 12,1<br>,799 10,1<br>,276 2,1  |   | 8,46  | 0 6,755  | 7,019<br>7,019<br>0   |
| Business On capital account Motor vehicle emission abatement Plant and equipment Other On current account Motor vehicle emission abatement Plant and equipment Public sewer systems <sup>1</sup> Other <sup>2</sup> | 39,010<br>15,241<br>3,306<br>10,209<br>1,726<br>23,770<br>2,040<br>14,839<br>5,297<br>1,594 | 37,615<br>13,968<br>3,170<br>9,397<br>1,401<br>23,647<br>2,064<br>14,069<br>5,616<br>1,898 | 38,461<br>13,106<br>3,807<br>7,309<br>1,990<br>25,355<br>2,147<br>15,369<br>5,959<br>1,880 | 41,635<br>15,099<br>5,057<br>7,852<br>2,190<br>26,537<br>2,130<br>16,289<br>6,149<br>1,969 | 43,874<br>15,189<br>5,282<br>7,711<br>2,196<br>28,686<br>2,156<br>17,482<br>6,550<br>2,498 | 14,<br>5,<br>7,<br>2,<br>31,<br>2,<br>19,<br>7,   | 953 14<br>152 4<br>475 7<br>326 2<br>135 32<br>179 1<br>098 19<br>285 7                     | 312 7,;<br>116 1,;<br>198 34,(<br>613 1,;<br>861 21,;<br>792 8,;                            | 354 14,7<br>791 5,2<br>285 7,8<br>778 1,7<br>074 35,1<br>137 7                              | 95 16,62<br>26 5,27<br>56 9,74<br>93 1,60<br>22 36,09<br>87 21<br>51 23,28<br>9,43          | 2 17,260<br>6 5,268<br>2 10,708<br>4 1,284<br>4 36,398<br>8 0<br>2 22,350<br>0 10,251<br>4 3,797 | 56,948<br>18,233<br>5,244<br>11,572<br>1,417<br>38,714<br>0<br>23,710<br>10,934<br>4,070    |
| Government  | 16,131<br>8,270<br>7,861  | 15,605<br>7,679<br>7,926   | 15,385<br>7,063<br>8,322   | 16,238<br>7,791<br>8,447   | 17,003<br>8,124<br>8,879   | 8,  | 807 10  | ,022 20,4<br>,035 9,6<br>,987 10,8  | 629 9,4   | 12 9,82   | 2 9,340  | 23,628<br>9,305<br>14,323   |

P Preliminary

<sup>3.</sup> The first year for which estimates are available is 1972; 1980 begins a period in which PAC spending has tended to parallel changes in the economy (as measured by gross domestic product) more closely than before.

<sup>1.</sup> Spending to operate public sewer systems is classified in the national income and product accounts as busi-

For this table, private purchases for research and development are included with business pollution abatement spending on current account.

Consists of government enterprise purchases of fixed capital (primarily for the construction of public sewer systems), which is classified in the national income and product accounts as government spending.

For this table, government regulation and monitoring and government research and development are included with "other" government pollution abatement spending.

Table 4.—Constant-Dollar Spending for Pollution Abatement and Control, by Type, 1972-92

|  | Per   | rcent                                       |                  |                  |                  |                  | Millions of     | constant (1987  | ) dollars               |                 |                 |                  |
|--|---|---|------------------|------------------|------------------|------------------|-----------------|-----------------|-------------------------|-----------------|-----------------|------------------|
|  | 1972–80<br>average<br>annual growth<br>rate | 1980–92<br>average<br>annual growth<br>rate | 1972             | 197              | 73 1             | 974              | 1975            | 1976            | 1977                    | 1978            | 1979            | 1980             |
| Pollution abatement and control                        | 4.5   | 2.4   | 46,0             | 32               | 49,683           | 52,098           | 57,246          | 60,139          | 61,703                  | 64,680          | 65,878          | 65,590           |
| Pollution abatement                                    | 4.6   | 2.7   | 42,8             | 14               | 46,166           | 48,460           | 53,587          | 56,230          | 57,485                  | 60,279          | 61,423          | 61,305           |
| Air 1  | 5.1   | 2   | 16,4             |                  | 18,272           | 19,004           | 21,291          | 21,903          | 22,855                  | 23,713          | 24,429          | 24,486           |
| Mobile sources <sup>2</sup> Emission abatement devices | 11.3<br>22.1                                | .2<br>4.5                                   | 5,0<br>1,4       |                  | 6,832<br>2,136   | 7,780<br>2,235   | 9,703<br>3,902  | 10,505<br>4,822 | 11,300<br>5,508         | 11,959<br>5,967 | 11,893<br>6,498 | 11,973<br>7,211  |
| Operation of these devices                             | 3.4   |   | 3,6              | 33               | 4,696            | 5,545            | 5,802           | 5,682           | 5,792                   | 5,992           | 5,395           | 4,762            |
| Stationary sources                                     | 1.3<br>.5                                   | 6<br>-1.0                                   | 11,3<br>6,2      |                  | 11,440<br>6,499  | 11,224<br>6,895  | 11,588<br>6,988 | 11,399<br>6,225 | 11,555<br>5,938         | 11,754<br>5,842 | 12,536<br>6,181 | 12,513<br>6,446  |
| Industrial 3   | 0   | 7   | 6,0              | 47               | 6,348            | 6,729            | 6,781           | 6,014           | 5,655                   | 5,628           | 5,892           | 6,044            |
| Other <sup>4</sup><br>Operation of facilities          | 12.6<br>2.1                                 | -5.5<br>2                                   | 5,1              | 56  <br>23       | 151<br>4,941     | 167<br>4,329     | 208<br>4,600    | 211<br>5,174    | 283<br>5,617            | 214<br>5,912    | 290<br>6,355    | 402<br>6,068     |
| Industrial   | 2.3   | 2   | 4,8              | 19               | 4,673            | 4,069            | 4,318           | 4,849           | 5,320                   | 5,646           | 6,063           | 5,782            |
| Other <sup>5</sup><br>Water <sup>6</sup>               | 8<br>4.5                                    | -1.7<br>1.8                                 | 18,7             | 03               | 268<br>19,732    | 259<br>21,012    | 281             | 325<br>25,907   | 297<br>25,483           | 266<br>26,744   | 292<br>27,255   | 285<br>26,622    |
| Point sources  | 6.0   | 2.3   | 14,7             | 50               | 15,542           | 17,159           | 20,991          | 22,797          | 22,103                  | 23,146          | 23,628          | 23,456           |
| FacilitiesIndustrial 3                                 | 5.7<br>-1.3                                 | 5   | 8,8<br>3,9       |                  | 8,929<br>3,709   | 10,183<br>3,633  | 13,604<br>4,093 | 14,738<br>4,701 | 13,329<br>4,769         | 13,812<br>4,167 | 13,786<br>3,964 | 13,828<br>3,586  |
| Public sewer systems                                   | 9.8   | .3<br>7<br>-7.7                             | 4,8              | 01               | 5,136            | 6,451            | 9,426           | 9.945           | 8,456                   | 9,508           | 9,710           | 10,148           |
| Other 7 Operation of facilities                        | 2.4<br>6.3                                  | -7.7<br>5.2                                 | 5,8              | 78               | 84<br>6,613      | 99<br>6,976      | 85<br>7,387     | 92<br>8,060     | 104<br>8,774            | 138<br>9,334    | 111<br>9,842    | 95<br>9,628      |
| Industrial   | 6.6   | 3.4   | 2,4              | 82               | 2,756            | 2,896            | 3,066           | 3,498           | 3,838                   | 4,010           | 4,296           | 4,131            |
| Public sewer systems<br>Other <sup>5</sup>             | 6.0<br>8.5                                  | 6.6<br>3.2                                  | 3,1              | 97               | 3,510<br>347     | 3,614<br>466     | 3,722<br>599    | 4,032<br>531    | 4,399<br>537            | 4,763<br>560    | 4,997<br>549    | 5,100<br>398     |
| Nonpoint sources                                       | -2.8  | -2.7  | 3,9              |                  | 4,190            | 3,853            | 2,932           | 3,110           | 3,380                   | 3,598           | 3,627           | 3,166            |
| Solid waste  | 4.0   | 7.7   | 8,6              |                  | 9,037            | 9,426            | 9,499           | 9,744           | 10,512                  | 11,318          | 11,356          | 11,850           |
| Industrial<br>Other <sup>8</sup>                       | 6.5<br>1.6                                  | 6.7<br>8.8                                  | 3,9<br>4,6       |                  | 4,211<br>4,826   | 4,543<br>4,884   | 4,481<br>5,018  | 4,831<br>4,913  | 5,471<br>5,041          | 5,979<br>5,339  | 6,026<br>5,330  | 6,562<br>5,288   |
| Other 9  | 6.8   | -2.1  | _9               |                  | -875             | -981             | -1,126          | -1,325          | -1,365                  | -1,496          | -1,617          | -1,654           |
| Regulation and monitoring                              | 8.7   | -1.2  | 9                | 59               | 1,190            | 1,340            | 1,346           | 1,403           | 1,514                   | 1,622           | 1,708           | 1,873            |
| Äir<br>Water   | 2.8<br>9.2                                  | 3<br>-1.1                                   |                  | 87<br>75         | 420<br>464       | 430<br>558       | 441<br>576      | 405<br>639      | 450<br>679              | 483<br>695      | 490<br>679      | 483<br>757       |
| Solid waste  | 23.1  | 14.8  |                  | 36               | 42               | 59               | 65              | 52              | 71                      | 95              | 140             | 190              |
| Other <sup>9</sup>                                     | 13.5  | -8.5  |                  | 61               | 264              | 293              | 264             | 307             | 314                     | 349             | 399             | 443              |
| Research and development                               | .8<br>8                                     | -3.1<br>-2.9                                | 2,2<br>1,4       |                  | 2,327<br>1,510   | 2,297<br>1,397   | 2,313<br>1,225  | 2,507<br>1,336  | 2,705<br>1,476          | 2,779<br>1,590  | 2,747<br>1,598  | 2,413<br>1,375   |
| Water  | -2.5  | -1.5  | ] 3              | 88               | 431              | 353              | 345             | 353             | 364                     | 371             | 383             | 317              |
| Solid waste<br>Other <sup>9</sup>                      | 0<br>8.8                                    | 4.4<br>-6.3                                 |                  | 74  <br>31       | 76<br>311        | 81<br>466        | 87<br>656       | 76<br>742       | 71<br>794               | 61<br>757       | 60<br>707       | 74<br>648        |
|  |   |   |                  |                  |                  | lillions of cons | stant (1987) d  | ollare          |                         |                 |                 |                  |
|  | 1981  | 1982  | 1983             | 1984             | 1985             | 1986             | 1987            | 1988            | 1989                    | 1990            | 1991            | 1992 <i>p</i>    |
| Pollution abatement and control                        | 63,614                                      | 61,714                                      | 63,836           | 68,913           | 72,813           | 77,48            | 37 77,6         | 49 81,4         | 465 81,66               | 4 83,901        | 83,348          | 87,594           |
| Pollution abatement                                    | 59,681                                      | 58,115                                      | 60,465           | 65,812           | 69,772           | 74,11            |                 |                 | 1                       | 1               | 1 '             | 84,328           |
| Air <sup>1</sup>                                       | 25,688                                      | 24,976                                      | 25,906           | 28,164           | 29,050           | 30,46            |                 |                 |                         |                 | 22,903          | 23,900           |
| Mobile sources <sup>2</sup> Emission abatement devices | 13,818<br>9,199                             | 13,728<br>9,003                             | 15,943<br>10,911 | 18,228<br>13,243 | 19,373<br>14,244 | 20,16<br>14,86   |                 |                 |                         |                 |                 | 12,264<br>12,264 |
| Operation of these devices                             | 4,619                                       | 4,724                                       | 5,032            | 4,985            | 5,129            | 5,30             | 00 3,8          | 89 3,4          | 1,70                    | 414             | 0               | 0                |
| Stationary sources                                     | 11,896<br>6,283                             | 11,248<br>5,761                             | 9,963<br>4,325   | 9,936<br>4,246   | 9,677<br>3,692   | 10,30<br>3,92    |                 |                 | 9,58<br>328 3,37        |                 | 10,880<br>5,009 | 11,637<br>5,740  |
| Industrial 3   | 5,851                                       | 5,301                                       | 3,879            | 3,900            | 3,409            | 3,65             | 54 3,4          | 82 3,           | 138 3,18                | 1 3,879         | 4,814           | 5,538            |
| Other <sup>4</sup><br>Operation of facilities          | 432<br>5,587                                | 460<br>5,487                                | 445<br>5,639     | 346<br>5,690     | 283<br>5,986     | 6,37             |                 |                 | 190 199<br>332 6,20     |                 |                 | 203<br>5,897     |
| Industrial   | 5,360<br>226                                | 5,263<br>224                                | 5,353<br>286     | 5,418<br>272     | 5,730<br>256     | 6,14             | 12 5,8          |                 | 089 5,969<br>243 230    |                 |                 | 5,664<br>233     |
| Other <sup>5</sup><br>Water <sup>6</sup>               | 23,892                                      | 23,227                                      | 23,328           | 24,900           | 26,017           | 27,71            |                 |                 |                         |                 |                 | 32,993           |
| Point sources  | 21,259                                      | 20,896                                      | 20,429           | 21,791           | 22,926           | 24,48            | 39 26,4         | 38 26,6         | 644 27,61               | 2 30,058        | 29,892          | 30,704           |
| FacilitiesIndustrial <sup>3</sup>                      | 11,657<br>3,306                             | 10,912<br>3,145                             | 9,705<br>2,564   | 10,676<br>2,807  | 10,997<br>2,771  | 11,46<br>2,58    |                 |                 | 218 12,510<br>539 3,040 |                 |                 | 13,044<br>3,702  |
| Public sewer systems                                   | 8,270                                       | 7,679                                       | 7,063            | 7,791            | 8,124            | 8,80             | 07 10,0         | 35 9,6          | 629 9,41                | 9,822           | 9,340           | 9,305            |
| Other 7<br>Operation of facilities                     | 9,602                                       | 9,984                                       | 77<br>10,724     | 78<br>11,115     | 102<br>11,929    | 13,02            |                 | 62<br>73 14,4   | 50 5:<br>426 15,10:     |                 |                 | 36<br>17,661     |
| IndustrialPublic sewer systems                         | 4,011<br>5,297                              | 4,062<br>5,616                              | 4,231<br>5,959   | 4,389<br>6,149   | 4,590<br>6,550   | 4,95<br>7,28     |                 | 57 5,4          | 467 5,613<br>269 8,803  |                 | 5,623<br>10,251 | 6,146<br>10,934  |
| Other 5  | 293   | 306   | 534              | 577              | 789              | 78               | 30 7            | 24              | 680                     | 668             | 670             | 581              |
| Nonpoint sources                                       | 2,633                                       | 2,331                                       | 2,899            | 3,109            | 3,091            | 3,22             |                 |                 | 582 2,553               |                 | 2,158           | 2,289            |
| Solid waste  | 11,698<br>6,521                             | 11,135<br>5,694                             | 12,401<br>6,651  | 13,922<br>7,628  | 15,666<br>8,694  | 17,06<br>9,23    |                 |                 |                         |                 |                 | 28,713<br>14,232 |
| Other <sup>8</sup>                                     | 5,177                                       | 5,441                                       | 5,750            | 6,294            | 6,972            |                  |                 |                 | 392 10,97               |                 |                 | 14,481           |
| Other 9  | -1,597                                      | -1,222                                      | -1,170           | -1,173           | -961             | -1,13            | -1,1            | 90 –1,4         | 416 -1,29               | 7 -1,395        | -1,123          | -1,279           |
| Regulation and monitoring                              | 1,810                                       | 1,709<br>400                                | 1,608<br>383     | 1,506<br>390     | 1,361<br>376     | 1,58<br>42       |                 |                 | 543 1,65°<br>430 45°    |                 | 1,654<br>488    | 1,619<br>467     |
| Water  | 445<br>677                                  | 606   | 548              | 525              | 566              | 60               | 06 5            | 83 (            | 617 610                 | 597             | 608             | 467<br>660       |
| Solid waste Other <sup>9</sup>                         | 286<br>401                                  | 294<br>409                                  | 186<br>491       | 202<br>390       | 277<br>143       | 32               |                 |                 | 371 369<br>225 220      |                 |                 | 993<br>152       |
| Research and development                               | 2,123                                       | 1,890                                       | 1,763            | 1,596            | 1,678            | 1,78             |                 |                 | 792 1,879               |                 |                 | 1,648            |
| Air  | 1,178                                       | 1,061                                       | 952              | 916              | 1,086            | 1,08             | 38 1,0          | 89 1,           | 103 1,114               | 4 866           | 992             | 961              |
| WaterSolid waste                                       | 292<br>81                                   | 281<br>80                                   | 273<br>98        | 238<br>91        | 234<br>98        | 24               | 19 1            | 13              | 241 26:<br>119 15:      | 3 150           | 135             | 266<br>124       |
| Other 9  | 572   | 468   | 440              | 350              | 261              | 34               |                 |                 | 329 350                 |                 | 302             | 298              |

are inseparable from the data on operating costs.

6. The Federal Water Pollution Control Act defines point sources as facilities that discharge to a body of water through a pipe or ditch.

7. Consists of spending for private connectors to public sewer systems, capital spending by owners of feedlots, and spending for fixed capital of government enterprises.

8. Consists of Federal, State, and local government spending for the collection and disposal of solid waste and of household payments to business for the collection and disposal of solid waste.

9. Consists of "other and unallocated" spending, for example, for abatement of multimedia pollution (see footnote 2. table 7). 2, table 7).

<sup>P Preliminary.

1. The Clean Air Act classifies sources of pollutants as either mobile, such as passenger cars, or stationary, such as factories.

2. Cars and trucks only.

3. Consists of new plant and equipment spending for pollution abatement from the Pollution Abatement Costs and Expenditures Survey and the Structures and Equipment Survey—Supplement for Pollution Abatement by the Bureau of Census and of indirect estimation by BEA for selected nonmanufacturing industries.

4. Consists of spending for fixed capital of government enterprises, such as the Tennessee Valley Authority.

5. Consists of spending to operate abatement facilities by government enterprises and spending to acquire and operate government facilities other than those covered in footnote 4; data on the acquisition costs of these facilities</sup> 

also have been affected by intensified review of regulatory rules and of enforcement initiatives.

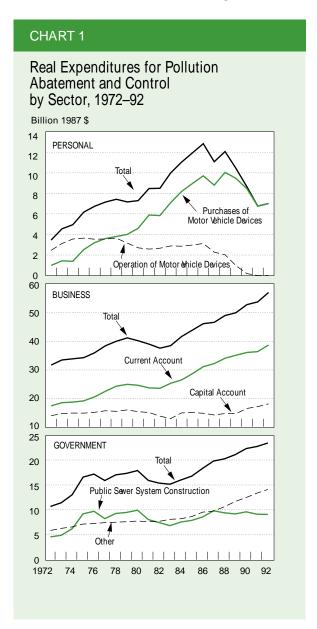
Within government PAC spending, most of the dollar increase occurred during 1972–80 in spending for public sewer system construction and during 1988–92 in "other" government spending, mostly for regulation and monitoring and for research and development. Spending for public sewer system construction, one of the most cyclically sensitive PAC components, increased at an average annual rate of 9.8 percent during 1972–80 and decreased at a 0.7-percent rate during 1980–92.

Within personal consumption PAC spending, most of the dollar increase in spending was for purchases of motor vehicle emission abatement devices, which increased at an average annual rate

of 21.1 percent during 1972–80 and 3.6 percent during 1980–92. These yearly purchases generally moved upward through 1988 and downward thereafter. Spending to operate these devices increased during 1972–80 at an average annual rate of 1.2 percent, leveled during 1980–86, and declined sharply to zero by 1991.<sup>4</sup>

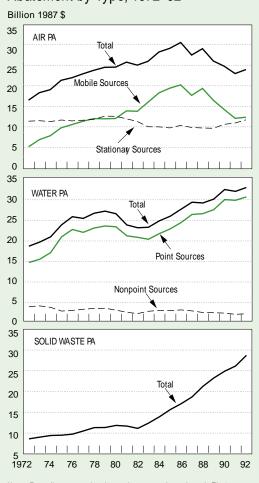
Real spending by type.—The overall increase in real PAC spending during 1972–92 was accounted for by a \$41.5 billion increase in pollution abatement. Among the other PAC components, a \$0.7 billion increase for regulation and monitoring was mostly offset by a \$0.6 billion decline for research and development. The increase for pollution abatement included \$7.5 billion for air PA,

<sup>4.</sup> For a discussion of spending for operation of emission abatement devices on motor vehicles, see the box on page 33 of the June 1992 Survey of Current Business.



## CHART 2

# Real Expenditures for Pollution Abatement by Type, 1972–92



Note.—Expenditure categories abevare the same as those shown in able 4.

U.S. Department of Commerce, Bureau of Economic Analysis

\$14.3 billion for water PA, and \$20.1 billion for solid waste disposal (chart 2).5

Air PA spending increased at an average annual rate of 5.1 percent during 1972-80 and declined at a 0.2-percent rate during 1980-92 (table 4). Within air PA spending, most of the dollar increase was in spending to abate emissions from mobile sources (cars and trucks only). Mobile sources spending increased until 1986 and generally declined thereafter. For all years except 1973 and 1974, purchases of motor vehicle emission abatement devices contributed the most to the increases in mobile source spending. Stationary sources spending, the other component of air PA spending, was relatively level during 1972-92. This spending increased at an average annual rate of 1.3 percent during 1972–80, mainly reflecting spending to operate industrial facilities, and decreased at an average annual rate of 0.6 percent during 1980-92, mainly reflecting spending to purchase industrial facilities.

Water PA spending increased at an average annual rate of 4.5 percent during 1972–80 and 1.8 percent during 1980–92. The majority of water PA spending consists of spending to abate pollution emissions from point sources. Within point source spending, most of the increases during 1972–92 came from growth in the construction and operation of public sewer systems. Spending to abate pollution emissions from nonpoint sources declined for most years, decreasing at an

average annual rate of 2.8 percent during 1972–80 and 2.7 percent during 1980–92.

Solid waste disposal spending increased at an average annual rate of 4.0 percent during 1972–80 and 7.7 percent during 1980-92. It increased each year except for 1981 and 1982, and the increases after 1982 typically were strong. During 1972–80, increases were mainly in purchases of industrial facilities to dispose of solid waste generated from their own plant and equipment. 1982, "other" solid waste spending has steadily increased, contributing to the strong increases in total spending for solid waste disposal. The increases in "other" solid waste spending were mainly due to State and local government spending and to business spending. State and local government spending for solid waste disposal rose for all years except 1974, 1976, and 1979. Business spending to collect and dispose of solid waste from residential customers who subscribe to such a service increased for all years except 1976, 1980, and 1981.

## Sources and size of revisions

The revisions in PAC spending for 1972–91 are statistical in origin; definitions, concepts, and coverage were not changed. Revisions in current-dollar estimates resulted from changes in estimation methodology—that is, new source data and/or estimating procedures—and the incorporation of revised data from regularly used sources. Revisions in constant-dollar estimates reflect the current-dollar revisions and improved combinations of price indexes used for deflation. Table 5 shows revisions in annual rates of change for

Table 5.—Pollution Abatement and Control and Its Major Components: Revisions in Average Annual Rates of Change for Selected Periods

|  |                                   |                    | 197              | 2-91                              |                    |                  |                      |                      | 197           | 2-80                              |                   |               |                                   |                    | 1980             | )-91                              |                     |                  |
|--|-----------------------------------|--------------------|------------------|-----------------------------------|--------------------|------------------|----------------------|----------------------|---------------|-----------------------------------|-------------------|---------------|-----------------------------------|--------------------|------------------|-----------------------------------|---------------------|------------------|
|  | Cı                                | rrent doll         | ars              | Cor                               | nstant dol         | lars             | Cu                   | rrent dolla          | ars           | Coi                               | nstant doll       | ars           | Cu                                | rrent doll         | ars              | Con                               | stant doll          | ars              |
|  | Previ-<br>ously<br>pub-<br>lished | Re-<br>vised       | Revi-<br>sion    | Previ-<br>ously<br>pub-<br>lished | Re-<br>vised       | Revi-<br>sion    | Previously published | Re-<br>vised         | Revi-<br>sion | Previ-<br>ously<br>pub-<br>lished | Re-<br>vised      | Revi-<br>sion | Previ-<br>ously<br>pub-<br>lished | Re-<br>vised       | Revi-<br>sion    | Previ-<br>ously<br>pub-<br>lished | Re-<br>vised        | Revi-<br>sion    |
| Pollution abatement and control .  | 9.2                               | 9.6                | 0.4              | 3.0                               | 3.2                | 0.2              | 14.8                 | 14.9                 | 0.1           | 4.8                               | 4.5               | -0.3          | 5.4                               | 5.9                | 0.5              | 1.7                               | 2.2                 | 0.5              |
| Pollution abatement<br>Regulation and monitoring<br>Research and development | 9.3<br>8.8<br>7.4                 | 9.8<br>8.9<br>4.8  | .5<br>.1<br>–2.6 | 3.1<br>2.8<br>1.0                 | 3.3<br>2.9<br>–1.5 | .2<br>.1<br>–2.5 | 15.0<br>17.1<br>9.9  | 15.1<br>17.1<br>9.9  | .1<br>0<br>0  | 4.9<br>8.7<br>.8                  | 4.6<br>8.7<br>.8  | 3<br>0<br>0   | 5.4<br>3.1<br>5.7                 | 6.1<br>3.4<br>1.3  | .7<br>.3<br>–4.4 | 1.8<br>-1.4<br>1.1                | 2.4<br>-1.1<br>-3.2 | .6<br>.3<br>–4.3 |
| By sector:   |                                   |                    |                  |                                   |                    |                  |                      |                      |               |                                   |                   |               |                                   |                    |                  |                                   |                     |                  |
| Personal consumption<br>Business<br>Government                               | 9.3<br>9.0<br>9.9                 | 9.4<br>9.3<br>10.4 | .1<br>.3<br>.5   | 3.5<br>2.7<br>3.6                 | 3.6<br>2.8<br>4.0  | .1<br>.1<br>.4   | 21.9<br>13.4<br>15.8 | 21.8<br>13.5<br>15.6 | 1<br>.1<br>2  | 9.8<br>3.4<br>6.7                 | 9.8<br>3.0<br>6.6 | 0<br>4<br>1   | .9<br>5.9<br>5.8                  | 1.1<br>6.4<br>6.7  | .2<br>.5<br>.9   | 9<br>2.2<br>1.3                   | 7<br>2.7<br>2.2     | .2<br>.5<br>.9   |
| By major type:   |                                   |                    |                  |                                   |                    |                  |                      |                      |               |                                   |                   |               |                                   |                    |                  |                                   |                     |                  |
| Air<br>Water<br>Solid waste  | 8.0<br>9.1<br>11.6                | 7.8<br>9.0<br>12.9 | 2<br>1<br>1.3    | 1.6<br>2.9<br>4.9                 | 1.5<br>2.8<br>6.0  | 1<br>1<br>1.1    | 17.0<br>14.2<br>13.2 | 16.7<br>14.2<br>12.7 | 3<br>0<br>5   | 4.9<br>4.5<br>5.0                 | 4.7<br>4.5<br>4.2 | 2<br>0<br>8   | 2.0<br>5.5<br>10.5                | 1.8<br>5.4<br>13.0 | 2<br>1<br>2.5    | 6<br>1.8<br>4.9                   | 7<br>1.6<br>7.4     | 1<br>2<br>2.5    |

<sup>5.</sup> For air PA, the Clean Air Act classifies sources of pollutants as mobile (for example, automobiles) or stationary (for example, factories). For water PA, the Federal Water Pollution Control Act classifies sources of pollutants as point (for example, factories) or nonpoint (for example, highway construction projects).

the current- and constant-dollar estimates for selected periods.

Current-dollar revisions.—Revisions were minimal for 1972–78, downward for 1979–84, and upward for 1985–91 (chart 3). For 1973–78, the current-dollar estimates were revised within a fairly small range—down at most 0.5 percent in 1974 and up at most 0.2 percent in 1978. For 1979–91, they were revised down as much as 4.0

CHART 3 Expenditures, Real Expenditures, and Fixed-Weighted Price Index for Pollution Abatement and Control, 1972-92 Billion \$ (Ratio Scale) 100 90 80 **EXPENDITURES** 70 Previously Published 60 50 40 Revised 30 20 Billion 1987 \$ (Ratio Scale) REAL EXPENDITURES 100 90 80 Previously Published 70 60 50 40 Revised 30 Index (1987=100) (Ratio Scale) 150 FIXED-WEIGHTED PRICE INDEX Revised 100 90 80 70 60 Previously Published 50 40 30 1972 74 76 78 80 82 84 86 88 90 Note.—Pollution Abatement Control APC) expenditures consist ofxpenditures for the direct abatement of pollution (P, for regulation and monitoring, and for U.S. Department of Commerce, Bureau of Economic Analysis

percent in 1981 and up as much as 3.7 percent in 1991.

For 1972–80, downward revisions mainly reflected nonmanufacturing spending for solid waste disposal, and upward revisions mainly reflected spending for the installation of septic systems and laterals (that is, connectors to public sewer systems). For 1981–84, downward revisions were mainly in air PAC for manufacturing spending to operate PA plant and equipment and for private research and development. For 1985–91, upward revisions were mainly due to spending to dispose of solid waste by nonmanufacturing businesses, residential customers, and State and local governments. For 1990 and 1991, downward revisions were sizable for public sewer system construction spending.

Estimates of spending for solid waste disposal were revised to reflect new source data (for example, new estimates of private contract services purchased by manufacturing establishments) from the Pollution Abatement Costs and Expenditures Survey published by the Bureau of the Census and increased use of refuse-industry payroll data published by the Bureau of Labor Statistics (BLS). The moderate to large size of revisions reflects the incorporation of these source data and related estimation improvements.

Estimates of private research and development for pollution abatement were revised to incorporate new data from the National Science Foundation (NSF) for 1984, 1989, and 1990. For this component of PAC spending, large downward revisions resulted for 1983 forward. The new data for 1984 indicated spending at a lower level and, when combined with the new data for 1989, confirmed that the sketchy information previously available had tended to overstate spending growth. The new data for 1990 indicated a decline in spending in that year, rather than an increase as previously published. Because spending for research and development is a relatively small PAC component, the sizable revision in this series had little effect on the estimates of total PAC.

Estimates of septic system and lateral purchases (and spending for cleaning of septic systems) were revised to incorporate refined estimates of average installation cost (and septic system cleaning cost) and newly available information from the 1990 Decennial Census of Housing by the Census Bureau. Telephone interviews with selected installers (and cleaners) updated the average cost estimates, and the decennial census data updated

the estimates of growth in housing units with septic systems and laterals.

Constant-dollar revisions.—The constant-dollar revisions mainly reflect the current-dollar revisions just discussed. Spending estimates affected by revisions in the price measures include those for septic system cleaning (included in table 8 in current-account spending for residential systems maintenance) and the operation of electric utility air and water pollution abatement facilities (included in table 8 in current-account spending for plant and equipment operation). The PAC fixedweighted price index was revised only slightly for most years; the largest revision, 0.5 percent, was for 1990.

On the whole, the revised constant-dollar estimates do not appear to have substantially altered the view of PAC spending throughout the economy (chart 3). The revised PAC estimates show a pattern of growth similar to that shown by the previously published estimates: Paralleling the enactment of major new environmental legislation and strengthening of the Federal role in environmental protection, real PAC spending rose throughout the 1970's; it dropped with the economy in the early 1980's and generally rose thereafter. During 1972-91, PAC spending increased at an average annual rate of 3.2 percent for the revised series and 3.0 percent for the previously published series (table 5). The slightly faster rate of growth in the revised series mainly reflects the substantially higher growth in solid waste disposal spending estimates for 1980-91 (a 7.4-percent average annual rate for the revised series, compared with a 4.9-percent rate for the previously published series). Most of the growth in solid waste disposal spending was due to State and local government spending and to nonmanufacturing business spending.

### Sources of the estimates

Some estimates of PAC expenditures are based directly on data from surveys or censuses; others are prepared by indirect methods. PAC estimates derived from direct sources account for about two-thirds of the revised total PAC spending; the remainder is based on other sources that provide more general survey information and on assumptions made to utilize this information. Table 6 shows the breakdown of PAC spending by type of estimate for 1992.

Surveys.—The most important direct sources are the Pollution Abatement Costs and Expenditures (PACE) Survey (for capital and operating

spending by manufacturing establishments) and surveys of government finances (for government spending to operate sewer systems and for solid waste disposal) and of new construction put in place (for government spending to construct sewer systems). These key surveys, as well as the Structures and Equipment Expenditures Survey—Supplement for Pollution Abatement (for electric utilities and, to a lesser extent, mining and petroleum enterprises), are all conducted by the Census Bureau. In addition, BEA collects data on Federal agency funding for PAC and information from the Environmental Protection Agency (EPA) regional offices on State and local government spending for regulation and monitoring. Finally, BEA relies on the Energy Information Agency of the U.S. Department of Energy to collect data on PA operating spending by electric utilities from its Steam-Electric Plant Operation and Design Report.

For 1992, the Census Bureau, in collaboration with BEA, redesigned its PACE survey. egories of spending that previously were not distinguished from more general categories were developed, and new categories were added.

Other sources.—About two-fifths of PAC spending derived by indirect methods is for nonmanufacturing and residential customers' spending for solid waste disposal privately contracted for (or subscribed). Data sources provide only sketchy information on purchases of solid waste disposal services by customer types (for example, nonmanufacturing demand for services) and on waste flows subject to contract service by refuse companies; therefore, the relationship between

Table 6.—Pollution Abatement and Control Expenditures for 1992, by Type of Estimate

|   | Percent<br>of PAC<br>expendi-<br>tures |
|---|--|
| Surveys Government Finances, BOC Pollution Abatement Costs and Expenditures (MA-200), BOC Value of New Construction Put in Place, BOC Federal Funding for Pollution Control, BEA Structures and Equipment Expenditures Survey—Supplement for Pollution Abatement, BOC Steam-Electric Plant Operation and Design Report, DOE | 65<br>24<br>22<br>10<br>7              |
| Other sources  Nonmanufacturing and residential customers' spending for solid waste disposal  Motor vehicle emission abatement  Nonmanufacturing operation and maintenance for pollution abatement Residential systems water pollution abatement investment and   | 35<br>15<br>13<br>3                    |
| operation  Nonmanufacturing plant and equipment, air and water  Electric utilities—extra cost of cleaner fuel  All other  | 2<br>1<br>0<br>1                       |

BOC Bureau of Census BEA Bureau of Economic Analysis

DOE Department of Energy

purchasers' and suppliers' data is difficult to de-The indirect method used compares a variety of data sources to discern and reconcile, to the extent possible, this relationship. This process of comparison, fitting, and reconciliation is aided by taking into account information for manufacturing establishments (which also purchase services from refuse companies) as well as for nonmanufacturing and residential customers. It relies heavily on the following information: (1) Refuse-industry (that is, supplier) payroll data from BLS, (2) PACE survey data on manufacturing purchases on private contract, and (3) partial information on waste flows by type (that is, information about demand) and disposal services provided (that is, information about supply) from EPA one-time studies, refuse company annual reports, and trade association contacts and reports.

Most of the remainder of PAC spending is attributable to indirect estimation of spending for motor vehicle emission abatement devices and their operation (fuel consumption penalty, maintenance cost, and fuel price penalty). Information on unit sales of motor vehicles is from the American Automobile Manufacturers Association of the United States, Inc., and the dollar value per emission abatement device at time of purchase is derived from selected BLS informa-Components of operating spending are based on information from a variety of sources, including studies by EPA (for the fuel consumption penalty and maintenance cost for pre-1975 model year vehicles), data from BLS (for the prices of unleaded and leaded gasoline and the amount of unleaded gasoline purchases to which the fuel price penalty applies), and data from R.L. Polk, Inc. (for the inventory, or stock, of motor vehicles by model year). Factors for the allocation of spending between consumers and business are developed by BEA.

Nonmanufacturing operation and maintenance spending for PA (excluding electric utilities) is estimated in relation to nonmanufacturing air and water PA plant and equipment (P&E) stocks that are being operated. The key assumption is that the ratio of operating spending to stocks for manufacturing establishments can be applied to the stocks of nonmanufacturing establishments to determine operating expenses. These nonmanufacturing PA P&E stocks (excluding electric utilities) are estimated using a perpetual inventory method. Nonmanufacturing PA P&E spending es-

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timates, the starting point for use of the perpetual inventory method, are derived using a variety of data sources, including the PA supplement to the structures and equipment survey mentioned earlier, an environmental protection expenditures survey by the American Petroleum Institute, the *Census of Mineral Industries*, and information about relationships between company-based and establishment-based data.

Estimates of residential systems water PA spending consist of purchases of septic systems and laterals and spending for cleaning septic systems. Data sources for these estimates include surveys of housing conducted by the Census Bureau; related construction activity indicators, such as housing permits and housing starts; and information from telephone contacts with technical experts about the cost of installing and cleaning PA residential systems.

The extra cost of cleaner fuel used by electric utilities that adopt a fuel-switching strategy to lessen emissions is estimated primarily from information on the cost and quality of oil and coal that utilities consume, which is reported by the Energy Information Agency of the U.S. Department of Energy in its *Electric Power Monthly*.

Notable among the remaining sources is the indirect method to estimate private purchases for research and development (R&D) PA spending. This method uses data on total R&D spending from the Industrial Research and Development Survey by the NSF to extrapolate R&D spending for PAC types. Newly available NSF data providing partial coverage of PAC for 1984, 1989, and 1990 has reduced reliance on extrapolation.

Tables 7 and 8 follow.

Table 7.—Expenditures for Pollution Abatement and Control by Sector and Type in Current and Constant Dollars and Selected Fixed-Weighted Price Indexes, 1972–92

|                      |  | rixe                         | a-vveig                      | iileu r                     | nice in                      | uexes,                        | 19/2-                         | 92                           |                              |                             |                             |                             |                             |                            |                              |                             |
|----------------------|--|------------------------------|------------------------------|-----------------------------|------------------------------|-------------------------------|-------------------------------|------------------------------|------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|------------------------------|-----------------------------|
| Line                 |  |                              |                              |                             |                              |                               |                               |                              | Total 1                      |                             |                             |                             |                             |                            |                              |                             |
|                      |  | 1972                         | 1973                         | 1974                        | 1975                         | 1976                          | 1977                          | 1978                         | 1979                         | 1980                        | 1981                        | 1982                        | 1983                        | 1984                       | 1985                         | 1986                        |
|                      |  |                              |                              |                             |                              |                               |                               | Mill                         | ions of dol                  | lars                        |                             |                             |                             |                            |                              |                             |
| 1                    | Pollution abatement and control  | 16,586                       | 19,404                       | 23,552                      | 28,442                       | 31,859                        | 35,048                        | 39,537                       | 45,115                       | 50,399                      | 54,241                      | 55,359                      | 58,873                      | 65,423                     | 71,169                       | 75,389                      |
| 2                    | Pollution abatement  | 15,397                       | 18,011                       | 21,969                      | 26,685                       | 29,855                        | 32,738                        | 36,941                       | 42,272                       | 47,352                      | 51,153                      | 52,321                      | 55,893                      | 62,561                     | 68,268                       | 72,111                      |
| 3<br>4<br>5          | Personal consumption   | 1,350<br>473<br>877          | 1,867<br>679<br>1,188        | 2,331<br>702<br>1,629       | 3,235<br>1,384<br>1,851      | 3,783<br>1,863<br>1,920       | 4,293<br>2,211<br>2,082       | 4,780<br>2,506<br>2,274      | 5,430<br>2,855<br>2,575      | 6,558<br>3,552<br>3,006     | 8,122<br>4,823<br>3,299     | 8,287<br>4,964<br>3,323     | 9,742<br>6,201<br>3,541     | 10,839<br>7,354<br>3,485   | 11,991<br>8,309<br>3,682     | 12,385<br>9,385<br>3,000    |
| 6<br>7<br>8          | Business On capital account  | 10,639<br>5,463<br>5,176     | 12,261<br>6,239<br>6,022     | 14,680<br>7,195<br>7,485    | 16,554<br>8,004<br>8,551     | 18,453<br>8,659<br>9,794      | 21,067<br>9,520<br>11,547     | 23,463<br>10,119<br>13,343   | 26,927<br>11,493<br>15,434   | 29,706<br>12,089<br>17,617  | 32,370<br>13,055<br>19,315  | 33,092<br>12,567<br>20,525  | 34,804<br>12,026<br>22,779  | 39,032<br>14,214<br>24,818 | 42,058<br>14,598<br>27,460   | 43,954<br>14,659<br>29,295  |
| 9<br>10<br>11        | Private Government enterprise Costs recovered  | 4,404<br>1,151<br>-379       | 5,078<br>1,342<br>-398       | 6,388<br>1,635<br>-538      | 7,348<br>1,896<br>-693       | 8,461<br>2,221<br>-887        | 9,906<br>2,608<br>-966        | 11,365<br>3,053<br>-1,074    | 13,272<br>3,522<br>-1,360    | 15,149<br>4,078<br>–1,610   | 16,402<br>4,701<br>-1,788   | 16,675<br>5,314<br>-1,463   | 18,375<br>5,805<br>-1,402   | 20,056<br>6,228<br>-1,465  | 21,972<br>6,722<br>–1,233    | 23,382<br>7,359<br>-1,446   |
| 12<br>13<br>14       | Government Federal State and local   | 3,409<br>139<br>1,311        | 3,883<br>203<br>1,433        | 4,958<br>294<br>1,592       | 6,896<br>432<br>1,752        | 7,619<br>469<br>1,834         | 7,378<br>490<br>1,965         | 8,698<br>472<br>2,212        | 9,915<br>548<br>2,461        | 11,088<br>494<br>2,768      | 10,660<br>506<br>3,144      | 10,942<br>550<br>3,484      | 11,346<br>795<br>3,842      | 12,690<br>944<br>4,280     | 14,220<br>1,225<br>4,858     | 15,772<br>1,346<br>5,515    |
| 15<br>16<br>17       | Government enterprise purchases of fixed capital   | 1,959<br>367<br>200          | 2,246<br>490<br>278          | 3,072<br>595<br>346         | 4,713<br>653<br>381          | 5,316<br>725<br>402           | 4,924<br>833<br>429           | 6,015<br>949<br>507          | 6,906<br>1,067<br>593        | 7,825<br>1,296<br>793       | 7,011<br>1,378<br>818       | 6,908<br>1,397<br>820       | 6,709<br>1,385<br>806       | 7,466<br>1,362<br>743      | 8,137<br>1,279<br>575        | 8,912<br>1,532<br>715       |
| 18                   | State and local  | 167                          | 212                          | 248                         | 272                          | 323                           | 404                           | 442                          | 474                          | 502                         | 560                         | 577                         | 579                         | 619                        | 705                          | 817                         |
| 19<br>20<br>21<br>22 | Research and development Private Federal State and local   | 823<br>519<br>205<br>99      | 903<br>569<br>269<br>65      | 988<br>608<br>342<br>39     | 1,104<br>609<br>448<br>47    | 1,279<br>706<br>528<br>45     | 1,478<br>849<br>578<br>51     | 1,647<br>999<br>592<br>57    | 1,777<br>1,143<br>564<br>71  | 1,751<br>1,096<br>591<br>64 | 1,711<br>1,037<br>646<br>28 | 1,641<br>1,009<br>604<br>28 | 1,595<br>920<br>640<br>35   | 1,501<br>879<br>590<br>32  | 1621.1<br>1,010<br>591<br>20 | 1,746<br>1,063<br>651<br>31 |
|                      |  |                              |                              |                             |                              |                               | N                             | lillions of o                | constant (1                  | 987) dolla                  | rs                          |                             |                             |                            |                              |                             |
| 23                   | Pollution abatement and control  | 46,032                       | 49,683                       | 52,098                      | 57,246                       | 60,139                        | 61,703                        | 64,680                       | 65,878                       | 65,590                      | 63,613                      | 61,714                      | 63,836                      | 68,913                     | 72,813                       | 77,487                      |
| 24                   | Pollution abatement  | 42,814                       | 46,166                       | 48,460                      | 53,587                       | 56,230                        | 57,485                        | 60,279                       | 61,423                       | 61,305                      | 59,681                      | 58,115                      | 60,465                      | 65,812                     | 69,773                       | 74,110                      |
| 25<br>26<br>27       | Personal consumption   | 3,450<br>994<br>2,456        | 4,543<br>1,425<br>3,118      | 4,950<br>1,394<br>3,555     | 6,172<br>2,528<br>3,644      | 6,736<br>3,199<br>3,536       | 7,158<br>3,606<br>3,552       | 7,426<br>3,795<br>3,631      | 7,165<br>4,001<br>3,164      | 7,297<br>4,602<br>2,694     | 8,472<br>5,893<br>2,579     | 8,494<br>5,834<br>2,660     | 9,990<br>7,105<br>2,885     | 11,040<br>8,186<br>2,855   | 11,935<br>8,961<br>2,973     | 12,831<br>9,710<br>3,121    |
| 28                   | Business   | 30,243                       | 31,997                       | 32,458                      | 32,987                       | 34,603                        | 36,861                        | 38,314                       | 39,394                       | 38,673                      | 37,731                      | 36,462                      | 37,454                      | 40,708                     | 42,833                       | 45,002                      |
| 29<br>30             | On capital account<br>On current account   | 14,138<br>16,105             | 14,830<br>17,166             | 15,039<br>17,419            | 15,001<br>17,986             | 15,315<br>19,288              | 15,822<br>21,039              | 15,620<br>22,694             | 16,140<br>23,255             | 15,512<br>23,161            | 15,241<br>22,491            | 13,968<br>22,494            | 13,106<br>24,348            | 15,099<br>25,610           | 15,189<br>27,645             | 14,953<br>30,049            |
| 31<br>32<br>33       | Private Government enterprise Costs recovered  | 13,745<br>3,344<br>–985      | 14,402<br>3,658<br>-893      | 14,654<br>3,760<br>-994     | 15,335<br>3,833<br>-1,182    | 16,568<br>4,167<br>-1,447     | 17,999<br>4,526<br>-1,487     | 19,323<br>4,902<br>-1,531    | 19,800<br>5,160<br>-1,705    | 19,643<br>5,285<br>-1,766   | 18,837<br>5,453<br>-1,799   | 18,189<br>5,769<br>-1,464   | 19,622<br>6,119<br>-1,392   | 20,721<br>6,310<br>-1,421  | 22,154<br>6,707<br>-1,217    | 24,095<br>7,447<br>-1,493   |
| 34                   | Government   | 9,122                        | 9,626                        | 11,053                      | 14,427                       | 14,891                        | 13,466                        | 14,539                       | 14,863                       | 15,335                      | 13,477                      | 13,159                      | 13,021                      | 14,063                     | 15,005                       | 16,277                      |
| 35<br>36<br>37       | Federal  | 402<br>3,693<br>5,027        | 539<br>3,723<br>5,364        | 688<br>3,660<br>6,705       | 937<br>3,782<br>9,708        | 953<br>3,701<br>10,237        | 917<br>3,717<br>8,832         | 809<br>3,878<br>9,852        | 840<br>3,917<br>10,106       | 679<br>4,015<br>10,641      | 627<br>4,070<br>8,780       | 649<br>4,287<br>8,224       | 911<br>4,527<br>7,583       | 1,048<br>4,803<br>8,212    | 1,300<br>5,200<br>8,505      | 1,402<br>5,726<br>9,149     |
| 38<br>39<br>40       | Regulation and monitoring  | 959<br>483<br>476            | 1,190<br>628<br>562          | 1,340<br>735<br>605         | 1,346<br>741<br>606          | 1,403<br>736<br>666           | 1,514<br>736<br>778           | 1,622<br>825<br>796          | 1,708<br>906<br>801          | 1,873<br>1,110<br>763       | 1,810<br>1,040<br>770       | 1,709<br>982<br>727         | 1,608<br>922<br>685         | 1,506<br>814<br>693        | 1,361<br>608<br>754          | 1,589<br>744<br>845         |
| 41<br>42<br>43<br>44 | Research and development Private Federal State and local   | 2,259<br>1,443<br>549<br>268 | 2,327<br>1,485<br>676<br>166 | 2,297<br>1,423<br>782<br>92 | 2,313<br>1,283<br>926<br>104 | 2,507<br>1,392<br>1,022<br>93 | 2,705<br>1,563<br>1,043<br>99 | 2,779<br>1,686<br>990<br>103 | 2,747<br>1,760<br>870<br>117 | 2,413<br>1,500<br>816<br>97 | 2,123<br>1,279<br>805<br>39 | 1,890<br>1,153<br>701<br>36 | 1,763<br>1,007<br>713<br>43 | 1,596<br>927<br>632<br>37  | 1,678<br>1,041<br>615<br>22  | 1,788<br>1,086<br>670<br>32 |
|                      |  |                              |                              |                             |                              |                               | Sel                           | ected fixed                  | d-weighted                   | price inde                  | exes                        |                             |                             |                            |                              |                             |
| 45                   | Pollution abatement and control  | 37.7                         | 40.0                         | 45.6                        | 49.8                         | 53.2                          | 56.8                          | 61.1                         | 68.1                         | 76.1                        | 84.2                        | 88.3                        | 91.1                        | 94.2                       | 97.1                         | 97.3                        |
| 46                   | Pollution abatement  | 37.7                         | 40.0                         | 45.7                        | 49.9                         | 53.3                          | 56.9                          | 61.2                         | 68.3                         | 76.4                        | 84.5                        | 88.5                        | 91.2                        | 94.3                       | 97.2                         | 97.3                        |
| 47                   | Personal consumption   | 45.0                         | 45.8                         | 50.8                        | 55.0                         | 58.4                          | 61.5                          | 65.8                         | 74.6                         | 86.3                        | 92.9                        | 94.0                        | 94.9                        | 96.5                       | 98.9                         | 96.6                        |
| 48<br>49             | Business On capital account  | 35.9<br>41.3                 | 38.4<br>43.5                 | 44.8<br>48.2                | 49.5<br>53.3                 | 52.9<br>56.7                  | 56.7<br>60.3                  | 60.7<br>64.9                 | 67.5<br>71.1                 | 75.8<br>77.5                | 84.6<br>84.7                | 89.3<br>88.9                | 92.0<br>91.5                | 95.3<br>94.0               | 97.7<br>96.2                 | 97.7<br>98.0                |
| 50<br>51             | On current account  Government   | 33.4<br>37.7                 | 36.1<br>40.6                 | 43.2<br>44.8                | 47.7<br>47.8                 | 51.1<br>51.1                  | 55.0<br>54.6                  | 58.8<br>59.4                 | 65.9<br>66.1                 | 75.0<br>71.8                | 84.5<br>78.9                | 89.5<br>83.1                | 92.2<br>87.1                | 95.9<br>90.2               | 98.5<br>94.8                 | 97.5<br>96.9                |
| 52                   | Regulation and monitoring  | 37.7                         | 40.6                         | 43.7                        | 47.8                         | 51.1                          | 54.6                          | 58.1                         | 62.0                         | 68.4                        | 75.4                        | 81.2                        | 85.7                        | 90.2                       | 94.8                         | 96.4                        |
| 53                   | Research and development   | 36.5                         | 38.8                         | 43.0                        | 47.7                         | 51.0                          | 54.6                          | 59.3                         | 64.8                         | 72.7                        | 80.6                        | 86.9                        | 90.6                        | 94.2                       | 96.6                         | 97.6                        |
|                      | ·  |                              |                              |                             |                              |                               |                               |                              | ions of dol                  | lars                        |                             |                             |                             |                            |                              |                             |
|                      | Added to Decision and the second of the seco | 1                            | 1                            |                             | 1                            | T                             |                               | J                            | T                            |                             | I                           | ı                           |                             | 1                          |                              |                             |
| 54<br>55             | Addendum: Business capital consumption allowances: 5  Valued at replacement cost in current dollars  | 1,827                        | 2,354                        | 3,030                       | 3,841                        | 4,610                         | 5,476                         | 6,443                        | 7,625                        | 8,846                       | 10,246                      | 11,449                      | 12,522                      | 13,496                     | 14,340                       | 14,997                      |
| 56                   | Valued at replacement cost in current dollars  Valued at replacement cost in constant (1987) dollars  feetpetps at end of table  | 4,825                        | 5,568                        | 6,364                       | 7,257                        | 8,124                         | 8,969                         | 9,754                        | 10,530                       | 11,272                      | 11,953                      | 12,700                      | 13,434                      | 14,027                     | 14,539                       | 15,030                      |

See footnotes at end of table.

Table 7.—Expenditures for Pollution Abatement and Control by Sector and Type in Current and Constant Dollars and Selected Fixed-Weighted Price Indexes, 1972–92—Continued

|                      | Fixe  | d-Wei   | ghted                    | Price I              | ndexe             | s, 1972   | -92—C                     | ontinu                    | ed                  |                   |   | ,                        |                          |                      |                   |                         |
|----------------------|---|---|--------------------------|----------------------|-------------------|---|---------------------------|---------------------------|---------------------|-------------------|---|--------------------------|--------------------------|----------------------|-------------------|-------------------------|
|                      |   |   |                          | 1987                 |                   |   |                           |                           | 1988                |                   |   | L                        |                          | 1989                 |                   | <del></del>             |
| Line                 |   | Total <sup>1</sup>  | Air                      | Water                | Solid<br>waste    | Other<br>and un-<br>allocat-<br>ed <sup>2</sup> | Total <sup>1</sup>        | Air                       | Water               | Solid<br>waste    | Other<br>and un-<br>allocat-<br>ed <sup>2</sup> | Total <sup>1</sup>       | Air                      | Water                | Solid<br>waste    | Other and unallocated 2 |
|                      |   |   |                          |                      |                   |   |                           | Mill                      | ions of do          | llars             |   |                          |                          |                      |                   |                         |
| 1                    | Pollution abatement and control   | 77,649  | 28,921                   | 30,255               | 19,111            | -638  | 83,809                    | 31,154                    | 30,895              | 22,663            | -903  | 87,390                   | 29,080                   | 33,052               | 26,065            | -806                    |
| 2                    | Pollution abatement   | 74,349  | 27,421                   | 29,420               | 18,698            | -1,190  | 80,242                    | 29,559                    | 30,008              | 22,155            | -1,480  | 83,543                   | 27,374                   | 32,097               | 25,500            | -1,428                  |
| 3<br>4<br>5          | Personal consumption Durable goods <sup>3</sup> Nondurable goods <sup>4</sup> | 11,075<br>8,799<br>2,276  | 11,075<br>8,799<br>2,276 |                      |                   |   | 12,284<br>10,247<br>2,037 | 12,284<br>10,247<br>2,037 |                     |                   |   | 10,944<br>9,865<br>1,079 | 10,944<br>9,865<br>1,079 |                      |                   |                         |
| 6<br>7               | Business On capital account   | 45,432<br>14,354  | 16,005<br>8,408          | 18,168<br>4,493      | 12,731<br>1,452   | -1,472  | 49,107<br>15,276          | 17,000<br>9,176           | 18,850<br>4,209     | 15,121<br>1,890   | -1,865  | 52,217<br>15,670         | 16,136<br>8,884          | 20,792<br>4,777      | 17,062<br>2,010   | -1,773                  |
| 8<br>9               | On current account Private  | 31,078<br>24,602  | 7,597<br>7,456           | 13,675<br>5,867      | 11,278<br>11,278  | -1,472  | 33,831<br>27,151          | 7,824<br>7,656            | 14,641<br>6,264     | 13,231<br>13,231  | -1,865  | 36,547<br>28,820         | 7,252<br>7,091           | 16,015<br>6,677      | 15,052<br>15,052  | -1,773                  |
| 10<br>11             | Government enterprise Costs recovered   | 7,949<br>-1,473   | 141                      | 7,808                | (*)               | 1<br>-1,473                                     | 8,547<br>-1,867           | 168                       | 8,377               | (*)               | 2<br>-1,867                                     | 9,502<br>-1,775          | 161                      | 9,338                | (*)               | 2<br>-1,775             |
| 12                   | Government  | 17,842  | 341                      | 11,252               | 5,968             | 282   | 18,852                    | 275                       | 11,158              | 7,034             | 385   | 20,382                   | 295                      | 11,305               | 8,438             | 345                     |
| 13<br>14<br>15       | Federal State and local Government enterprise purchases of fixed capital      | 1,237<br>6,266<br>10,339  | 80<br>15<br>246          | 707<br>452<br>10,094 | 250<br>5,718      | 200<br>82                                       | 1,402<br>7,283<br>10,167  | 65<br>10<br>200           | 707<br>484<br>9,967 | 300<br>6,734      | 330<br>55                                       | 1,379<br>8,705<br>10,299 | 70<br>12<br>213          | 729<br>489<br>10,086 | 300<br>8,138      | 280<br>65               |
| 16<br>17<br>18       | Regulation and monitoring   | 1,519<br>700<br>819   | 410<br>110<br>300        | 583<br>250<br>333    | 300<br>120<br>180 | 226<br>220<br>6                                 | 1,695<br>850<br>845       | 440<br>120<br>320         | 635<br>300<br>335   | 385<br>200<br>185 | 235<br>230<br>5                                 | 1,803<br>860<br>943      | 490<br>130<br>360        | 670<br>310<br>360    | 400<br>180<br>220 | 243<br>240<br>3         |
| 19<br>20             | Research and development  | 1,781<br>1,120  | 1,089<br>887             | 253<br>113           | 113<br>19         | 326<br>101                                      | 1,872<br>1,179            | 1,155<br>934              | 252<br>119          | 123<br>20         | 342<br>106                                      | 2,044<br>1,241           | 1,216<br>984             | 285<br>125           | 165<br>21         | 379<br>112              |
| 21<br>22             | Federal State and local   | 630<br>31   | 200                      | 120<br>20            | 90                | 220   | 665                       | 220<br>1                  | 115<br>18           | 100               | 230   | 770                      | 230                      | 140<br>20            | 140<br>4          | 260<br>7                |
|                      |   |   |                          |                      |                   |   | l l                       | fillions of o             | constant (1         | 1987) dolla       | ars   |                          |                          |                      |                   |                         |
| 23                   | Pollution abatement and control   | 77,649  | 28,920                   | 30,255               | 19,111            | -638  | 81,465                    | 30,488                    | 30,084              | 21,755            | -861  | 81,664                   | 27,548                   | 31,042               | 23,800            | -726                    |
| 24                   | Pollution abatement   | 74,349  | 27,421                   | 29,420               | 18,698            | -1,190  | 78,030                    | 28,955                    | 29,226              | 21,265            | -1,416  | 78,128                   | 25,982                   | 30,164               | 23,279            | -1,297                  |
| 25                   | Personal consumption  | 11,075  | 11,075                   |                      |                   |   | 12,067                    | 12,067                    |                     |                   |   | 10,438                   | 10,438                   |                      |                   |                         |
| 26<br>27             | Durable goods <sup>3</sup> Nondurable goods <sup>4</sup>                      | 8,799<br>2,276  | 8,799<br>2,276           |                      |                   |   | 10,039<br>2,028           | 10,039<br>2,028           |                     |                   |   | 9,467<br>971             | 9,467<br>971             |                      |                   |                         |
| 28<br>29             | Business  | 45,432<br>14,354  | 16,005<br>8,408          | 18,168<br>4,493      | 12,731<br>1,452   | -1,472  | 47,805<br>14,854          | 16,625<br>8,928           | 18,444<br>4,089     | 14,512<br>1,836   | -1,776  | 48,782<br>14,795         | 15,273<br>8,411          | 19,539<br>4,510      | 15,577<br>1,874   | -1,607                  |
| 29<br>30<br>31       | On current account  | 31,078<br>24,602  | 7,597<br>7,456           | 13,675<br>5,867      | 11,278<br>11,278  | -1,472<br>                                      | 32,951<br>26,274          | 7,696<br>7,526            | 14,355<br>6,073     | 12,676<br>12,676  | -1,776<br>                                      | 33,987<br>26,620         | 6,862<br>6,702           | 15,029<br>6,214      | 13,703<br>13,703  | -1,607                  |
| 32<br>33             | Government enterprise   | 7,949<br>-1,473   | 141                      | 7,808                | (*)               | 1<br>-1,473                                     | 8,455<br>-1,778           | 170                       | 8,283               | (*)               | -1,778  | 8,977<br>-1,609          | 160                      | 8,815                | (*)               | -1,609                  |
| 34<br>35             | Government Federal  | 17,842<br>1,237   | 341<br>80                | 11,252<br>707        | 5,968<br>250      | 282<br>200                                      | 18,158<br>1,340           | 263<br>64                 | 10,781<br>675       | 6,753<br>292      | 361<br>309                                      | 18,908<br>1,271          | 271<br>66                | 10,625<br>670        | 7,701<br>283      | 311<br>252              |
| 34<br>35<br>36<br>37 | State and local Government enterprise purchases of fixed capital              | 6,266<br>10,339   | 15<br>246                | 452<br>10,094        | 5,718             | 82  | 6,953<br>9,866            | 10<br>190                 | 431<br>9,676        | 6,461             | 52  | 7,982<br>9,655           | 11<br>195                | 495<br>9,460         | 7,418             | 59                      |
| 38                   | Regulation and monitoring   | 1,519   | 410                      | 583                  | 300               | 226   | 1,643                     | 430                       | 617                 | 371               | 225   | 1,657                    | 452                      | 616                  | 369               | 220                     |
| 39<br>40             | FederalState and local  | 700<br>819  | 110<br>300               | 250<br>333           | 120<br>180        | 220<br>6  | 814<br>829                | 115<br>315                | 287<br>329          | 192<br>180        | 220<br>5  | 780<br>877               | 118<br>334               | 281<br>334           | 163<br>206        | 218<br>3                |
| 41<br>42             | Research and development  | 1,781<br>1,120  | 1,089<br>887             | 253<br>113           | 113<br>19         | 326<br>101                                      | 1,792<br>1,123            | 1,103<br>890              | 241<br>113          | 119<br>19         | 329<br>101                                      | 1,879<br>1,135           | 1,114<br>899             | 262<br>114           | 153<br>19         | 350<br>102              |
| 43<br>44             | Federal<br>State and local  | 630   | 200                      | 120<br>20            | 90<br>4           | 220   | 643                       | 213                       | 111<br>17           | 97                | 222   | 715                      | 213                      | 130                  | 130               | 241                     |
|                      |   |   |                          |                      |                   |   |                           |                           |                     |                   |   |                          |                          |                      |                   |                         |
|                      |   |   |                          |                      |                   |   | Sel                       | ected fixed               | d-weighted          | price ind         | exes  |                          |                          |                      |                   |                         |
| 45                   | Pollution abatement and control   | 100.0   | 100.0                    | 100.0                | 100.0             | 100.0   | 102.9                     | 102.3                     | 102.7               | 104.2             | 105.0   | 107.0                    | 106.0                    | 106.5                | 109.5             | 111.0                   |
| 46                   | Pollution abatement   | 100.0   | 100.0                    | 100.0                | 100.0             | 100.0   | 102.9                     | 102.2                     | 102.7               | 104.2             | 104.6   | 106.9                    | 105.9                    | 106.4                | 109.6             | 110.1                   |
| 47                   | Personal consumption  | 100.0   | 100.0                    |                      |                   |   | 101.9                     | 101.9                     |                     |                   |   | 105.5                    | 105.5                    |                      |                   |                         |
| 48<br>49             | BusinessOn capital account  | 100.0<br>100.0  | 100.0<br>100.0           | 100.0<br>100.0       | 100.0<br>100.0    | 100.0   | 102.8<br>102.9            | 102.4<br>103.0            | 102.2<br>102.9      | 104.2<br>102.9    | 105.0   | 107.0<br>105.9           | 106.0<br>105.9           | 106.4<br>105.6       | 109.6<br>107.2    | 110.3                   |
| 50                   | On current account  | 100.0   | 100.0                    | 100.0                | 100.0             | 100.0   | 102.7                     | 101.8                     | 102.0               | 104.4             | 105.0   | 107.5                    | 106.2                    | 106.6                | 109.9             | 110.3                   |
| 51                   | Government  | 100.0   | 100.0                    | 100.0                | 100.0             | 100.0   | 103.8                     | 104.4                     | 103.5               | 104.1             | 106.7   | 107.6                    | 108.8                    | 106.4                | 109.5             | 111.0                   |
| 52<br>53             | Regulation and monitoring  Research and development                           | 100.0   | 100.0                    | 100.0                | 100.0             | 100.0   | 103.1                     | 102.4<br>105.0            | 102.9               | 103.6<br>103.7    | 104.4   | 108.8                    | 108.5<br>109.4           | 108.8<br>108.7       | 108.3<br>108.2    | 110.2<br>108.3          |
| ວວ                   | позвани ани истонринени   | 100.0 100.0 100.0 100.0 100.0 100.0 100.0 104.4 105.0 104.2 103.7 103.9 108.8 109.4 108.7 108.2 108.3 |                          |                      |                   |   |                           |                           |                     |                   |   |                          |                          |                      | 100.3             |                         |
|                      |   |   |                          |                      |                   |   |                           | Mill                      | ions of do          | llars             |   |                          |                          |                      |                   |                         |
| 54                   | Addendum: Business capital consumption allowances: 5                          |   |                          |                      |                   |   |                           |                           |                     |                   |   |                          |                          |                      |                   |                         |
| 55<br>56             | Valued at replacement cost in current dollars                                 | 15,505<br>15,285  |                          |                      |                   |   | 15,929<br>15,276          |                           |                     |                   |   | 15,880<br>14,708         |                          |                      |                   |                         |
|                      | - a.a.a.a. at representative cost in constant (1901) deliais                  | 10,200  |                          |                      |                   |   | 10,210                    |                           |                     |                   |   | 1-7,700                  |                          |                      |                   |                         |

See footnotes at end of table.

Table 7.—Expenditures for Pollution Abatement and Control by Sector and Type in Current and Constant Dollars and Selected Fixed-Weighted Price Indexes, 1972-92—Continued

|                | Fixe   | d-Weig                    | ghted                 | Price I              | ndexe            | s, 1972   | -92—C                     | ontinu              | ed                   |                  |   |                           |                     |                         |                  |                         |
|----------------|--|---------------------------|-----------------------|----------------------|------------------|---|---------------------------|---------------------|----------------------|------------------|---|---------------------------|---------------------|-------------------------|------------------|-------------------------|
|                |  |                           |                       | 1990                 |                  |   |                           |                     | 1991                 |                  |   |                           |                     | 1992 <i>P</i>           |                  |                         |
| Line           |  | Total 1                   | Air                   | Water                | Solid<br>waste   | Other<br>and un-<br>allocat-<br>ed <sup>2</sup> | Total <sup>1</sup>        | Air                 | Water                | Solid<br>waste   | Other<br>and un-<br>allocat-<br>ed <sup>2</sup> | Total <sup>1</sup>        | Air                 | Water                   | Solid<br>waste   | Other and unallocated 2 |
|                |  |                           |                       |                      |                  |   |                           | Mill                | ions of do           | llars            |   |                           |                     |                         |                  |                         |
| 1              | Pollution abatement and control  | 92,873                    | 28,049                | 36,441               | 29,368           | -987  | 94,799                    | 27,019              | 36,585               | 31,837           | -643  | 101,954                   | 28,560              | 38,222                  | 36,046           | -873                    |
| 2              | Pollution abatement  | 89,317                    | 26,592                | 35,509               | 28,789           | -1,573  | 90,918                    | 25,312              | 35,593               | 31,248           | -1,235  | 98,136                    | 26,889              | 37,162                  | 35,496           | -1,411                  |
| 3<br>4<br>5    | Personal consumption Durable goods 3 Nondurable goods 4                  | 9,238<br>8,943<br>295     | 9,238<br>8,943<br>295 |                      |                  |   | 7,394<br>7,394<br>0       | 7,394<br>7,394<br>0 |                      |                  |   | 7,896<br>7,896<br>0       | 7,896<br>7,896<br>0 |                         |                  |                         |
| 6<br>7         | Business On capital account  | 57,492<br>17,904          | 17,064<br>9,820       | 23,430<br>5,720      | 18,920<br>2,364  | -1,922  | 59,618<br>19,043          | 17,610<br>11,128    | 23,580<br>5,395      | 19,997<br>2,520  | -1,569  | 64,825<br>20,508          | 18,667<br>12,095    | 25,067<br>5,332         | 22,804<br>3,081  | -1,712                  |
| 8              | On current account Private   | 39,588<br>31,077          | 7,244<br>7,083        | 17,710<br>7,438      | 16,556<br>16,556 | -1,922  | 40,574<br>30,912          | 6,482<br>6,320      | 18,185<br>7.116      | 17,476<br>17,476 | -1,569  | 44,318<br>34,009          | 6,571<br>6,411      | 19,735<br>7,875         | 19,723<br>19,723 | -1,712                  |
| 10<br>11       | Government enterprise Costs recovered                                    | 10,435<br>-1,924          | 161                   | 10,272               | (*)              | 2<br>-1,924                                     | 11,233<br>-1,571          | 162                 | 11,069               | (*)              | 2<br>-1,571                                     | 12,022<br>-1714           | 160                 | 11,860                  | (*)              | 2<br>-1714              |
| 12             | Government   | 22,587                    | 289                   | 12,079               | 9,870            | 349<br>281                                      | 23,906                    | 308                 | 12,013               | 11,252           | 334   | 25,414                    | 327                 | 12,095                  | 12,692           | 300                     |
| 13<br>14<br>15 | Federal State and local Government enterprise purchases of fixed capital | 1,391<br>10,161<br>11,035 | 71<br>13<br>205       | 734<br>514<br>10,831 | 304<br>9,565     | 68  | 1,417<br>11,547<br>10,942 | 73<br>16<br>219     | 753<br>537<br>10,723 | 341<br>10,911    | 250<br>83                                       | 1,215<br>13,086<br>11,113 | 75<br>22<br>230     | 656<br>556<br>10,883    | 281<br>12,411    | 203<br>97               |
| 16             | Regulation and monitoring  | 1,784                     | 476                   | 649                  | 408              | 250   | 1,868                     | 533                 | 677                  | 427              | 231   | 1,848                     | 526                 | 741                     | 401              | 180                     |
| 17<br>18       | Federal  | 877<br>907                | 133<br>343            | 307<br>342           | 191<br>217       | 245<br>5  | 900<br>968                | 175<br>358          | 301<br>376           | 201<br>226       | 223<br>8  | 842<br>1,006              | 185<br>341          | 290<br>451              | 191<br>210       | 176<br>5                |
| 19<br>20       | Research and development   | 1,772<br>945              | 982<br>749            | 284<br>95            | 171<br>16        | 336   | 2,013<br>1,176            | 1,174<br>932        | 315<br>118           | 162<br>20        | 362.1<br>106                                    | 1,971<br>1,131            | 1,144<br>896        | 320<br>114              | 149<br>19        | 358<br>102              |
| 21<br>22       | Federal<br>State and local   | 777<br>51                 | 231                   | 151<br>38            | 151<br>4         | 336<br>85<br>244<br>7                           | 790<br>47                 | 240                 | 160<br>36            | 139              | 250<br>6  | 803                       | 247<br>1            | 178<br>28               | 127              | 252<br>4                |
|                |  |                           |                       |                      |                  |   |                           |                     |                      |                  |   |                           |                     |                         |                  |                         |
|                |  |                           |                       |                      |                  |   |                           |                     | constant (1          |                  |   |                           |                     |                         |                  |                         |
| 23             | Pollution abatement and control  | 83,901                    | 26,000                | 33,355               | 25,427           | -880<br>4 205                                   | 83,348                    | 24,384              | 32,921               | 26,669           | -627<br>4 400                                   | 87,594                    | 25,329              | <b>33,919</b><br>32,993 | 29,176           | - <b>829</b><br>-1,279  |
| 24<br>25       | Pollution abatement  | 80,706<br>8,657           | 24,687<br>8,657       | 32,509               | 24,905           | -1,395  | 80,002<br>6,755           | 22,903<br>6,755     | 32,050               | 26,171           | -1,123  | 7,019                     | 23,900<br>7,019     | 32,993                  | 28,713           | -1,279                  |
| 26<br>27       | Durable goods <sup>4</sup> Nondurable goods <sup>4</sup>                 | 8,460<br>197              | 8,460<br>197          |                      |                  |   | 6,755                     | 6,755<br>0          |                      |                  |   | 7,019<br>0                | 7,019<br>0          |                         |                  |                         |
| 28<br>29<br>30 | Business On capital account  | 51,881<br>16,622          | 15,772<br>9,155       | 21,437<br>5,323      | 16,367<br>2,144  | -1,695  | 52,658<br>17,260          | 15,877<br>10,082    | 21,432<br>4,950      | 16,751<br>2,227  | -1,402  | 55,994<br>18,233          | 16,596<br>10,782    | 22,478<br>4,794         | 18,448<br>2,658  | -1,529<br>              |
| 31             | On current account   | 35,259<br>27,362          | 6,618<br>6,464        | 16,114<br>6,675      | 14,222<br>14,222 | -1,695<br>                                      | 35,398<br>26,384          | 5,795<br>5,644      | 16,482<br>6,216      | 14,524<br>14,524 | -1,402<br>                                      | 37,760<br>28,192          | 5,814<br>5,664      | 17,685<br>6,738         | 15,790<br>15,790 | -1,529<br>              |
| 32<br>33       | Government enterprise Costs recovered                                    | 9,594<br>-1,697           | 154                   | 9,439                | (*)              | -1,697  | 10,418<br>-1,404          | 150                 | 10,266               | (*)              | -1,404  | 11,099<br>-1,531          | 151                 | 10,946                  | (*)              | -1,531                  |
| 34<br>35       | Government Federal   | 20,169<br>1,228           | 258<br>62             | 11,073<br>656        | 8,538<br>269     | 300<br>241                                      | 20,589<br>1,220           | 271<br>63           | 10,618<br>652        | 9,421<br>296     | 279<br>209                                      | 21,315<br>1,041           | 285<br>64           | 10,514<br>565           | 10,265<br>242    | 251<br>170              |
| 36<br>37       | State and local  | 8,864<br>10,077           | 11<br>185             | 524<br>9,892         | 8,269            | 59  | 9,770<br>9,599            | 14<br>195           | 562<br>9,404         | 9,125            | 70  | 10,734<br>9,540           | 18<br>203           | 613<br>9,337            | 10,023           | 81                      |
| 38<br>39       | Regulation and monitoringFederal   | 1,636<br>771              | 446<br>117            | 597<br>270           | 372<br>168       | 220<br>216                                      | 1,654<br>761              | 488<br>148          | 608<br>255           | 363<br>170       | 195<br>188                                      | 1,619<br>709              | 467<br>156          | 660<br>245              | 339<br>161       | 152<br>148              |
| 40             | State and local  | 865                       | 330                   | 327                  | 204              | 4   | 893                       | 340                 | 354                  | 193              | 6   | 909                       | 311                 | 416                     | 179              | 4                       |
| 41<br>42       | Research and development   | 1,560<br>835              | 866<br>662            | 249<br>84            | 150<br>14        | 295<br>75                                       | 1,692<br>1,000            | 992<br>792          | 263<br>101           | 135<br>17        | 302<br>90                                       | 1,648<br>954              | 961<br>756          | 266<br>96               | 124<br>16        | 298<br>86               |
| 43<br>44       | Federal<br>State and local   | 681<br>43                 | 203<br>1              | 132<br>33            | 133<br>3         | 214<br>6  | 654<br>39                 | 199<br>2            | 133<br>29            | 115<br>3         | 207<br>5  | 664<br>30                 | 204<br>1            | 147<br>23               | 105<br>2         | 208<br>3                |
|                |  |                           | '                     |                      |                  |   | Sele                      | ected fixed         | d-weighted           | price ind        | exes  |                           |                     |                         |                  |                         |
| 45             | Pollution abatement and control  | 111.0                     | 109.9                 | 109.2                | 115.6            | 111.7   | 113.9                     | 112.5               | 111.5                | 119.5            | 102.1   | 116.2                     | 114.1               | 113.2                   | 123.7            | 101.8                   |
| 46             | Pollution abatement  | 111.0                     | 109.8                 | 109.2                | 115.7            | 112.7   | 113.8                     | 112.3               | 111.4                | 119.5            | 110.1   | 116.2                     | 114.0               | 113.1                   | 123.7            | 110.1                   |
| 47             | Personal consumption   | 109.9                     | 109.9                 |                      |                  |   | 112.4                     | 112.4               |                      |                  |   | 114.5                     | 114.5               |                         |                  |                         |
| 48<br>49       | Business On capital account  | 111.1<br>107.5            | 109.7<br>107.4        | 109.2<br>107.0       | 115.7<br>110.3   | 113.4   | 113.5<br>110.1            | 112.3<br>110.4      | 110.2<br>108.4       | 119.5<br>113.1   | 111.9   | 115.8<br>112.0            | 113.5<br>112.2      | 111.7<br>110.5          | 123.9<br>115.9   | 112.0                   |
| 50             | On current account   | 112.7                     | 112.3                 | 110.0                | 116.4            | 113.4   | 115.1                     | 114.4               | 110.7                | 120.3            | 111.9   | 117.5                     | 115.0               | 112.1                   | 124.9            | 112.0                   |
| 51             | Government   | 111.5                     | 112.1                 | 109.1                | 115.6            | 116.2   | 115.5                     | 113.8               | 113.3                | 119.4            | 119.6   | 118.2                     | 114.5               | 115.4                   | 123.5            | 119.9                   |
| 52<br>53       | Regulation and monitoring  | 109.0<br>113.5            | 106.7<br>113.1        | 108.5<br>113.9       | 109.5<br>114.0   | 114.0<br>113.8                                  | 113.4<br>118.9            | 108.8<br>117.7      | 111.7<br>119.5       | 119.1<br>120.3   | 118.5<br>119.9                                  | 115.1<br>119.5            | 111.9<br>118.6      | 113.2<br>120.0          | 120.1<br>120.6   | 119.0<br>120.2          |
| JJ             | посостат апи истопуннин  | 113.3                     | 113.1                 | 113.8                | 114.0            | 113.0   | 110.8                     | 11/./               | 118.0                | 120.3            | 113.3   | 118.0                     | 110.0               | 120.0                   | 120.0            | 120.2                   |
|                |  |                           |                       |                      |                  |   |                           | Mill                | ions of do           | llars            |   |                           |                     |                         |                  |                         |
| 54             | Addendum: Business capital consumption allowances: 5                     |                           |                       |                      |                  |   |                           |                     |                      |                  |   |                           |                     |                         |                  |                         |
| 55             | Valued at replacement cost in current dollars                            | 16,123                    |                       |                      |                  |   | 11,267                    |                     |                      |                  |   | 11,545                    |                     |                         |                  |                         |
| 56             | Valued at replacement cost in constant (1987) dollars                    | 13,701                    |                       |                      |                  |   | 10,064                    | to of open          | ding to on           | oroto mot        | or vahiola                                      | 10,173                    | otomont (           |                         |                  |                         |
| " PI           | eliminary.   |                           |                       |                      |                  | +. INONGUľa                                     | DIES CONSIST              | is di Spen          | uitiu to ob          | erare mot        | ui venicie                                      | emission ab               | atement (           | JEVICES.                |                  |                         |

- Nondurables consists of spending to operate motor vehicle emission abatement devices.
   Capital consumption allowances facilitate the conversion of expenditures to a cost basis.
- NOTE.—Expenditures are attributed to the sector that performs, rather than pays for, the air or water pollution abatement or the solid waste collection and disposal.

<sup>P Preliminary.

1. Includes spending for air and water pollution abatement and control and expenditures for solid waste collection and disposal by means acceptable to Federal, State, and local governments. Excludes agricultural production except feedlot operations.

2. "Other" includes spending for abatement and control of noise, radiation, and pesticide pollution; "unallocated" includes business spending not assigned to media.

3. Durables consists of purchases of motor vehicle emission abatement devices.</sup> 

Table 8.—Business and Government Expenditures for Air and Water Pollution Abatement in Current and Constant Dollars, 1972-92

|  |  | =,   |  |   |   |   |  |   |   |  |  |  |   |   |   |
|--|--|--|--|---|---|---|--|---|---|--|--|--|---|---|---|
|  |  |  |  |   |   |   |  | Total <sup>1</sup>                              |   |  |  |  |   |   |   |
|  | 1972   | 1973   | 1974   | 1975  | 1976  | 1977  | 1978   | 1979  | 1980  | 1981   | 1982   | 1983   | 1984  | 1985  | 1986  |
|  |  |  |  |   |   |   | Milli  | ons of dolla                                    | rs  |  |  |  |   |   |   |
|  |  |  |  |   |   |   |  |   |   |  |  |  |   |   |   |
| Business (line 6)  | 9,020  | 10,399                                       | 12,548   | 14,391  | 16,100  | 18,231  | 20,184   | 23,418  | 25,735  | 27,904   | 28,479   | 29,075                                       | 31,973  | 33,227  | 34,199  |
| On capital account (line 7)  Motor vehicle emission abatement  Plant and equipment 2  Posidotial systems 3   | 5,207<br>220<br>3,954<br>1,030                 | 5,902<br>334<br>4,263<br>1,302               | 6,794<br>416<br>5,103<br>1,268                 | 7,601<br>747<br>5,901<br>946                    | 8,205<br>939<br>6,135<br>1,123                  | 8,928<br>1,160<br>6,347<br>1,412                | 9,529<br>1,429<br>6,412<br>1,683               | 10,731<br>1,779<br>7,096<br>1,852               | 11,258<br>2,011<br>7,606<br>1,637               | 12,069<br>2,706<br>8,017<br>1,344              | 11,598<br>2,699<br>7,772<br>1,124              | 11,125<br>3,325<br>6,051<br>1,747            | 13,027<br>4,546<br>6,478<br>1,999             | 12,987<br>4,901<br>6,065<br>2,018               | 13,277<br>4,982<br>6,158<br>2,135               |
| Residential systems 3 Agricultural business 4 On current account (line 8) Private (line 9)   | 3,813<br>2,662                                 | 3<br>4,497<br>3,155                          | 5,754<br>4,120                                 | 6,790<br>4,896                                  | 7,895<br>5,676                                  | 9,304<br>6,697                                  | 10,656<br>7,603                                | 12,687<br>9,166                                 | 14,477<br>10,399                                | 15,835<br>11,135                               | 16,881<br>11,568                               | 17,950<br>12,145                             | 18,946<br>12,719                              | 20,240<br>13,519                                | 20,922<br>13,564                                |
| Motor vehicle emission abatement Plant and equipment <sup>2</sup> Residential systems <sup>3</sup> Agricultural business <sup>4</sup>  | 420<br>2,034<br>209                            | 603<br>2,327<br>225                          | 925<br>2,955<br>240                            | 1,106<br>3,533<br>256                           | 1,172<br>4,228<br>274                           | 1,316<br>5,081<br>296                           | 1,477<br>5,800<br>322                          | 1,803<br>7,008<br>351                           | 2,262<br>7,749<br>384                           | 2,536<br>8,185<br>408                          | 2,513<br>8,612<br>436                          | 2,581<br>9,090<br>468                        | 2,555<br>9,642<br>513                         | 2,631<br>10,321<br>559                          | 2,094<br>10,909<br>553                          |
| Publicly owned electric utilities  | 1,151<br>26<br>1,124                           | 1,342<br>33<br>1,308                         | 1,634<br>62<br>1,571                           | 1,895<br>53<br>1,842                            | 2<br>2,220<br>66<br>2,153                       | 2,607<br>69<br>2,537                            | 3,053<br>83<br>2,970                           | 3,521<br>118<br>3,403                           | 5<br>4,078<br>161<br>3,917                      | 4,700<br>153<br>4,547                          | 5,313<br>153<br>5,159                          | 5,805<br>161<br>5,642                        | 6,227<br>165<br>6,059                         | 6,721<br>161<br>6,557                           | 7,358<br>154<br>7,201                           |
| Other  | 2,261  | 2,598  | 3,513  | 5,282   | 5,882   | (*)<br>5,497                                    | 6,639  | 7,613   | (*)<br>8,494                                    | 7,602  | 7,509  | 7,583  | 8,424   | 9,363   | ە<br>10,146                                     |
| Federal (line 13)  Federal except highways  Highway erosion abatement  State and local (line 14)   | 131<br>126<br>2<br>171                         | 181<br>176<br>5<br>171                       | 252<br>248<br>4<br>189                         | 358<br>353<br>5<br>211                          | 362<br>357<br>5<br>205                          | 385<br>379<br>6<br>189                          | 406<br>400<br>7<br>218                         | 450<br>442<br>9<br>257                          | 369<br>362<br>7<br>299                          | 305<br>293<br>12<br>286                        | 325<br>316<br>8<br>277                         | 579<br>572<br>8<br>294                       | 607<br>599<br>8<br>351                        | 823<br>816<br>7<br>403                          | 795<br>788<br>6<br>440                          |
| State and local except highways Highway erosion abatement Government enterprise fixed capital (line 15) Publicly owned electric utilities Public sewer systems 5   | (*)<br>171<br>1,959<br>92<br>1,867             | (*)<br>171<br>2,246<br>97<br>2,149           | (*)<br>189<br>3,072<br>128<br>2,945            | 1<br>210<br>4,713<br>159<br>4,553               | 1<br>204<br>5,316<br>174<br>5,142               | 1<br>188<br>4,924<br>237<br>4,687               | (*)<br>218<br>6,015<br>232<br>5,783            | (*)<br>257<br>6,906<br>291<br>6,615             | (*)<br>299<br>7,825<br>397<br>7,429             | (*)<br>286<br>7,011<br>444<br>6,567            | (*)<br>276<br>6,908<br>501<br>6,407            | 4<br>290<br>6,709<br>487<br>6,222            | 14<br>337<br>7,466<br>409<br>7,057            | 12<br>391<br>8,137<br>373<br>7,765              | 14<br>426<br>8,912<br>337<br>8,575              |
|  |  |  |  |   |   |   | Millions of c                                  | onstant (198                                    | 87) dollars                                     |  |  |  |   |   |   |
| Business (line 28)   | 25,727   | 27,096                                       | 27,311   | 28,059  | 29,627  | 31,239  | 32,140   | 33,341  | 32,271  | 31,557   | 30,677   | 30,591                                       | 32,690  | 33,317  | 34,899  |
| On capital account (line 29)  Motor vehicle emission abatement Plant and equipment 2 Residential systems 3   | 13,431<br>469<br>10,033<br>2,923               | 13,940<br>711<br>10,057<br>3,166             | 14,093<br>840<br>10,362<br>2,881               | 14,171<br>1,374<br>10,874<br>1,914              | 14,444<br>1,623<br>10,715<br>2,097              | 14,778<br>1,902<br>10,424<br>2,442              | 14,670<br>2,172<br>9,795<br>2,698              | 15,028<br>2,498<br>9,856<br>2,670               | 14,430<br>2,609<br>9,630<br>2,189               | 14,113<br>3,306<br>9,157<br>1,648              | 12,936<br>3,170<br>8,446<br>1,318              | 12,152<br>3,807<br>6,444<br>1,900            | 13,844<br>5,057<br>6,706<br>2,078             | 13,530<br>5,282<br>6,180<br>2,065               | 13,564<br>5,152<br>6,241<br>2,168               |
| Residential systems <sup>3</sup> Agricultural business <sup>4</sup> On current account (line 30) Private (line 31) Motor vehicle emission abatement Plant and equipment <sup>2</sup> Residential systems <sup>3</sup> Agricultural business <sup>4</sup> | 12,297<br>8,954<br>1,177<br>7,301<br>475       | 13,156<br>9,499<br>1,578<br>7,430<br>491     | 10<br>13,218<br>9,462<br>1,990<br>6,965<br>505 | 10<br>13,888<br>10,057<br>2,157<br>7,384<br>514 | 10<br>15,183<br>11,018<br>2,146<br>8,347<br>523 | 10<br>16,460<br>11,936<br>2,240<br>9,158<br>534 | 17,470<br>12,568<br>2,361<br>9,657<br>547      | 18,313<br>13,154<br>2,230<br>10,360<br>559      | 2<br>17,841<br>12,557<br>2,068<br>9,914<br>572  | 3<br>17,445<br>11,993<br>2,040<br>9,371<br>579 | 17,742<br>11,973<br>2,064<br>9,326<br>579      | 18,440<br>12,321<br>2,147<br>9,584<br>586    | 18,846<br>12,537<br>2,130<br>9,808<br>592     | 3<br>19,787<br>13,081<br>2,156<br>10,319<br>597 | 3<br>21,335<br>13,889<br>2,179<br>11,101<br>601 |
| Agricultural business <sup>4</sup> Government enterprise (line 32) Publicly owned electric utilities Public sewer systems <sup>5</sup> Other   | (*)<br>3,343<br>145<br>3,197                   | 3,657<br>145<br>3,510<br>2                   | 3,756<br>139<br>3,614<br>3                     | 3,831<br>109<br>3,722                           | 3<br>4,165<br>132<br>4,032                      | 4<br>4,524<br>125<br>4,399<br>1                 | 4,901<br>137<br>4,763                          | 5,159<br>161<br>4,997                           | 5<br>5,284<br>184<br>5,100<br>(*)               | 5,452<br>154<br>5,297                          | 5,768<br>151<br>5,616<br>2                     | 5<br>6,118<br>157<br>5,959<br>2              | 7<br>6,309<br>158<br>6,149<br>3               | 6,706<br>153<br>6,550<br>3                      | 9<br>7,446<br>159<br>7,285<br>3                 |
| Government (line 34)   | 5,983  | 6,365  | 7,756  | 10,983  | 11,447  | 9,941   | 10,891   | 11,178  | 11,541  | 9,550  | 9,031  | 8,653  | 9,332   | 9,816   | 10,450  |
| Federal (line 35) Federal except highways Highway erosion abatement State and local (line 36) State and local except highways Highway erosion abatement Government enterprise fixed capital (line 37)  | 380<br>363<br>17<br>576<br>(*)<br>576<br>5,027 | 480<br>466<br>14<br>521<br>1<br>520<br>5,364 | 591<br>581<br>10<br>460<br>1<br>459<br>6,705   | 780<br>768<br>12<br>496<br>1<br>495<br>9,708    | 731<br>718<br>13<br>480<br>2<br>478<br>10,237   | 717<br>704<br>13<br>393<br>1<br>392<br>8,832    | 695<br>684<br>11<br>344<br>(*)<br>344<br>9,852 | 686<br>674<br>13<br>386<br>(*)<br>386<br>10,106 | 504<br>494<br>10<br>397<br>(*)<br>397<br>10,641 | 377<br>360<br>17<br>394<br>(*)<br>394<br>8,780 | 385<br>372<br>13<br>423<br>(*)<br>423<br>8,224 | 661<br>651<br>10<br>409<br>4<br>404<br>7,583 | 676<br>665<br>11<br>445<br>16<br>429<br>8,212 | 875<br>867<br>8<br>436<br>13<br>423<br>8,505    | 834<br>827<br>7<br>467<br>14<br>453<br>9,149    |
| Publicly owned electric utilities<br>Public sewer systems <sup>5</sup>   | 227<br>4,801                                   | 228<br>5,136                                 | 254<br>6,451                                   | 282<br>9,426                                    | 292<br>9,945                                    | 376<br>8,456                                    | 344<br>9,508                                   | 396<br>9,710                                    | 493<br>10,148                                   | 510<br>8,270                                   | 545<br>7,679                                   | 520<br>7,063                                 | 421<br>7,791                                  | 381<br>8,124                                    | 342<br>8,807                                    |

See footnotes at end of table.

Table 8.—Business and Government Expenditures for Air and Water Pollution Abatement in Current and Constant Dollars, 1972-92—Continued

| Table 0.—Busiless and Governin  | CIII LA   | penan   | uico i   | UI AII (   | and W   | ater i v  | Jiiutioii  | Abatt   | JIIICIIL  | iii Guii  | CIIL GI                                       | iu con  | Starit L  | onai 3   | , 1312  | 32 0  | ontina                                   |   |
|---|---|---|--|--|---|---|--|---|---|---|---|---|---|--|---|---|--|---|
|   |   | 1987  |  |  | 1988  |   |  | 1989  |   |   | 1990  |   |   | 1991   |   |   | 1992 <sup>p</sup>                        |   |
|   | Total 1   | Air   | Water  | Total 1  | Air   | Water   | Total 1  | Air   | Water   | Total 1   | Air   | Water   | Total 1   | Air  | Water   | Total 1   | Air                                      | Water   |
|   |   |   |  |  |   |   |  |   | Millions o  | of dollars  |   |   |   |  |   |   |  |   |
| Business (line 6)   | 34,173  | 16,005  | 18,168   | 35,851   | 17,000  | 18,850  | 36,928   | 16,136  | 20,792  | 40,494  | 17,064  | 23,430  | 41,190  | 17,610   | 23,580  | 43,733  | 18,667                                   | 25,067  |
| On capital account (line 7)  Motor vehicle emission abatement Plant and equipment <sup>2</sup> Residential systems <sup>3</sup> Agricultural business <sup>4</sup> On current account (line 8) Private (line 9)   | 12,901<br>4,926<br>6,049<br>1,924<br>3<br>21,272<br>13,323  | 8,408<br>4,926<br>3,482<br><br>7,597<br>7,456               | 4,493<br>  | 13,386<br>5,910<br>5,901<br>1,572<br>3<br>22,465<br>13,920   | 9,176<br>5,910<br>3,267<br><br>7,824<br>7,656 | 4,209<br>   | 13,661<br>5,446<br>6,699<br>1,512<br>4<br>23,267<br>13,768   | 8,884<br>5,446<br>3,437<br><br>7,252<br>7,091 | 4,777<br>   | 15,540<br>5,578<br>8,554<br>1,405<br>3<br>24,954<br>14,521  | 9,820<br>5,578<br>4,243<br><br>7,244<br>7,083 | 5,720<br>   | 16,523<br>5,766<br>9,672<br>1,081<br>3<br>24,667<br>13,436  | 11,128<br>5,766<br>5,362<br><br>6,482<br>6,320               | 5,395<br>   | 17,427<br>5,902<br>10,334<br>1,188<br>3<br>26,306<br>14,286   | 12,095<br>5,902<br>6,194<br>             | 5,332<br>4,140<br>1,188<br>3<br>19,735<br>7,875         |
| Motor vehicle emission abatement Plant and equipment 2 Residential systems 3 Agricultural business 4 Government enterprise (line 10) Publicly owned electric utilities Public sewer systems 5 Other   | 1,613<br>11,101<br>601<br>8<br>7,948<br>153<br>7,792<br>3   | 1,613<br>5,843<br>141<br>141                                | 5,257<br>601<br>8<br>7,808<br>13<br>7,792                  | 1,446<br>11,824<br>642<br>8<br>8,545<br>181<br>8,363<br>2  | 1,446<br>6,210<br>168<br>168                  | 5,614<br>642<br>8<br>8,377<br>12<br>8,363<br>2        | 817<br>12,260<br>682<br>10<br>9,500<br>173<br>9,325<br>3   | 817<br>6,273<br>161<br>161                    | 5,985<br>682<br>10<br>9,338<br>11<br>9,325<br>3   | 301<br>13,497<br>714<br>9<br>10,432<br>168<br>10,262<br>2   | 301<br>6,783<br>161<br>161                    | 6,714<br>714<br>9<br>10,272<br>8<br>10,262<br>2         | 0<br>12,678<br>749<br>9<br>11,231<br>176<br>11,052<br>3   | 6,320<br><br>162<br>162                                      | 6,358<br>749<br>9<br>11,069<br>14<br>11,052<br>3        | 13,488<br>789<br>9<br>12,020<br>170<br>11,845   | 0<br>6,411<br>160<br>160                 | 7,077<br>789<br>9<br>11,860<br>10<br>11,845<br>5        |
| Government (line 12)  | 11,592  | 341   | 11,252   | 11,433   | 275   | 11,158  | 11,599   | 295   | 11,305  | 12,368  | 289   | 12,079  | 12,321  | 308  | 12,013  | 12,421  | 327                                      | 12,095  |
| Federal (line 13) Federal except highways Highway erosion abatement State and local (line 14) State and local except highways Highway erosion abatement Government enterprise fixed capital (line 15) Publicly owned electric utilities Public sewer systems 5  | 787<br>780<br>7<br>467<br>15<br>452<br>10,339<br>304<br>10,035  | 80<br>80<br>15<br>15<br>246<br>246                          | 707<br>700<br>7<br>452<br>452<br>10,094<br>58<br>1,035     | 772<br>765<br>7<br>494<br>10<br>484<br>10,167<br>248<br>9,918  | 65<br>65<br>10<br>10<br>200<br>200            | 707<br>500<br>7<br>484<br>484<br>9,967<br>49<br>9,918 | 799<br>795<br>4<br>501<br>12<br>489<br>10,299<br>265<br>10,034   | 70<br>70<br>12<br>12<br>12<br>213<br>213      | 729<br>725<br>4<br>489<br>489<br>10,086<br>52<br>10,034   | 805<br>802<br>4<br>528<br>13<br>514<br>11,035<br>281<br>10,755  | 71<br>71<br>13<br>13<br>205<br>205            | 734<br>730<br>4<br>514<br>514<br>10,831<br>76<br>10,755 | 826<br>822<br>4<br>553<br>16<br>537<br>10,942<br>289<br>10,653  | 73<br>73<br>16<br>16<br>219<br>219                           | 753<br>749<br>4<br>537<br>537<br>10,723<br>70<br>10,653 | 731<br>727<br>4<br>578<br>22<br>556<br>11,113<br>265<br>10,848  | 75<br>75<br>22<br>22<br>22<br>230<br>230 | 656<br>652<br>4<br>556<br>556<br>10,883<br>35<br>10,848 |
|   |   |   |  |  |   |   |  | Millions                                      | of consta   | nt (1987) d   | dollars                                       |   |   |  |   |   |  |   |
| Business (line 28)  | 34,173  | 16,005  | 18,168   | 35,069   | 16,625  | 18,444  | 34,812   | 15,273  | 19,539  | 37,209  | 15,772  | 21,437  | 37,309  | 15,877   | 21,432  | 39,074  | 16,596                                   | 22,478  |
| On capital account (line 29)  Motor vehicle emission abatement Plant and equipment <sup>2</sup> Residential systems <sup>3</sup> Agricultural business <sup>4</sup> On current account (line 30) Private (line 31) Motor vehicle emission abatement Plant and equipment <sup>2</sup> Residential systems <sup>3</sup> Agricultural business <sup>4</sup> Government enterprise (line 32) Publicy owned electric utilities Public sewer systems <sup>5</sup> Other | 12,901<br>4,926<br>6,049<br>1,924<br>3<br>21,272<br>13,323<br>1,613<br>11,101<br>601<br>8<br>7,948<br>153<br>7,792<br>3 | 8,408<br>4,926<br>3,482<br>7,597<br>7,456<br>1,613<br>5,843 | 4,493<br>2,566<br>1,924<br>3<br>13,675<br>5,867<br>        | 13,018<br>5,791<br>5,677<br>1,548<br>3<br>22,051<br>13,598<br>1,437<br>11,557<br>598<br>8,453<br>182<br>8,269<br>2 | 8,928<br>5,791<br>3,138<br>                   | 4,089<br>2,539<br>1,548<br>3<br>14,355<br>6,073<br>   | 12,921<br>5,226<br>6,230<br>1,461<br>3<br>21,891<br>12,916<br>737<br>11,578<br>594<br>8,975<br>170<br>8,803<br>2 | 8,411<br>5,226<br>3,184<br>                   | 4,510<br>3,046<br>1,461<br>3<br>15,029<br>6,214<br><br>5,613<br>594<br>8<br>8,815<br>10<br>8,803<br>2 | 14,477<br>5,276<br>7,862<br>1,337<br>3<br>22,732<br>13,139<br>218<br>12,327<br>588<br>7<br>9,592<br>160<br>9,430<br>2 | 9,155<br>5,276<br>3,879<br>                   | 5,323<br>3,983<br>1,337<br>3<br>16,114<br>6,675<br>     | 15,033<br>5,268<br>8,755<br>1,007<br>3<br>22,276<br>11,860<br>0<br>11,268<br>586<br>7<br>10,416<br>162<br>10,251<br>3 | 10,082<br>5,268<br>4,814<br>5,795<br>5,644<br>0<br>5,644<br> | 4,950<br>3,941<br>1,007<br>3<br>16,482<br>6,216<br>     | 15,575<br>5,244<br>9,240<br>1,088<br>3<br>23,499<br>12,402<br>0<br>11,810<br>584<br>8<br>11,097<br>159<br>10,934<br>4 | 10,782<br>5,244<br>5,538<br>             | 4,794<br>   |
| Government (line 34)  | 11,592  | 341   | 11,252   | 11,044   | 263   | 10,781  | 10,895   | 271   | 10,625  | 11,331  | 258   | 11,073  | 10,889  | 271  | 10,618  | 10,800  | 285                                      | 10,514  |
| Federal (line 35) Federal except highways Highway erosion abatement State and local (line 36) State and local except highways Highway erosion abatement Government enterprise fixed capital (line 37) Publicly owned electric utilities Public sewer systems 5  | 787<br>780<br>7<br>467<br>15<br>452<br>10,339<br>304<br>10,035  | 80<br>80<br>15<br>15<br>246<br>246                          | 707<br>700<br>7<br>452<br><br>452<br>10,094<br>58<br>1,035 | 738<br>732<br>6<br>441<br>10<br>431<br>9,866<br>896<br>9,629   | 64<br>64<br>10<br>10<br>10<br>190<br>190      | 675<br>669<br>6<br>431<br>                            | 736<br>732<br>4<br>505<br>11<br>495<br>9,655<br>243<br>9,412   | 66<br>66<br>11<br>11<br>11<br>195<br>195      | 670<br>666<br>4<br>495<br>9<br>9,460<br>48<br>9,412   | 718<br>715<br>4<br>536<br>11<br>524<br>10,077<br>254<br>9,822   | 62<br>62<br>11<br>11<br>185<br>185            | 656<br>653<br>4<br>524<br>524<br>9,892<br>70<br>9,822   | 715<br>711<br>4<br>575<br>14<br>562<br>9,599<br>259<br>9,340  | 63<br>63<br>14<br>14<br>195<br>195                           | 652<br>648<br>4<br>562<br>562<br>9,404<br>65<br>9,340   | 628<br>624<br>4<br>631<br>18<br>613<br>9,540<br>235<br>9,305  | 64<br>64<br>                             | 565<br>560<br>4<br>613<br>                              |

NOTE.—Line numbers refer to those in table 7.

<sup>P Preliminary.
Less than \$500,000.
Consists of air and water pollution abatement expenditures only.
Consists of manufacturing companies and of privately and cooperatively owned electric utilities and other non-manufacturing companies.
Consists of private septic systems and sewer connections linking household plumbing to street sewers.</sup> 

Feedlot operations only; see footnote 1 to table 7.
 Public sewer systems consist of treatment plants, collection sewers, interceptor sewers, pumping stations, and dry-waste disposal plants. Spending to operate public sewer systems is classified in the national income and product accounts as business spending. Government enterprise purchases of fixed capital (primarily for construction of public sewer systems) is classified in the national income and product accounts as government spending.