SPECIAL ANALYSES AND PRESENTATIONS

6. FEDERAL INVESTMENT SPENDING AND CAPITAL BUDGETING

Investment spending is spending that yields long-term benefits. Its purpose may be to improve the efficiency of internal Federal agency operations or to increase the Nation's overall stock of capital for economic growth. The spending can be direct Federal spending or grants to State and local governments. It can be for physical capital, which yields a stream of services over a period of years, or for research and development or education and training, which are intangible but also increase income in the future or provide other long-term benefits.

Most presentations in the Federal budget combine investment spending with spending for current use. This chapter focuses solely on Federal and federally financed investment. These investments are discussed in the following sections:

- a description of the size and composition of Federal investment spending;
- a discussion of capital assets used to provide Federal services, and efforts to improve planning and budgeting for these assets. An Appendix to Part II presents the "Principles of Budgeting for Capital Asset Acquisitions," which are being used to guide the analysis of Administration requests for spending for capital assets;
- a presentation of trends in the stock of federally financed physical capital, research and development, and education;
- alternative capital budget and capital expenditure presentations; and
- projections of Federal physical capital outlays and recent assessments of public civilian capital needs, as required by the Federal Capital Investment Program Information Act of 1984.

The President established a Commission to Study Capital Budgeting in 1997, and the Commission is scheduled to transmit its report to the National Economic Council in early 1999. The Administration looks forward to receipt of the report and will review its analysis and recommendations on how to improve the planning, budgeting, and use of capital in the Federal Government.

Part I: DESCRIPTION OF FEDERAL INVESTMENT

For almost fifty years, a chapter in the budget has shown Federal investment outlays—defined as those outlays that yield long-term benefits—separately from outlays for current use. Again this year the discussion of the composition of investment includes estimates of budget authority as well as outlays and extends these estimates four years beyond the budget year, to 2004.

The classification of spending between investment and current outlays is a matter of judgment. The budget has historically employed a relatively broad classification, including physical investment, research, development, education, and training. The budget further classifies investments into those that are grants to State and local governments, such as grants for highways or for elementary and secondary education, and all other investments, called "direct Federal programs," in this analysis. This "direct Federal" category consists primarily of spending for assets owned by the Federal Government, such as defense weapons systems and general purpose office buildings, but also includes grants to private organizations and individuals for investment, such as capital grants to Amtrak or higher education loans directly to individuals.

Presentations for particular purposes could adopt different definitions of investment:

- To suit the purposes of a traditional balance sheet, investment might include only those physical assets owned by the Federal Government, excluding capital financed through grants and intangible assets such as research and education.
- Focusing on the role of investment in improving national productivity and enhancing economic growth would exclude items such as national defense assets, the direct benefits of which enhance national security rather than economic growth.
- Concern with the efficiency of Federal operations would confine the coverage to investments that reduce costs or improve the effectiveness of internal Federal agency operations, such as computer systems.
- A "social investment" perspective might broaden the coverage of investment beyond what is included in this chapter to encompass programs such as childhood immunization, maternal health, certain nutrition programs, and substance abuse treatment, which are designed in part to prevent more costly health problems in future years.

The relatively broad definition of investment used in this section provides consistency over time—historical figures on investment outlays back to 1940 can be found in the separate *Historical Tables* volume. The detailed tables at the end of this section allow disaggregation of the data to focus on those investment outlays that best suit a particular purpose.

In addition to this basic issue of definition, there are two technical problems in the classification of investment data, involving the treatment of grants to

State and local governments and the classification of spending that could be shown in more than one category.

First, for some grants to State and local governments it is the recipient jurisdiction, not the Federal Government, that ultimately determines whether the money is used to finance investment or current purposes. This analysis classifies all of the outlays in the category where the recipient jurisdictions are expected to spend most of the money. Hence, the community development block grants are classified as physical investment, although some may be spent for current purposes. General purpose fiscal assistance is classified as current spending, although some may be spent by recipient jurisdictions on physical investment.

Second, some spending could be classified in more than one category of investment. For example, outlays for construction of research facilities finance the acquisition of physical assets, but they also contribute to research and development. To avoid double counting, the outlays are classified in the category that is most commonly recognized as investment. Consequently outlays for the conduct of research and development do not include outlays for research facilities, because these outlays are included in the category for physical investment. Similarly, physical investment and research and development related to education and training are included in the categories of physical assets and the conduct of research and development.

When direct loans and loan guarantees are used to fund investment, the subsidy value is included as investment. The subsidies are classified according to their program purpose, such as construction, education and training, or non-investment outlays. For more information about the treatment of Federal credit programs, refer to Chapter 8, "Underwriting Federal Credit and Insurance."

This section presents spending for gross investment, without adjusting for depreciation. A subsequent section discusses depreciation, shows investment both gross and net of depreciation, and displays net capital stocks.

Composition of Federal Investment Outlays

Major Federal Investment

The composition of major Federal investment outlays is summarized in Table 6–1. They include major public physical investment, the conduct of research and development, and the conduct of education and training. Defense and nondefense investment outlays were $228.0 billion in 1998. They are estimated to increase to $243.9 billion in 1999 and to increase further to $247.3 billion in 2000. Major Federal investment will comprise an estimated 14.0 percent of total Federal outlays in 2000 and 2.7 percent of the Nation's gross domestic product (GDP). Greater detail on Federal investment is available in tables 6–2 and 6–3 at the end of this section. Those tables include both budget authority and outlays.

Physical investment.—Outlays for major public physical capital investment (hereafter referred to as physical investment outlays) are estimated to be $121.2 billion in 2000. Physical investment outlays are for construction and rehabilitation, the purchase of major equipment, and the purchase or sale of land and structures. Three-fifths of these outlays are for direct physical investment by the Federal Government, with the remaining being grants to State and local governments for physical investment.

Direct physical investment outlays by the Federal Government are primarily for national defense. Defense outlays for physical investment were $53.5 billion in 1998 and are estimated to decline slightly to $51.6 billion in 2000. Almost all of these outlays, or $46.9 billion, are for the procurement of weapons and other defense equipment, and the remainder is primarily for construction on military bases, family housing for military personnel, and Department of Energy defense facilities. These outlays will begin to increase in 2001 in response to increases in defense budget authority requested for 2000 and later years in this budget. The increases in budget authority are discussed in Chapter 11 of the *Budget* volume.

Outlays for direct physical investment for nondefense purposes are estimated to be $21.2 billion in 2000. These outlays include $13.0 billion for construction and rehabilitation. This amount funds water, power, and natural resources projects of the Army Corps of Engineers, the Bureau of Reclamation within the Department of the Interior, the Tennessee Valley Authority, and the power administrations in the Department of Energy; construction and rehabilitation of veterans hospitals and Postal Service facilities; and facilities for space and science programs. Outlays for the acquisition of major equipment are estimated to be $7.6 billion in 2000. The largest amounts are for the air traffic control system and the Postal Service. For the purchase or sale of land and structures, collections exceeded disbursements by $4.6 billion in 1998, largely due to the sale of the United States Enrichment Corporation and the privatization of Elk Hills. These sales explain most of the increase in outlays in this category from 1998 to 1999.

Grants to State and local governments for physical investment are estimated to be $48.4 billion in 2000. Almost two-thirds of these outlays, or $31.0 billion, are to assist States and localities with transportation infrastructure, primarily highways. Other major grants for physical investment fund sewage treatment plants, community development, and public housing.

Conduct of research and development.—Outlays for the conduct of research and development are estimated to be $73.6 billion in 2000. These outlays are devoted to increasing basic scientific knowledge and promoting research and development. They increase the Nation's security, improve the productivity of capital and labor for both public and private purposes, and enhance the quality of life. Slightly more than half of these outlays, an estimated $37.7 billion in 2000, are for national defense. Physical investment for research and develop-

Table 6–1. COMPOSITION OF FEDERAL INVESTMENT OUTLAYS

(In billions of dollars)

	1998 actual	Estimate	
		1999	2000
Federal Investment			
Major public physical capital investment:			
Direct Federal:			
National defense	53.5	53.5	51.6
Nondefense	15.1	20.8	21.2
Subtotal, direct major public physical capital investment	68.7	74.2	72.8
Grants to State and local governments	41.1	44.9	48.4
Subtotal, major public physical capital investment	109.8	119.1	121.2
Conduct of research and development:			
National defense	40.1	39.6	37.7
Nondefense	32.7	34.5	35.9
Subtotal, conduct of research and development	72.8	74.2	73.6
Conduct of education and training:			
Grants to State and local governments	26.5	28.8	32.4
Direct Federal	19.0	21.8	20.0
Subtotal, conduct of education and training	45.4	50.6	52.5
Major Federal investment outlays	**228.0**	**243.9**	**247.3**
MEMORANDUM			
Major Federal investment outlays:			
National defense	93.7	93.1	89.3
Nondefense	134.3	150.8	158.0
Total, major Federal investment outlays	228.0	243.9	247.3
Miscellaneous physical investments:			
Commodity inventories	–0.4	0.1	–0.3
Other physical investment (direct)	3.0	3.3	3.1
Total, miscellaneous physical investment	2.6	3.4	2.9
Total, Federal investment outlays, including miscellaneous physical investment	230.6	247.3	250.1

ment facilities and equipment is included in the physical investment category.

Nondefense outlays for the conduct of research and development are estimated to be $35.9 billion in 2000. This is almost entirely direct spending by the Federal Government, and is largely for the space programs, the National Science Foundation, the National Institutes of Health, and research for nuclear and non-nuclear energy programs.

Conduct of education and training.—Outlays for the conduct of education and training are estimated to be $52.5 billion in 2000. These outlays add to the stock of human capital by developing a more skilled and productive labor force. Grants to State and local governments for this category are estimated to be $32.4 billion in 2000, more than three-fifths of the total. They include education programs for the disadvantaged and the handicapped, vocational and adult education programs, training programs in the Department of Labor, and Head Start. Direct education and training outlays by the Federal Government are estimated to be $20.0 billion in 2000. Programs in this category are primarily aid for higher education through student financial assistance, loan subsidies, the veterans GI bill, and health training programs.

This category does not include outlays for education and training of Federal civilian and military employees. Outlays for education and training that are for physical investment and for research and development are in the categories for physical investment and the conduct of research and development.

Miscellaneous Physical Investment Outlays

In addition to the categories of major Federal investment, several miscellaneous categories of investment outlays are shown at the bottom of Table 6–1. These items, all for physical investment, are generally unrelated to improving Government operations or enhancing economic activity.

Outlays for commodity inventories are for the purchase or sale of agricultural products pursuant to farm price support programs and the purchase and sale of other commodities such as oil and gas. Sales are estimated to exceed purchases by $0.3 billion in 2000.

Outlays for other miscellaneous physical investment are estimated to be $3.1 billion in 2000. This category includes primarily conservation programs. These outlays are entirely for direct Federal spending.

Detailed Tables on Investment Spending

This section provides data on budget authority as well as outlays for major Federal investment. These estimates extend four years beyond the budget year to 2004. Table 6–2 displays budget authority (BA) and outlays (O) by major programs according to defense and nondefense categories. The greatest level of detail appears in Table 6–3, which shows budget authority and outlays divided according to grants to State and local governments and direct Federal spending. Miscellaneous investment is not included in these tables because it is generally unrelated to improving Government operations or enhancing economic activity.

Table 6–2. FEDERAL INVESTMENT BUDGET AUTHORITY AND OUTLAYS: DEFENSE AND NONDEFENSE PROGRAMS

(in millions of dollars)

Description		1998 Actual	Estimate					
			1999	2000	2001	2002	2003	2004
NATIONAL DEFENSE								
Major public physical investment:								
Construction and rehabilitation	**BA**	**4,866**	**4,794**	**2,318**	**7,124**	**3,951**	**4,048**	**4,159**
	O	5,092	4,716	4,461	3,882	4,988	4,693	4,326
Acquisition of major equipment	**BA**	**45,263**	**48,915**	**52,833**	**61,789**	**62,115**	**66,369**	**69,033**
	O	48,492	48,778	47,207	51,553	55,038	59,961	63,851
Purchase or sale of land and structures	**BA**	**–34**	**–36**	**–36**	**–36**	**–36**	**–36**	**–36**
	O	–34	–36	–36	–36	–36	–36	–36
Subtotal, major public physical investment	**BA**	**50,095**	**53,673**	**55,115**	**68,877**	**66,030**	**70,381**	**73,156**
	O	53,550	53,458	51,632	55,399	59,990	64,618	68,141
Conduct of research and development	**BA**	**39,824**	**39,819**	**37,712**	**37,597**	**37,975**	**37,829**	**38,337**
	O	40,141	39,612	37,662	37,764	37,779	37,792	38,091
Conduct of education and training (civilian)	**BA**	**2**	**3**	**8**	**8**	**10**	**10**	**10**
	O	8	3	6	8	9	10	10
Subtotal, national defense investment	**BA**	**89,921**	**93,495**	**92,835**	**106,482**	**104,015**	**108,220**	**111,503**
	O	93,699	93,073	89,300	93,171	97,778	102,420	106,242
NONDEFENSE								
Major public physical investment:								
Construction and rehabilitation:								
Highways	**BA**	**24,868**	**29,385**	**30,664**	**30,144**	**30,692**	**31,237**	**31,876**
	O	20,063	23,150	25,517	26,762	26,955	27,154	27,698
Mass transportation	**BA**	**4,602**	**4,830**	**5,906**	**6,086**	**6,552**	**7,019**	**7,168**
	O	3,892	3,789	3,960	4,763	5,299	5,984	6,404
Rail transportation	**BA**	**271**	**6**	**11**	**11**	**11**	**11**	**11**
	O	465	107	16	10	11	11	11
Air transportation	**BA**	**1,657**	**2,336**	**1,616**	**1,617**	**1,618**	**1,619**	**1,619**
	O	1,541	1,684	1,766	1,697	1,659	1,648	1,641
Community development block grants	**BA**	**4,925**	**4,873**	**4,775**	**4,775**	**4,775**	**4,775**	**4,775**
	O	4,621	4,965	4,856	4,817	4,792	4,757	4,779
Other community and regional development	**BA**	**1,465**	**1,560**	**1,669**	**1,669**	**1,669**	**1,669**	**1,669**
	O	1,479	1,438	1,414	1,522	1,788	1,853	1,826
Pollution control and abatement	**BA**	**4,131**	**4,169**	**3,613**	**3,615**	**3,615**	**3,615**	**3,615**
	O	3,521	3,616	4,104	4,205	4,032	4,010	4,005
Water resources	**BA**	**2,650**	**2,967**	**3,039**	**3,037**	**3,023**	**3,031**	**3,045**
	O	2,350	3,297	3,295	3,176	2,936	3,079	3,060
Housing assistance	**BA**	**6,219**	**6,982**	**6,559**	**6,559**	**6,559**	**6,559**	**6,559**
	O	6,406	6,501	7,264	8,178	8,175	8,249	8,287
Energy	**BA**	**779**	**960**	**843**	**721**	**930**	**892**	**672**
	O	778	961	843	719	928	890	670
Veterans hospitals and other health	**BA**	**1,660**	**1,662**	**1,453**	**1,493**	**1,475**	**1,466**	**1,466**
	O	1,565	1,633	1,652	1,657	1,628	1,586	1,577
Postal Service	**BA**	**1,726**	**1,654**	**1,457**	**1,317**	**1,485**	**1,742**	**1,509**
	O	1,528	1,032	1,225	1,344	1,457	1,574	1,609
GSA real property activities	**BA**	**238**	**1,165**	**767**	**952**	**875**	**918**	**847**
	O	1,375	1,069	1,016	1,079	1,062	1,016	939
Other programs	**BA**	**3,764**	**3,111**	**2,748**	**2,919**	**2,801**	**2,578**	**2,680**
	O	3,718	3,044	3,330	2,910	2,935	2,973	2,742
Subtotal, construction and rehabilitation	**BA**	**58,955**	**65,660**	**65,120**	**64,915**	**66,080**	**67,131**	**67,511**
	O	53,302	56,286	60,258	62,839	63,657	64,784	65,248
Acquisition of major equipment:								
Air transportation	**BA**	**1,948**	**2,096**	**2,320**	**2,486**	**2,626**	**2,792**	**2,927**
	O	2,285	1,952	2,019	2,184	2,360	2,606	2,758
Postal Service	**BA**	**597**	**739**	**848**	**918**	**744**	**744**	**530**
	O	364	319	736	802	781	590	835
Other	**BA**	**4,877**	**5,839**	**4,964**	**5,547**	**5,488**	**5,447**	**5,405**
	O	3,969	4,788	4,941	5,446	5,601	5,615	5,604
Subtotal, acquisition of major equipment	**BA**	**7,422**	**8,674**	**8,132**	**8,951**	**8,858**	**8,983**	**8,862**
	O	6,618	7,059	7,696	8,432	8,742	8,811	9,197
Purchase or sale of land and structures	**BA**	**–3,966**	**626**	**398**	**720**	**223**	**719**	**712**
	O	–4,613	1,265	525	765	244	748	721

Table 6–2. FEDERAL INVESTMENT BUDGET AUTHORITY AND OUTLAYS: DEFENSE AND NONDEFENSE PROGRAMS—Continued

(in millions of dollars)

Description		1998 Actual	Estimate					
			1999	2000	2001	2002	2003	2004
Other physical assets (grants)	**BA**	**942**	**941**	**1,327**	**1,314**	**1,342**	**1,388**	**1,477**
	O	917	1,075	1,086	1,264	1,261	1,313	1,363
Subtotal, major public physical investment	**BA**	**63,353**	**75,901**	**74,977**	**75,900**	**76,503**	**78,221**	**78,562**
	O	56,224	65,685	69,565	73,300	73,904	75,656	76,529
Conduct of research and development:								
General science, space and technology	**BA**	**12,367**	**12,970**	**13,409**	**13,588**	**13,657**	**13,847**	**13,907**
	O	12,503	12,858	12,907	13,291	13,480	13,768	13,926
Energy	**BA**	**1,281**	**1,230**	**1,346**	**1,324**	**1,324**	**1,324**	**1,324**
	O	1,526	1,368	1,365	1,516	1,517	1,487	1,419
Transportation	**BA**	**1,826**	**1,678**	**1,581**	**1,597**	**1,640**	**1,662**	**1,687**
	O	1,778	1,699	1,698	1,716	1,693	1,748	1,771
Health	**BA**	**13,543**	**15,471**	**15,821**	**16,001**	**16,061**	**16,085**	**15,785**
	O	12,471	13,903	15,371	15,935	16,045	16,076	15,768
Natural resources and environment	**BA**	**1,936**	**2,011**	**1,953**	**1,953**	**1,953**	**1,953**	**1,953**
	O	1,653	1,785	1,767	1,757	1,758	1,768	1,770
All other research and development	**BA**	**2,791**	**3,128**	**2,902**	**2,913**	**3,027**	**2,993**	**3,022**
	O	2,731	2,931	2,834	2,886	3,053	3,011	3,031
Subtotal, conduct of research and development	**BA**	**33,744**	**36,488**	**37,012**	**37,376**	**37,662**	**37,864**	**37,678**
	O	32,662	34,544	35,942	37,101	37,546	37,858	37,685
Conduct of education and training:								
Education, training, employment and social services:								
Elementary, secondary, and vocational education	**BA**	**18,738**	**16,761**	**20,762**	**22,687**	**22,687**	**22,687**	**22,687**
	O	16,507	16,910	20,041	22,527	22,750	22,837	22,849
Higher education	**BA**	**13,818**	**14,248**	**12,332**	**13,610**	**12,666**	**13,954**	**14,599**
	O	12,060	14,032	11,636	13,427	12,157	13,623	14,175
Research and general education aids	**BA**	**1,900**	**2,233**	**2,300**	**2,304**	**2,320**	**2,279**	**2,268**
	O	1,958	2,128	2,415	2,413	2,432	2,399	2,407
Training and employment	**BA**	**6,370**	**6,608**	**6,435**	**5,433**	**5,386**	**5,386**	**5,386**
	O	4,569	5,938	6,645	6,378	5,740	5,413	5,381
Social services	**BA**	**6,994**	**7,366**	**8,026**	**8,087**	**8,149**	**8,213**	**8,279**
	O	6,610	7,454	7,554	7,903	7,993	8,036	8,102
Subtotal, education, training, and social services	**BA**	**47,820**	**47,216**	**49,855**	**52,121**	**51,208**	**52,519**	**53,219**
	O	41,704	46,462	48,291	52,648	51,072	52,308	52,914
Veterans education, training, and rehabilitation	**BA**	**1,568**	**1,357**	**1,652**	**1,908**	**1,902**	**1,901**	**1,927**
	O	1,502	1,693	1,681	1,937	1,909	1,906	1,933
Health	**BA**	**871**	**1,003**	**951**	**948**	**946**	**940**	**935**
	O	808	932	957	956	948	942	936
Other education and training	**BA**	**1,503**	**1,535**	**1,578**	**1,578**	**1,555**	**1,557**	**1,559**
	O	1,408	1,468	1,521	1,557	1,561	1,560	1,564
Subtotal, conduct of education and training	**BA**	**51,762**	**51,111**	**54,036**	**56,555**	**55,611**	**56,917**	**57,640**
	O	45,422	50,555	52,450	57,098	55,490	56,716	57,347
Subtotal, nondefense investment	**BA**	**148,859**	**163,500**	**166,025**	**169,831**	**169,776**	**173,002**	**173,880**
	O	134,308	150,784	157,957	167,499	166,940	170,230	171,561
Total, Federal investment	**BA**	**238,780**	**256,995**	**258,860**	**276,313**	**273,791**	**281,222**	**285,383**
	O	228,007	243,857	247,257	260,670	264,718	272,650	277,803

Table 6–3. FEDERAL INVESTMENT BUDGET AUTHORITY AND OUTLAYS: GRANT AND DIRECT FEDERAL PROGRAMS

(in millions of dollars)

Description		1998 Actual	Estimate					
			1999	2000	2001	2002	2003	2004
GRANTS TO STATE AND LOCAL GOVERNMENTS								
Major public physical investments:								
Construction and rehabilitation:								
Highways	BA	**24,691**	**29,008**	**30,453**	**29,937**	**30,481**	**31,022**	**31,657**
	O	20,036	23,057	25,320	26,558	26,750	26,948	27,487
Mass transportation	BA	**4,602**	**4,834**	**5,906**	**6,086**	**6,552**	**7,019**	**7,168**
	O	3,892	3,789	3,960	4,763	5,299	5,984	6,404
Rail transportation	BA	**10**	.....	.....	.....	.....	.....	.....
	O	44	47	2	.....	.....	.....	.....
Air transportation	BA	**1,640**	**2,322**	**1,600**	**1,600**	**1,600**	**1,600**	**1,600**
	O	1,511	1,670	1,750	1,680	1,641	1,628	1,620
Pollution control and abatement	BA	**2,730**	**2,783**	**2,149**	**2,149**	**2,149**	**2,149**	**2,149**
	O	2,084	2,188	2,558	2,675	2,493	2,435	2,394
Other natural resources and environment	BA	**43**	**27**	**26**	**26**	**26**	**26**	**26**
	O	65	96	67	44	34	34	34
Community development block grants	BA	**4,925**	**4,873**	**4,775**	**4,775**	**4,775**	**4,775**	**4,775**
	O	4,621	4,965	4,856	4,817	4,792	4,757	4,779
Other community and regional development	BA	**1,084**	**1,327**	**1,423**	**1,423**	**1,423**	**1,423**	**1,423**
	O	1,060	1,284	1,274	1,365	1,493	1,547	1,520
Housing assistance	BA	**6,193**	**6,956**	**6,529**	**6,529**	**6,529**	**6,529**	**6,529**
	O	6,388	6,475	7,237	8,148	8,145	8,219	8,257
National defense	BA	.....	.....	.....	.....	.....	.....	.....
	O	5	3	.....	.....	.....	.....	.....
Other construction	BA	**460**	**166**	**119**	**119**	**119**	**119**	**119**
	O	427	194	206	181	145	119	119
Subtotal, construction and rehabilitation	BA	**46,378**	**52,296**	**52,980**	**52,644**	**53,654**	**54,662**	**55,446**
	O	40,133	43,768	47,230	50,231	50,792	51,671	52,614
Other physical assets	BA	**996**	**1,027**	**1,402**	**1,462**	**1,480**	**1,515**	**1,533**
	O	972	1,161	1,178	1,348	1,373	1,436	1,485
Subtotal, major public physical capital	BA	**47,374**	**53,323**	**54,382**	**54,106**	**55,134**	**56,177**	**56,979**
	O	41,105	44,929	48,408	51,579	52,165	53,107	54,099
Conduct of research and development:								
Agriculture	BA	**223**	**253**	**181**	**189**	**189**	**189**	**189**
	O	223	226	220	237	258	254	251
Other	BA	**121**	**154**	**168**	**164**	**167**	**169**	**172**
	O	79	105	182	187	188	190	193
Subtotal, conduct of research and development	BA	**344**	**407**	**349**	**353**	**356**	**358**	**361**
	O	302	331	402	424	446	444	444
Conduct of education and training:								
Elementary, secondary, and vocational education	BA	**17,714**	**15,504**	**18,611**	**20,536**	**20,536**	**20,536**	**20,536**
	O	15,686	15,992	18,752	20,692	20,724	20,776	20,787
Higher education	BA	**80**	**160**	**197**	**197**	**197**	**197**	**197**
	O	90	65	122	141	144	144	144
Research and general education aids	BA	**328**	**516**	**347**	**362**	**366**	**347**	**340**
	O	378	389	479	468	462	447	445
Training and employment	BA	**5,122**	**5,043**	**4,749**	**3,748**	**3,715**	**3,715**	**3,715**
	O	3,463	4,639	5,304	4,961	4,309	3,979	3,951
Social services	BA	**6,722**	**7,081**	**7,721**	**7,782**	**7,844**	**7,908**	**7,974**
	O	6,354	7,153	7,258	7,598	7,688	7,731	7,797
Agriculture	BA	**423**	**453**	**402**	**402**	**402**	**402**	**402**
	O	416	438	433	410	405	402	402
Other	BA	**87**	**80**	**82**	**82**	**82**	**82**	**82**
	O	82	80	79	81	82	80	81
Subtotal, conduct of education and training	BA	**30,476**	**28,837**	**32,109**	**33,109**	**33,142**	**33,187**	**33,246**
	O	26,469	28,756	32,427	34,351	33,814	33,559	33,607
Subtotal, grants for investment	BA	**78,194**	**82,567**	**86,840**	**87,568**	**88,632**	**89,722**	**90,586**
	O	67,876	74,016	81,237	86,354	86,425	87,110	88,150

Table 6–3. FEDERAL INVESTMENT BUDGET AUTHORITY AND OUTLAYS: GRANT AND DIRECT FEDERAL PROGRAMS—Continued

(in millions of dollars)

Description		1998 Actual	Estimate					
			1999	2000	2001	2002	2003	2004
DIRECT FEDERAL PROGRAMS								
Major public physical investment:								
Construction and rehabilitation:								
National defense:								
Military construction	BA	**3,281**	**3,309**	**1,433**	**5,328**	**2,646**	**2,742**	**2,852**
	O	3,515	3,107	2,955	2,526	3,730	3,433	3,055
Family housing	BA	**887**	**739**	**206**	**937**	**446**	**447**	**448**
	O	883	966	803	602	484	489	500
Atomic energy defense activities and other	BA	**698**	**746**	**679**	**859**	**859**	**859**	**859**
	O	689	640	703	754	774	771	771
Subtotal, national defense	BA	**4,866**	**4,794**	**2,318**	**7,124**	**3,951**	**4,048**	**4,159**
	O	5,087	4,713	4,461	3,882	4,988	4,693	4,326
International affairs	BA	**213**	**513**	**341**	**539**	**639**	**738**	**837**
	O	150	318	392	455	488	553	639
General science, space, and technology	BA	**375**	**465**	**524**	**536**	**541**	**536**	**539**
	O	517	479	551	511	515	518	518
Water resources projects	BA	**2,607**	**2,940**	**3,017**	**3,015**	**3,001**	**3,009**	**3,023**
	O	2,287	3,204	3,233	3,137	2,907	3,050	3,031
Other natural resources and environment	BA	**1,782**	**1,756**	**1,793**	**1,854**	**1,826**	**1,828**	**1,828**
	O	1,799	1,788	1,895	1,926	1,930	1,976	2,017
Energy	BA	**779**	**960**	**843**	**721**	**930**	**892**	**672**
	O	778	961	843	719	928	890	670
Postal Service	BA	**1,726**	**1,654**	**1,457**	**1,317**	**1,485**	**1,742**	**1,509**
	O	1,528	1,032	1,225	1,344	1,457	1,574	1,609
Transportation	BA	**596**	**628**	**296**	**206**	**211**	**216**	**220**
	O	664	344	361	205	207	204	214
Housing assistance	BA	**26**	**26**	**30**	**30**	**30**	**30**	**30**
	O	18	26	27	30	30	30	30
Veterans hospitals and other health facilities	BA	**1,580**	**1,572**	**1,413**	**1,453**	**1,435**	**1,426**	**1,426**
	O	1,515	1,581	1,588	1,594	1,562	1,546	1,537
Federal Prison System	BA	**151**	**323**	**439**	**432**	**342**	**22**	**22**
	O	33	459	414	477	477	434	186
GSA real property activities	BA	**416**	**1,165**	**767**	**952**	**875**	**918**	**847**
	O	1,640	1,069	1,016	1,079	1,062	1,016	939
Other construction	BA	**2,326**	**1,362**	**1,220**	**1,216**	**1,111**	**1,112**	**1,112**
	O	2,245	1,260	1,483	1,131	1,302	1,322	1,244
Subtotal, construction and rehabilitation	BA	**17,443**	**18,158**	**14,458**	**19,395**	**16,377**	**16,517**	**16,224**
	O	18,261	17,234	17,489	16,490	17,853	17,806	16,960
Acquisition of major equipment:								
National defense:								
Department of Defense	BA	**44,934**	**48,562**	**52,483**	**61,439**	**61,765**	**66,019**	**68,683**
	O	48,180	48,422	46,864	51,199	54,686	59,610	63,500
Atomic energy defense activities	BA	**329**	**353**	**350**	**350**	**350**	**350**	**350**
	O	312	356	343	354	352	351	351
Subtotal, national defense	BA	**45,263**	**48,915**	**52,833**	**61,789**	**62,115**	**66,369**	**69,033**
	O	48,492	48,778	47,207	51,553	55,038	59,961	63,851
General science and basic research	BA	**386**	**368**	**396**	**443**	**429**	**407**	**408**
	O	378	341	375	392	422	431	421
Space flight, research, and supporting activities	BA	**657**	**659**	**509**	**506**	**491**	**471**	**462**
	O	662	668	499	502	493	478	467
Energy	BA	**125**	**125**	**121**	**118**	**105**	**72**	**72**
	O	124	125	121	118	105	72	72
Postal Service	BA	**597**	**739**	**848**	**918**	**744**	**744**	**530**
	O	364	319	736	802	781	590	835
Air transportation	BA	**1,948**	**2,096**	**2,320**	**2,486**	**2,626**	**2,792**	**2,927**
	O	2,285	1,952	2,019	2,184	2,360	2,606	2,758
Water transportation (Coast Guard)	BA	**263**	**423**	**231**	**318**	**318**	**318**	**318**
	O	187	272	325	274	309	309	318
Other transportation (railroads)	BA	.....	**609**	**571**	**571**	**571**	**571**	**571**
	O	164	247	442	581	572	572	572
Social security	BA	**50**	.....	.....	.....	.....	.....	.....

Table 6–3. FEDERAL INVESTMENT BUDGET AUTHORITY AND OUTLAYS: GRANT AND DIRECT FEDERAL PROGRAMS—Continued

(in millions of dollars)

Description		1998 Actual	Estimate					
			1999	2000	2001	2002	2003	2004
	O	87	55	30	32	34	37	40
Hospital and medical care for veterans	**BA**	**700**	**684**	**500**	**504**	**510**	**511**	**512**
	O	475	542	556	571	575	579	580
Department of Justice	**BA**	**523**	**464**	**550**	**551**	**549**	**549**	**549**
	O	453	436	505	560	577	580	580
Department of the Treasury	**BA**	**919**	**858**	**394**	**727**	**724**	**727**	**731**
	O	578	644	522	734	749	716	709
GSA general supply fund	**BA**	**513**	**657**	**657**	**654**	**681**	**735**	**737**
	O	493	657	657	654	681	735	737
Other	**BA**	**687**	**906**	**960**	**1,007**	**972**	**959**	**989**
	O	313	715	817	944	972	983	986
Subtotal, acquisition of major equipment	**BA**	**52,631**	**57,503**	**60,890**	**70,592**	**70,835**	**75,225**	**77,839**
	O	55,055	55,751	54,811	59,901	63,668	68,649	72,926
Purchase or sale of land and structures:								
National defense	**BA**	**–34**	**–36**	**–36**	**–36**	**–36**	**–36**	**–36**
	O	–34	–36	–36	–36	–36	–36	–36
International affairs	**BA**	**10**	**19**	**14**	**19**	**23**	**27**	**31**
	O	13	19	21	23	24	28	32
Sale of the United States Enrichment Corporation	**BA**	**–1,885**	.....	.....	.....	.....	.....	.....
	O	–1,885	.....	.....	.....	.....	.....	.....
Privatization of Elk Hills	**BA**	**–2,887**	.....	**–323**	.....	.....	.....	.....
	O	–2,887	.....	–323	.....	.....	.....	.....
Other	**BA**	**796**	**607**	**707**	**701**	**200**	**692**	**681**
	O	146	1,246	827	742	220	720	689
Subtotal, purchase or sale of land and structures	**BA**	**–4,000**	**590**	**362**	**684**	**187**	**683**	**676**
	O	–4,647	1,229	489	729	208	712	685
Subtotal, major public physical investment	**BA**	**66,074**	**76,251**	**75,710**	**90,671**	**87,399**	**92,425**	**94,739**
	O	68,669	74,214	72,789	77,120	81,729	87,167	90,571
Conduct of research and development:								
National defense								
Defense military	**BA**	**37,230**	**36,895**	**34,794**	**34,679**	**35,057**	**34,911**	**35,419**
	O	37,558	36,875	34,723	34,748	34,777	34,815	35,114
Atomic energy and other	**BA**	**2,594**	**2,924**	**2,918**	**2,918**	**2,918**	**2,918**	**2,918**
	O	2,583	2,737	2,939	3,016	3,002	2,977	2,977
Subtotal, national defense	**BA**	**39,824**	**39,819**	**37,712**	**37,597**	**37,975**	**37,829**	**38,337**
	O	40,141	39,612	37,662	37,764	37,779	37,792	38,091
International affairs	**BA**	**163**	**165**	**115**	**115**	**115**	**115**	**115**
	O	233	201	182	185	197	199	199
General science, space and technology								
NASA	**BA**	**8,200**	**8,237**	**8,422**	**8,607**	**8,684**	**8,874**	**8,934**
	O	8,631	8,475	8,201	8,355	8,417	8,716	8,861
National Science Foundation	**BA**	**2,293**	**2,507**	**2,734**	**2,728**	**2,720**	**2,720**	**2,720**
	O	2,010	2,125	2,437	2,603	2,722	2,711	2,724
Department of Energy	**BA**	**1,874**	**2,226**	**2,253**	**2,253**	**2,253**	**2,253**	**2,253**
	O	1,862	2,258	2,269	2,333	2,341	2,341	2,341
Subtotal, general science, space and technology	**BA**	**12,530**	**13,135**	**13,524**	**13,703**	**13,772**	**13,962**	**14,022**
	O	12,736	13,059	13,089	13,476	13,677	13,967	14,125
Energy	**BA**	**1,281**	**1,230**	**1,346**	**1,324**	**1,324**	**1,324**	**1,324**
	O	1,526	1,368	1,365	1,516	1,517	1,487	1,419
Transportation:								
Department of Transportation	**BA**	**471**	**416**	**436**	**431**	**446**	**466**	**482**
	O	475	424	488	526	488	510	524
NASA	**BA**	**1,262**	**1,144**	**1,020**	**1,043**	**1,068**	**1,068**	**1,074**
	O	1,250	1,198	1,054	1,027	1,041	1,072	1,078
Subtotal, transportation	**BA**	**3,014**	**2,790**	**2,802**	**2,798**	**2,838**	**2,858**	**2,880**
	O	3,251	2,990	2,907	3,069	3,046	3,069	3,021

Table 6–3. FEDERAL INVESTMENT BUDGET AUTHORITY AND OUTLAYS: GRANT AND DIRECT FEDERAL PROGRAMS—Continued

(in millions of dollars)

Description		1998 Actual	Estimate					
			1999	2000	2001	2002	2003	2004
Health:								
National Institutes of Health	**BA**	**12,898**	**14,783**	**15,150**	**15,150**	**15,150**	**15,124**	**15,124**
	O	11,853	13,213	14,600	15,020	15,076	15,059	15,055
All other health	**BA**	**633**	**675**	**658**	**838**	**898**	**948**	**648**
	O	606	677	758	902	956	1,004	700
Subtotal, health	**BA**	**13,531**	**15,458**	**15,808**	**15,988**	**16,048**	**16,072**	**15,772**
	O	12,459	13,890	15,358	15,922	16,032	16,063	15,755
Agriculture	**BA**	**1,026**	**1,235**	**1,204**	**1,204**	**1,205**	**1,208**	**1,208**
	O	977	1,083	1,116	1,132	1,147	1,144	1,140
Natural resources and environment	**BA**	**1,936**	**2,011**	**1,953**	**1,953**	**1,953**	**1,953**	**1,953**
	O	1,653	1,785	1,767	1,757	1,758	1,768	1,770
National Institute of Standards and Technology	**BA**	**392**	**395**	**432**	**432**	**432**	**432**	**432**
	O	423	431	423	432	440	439	437
Hospital and medical care for veterans	**BA**	**272**	**316**	**316**	**316**	**316**	**316**	**316**
	O	247	305	314	315	315	315	315
All other research and development	**BA**	**699**	**741**	**624**	**629**	**742**	**705**	**734**
	O	614	670	566	574	685	649	678
Subtotal, conduct of research and development	**BA**	**73,224**	**75,900**	**74,375**	**74,620**	**75,281**	**75,335**	**75,654**
	O	72,501	73,825	73,202	74,441	74,879	75,206	75,332
Conduct of education and training:								
Elementary, secondary, and vocational education	**BA**	**1,024**	**1,257**	**2,151**	**2,151**	**2,151**	**2,151**	**2,151**
	O	821	918	1,289	1,835	2,026	2,061	2,062
Higher education	**BA**	**13,738**	**14,088**	**12,135**	**13,413**	**12,469**	**13,757**	**14,402**
	O	11,970	13,967	11,514	13,286	12,013	13,479	14,031
Research and general education aids	**BA**	**1,572**	**1,717**	**1,953**	**1,942**	**1,954**	**1,932**	**1,928**
	O	1,580	1,739	1,936	1,945	1,970	1,952	1,962
Training and employment	**BA**	**1,248**	**1,565**	**1,686**	**1,685**	**1,671**	**1,671**	**1,671**
	O	1,106	1,299	1,341	1,417	1,431	1,434	1,430
Health	**BA**	**871**	**1,003**	**951**	**948**	**946**	**940**	**935**
	O	808	932	957	956	948	942	936
Veterans education, training, and rehabilitation	**BA**	**1,568**	**1,357**	**1,652**	**1,908**	**1,902**	**1,901**	**1,927**
	O	1,502	1,693	1,681	1,937	1,909	1,906	1,933
General science and basic reserach	**BA**	**599**	**660**	**686**	**684**	**659**	**659**	**659**
	O	543	586	639	667	653	657	659
National defense	**BA**	**2**	**3**	**8**	**8**	**10**	**10**	**10**
	O	8	3	6	8	9	10	10
International affairs	**BA**	**269**	**201**	**211**	**211**	**211**	**211**	**211**
	O	252	230	213	217	211	211	211
Other	**BA**	**397**	**426**	**502**	**504**	**506**	**508**	**510**
	O	371	435	453	487	515	515	516
Subtotal, conduct of education and training	**BA**	**21,288**	**22,277**	**21,935**	**23,454**	**22,479**	**23,740**	**24,404**
	O	18,961	21,802	20,029	22,755	21,685	23,167	23,750
Subtotal, direct Federal investment	**BA**	**160,586**	**174,428**	**172,020**	**188,745**	**185,159**	**191,500**	**194,797**
	O	160,131	169,841	166,020	174,316	178,293	185,540	189,653
Total, Federal investment	**BA**	**238,780**	**256,995**	**258,860**	**276,313**	**273,791**	**281,222**	**285,383**
	O	228,007	243,857	247,257	260,670	264,718	272,650	277,803

Part II: PLANNING, BUDGETING, AND ACQUISITION OF CAPITAL ASSETS

The previous section discussed Federal investment broadly defined. The focus of this section is much narrower—the review of planning and budgeting during the past year and the resultant budget proposals for capital assets owned by the Federal Government and used to deliver Federal services. Capital assets consist of Federal buildings, information technology, and other facilities and major equipment, including weapons systems, federally owned infrastructure, and space satellites.[1] With proposed major agency restructuring, organizational streamlining, and other reforms, good planning may suggest reduced spending for some assets, such as office buildings, and increased spending for others, such as information technology, to increase the productivity of a smaller workforce.

In recent years the Administration and the Congress have reviewed the Federal Government's performance in planning, budgeting, risk management, and the acquisition of capital assets. The reviews indicate that the performance is uneven across the Government; the problems have many causes, and as a result, there is no single solution. However, in meeting the objective of improving the Government's performance, it is essential that the caliber of Government planning and budgeting for capital assets be improved.

Improving Planning, Budgeting, and Acquisition of Capital Assets

Risk Management.—Recent Executive Branch reviews have found a recurring theme in many capital asset acquisitions—that risk management should become more central to the planning, budgeting, and acquisition process. Failure to analyze and manage the inherent risk in all capital asset acquisitions may have contributed to cost overruns, schedule shortfalls, and acquisitions that fail to perform as expected. Failure to adopt capital asset requirements that are within the capabilities of the market and budget limitations may also have contributed to these problems. For each major project a risk analysis that includes how risks will be isolated, minimized, monitored, and controlled may help prevent these problems. The proposals in this budget, together with recent legislation enacted by Congress, are designed to help the Government manage better its portfolio of capital assets.

Long-Term Planning and Analysis.—Planning and managing capital assets, especially better management of risk, has historically been a low priority for some agencies. Attention focuses on coming-year appropriations, and justifications are often limited to lists of desired projects. The increased use of long-range planning linked to performance goals required by the Government Performance and Results Act would provide a better basis for justifications. It would increase foresight and improve the odds for cost-effective investments.

A need for better risk management, integrated lifecycle planning, and operation of capital assets at many agencies was evident in the Executive Branch reviews. Research equipment was acquired with inadequate funding for its operation. New medical facilities sometimes were built without funds for maintenance and operation. New information technology sometimes was acquired without planning for associated changes in agency operations.

Congressional concern.—Congress has expressed its concern about planning for capital assets with legislation and other actions that complement Administration efforts to ensure better performance:

- The Government Performance and Results Act of 1993 (GPRA) is designed to help ensure that program objectives are more clearly defined and resources are focused on meeting these objectives.
- The Federal Acquisition Streamlining Act of 1994 (FASA), Title V, requires agencies to improve the management of large acquisitions. Title V requires agencies to institute a performance-based planning, budgeting, and management approach to the acquisition of capital assets. As a result of improved planning efforts, agencies are required to establish cost, schedule, and performance goals that have a high probability of successful achievement. For projects that are not achieving 90 percent of original goals, agencies are required to discuss corrective actions taken or planned to bring the project within goals. If they cannot be brought within goals, agencies should identify how and why the goals should be revised, whether the project is still cost beneficial and justified for continued funding, or whether the project should be canceled.
- The Clinger-Cohen Act of 1996 is designed to ensure that information technology acquisitions support agency missions developed pursuant to GPRA. The Clinger-Cohen Act also requires a performance-based planning, budgeting, and management approach to the acquisition of capital assets.
- The General Accounting Office published a study, *Budget Issues: Budgeting for Federal Capital* (November 1996), written in response to a congressional request, which recommended that the Office of Management and Budget (OMB) continue its focus on capital assets.

Administration concern.—Since 1994, the Administration has devoted particular attention to improving the process of planning, budgeting, and acquiring capital assets. After seeking out and analyzing the problems, which differed from agency to agency, OMB issued guidance on this issue in 1994. This guidance has been issued for several years, most recently as OMB Circular A–11: Part 3: "Planning, Budgeting, and Acquisition

[1] This is almost the same as the definition in Part I of this chapter for spending for direct Federal construction and rehabilitation, major equipment, and purchase of land, except that capital assets excludes grants to private groups for these purposes (e.g., grants to universities for research equipment and grants to AMTRAK). A more complete definition can be found in the glossary to the "Principles of Budgeting for Capital Asset Acquisitions," which is at the end of this Part.

of Capital Assets" (July 1998) (hereafter referred to as Part 3). Part 3 identified other OMB guidance on this issue.[2]

Part 3 requests agencies to approach planning for capital assets in the context of strategic plans to carry out their missions, and to consider alternative methods of meeting their goals. Systematic analysis of the full life-cycle expected costs and benefits is required, along with risk analysis and assessment of alternative means of acquiring assets. The Administration proposes to make agencies responsible for using good capital programming principles for managing the capital assets they use, and to work throughout the coming year to improve agency practices in risk management, planning, budgeting, acquisition, and operation of these assets.

In support of this, in July 1997 OMB issued a *Capital Programming Guide*. This Guide was developed by an interagency task force with representation from 14 executive agencies and the General Accounting Office. The *Guide's* purpose is to provide professionals in the Federal Government a basic reference on capital assets management principles to assist them in planning, budgeting, acquiring, and managing the asset once in use. The Guide emphasizes risk management and the importance of analyzing capital assets as a portfolio. In addition, other recent actions by the Administration include:

- OMB memorandum 97–02, "Funding Information Systems Investments" (October 25, 1996) was issued to establish clear and concise decision criteria regarding investments in major information technology investments.
- As part of this budget, the Administration is:
  —requesting full funding in regular or advance appropriations for new capital projects and for many capital projects formerly funded incrementally. These requests are shown in Table 6–5 and discussed in the accompanying text.
  —reissuing the "Principles of Budgeting for Capital Asset Acquisitions," which appear at the end of this Part. These principles offer guidelines to agencies to help carry out better planning, analysis, risk management, and budgeting for capital asset acquisitions.

From Planning to Budgeting.—Long-range agency plans should channel fully justified budget-year and out-year capital acquisition proposals into the budget process. Agencies were asked to submit projections of both budget authority and outlays for high-priority capital asset proposals not only for the budget year but for the four subsequent years through 2004 as well. In addition, agency-specific capital asset issues were highlighted in the agency reviews.

Attention was given to whether the "lumpiness" of some capital assets—large one-year temporary increases in funding—disadvantaged them in the budget review process. In some cases, agencies aggregate capital asset acquisitions into budget accounts containing only such acquisitions; such accounts tend to smooth out year-to-year changes in budget authority and outlays and avoid crowding other expenditures. In other cases, agencies or program managers do not hesitate to request "spikes" in spending for asset acquisitions, and the review process accommodates them. But some agencies go out of their way to avoid such spikes, and some agencies have trouble accommodating them. Part 3 encouraged agencies to accommodate justified spikes in their own internal reviews.

Full funding of capital assets.—Good budgeting requires that appropriations for the full costs of asset acquisition be provided up front to help ensure that all costs and benefits are fully taken into account when decisions are made about providing resources. Full funding was endorsed by the General Accounting Office in its report, *Budgeting for Federal Capital* (November 1996). This rule is followed for most Department of Defense procurement and construction programs and for General Services Administration buildings. In other areas, however, too often it is not. When it is not followed and capital assets are funded in increments, without certainty if or when future funding will be available, it can and occasionally does result in poor risk management, weak planning, acquisition of assets not fully justified, higher acquisition costs, cancellation of major projects, the loss of sunk costs, and inadequate funding to maintain and operate the assets. Full funding is also an important element in managing large acquisitions effectively and holding management responsible for achieving goals.

This budget requests full funding with regular or advance appropriations for new capital projects and for many capital projects funded incrementally in the past. Projects that might have been funded in increments in past years and are fully funded in this budget are identified below in Table 6–5 and discussed in the accompanying text. Efforts will continue to include full funding for all new capital projects, or at least economically and programmatically viable segments (or modules) of new projects.

Other budgeting issues.—Other budgeting decisions can also aid in acquiring capital assets. Availability of funds for one year often may not be enough time to complete the acquisition process. Most agencies request that funds be available for more than one year to complete acquisitions efficiently, and Part 3 encourages this. As noted, many agencies aggregate asset ac-

[2]Other guidance published by OMB with participation by other agencies includes: (1) OMB Circular No. A–109, *Major System Acquisitions*, which establishes policies for planning major systems that are generally applicable to capital asset acquisitions. (2) OMB Circular No. A–94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*, which provides guidance on benefit-cost, cost-effectiveness, and lease-purchase analysis to be used by agencies in evaluating Federal activities including capital asset acquisition. It includes guidelines on the discount rate to use in evaluating future benefits and costs, the measurement of benefits and costs, the treatment of uncertainty, and other issues. This guidance must be followed in all analyses in support of legislative and budget programs. (3) Executive Order No. 12893, "Principles for Federal Infrastructure Investments," which provides principles for the systematic economic analysis of infrastructure investments and their management. (4) OMB Bulletin No. 94–16, Guidance on Executive Order No. 12893, "Principles for Federal Infrastructure Investments," which provides guidance for implementing this order and appends the order itself. (5) the revision of OMB Circular A–130, *Management of Federal Information Resources* (February 20, 1996), which provides principles for internal management and planning practices for information systems and technology; and (6) OMB Circular No. A–127, *Financial Management Systems*, which prescribes policies and standards for executive departments and agencies to follow in developing, evaluating, and reporting on financial management standards.

quisition in budget accounts to avoid lumpiness. In some cases, these are revolving funds that "rent" the assets to the agency's programs.

To promote better program performance, agencies are also being encouraged by OMB to examine their budget account structures to align them better with program outputs and outcomes and to charge the appropriate account with significant costs used to achieve these results. The asset acquisition rental accounts, mentioned above, would contribute to this. Budgeting this way would provide information and incentives for better resource allocation among programs and a continual search for better ways to deliver services. It would also provide incentives for efficient capital asset acquisition and management.

Acquisition of Capital Assets.—Improved planning, budgeting, and acquisition strategies are necessary to increase the ability of agencies to acquire capital assets within, or close to, the original estimates of cost, schedule, and performance used to justify project budgets and to maintain budget discipline. The Administration initiative along with enactment of FASA (Title V) and the Clinger-Cohen Act require agencies to institute a performance-based planning, budgeting, and management approach to the acquisition of capital assets.

OMB, working with the agencies over the last several years, began separate but related efforts to develop an integrated management approach that employs performance based acquisition management as part of a disciplined capital programming process. The Administration also wants the capital asset acquisition goals incorporated into the annual performance plan called for by GPRA so that a unified picture of agency management activities is presented and acquisition performance goals are linked to the achievement of program and policy goals. This integrated approach will not only eliminate duplication in reporting agency actions but, most importantly, will foster more effective implementation of performance-based acquisition management.

The first effort was the issuance of OMB Circular A–11, Part 3, "Planning, Budgeting and Acquisition of Capital Assets," in July 1996. Part 3 has been reissued annually since then. The *Capital Programming Guide* was issued as a Supplement to Part 3 in June 1997. These documents present unified guidance on planning, budgeting, acquisition, and management of capital assets. It also presents unified guidance designed to coordinate the collection of agency information for reports to the Congress required by FASA Title V. Part 3 for this year asked agencies to report on all major acquisitions and provide information on the extent of planning and risk mitigation efforts accomplished for new projects to ensure a high probability that the cost, schedule and performance goals established will be successfully achieved. For ongoing projects agencies are to provide information on the achievement of, or deviation from, goals. For projects that are not achieving 90 percent of original goals, agencies are required to discuss corrective actions taken, or contemplated, to bring the project within goals. If the project cannot be brought within goals, agencies should explain how and why the goals should be revised and whether the project is still cost beneficial and justifies continued funding, or whether the project should be canceled. Approved acquisition goals submitted with the 2000 budget are the baseline goals for all future monitoring of project progress for both management purposes and reporting to Congress as required by FASA Title V. This more disciplined capital management approach is new to many agencies, and some agencies were not yet able to provide all the required information for all major acquisitions for this year. OMB expects that agencies will be able to meet the requirements for next year's budget.

Part 3 complements OMB memorandum 97–02, "Funding Information Systems Investments" (October 25, 1996), which was issued to establish clear and concise decision criteria regarding investments in major information technology investments. These policy documents establish the general presumption that OMB will recommend new or continued funding only for those major investments in assets that comply with good capital programming principles.

At the Appendix to this Part are the "Principles of Budgeting for Capital Asset Acquisitions," which incorporate the above criteria and expand coverage to all capital investments. The Administration recognizes that many agencies are in the middle of projects initiated prior to enactment of the Clinger-Cohen Act and FASA Title V, and may not be able to satisfy the criteria immediately. For those systems that do not satisfy the criteria, the Administration considered requests to use 1999 and 2000 funds to support reevaluation and replanning of the project as necessary to achieve compliance with the criteria or to determine that the project would not meet the criteria and should be canceled.

As a result of these two initiatives, capital asset acquisitions are to have baseline cost, schedule, and performance goals for future tracking purposes or they are to be either reevaluated and changed or canceled if no longer cost beneficial.

Outlook.—The effort to improve planning and budgeting for capital assets will continue in 1999 and 2000.

- The Administration will work with the Congress to increase the number of projects that are fully funded with regular or advance appropriations.
- OMB will be working with congressional committees, the President's Management Council, the Chief Financial Officers Council, and the Chief Information Officers Council to help agencies with their responsibility for capital assets through the alignment of budgetary resources with program results. OMB will also work with these groups to implement the "Principles of Budgeting for Capital Asset Acquisitions," which are shown as an Appendix to this Part.
- Interagency working groups will be established to address: (1) program manager qualification standards; (2) enhanced systems of incentives to encourage excellence in the acquisition workforce; and

(3) government-wide implementation of performance-based management systems (e.g., earned value or similar systems) to monitor achievement or deviation from goals of in-process acquisitions.

- In the review process, proposals for the acquisition of capital assets and related issues of lumpiness or "spikes" will continue to receive special attention. Agencies will be encouraged to give the same special attention to future asset acquisition proposals.
- To ensure that the full costs and benefits of all budget proposals are fully taken into account in allocating resources, agencies will be required to propose full funding for acquisitions in their budget requests.

Major Acquisition Proposals

For the definition of major capital assets described above this budget requests $73.4 billion of budget authority for 2000. This includes $54.1 billion for the Department of Defense and $19.3 billion for other agencies. The major requests are shown in the accompanying Table 6–4: "Capital Asset Acquisitions," which distributes the funds according to the categories for construction and rehabilitation, major equipment, and purchases of land and structures.

Table 6–4. CAPITAL ASSET ACQUISITIONS

(Budget authority in billions of dollars)

	1998 actual	1999 proposed	2000 proposed
MAJOR ACQUISITIONS			
Construction and rehabilitation:			
Defense military construction and family housing	4.2	4.0	1.6
Army Corps of Engineers	2.1	2.6	2.6
Department of Energy	1.1	1.1	1.1
Department of Veterans Affairs	1.0	1.0	0.8
General Services Administration	0.4	1.2	0.8
Other agencies	5.8	6.6	5.9
Subtotal, construction and rehabilitation	14.5	16.5	12.9
Major equipment:			
Department of Defense	44.9	48.6	52.5
Department of Transportation	2.1	2.5	2.5
NASA	0.7	0.7	0.6
Department of Veterans Affairs	0.7	0.7	0.5
Department of the Treasury	0.9	0.9	0.4
Other agencies	3.0	3.4	3.7
Subtotal, major equipment	52.4	56.7	60.1
Purchases of land and structures	1.2	0.6	0.7
Total, major acquisitions [1]	68.1	73.9	73.7
Sale of major assets	–5.2	.....	–0.3
Total, capital asset acquisitions 1/	62.9	73.9	73.4

[1] This total is derived from the direct Federal major public physical investment budget authority on Table 6–3 ($75.7 billion for 2000). Table 6–4 excludes an estimate of spending for assets not owned by the Federal Government ($2.3 billion for 2000).

Construction and Rehabilitation

This budget includes $12.9 billion of budget authority for 2000 for construction and rehabilitation.

Department of Defense.—The budget requests $1.6 billion for 2000 for general construction on military bases and family housing. This funding will be used to:

- support the fielding of new systems;
- enhance operational readiness, including deployment and support of military forces;
- provide housing for military personnel and their families;
- implement base closure and realignment actions; and
- correct safety deficiencies and environmental problems.

Army Corps of Engineers.—This budget requests $2.6 billion for 2000 for construction and rehabilitation for the Army Corps of Engineers. These funds finance construction, rehabilitation, and related activity for water resources development projects that provide navigation, flood control, environmental restoration, and other benefits.

Department of Energy.—This budget requests $1.1 billion for 2000 for construction and rehabilitation for the Department of Energy. The largest item is for the National Ignition Facility, which will be used to perform experiments, including inertial confinement fusion experiments, at high pressures and temperatures. Some of these investments are also discussed in the text that accompanies Table 6–5.

Department of Veterans Affairs.—The budget requests $0.8 billion for construction and rehabilitation associated with veterans hospitals. These funds will provide for modernization and improvements to these facilities.

General Services Administration (GSA).—The 2000 budget includes $0.8 billion in budget authority for GSA for the construction or renovation of buildings. These funds will allow for new construction and the acquisition of border stations and general purpose office space in locations where long-term needs show that ownership is preferable to leasing.

Other agencies.—This budget includes $5.9 billion for construction and rehabilitation for other agencies in 2000. The largest items are for the Postal Service ($1.5 billion), the Department of the Interior ($0.8 billion), and the Tennessee Valley Authority ($0.7 billion).

Major Equipment

This category covers capital purchases for major equipment, including weapons systems; information technology, such as computer hardware, major software, and renovations required for this equipment; and other types of equipment. This budget requests $60.1 billion in budget authority for 2000 for the purchase of major equipment.

Department of Defense.—The budget requests $52.5 billion for 2000 to procure or modify weapons systems, related support equipment, and purchase of other capital goods. This includes tactical fighter aircraft, airlift aircraft, naval vessels, tanks, helicopters, missiles, and vehicles.

Department of Transportation.—The budget requests $2.5 billion in budget authority for the Department of Transportation, which includes $2.3 billion to modern-

ize the air traffic control system and $0.2 billion for the Coast Guard to acquire vessels and other equipment. Requests for advance appropriations for the air traffic control system in the Federal Aviation Administration are discussed with Table 6–5.

National Aeronautics and Space Administration (NASA).—The budget requests $0.6 billion in budget authority to procure major equipment for programs in human space flight, science, aeronautics, and technology. Most of the equipment is to be acquired for Space Shuttle upgrades, such as orbiter improvements, Space Shuttle main engines, solid rocket booster improvements, and launch site equipment.

Department of Veterans Affairs.—This budget requests $0.5 billion for medical equipment for health care facilities for veterans. These funds will be used to continue to provide quality health care services for veterans.

Department of the Treasury.—The budget requests $0.4 billion in budget authority for 2000 for major equipment. These resources fund Internal Revenue Service information systems and other Treasury investment needs. The IRS funding and advanced appropriations ($325 million) for 2001 for the IRS information technology investment account will help the IRS improve customer service by providing alternative means of filing returns and paying taxes, improve telephone service for taxpayers; and give employees immediate access to complete information and modern tools to do their jobs. Advanced appropriations ($163 million) for the U.S. Customs Service in 2001 will fund modernization of automated commercial operations and an international trade data system. These investments are also discussed in the text that accompanies Table 6–5, which displays advance appropriations for capital acquisitions.

Other agencies.—This budget requests $3.7 billion for major equipment for other agencies for 2000. The largest amount is for the Postal Service ($0.8 billion). Other agencies include the General Services Administration ($0.7 billion); the Department of Energy ($0.6 billion) for science and other projects; and the Department of Commerce ($0.6 billion), for procurement of weather satellites and other equipment.

Purchase and Sale of Land and Structures

This budget includes $0.7 billion for 2000 for the purchase of land and structures. This includes $0.2 billion for the purchase of buildings by the General Services Administration. The sale of assets that took place in 1998 was for proceeds from the sale of the United States Enrichment Corporation ($1.9 billion), the privatization of Elk Hills ($2.9 billion), and other assets.

Full Funding of Major Projects

This budget proposes full funding for new capital projects and for many projects formerly funded incrementally. The requests for advance appropriations shown in Table 6–5 demonstrate the Admninistration's continuing support for full funding of capital investments.

The importance of full funding was discussed earlier in this Part and is also explained in the "Principles of Budgeting for Capital Asset Acquisitions," which appears as an Appendix to this Part. This budget requests $5.5 billion in budget authority for 2000 and $24.6 billion in advance appropriations for later years, for a total request of $30.1 billion for these projects for these years.

Department of Commerce

National Oceanic and Atmospheric Administration (NOAA).—This budget requests $563 million for 2000 and $5,367 million in advance appropriations for capital asset acquisitions in NOAA for 2001–2018.

These acquisitions support the largest modernization in the history of the National Weather Service. The modernization is well underway and demonstrating improvements in weather forecasts and warnings that lead to lives and property saved. The budget supports this multi-year effort to develop and deploy advanced technology, including advanced radar equipment, other ground observing systems, and geostationary and polar-orbiting satellites that will greatly improve the timeliness and accuracy of severe weather and flood warnings while reducing staffing requirements.

National Telecommunications and Information Administrations—The budget requests $35 million in 2000 and $314 million in advance appropriations for 2001–2004 to support the acquisition of digital technology for public television.

Department of Defense

This budget requests $2,484 million in advance appropriations for 2001 to fully fund selected military construction and family housing projects in the Department of Defense. The budget requests $1,631 million for these projects in 2000.

Department of Energy

Defense environmental management privatization.—The budget requests $228 million in 2000 to proceed with various projects that will treat some of DOE's most contaminated soil and highly radioactive waste. An additional $2,557 million in advance appropriations for 2001–2004 is requested to provide primarily for treatment of high-level radioactive waste stored in underground tanks at the Hanford nuclear facility in Washington. This waste will be stabilized for safe storage and eventual disposal.

Clean coal technology.—The clean coal technology program supports cost-shared projects with industry to demonstrate the technical and economic viability of environmentally friendly and efficient technologies to extract energy from coal. Advanced appropriations for the clean coal technology program were provided by Congress in 1984 and 1988. The budget defers the availability of $256 million of the clean coal technology program balances in 2000 and requests an advance appropriation to recoup the deferred budget authority in 2001–2003. Delays in the construction of two large

Table 6–5. PROPOSED SPENDING TO FULLY FUND SELECTED CAPITAL ASSET ACQUISITIONS

(Budget authority in millions of dollars)

	Regular appropriations 2000	Advance appropriations					
		2001	2002	2003	2004	After 2004	Total Advance Appropriations
DEPARTMENT OF COMMERCE							
National Oceanic and Atmospheric Administration: Procurement, acquisition and construction	563	611	587	587	655	2,927	5,367
National Telecommunications and Information Administration:.							
Public telecommunications facilities, planning and construction	35	110	100	89	15	.....	314
Subtotal, Department of Commerce	598	721	687	676	670	2,927	5,681
DEPARTMENT OF DEFENSE							
Military construction and family housing	1,631	2,484	.....	.....	.....	.....	2,484
DEPARTMENT OF ENERGY							
Defense environmental management privatization 1/	228	671	659	633	594	.....	2,557
Clean coal technology	–256	189	40	27	.....	.....	256
Subtotal, Department of Energy.	–28	860	699	660	594	.....	2,813
DEPARTMENT OF HEALTH AND HUMAN SERVICES							
Indian health facilities.	36	34	10	.....	.....	.....	44
DEPARTMENT OF THE INTERIOR							
National Park Service: Construction and major maintenance	26	57	16	15	10	.....	98
DEPARTMENT OF STATE							
Security and maintenance of United States missions	36	300	450	600	750	900	3,000
DEPARTMENT OF TRANSPORTATION							
Federal Aviation Administration: Facilities and equipment	596	739	439	355	191	258	1,982
DEPARTMENT OF THE TREASURY							
Internal Revenue Service: Information technology investment	.....	325	.....	.....	.....	.....	325
United States Customs Service: Automation modernization	.....	163	.....	.....	.....	.....	163
Subtotal, Department of the Treasury	.....	488	.....	.....	.....	.....	488
GENERAL SERVICES ADMINISTRATION							
Federal buildings fund	41	163	.....	.....	.....	.....	163
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION							
Human space flight	2,483	2,328	2,091	1,721	1,573	.....	7,713
NATIONAL SCIENCE FOUNDATION							
Major research equipment	29	58	41	15	17	.....	131
SMITHSONIAN INSTITUTION							
Construction	8	17	17	18	.....	.....	52
Total	5,456	8,249	4,450	4,060	3,805	4,085	24,649

Note: For these capital projects, budget authority for the project is requested partly in the budget year and partly in future years in advance appropriations.

[1] Additional funding for this program will be needed in future years.

clean coal technology demonstration projects make the deferral possible.

Department of Health and Human Services

This budget requests $36 million for 2000 in regular appropriations and $44 million in advance appropriations for projects in the Department of Health and Human Services for Indian health facilities. The funds will allow for needed improvements in these facilities.

Department of the Interior

National Park Service.—This budget requests $26 million in budget authority for 2000 and $98 million in advance appropriations for 2001–2004 to fully fund projects in the National Park Service. The National Park Service needs to build or restore its buildings and other structures over the next few years. Funding stability is particularly needed for the National Park Service (NPS) to restore the Elwha River in Olympic National Park, Washington, by acquiring and removing two dams. Before the NPS can acquire the dams, the Secretary of the Interior must determine that funds to complete restoration are available. In addition to $30 million already appropriated for acquisition and $12 million in 2000, advance appropriations of $71 million in 2001 through 2004 would fully fund the $113

million project and provide the funding stability needed for the Secretary to proceed with acquisition. Advance appropriations in 2001 totaling $27 million are also requested for seven parks that have an ongoing project requiring funding for later years: Sequoia National Park, Gettysburg National Military Park, Cape Cod National Seashore, Statue of Liberty/Ellis Island, San Francisco Maritime National Historical Park, George Washington Parkway/Glen Echo, and Cumberland Island National Seashore.

Department of State

This budget requests $36 million for 2000 and advance appropriations of $3.0 billion for 2001–2005 for embassy and consulate construction. This request would establish a program to provide a sustained, increasing funding path to meet overseas facility security needs.

Department of Transportation

Federal Aviation Administration.—This budget requests $596 million in 2000 and an additional $1,982 million for 2001–2007 for 11 multi-year capital projects to improve and modernize the FAA's air traffic control, communications, and aviation weather information systems. These projects are: Aviation Weather Services Improvements, Terminal Digital Radar, Terminal Automation (STARS), Wide Area Augmentation System for GPS, Display System Replacement, Weather and Radar Processor, Voice Switching and Control System, Oceanic Automation, Aeronautical Data Link, Operational and Supportability Implementation System (OASIS), and Beacon Interrogation Replacement.

Department of the Treasury

Internal Revenue Service (IRS).—This budget requests $325 million in advance appropriations for 2001 to finance information technology investments. Budget authority enacted in 1998 and 1999 will finance the program through 2000. The IRS and the Treasury Department are significantly modifying the business plans for modernizing the IRS tax administration and systems by focusing on reengineering work processes and exploring private sector technology opportunities. These efforts will ensure that future capital investments by the IRS will improve customer service by providing alternative means of filing returns and paying taxes, improve telephone service for taxpayers; and give employees immediate access to complete information and modern tools to do their jobs.

United States Customs Service.—This budget requests $163 million advance appropriations for 2001 to finance modernization of automated commercial operations and an international trade data system. The Customs Service must modernize its existing automated systems in order to keep up with the increasing volume of trade and to proceed with its recently redesigned trade process, which will deal with importers on an account level rather than on a transaction by transaction basis. In addition, an international trade data system will further simplify the trade community's interactions with the Federal government by reducing redundant data requests and processing.

General Services Administration

This budget requests $41 million for 2000 and $163 million in advance appropriations for 2001 for the construction of a new Bureau of Alcohol, Tobacco and Firearms headquarters and office space for the Food and Drug Administration's Center for Drug and Evaluation Research.

National Aeronautics and Space Administration (NASA)

Human Space Flight (International Space Station).—This budget requests $2,483 million in budget authority for 2000, and $7,713 million in advance appropriations over the years 2001–2004 for the space station. This will be an international laboratory in low earth orbit on which American, Russian, Canadian, European, and Japanese astronauts will conduct unique scientific and technological investigations in a microgravity environment. During 1993 the program underwent a major redesign to reduce program costs. The first two launches beginning construction of the Station took place in 1998 and final assembly will be complete by 2004. Advance appropriations will enable NASA to complete the development program on schedule and at minimal total cost. Since the redesign, Congress has appropriated $13.5 billion through 1999.

National Science Foundation (NSF)

This budget requests $29 million in 2000 and $131 million in advance appropriations for 2001–2004 to complete the redevelopment of the U.S. station at the South Pole in Antarctica, NSF's contribution to the International Large Hadron Collider, and the Network for Earthquake Engineering Simulation.

These amounts include $5 million in 2000 and $14 million in 2001 to complete the redevelopment of the South Pole station. This will provide a platform for scientific activities, provide a safe working and living environment, and maintain a U.S. presence in the Antarctica in accordance with national policy.

The Large Hadron Collider will be the largest particle accelerator in the world, and will be owned and operated by the European Laboratory for Particle Physics (CERN). NSF is collaborating with the Department of Energy in the development of detectors for the project. The budget requests $16 million in 2000 and $43 million in 2001–2003 to complete NSF's contribution.

The Newtwork for Earthquake Engineering Simulation is a network to connect and integrate a distributed collection of earthquake engineering facilities that will facilitate the future replacement of mechanical earthquake simulation with model-based computer simulation. The budget requests $8 million in 2000 and $74 million for 2001–2004 to complete development of the network.

Smithsonian Institution

The budget requests $8 million in budget authority in 2000 and $52 million in advance appropriations for 2001–2003 for the major capital renewal of the Patent Office Building. This building houses the Smithsonian's Museum of American Art and the National Portrait Gallery.

Appendix to Part II: PRINCIPLES OF BUDGETING FOR CAPITAL ASSET ACQUISITIONS

Introduction and Summary

The Administration plans to use the following principles in budgeting for capital asset acquisitions. These principles address planning, costs and benefits, financing, and risk management requirements that should be satisfied before a proposal for the acquisition of capital assets can be included in the Administration's budget. A Glossary describes key terms. *A Capital Programming Guide* has been published that provides detailed information on planning and acquisition of capital assets.

The principles are organized in the following four sections:

A. Planning. This section focuses on the need to ensure that capital assets support core/priority missions of the agency; the assets have demonstrated a projected return on investment that is clearly equal to or better than alternative uses of available public resources; the risk associated with the assets is understood and managed at all stages; and the acquisition is implemented in phased, successive segments, unless it can be demonstrated there are significant economies of scale at acceptable risk from funding more than one segment or there are multiple units that need to be acquired at the same time.

B. Costs and Benefits. This section emphasizes that the asset should be justified primarily by benefit-cost analysis, including life-cycle costs; that all costs are understood in advance; and that cost, schedule, and performance goals are identified that can be measured using an earned value management system or similar system.

C. Principles of Financing. This section stresses that useful segments are to be fully funded with regular or advance appropriations; that as a general rule, planning segments should be financed separately from procurement of the asset; and that agencies are encouraged to aggregate assets in capital acquisition accounts and take other steps to accommodate lumpiness or "spikes" in funding for justified acquisitions.

D. Risk Management. This section is to help ensure that risk is analyzed and managed carefully in the acquisition of the asset. Strategies can include separate accounts for capital asset acquisitions, the use of apportionment to encourage sound management, and the selection of efficient types of contracts and pricing mechanisms in order to allocate risk appropriately between the contractor and the Government. In addition cost, schedule, and performance goals are to be controlled and monitored by using an earned value management system or a similar system; and if progress toward these goals is not met there is a formal review process to evaluate whether the acquisition should continue or be terminated.

A Glossary defines key terms, including capital assets. As defined here, capital assets are land, structures, equipment, and intellectual property (including software) that are used by the Federal Government, including weapon systems. Not included are grants to States or others for their acquisition of capital assets.

A. Planning

Investments in major capital assets proposed for funding in the Administration's budget should:

1. support core/priority mission functions that need to be performed by the Federal Government;
2. be undertaken by the requesting agency because no alternative private sector or governmental source can support the function more efficiently;
3. support work processes that have been simplified or otherwise redesigned to reduce costs, improve effectiveness, and make maximum use of commercial, off-the-shelf technology;
4. demonstrate a projected return on the investment that is clearly equal to or better than alternative uses of available public resources. Return may include: improved mission performance in accordance with measures developed pursuant to the Government Performance and Results Act; reduced cost; increased quality, speed, or flexibility; and increased customer and employee satisfaction. Return should be adjusted for such risk factors as the project's technical complexity, the agency's management capacity, the likelihood of cost overruns, and the consequences of under- or non-performance;
5. for information technology investments, be consistent with Federal, agency, and bureau information architectures which: integrate agency work processes and information flows with technology to achieve the agency's strategic goals; reflect the agency's technology vision and year 2000 compliance plan; and specify standards that enable information exchange and resource sharing, while retaining flexibility in the choice of suppliers and in the design of local work processes;
6. reduce risk by: avoiding or isolating custom-designed components to minimize the potential adverse consequences on the overall project; using fully tested pilots, simulations, or prototype implementations when necessary before going to production; establishing clear measures and accountability for project progress; and, securing substantial involvement and buy-in throughout the project

from the program officials who will use the system;
7. be implemented in phased, successive segments as narrow in scope and brief in duration as practicable, each of which solves a specific part of an overall mission problem and delivers a measurable net benefit independent of future segments, unless it can be demonstrated that there are significant economies of scale at acceptable risk from funding more than one segment or there are multiple units that need to be acquired at the same time; and
8. employ an acquisition strategy that appropriately allocates risk between the Government and the contractor, effectively uses competition, ties contract payments to accomplishments, and takes maximum advantage of commercial technology.

Prototypes require the same justification as other capital assets.

As a general presumption, the Administration will recommend new or continued funding only for those capital asset investments that satisfy good capital programming policies. Funding for those projects will be recommended on a phased basis by segment, unless it can be demonstrated that there are significant economies of scale at acceptable risk from funding more than one segment or there are multiple units that need to be acquired at the same time. (For more information, see the Glossary entry, "capital project and useful segments of a capital project.")

The Administration recognizes that many agencies are in the middle of ongoing projects, and they may not be able immediately to satisfy the criteria. For those projects that do not satisfy the criteria, OMB will consider requests to use 1999 and 2000 funds to finance additional planning, as necessary, to support the establishment of realistic cost, schedule, and performance goals for the completion of the project. This planning could include: the redesign of work processes, the evaluation of alternative solutions, the development of information system architectures, and, if necessary, the purchase and evaluation of prototypes. Realistic goals are necessary for agency portfolio analysis to determine the viability of the project, to provide the basis for fully funding the project to completion, and setting the baseline for management accountability to deliver the project within goals.

Because the Administration considers this information essential to agencies' long-term success, the Administration will use this information both in preparing its budget and, in conjunction with cost, schedule, and performance data, as apportionments are made. Agencies are encouraged to work with their OMB representative to arrive at a mutually satisfactory process, format, and timetable for providing the requested information.

B. Costs and Benefits

The justification of the project should evaluate and discuss the extent to which the project meets the above criteria and should also include:

1. an analysis of the project's total life-cycle costs and benefits, including the total budget authority required for the asset, consistent with policies described in OMB Circular A–94: "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (October 1992);
2. an analysis of the risk of the project including how risks will be isolated, minimized, monitored, and controlled, and, for major programs, an evaluation and estimate by the Chief Financial Officer of the probability of achieving the proposed goals;
3. if, after the planning phase, the procurement is proposed for funding in segments, an analysis showing that the proposed segment is economically and programmatically justified—that is, it is programmatically useful if no further investments are funded, and in this application its benefits exceed its costs; and
4. show cost, schedule, and performance goals for the project (or the useful segment being proposed) that can be measured throughout the acquisition process using an earned value management system or similar system. Earned value is described in OMB Circular A–11, Part 3, "Planning, Budgeting and Acquisition of Capital Assets," (July 1998), Appendix 300C.

C. Principles of Financing

Principle 1: Full Funding

Budget authority sufficient to complete a useful segment of a capital project (or the entire capital project, if it is not divisible into useful segments) must be appropriated before any obligations for the useful segment (or project) may be incurred.

Explanation: Good budgeting requires that appropriations for the full costs of asset acquisition be enacted in advance to help ensure that all costs and benefits are fully taken into account at the time decisions are made to provide resources. Full funding with regular appropriations in the budget year also leads to tradeoffs within the budget year with spending for other capital assets and with spending for purposes other than capital assets. Full funding increases the opportunity to use performance-based fixed price contracts, allows for more efficient work planning and management of the capital project, and increases the accountability for the achievement of the baseline goals.

When full funding is not followed and capital projects or useful segments are funded in increments, without certainty if or when future funding will be available, the result is sometimes poor planning, acquisition of assets not fully justified, higher acquisition costs, cancellation of major projects, the loss of sunk costs, or inadequate funding to maintain and operate the assets.

Principle 2: Regular and Advance Appropriations

Regular appropriations for the full funding of a capital project or a useful segment of a capital project in the budget year are preferred. If this results in spikes

that, in the judgment of OMB, cannot be accommodated by the agency or the Congress, a combination of regular and advance appropriations that together provide full funding for a capital project or a useful segment should be proposed in the budget.

Explanation: Principle 1 (Full Funding) is met as long as a combination of regular and advance appropriations provide budget authority sufficient to complete the capital project or useful segment. Full funding in the budget year with regular appropriations alone is preferred because it leads to tradeoffs within the budget year with spending for other capital assets and with spending for purposes other than capital assets. In contrast, full funding for a capital project over several years with regular appropriations for the first year and advance appropriations for subsequent years may bias tradeoffs in the budget year in favor of the proposed asset because with advance appropriations the full cost of the asset is not included in the budget year. Advance appropriations, because they are scored in the year they become available for obligation, may constrain the budget authority and outlays available for regular appropriations of that year.

If, however, the lumpiness caused by regular appropriations cannot be accommodated within an agency or Appropriations Subcommittee, advance appropriations can ameliorate that problem while still providing that all of the budget authority is enacted in advance for the capital project or useful segment. The latter helps ensure that agencies develop appropriate plans and budgets and that all costs and benefits are identified prior to providing resources. In addition, amounts of advance appropriations can be matched to funding requirements for completing natural components of the useful segment. Advance appropriations have the same benefits as regular appropriations for improved planning, management, and accountability of the project.

Principle 3: Separate Funding of Planning Segments

As a general rule, planning segments of a capital project should be financed separately from the procurement of a useful asset.

Explanation: The agency must have information that allows it to plan the capital project, develop the design, and assess the benefits, costs, and risks before proceeding to procurement of the useful asset. This is especially important for high risk acquisitions. This information comes from activities, or planning segments, that include but are not limited to market research of available solutions, architectural drawings, geological studies, engineering and design studies, and prototypes. The construction of a prototype that is a capital asset, because of its cost and risk, should be justified and planned as carefully as the project itself. The process of gathering information for a capital project may consist of one or more planning segments, depending on the nature of the asset. Funding these segments separately will help ensure that the necessary information is available to establish cost, schedule, and performance goals before proceeding to procurement.

If budget authority for planning segments and procurement of the useful asset are enacted together, the Administration may wish to apportion budget authority for one or several planning segments separately from procurement of the useful asset.

Principle 4: Accommodation of Lumpiness or "Spikes" and Separate Capital Acquisition Accounts

To accommodate lumpiness or "spikes" in funding justified capital acquisitions, agencies, working with OMB, are encouraged to aggregate financing for capital asset acquisitions in one or several separate capital acquisition budget accounts within the agency, to the extent possible within the agency's total budget request.

Explanation: Large, temporary, year-to-year increases in budget authority, sometimes called lumps or spikes, may create a bias against the acquisition of justified capital assets. Agencies, working with OMB, should seek ways to avoid this bias and accommodate such spikes for justified acquisitions. Aggregation of capital acquisitions in separate accounts may:

- reduce spikes within an agency or bureau by providing roughly the same level of spending for acquisitions each year;
- help to identify the source of spikes and to explain them. Capital acquisitions are more lumpy than operating expenses; and with a capital acquisition account, it can be seen that an increase in operating expenses is not being hidden and attributed to one-time asset purchases;
- reduce the pressure for capital spikes to crowd out operating expenses; and
- improve justification and make proposals easier to evaluate, since capital acquisitions are generally analyzed in a different manner than operating expenses (e.g., capital acquisitions have a longer time horizon of benefits and life-cycle costs).

D. Risk Management

Risk management should be central to the planning, budgeting, and acquisition process. Failure to analyze and manage the inherent risk in all capital asset acquisitions may contribute to cost overruns, schedule shortfalls, and acquisitions that fail to perform as expected. For each major capital project a risk analysis that includes how risks will be isolated, minimized, monitored, and controlled may help prevent these problems.

The project cost, schedule and performance goals established through the planning phase of the project are the basis for approval to procure the asset and the basis for assessing risk. During the procurement phase performance-based management systems (earned value or similar system) must be used to provide contractor and Government management visibility on the achievement of, or deviation from, goals until the asset is accepted and operational. If goals are not being met,

performance-based management systems allow for early identification of problems, potential corrective actions, and changes to the original goals needed to complete the project and necessary for agency portfolio analysis decisions. These systems also allow for Administration decisions to recommend meaningful modifications for increased funding to the Congress, or termination of the project, based on its revised expected return on investment in comparison to alternative uses of the funds. Agencies must ensure that the necessary acquisition strategies are implemented to reduce the risk of cost escalation and the risk of failure to achieve schedule and performance goals. These strategies may include:

1. having budget authority appropriated in separate capital asset acquisition accounts;
2. apportioning budget authority for a useful segment;
3. establishing thresholds for cost, schedule, and performance goals of the acquisition, including return on investment, which if not met may result in cancellation of the acquisition;
4. selecting types of contracts and pricing mechanisms that are efficient and that provide incentives to contractors in order to allocate risk appropriately between the contractor and the Government;
5. monitoring cost, schedule, and performance goals for the project (or the useful segment being proposed) using an earned value management system or similar system. Earned value is described in OMB Circular A–11, Part 3, "Planning, Budgeting and Acquisition of Capital Assets" (July 1998), Appendix 300C; and
6. if progress is not within 90 percent of goals, or if new information is available that would indicate a greater return on investment from alternative uses of funds, institute senior management review of the project through portfolio analysis to determine the continued viability of the project with modifications, or the termination of the project, and the start of exploration for alternative solutions if it is necessary to fill a gap in agency strategic goals and objectives.

E. Glossary

Appropriations

An appropriation provides budget authority that permits Government officials to incur obligations that result in immediate or future outlays of Government funds.

Regular annual appropriations: These appropriations are:

- enacted normally in the current year;
- scored entirely in the budget year; and
- available for obligation in the budget year and subsequent years if specified in the language. (See "Availability," below.)

Advance appropriations: Advance appropriations may be accompanied by regular annual appropriations to provide funds available for obligation in the budget year as well as subsequent years. Advance appropriations are:

- enacted normally in the current year;
- scored after the budget year (e.g., in each of one, two, or more later years, depending on the language); and
- available for obligation in the year scored and subsequent years if specified in the language. (See "Availability," below.)

Availability: Appropriations made in appropriations acts are available for obligation only in the budget year unless the language specifies that an appropriation is available for a longer period. If the language specifies that the funds are to remain available until the end of a certain year beyond the budget year, the availability is said to be "multi-year." If the language specifies that the funds are to remain available until expended, the availability is said to be "no-year." Appropriations for major procurements and construction projects are typically made available for multiple years or until expended.

Capital Assets

Capital assets are land, structures, equipment, and intellectual property (including software) that are used by the Federal Government and have an estimated useful life of two years or more. Capital assets exclude items acquired for resale in the ordinary course of operations or held for the purpose of physical consumption such as operating materials and supplies. The cost of a capital asset includes both its purchase price and all other costs incurred to bring it to a form and location suitable for its intended use.

Capital assets may be acquired in different ways: through purchase, construction, or manufacture; through a lease-purchase or other capital lease, regardless of whether title has passed to the Federal Government; through an operating lease for an asset with an estimated useful life of two years or more; or through exchange. Capital assets include leasehold improvements and land rights; assets owned by the Federal Government but located in a foreign country or held by others (such as Federal contractors, state and local governments, or colleges and universities); and assets whose ownership is shared by the Federal Government with other entities. Capital assets include not only the assets as initially acquired but also additions; improvements; replacements; rearrangements and reinstallations; and major repairs but not ordinary repairs and maintenance.

Examples of capital assets include the following, but are not limited to them: office buildings, hospitals, laboratories, schools, and prisons; dams, power plants, and water resources projects; furniture, elevators, and printing presses; motor vehicles, airplanes, and ships; satellites and space exploration equipment; information technology hardware and software; and Department of Defense weapons systems. Capital assets may or may not be capitalized (i.e., recorded in an entity's balance

sheet) under Federal accounting standards. Examples of capital assets not capitalized are Department of Defense weapons systems, heritage assets, stewardship land, and some software. Capital assets do not include grants for acquiring capital assets made to State and local governments or other entities (such as National Science Foundation grants to universities or Department of Transportation grants to AMTRAK). Capital assets also do not include intangible assets such as the knowledge resulting from research and development or the human capital resulting from education and training, although capital assets do include land, structures, equipment, and intellectual property (including software) that the Federal Government uses in research and development and education and training.

Capital Project and Useful Segments of a Capital Project

The total capital project, or acquisition of a capital asset, includes useful segments that are either planning segments or useful assets.

Planning segments: A planning segment of a capital project provides information that allows the agency to develop the design; assess the benefits, costs, and risks; and establish realistic baseline cost, schedule, and performance goals before proceeding to full acquisition of the useful asset (or canceling the acquisition). This information comes from activities, or planning segments, that include but are not limited to market research of available solutions, architectural drawings, geological studies, engineering and design studies, and prototypes. The process of gathering information for a capital project may consist of one or more planning segments, depending on the nature of the asset. If the project includes a prototype that is a capital asset, the prototype may itself be one segment or may be divisible into more than one segment. Because of uncertainty regarding the identification of separate planning segments for research and development activities, the application of full funding concepts to research and development planning will need more study.

Useful asset: A useful asset is an economically and programmatically separate segment of the asset procurement stage of the capital project that provides an asset for which the benefits exceed the costs, even if no further funding is appropriated. The total capital asset procurement may include one or more useful assets, although it may not be possible to divide all procurements in this way. Illustrations follow:

Illustration 1: If the construction of a building meets the justification criteria and has benefits greater than its costs without further investment, then the construction of that building is a "useful segment." Excavation is not a useful segment because no useful asset results from the excavation alone if no further funding becomes available. For a campus of several buildings, a useful segment is one complete building if that building has programmatic benefits that exceed its costs regardless of whether the other buildings are constructed, even though that building may not be at its maximum use.

Illustration 2: If the full acquisition is for several items (e.g., aircraft), the useful segment would be the number of complete aircraft required to achieve benefits that exceed costs even if no further funding becomes available. In contrast, some portion of several aircraft (e.g., engines for five aircraft) would not be a useful segment if no further funding is available, nor would one aircraft be a useful segment if two or more are required for benefits to exceed costs.

Illustration 3: For information technology, a module (the information technology equivalent of "useful segment") is separable if it is useful in itself without subsequent modules. The module should be designed so that it can be enhanced or integrated with subsequent modules if future funding becomes available.

Earned Value

Earned value refers to a performance-based management system for establishing baseline cost, schedule, and performance goals for a capital project and measuring progress against the goals. Earned value is described in OMB Circular A–11, Part 3, "Planning, Budgeting and Acquisition of Capital Assets" (July 1998), Appendix 300C.

Funding

Full funding: Full funding means that appropriations—regular appropriations or advance appropriations—are enacted that are sufficient in total to complete a useful segment of a capital project before any obligations may be incurred for that segment. Full funding for an entire capital project is required if the project cannot be divided into more than one useful segment. If the asset can be divided into more than one useful segment, full funding for a project may be desirable, but is not required to constitute full funding.

Incremental (partial) funding: Incremental (partial) funding means that appropriations—regular appropriations or advance appropriations—are enacted for just part of a useful segment of a capital project, if the project has useful segments, or for part of the capital project as a whole, if it is not divisible into useful segments. Under incremental funding for a capital asset, which is not permitted under these principles, the funds could be obligated to start the segment (or project) despite the fact that they are insufficient to complete a useful segment or project.

Risk Management

Risk management is an organized method of identifying and measuring risk and developing, selecting, and managing options for handling these risks. Before beginning any procurement, managers should review and revise as needed the acquisition plan to ensure that risk management techniques considered in the planning phase are still appropriate.

There are three key principles for managing risk when procuring capital assets: (1) avoiding or limiting the amount of development work; (2) making effective use of competition and financial incentives; and (3) es-

tablishing a performance-based acquisition management system that provides for accountability for program successes and failures, such as an earned value system or similar system.

There are several types of risk an agency should consider as part of risk management. The types of risk include:

- schedule risk;
- cost risk;
- technical feasibility;
- risk of technical obsolescence;
- dependencies between a new project and other projects or systems (e.g., closed architectures); and
- risk of creating a monopoly for future procurement.

Part III: FEDERALLY FINANCED CAPITAL STOCKS

Federal investment spending creates a "stock" of capital that is available in the future for productive use. Each year, Federal investment outlays add to the stock of capital. At the same time, however, wear and tear and obsolescence reduce it. This section presents very rough measures over time of three different kinds of capital stocks financed by the Federal Government: public physical capital, research and development (R&D), and education.

Federal spending for physical assets adds to the Nation's capital stock of tangible assets, such as roads, buildings, and aircraft carriers. These assets deliver a flow of services over their lifetime. The capital depreciates as the asset ages, wears out, is accidentally damaged, or becomes obsolete.

Federal spending for the conduct of research, development, and education adds to an "intangible" asset, the Nation's stock of knowledge. Although financed by the Federal Government, the research and development or education can be performed by Federal or State government laboratories, universities and other nonprofit organizations, or private industry. Research and development covers a wide range of activities, from the investigation of subatomic particles to the exploration of outer space; it can be "basic" research without particular applications in mind, or it can have a highly specific practical use. Similarly, education includes a wide variety of programs, assisting people of all ages beginning with pre-school education and extending through graduate studies and adult education. Like physical assets, the capital stocks of R&D and education provide services over a number of years and depreciate as they become outdated.

For this analysis, physical and R&D capital stocks are estimated using the perpetual inventory method. In this method, the estimates are based on the sum of net investment in prior years. Each year's Federal outlays are treated as gross investment, adding to the capital stock; depreciation reduces the capital stock. Gross investment less depreciation is net investment. A limitation of the perpetual inventory method is that investment spending may not accurately measure the value of the asset created. However, alternative methods for measuring asset value, such as direct surveys of current market worth or indirect estimation based on an expected rate of return, are especially difficult to apply to assets that do not have a private market, such as highways or weapons systems.

In contrast to physical and R&D stocks, the estimate of the education stock is based on the replacement cost method. Data on the total years of education of the U.S. population are combined with data on the cost of education and the Federal share of education spending to yield the cost of replacing the Federal share of the Nation's stock of education.

Additional detail about the methods used to estimate capital stocks appears in a methodological note at the end of this section. It should be stressed that these estimates are rough approximations, and provide a basis only for making broad generalizations. Errors may arise from uncertainty about the useful lives and depreciation rates of different types of assets, incomplete data for historical outlays, and imprecision in the deflators used to express costs in constant dollars.

The Stock of Physical Capital

This section presents data on stocks of physical capital assets and estimates of the depreciation on these assets.

Trends.—Table 6–6 shows the value of the net federally financed physical capital stock since 1960, in constant fiscal year 1992 dollars.[3] After rising in the 1960s, the total stock held constant through the 1970s and began rising again in the early 1980s. The stock amounted to $1,838 billion in 1998 and is estimated to increase slightly to $1,872 billion by 2000. In 1998, the national defense capital stock accounted for $642 billion, or 35 percent of the total, and nondefense stocks for $1,196 billion, or 65 percent of the total.

Real stocks of defense and nondefense capital show very different trends. Nondefense stocks have grown consistently since 1970, increasing from $476 billion in 1970 to $1,196 billion in 1998. With the investments proposed in the budget, nondefense stocks are estimated to grow to $1,261 billion in 2000. During the 1970s, the nondefense capital stock grew at an average annual rate of 4.5 percent. In the 1980s, however, the growth rate slowed to 2.8 percent annually, with growth continuing at about that rate since then.

Real national defense stocks began in 1970 at a relatively high level, and declined steadily throughout the decade, as depreciation from the Vietnam era exceeded new investment in military construction and weapons procurement. Starting in the early 1980s, however, a

[3] Constant dollar stock estimates are expressed in chained 1992 dollars, consistent with the January 1996 revisions to the National Income and Product Accounts (NIPAs).

Table 6–6. NET STOCK OF FEDERALLY FINANCED PHYSICAL CAPITAL

(In billions of 1992 dollars)

Fiscal Year	Total	National Defense	Nondefense								
			Total Non-defense	Direct Federal Capital			Capital Financed by Federal Grants				
				Total	Water and Power	Other	Total	Trans-portation	Commu-nity and Regional	Natural Resources	Other
Five year intervals:											
1960	895	633	262	128	78	50	134	82	24	19	9
1965	964	599	365	160	96	64	205	145	29	20	11
1970	1,098	621	476	182	109	72	295	211	42	24	18
1975	1,142	553	589	203	124	79	386	260	67	37	22
1980	1,237	498	738	230	145	85	508	313	104	68	23
1985	1,442	587	855	256	157	99	599	365	126	86	22
1990	1,692	719	973	288	166	121	685	426	136	98	24
Annual data:											
1995	1,810	700	1,109	325	174	151	784	493	145	106	39
1996	1,820	679	1,141	334	175	159	807	508	148	108	44
1997	1,831	659	1,172	341	175	166	831	523	150	109	49
1998	1,838	642	1,196	343	174	169	853	537	152	110	54
1999 est.	1,855	627	1,228	350	175	175	878	552	155	111	59
2000 est.	1,872	611	1,261	357	176	182	904	569	158	112	65

large defense buildup began to increase the stock of defense capital. By 1987, the defense stock had exceeded its size at the height of the Vietnam War. In the last few years, depreciation on this increased stock and a slower pace of defense investment have begun to reduce the stock from its recent levels. The stock is estimated to fall from $642 billion in 1998 to $611 billion in 2000.

Another trend in the Federal physical capital stocks is the shift from direct Federal assets to grant-financed assets. In 1960, 49 percent of federally financed nondefense capital was owned by the Federal Government, and 51 percent was owned by State and local governments but financed by Federal grants. Expansion in Federal grants for highways and other State and local capital, coupled with relatively slow growth in direct Federal investments by agencies such as the Bureau of Reclamation and Corps of Engineers, shifted the composition of the stock substantially. In 1998, 29 percent of the nondefense stock was owned by the Federal Government and 71 percent by State and local governments.

The growth in the stock of physical capital financed by grants has come in several areas. The growth in the stock for transportation is largely grants for highways, including the Interstate Highway System. The growth in community and regional development stocks occurred largely with the enactment of the community development block grant in the early 1970s. The value of this capital stock has grown only slowly in the past few years. The growth in the natural resources area occurred primarily because of construction grants for sewage treatment facilities. The value of this federally financed stock has increased about 30 percent since the mid-1980s.

Table 6–7 shows nondefense physical capital outlays both gross and net of depreciation since 1960. Total nondefense net investment has been consistently positive over the period covered by the table, indicating that new investment has exceeded depreciation on the existing stock. The reduced amount of net investment in 1998 reflects the sale of the United States Enrichment Corporation and the privatization of Elk Hills. For some categories in the table, such as water and power programs, net investment has been negative in some years, indicating that new investment has not been sufficient to offset estimated depreciation. The net investment in this table is the change in the net nondefense physical capital stock displayed in Table 6–6.

The Stock of Research and Development Capital

This section presents data on the stock of research and development, taking into account adjustments for its depreciation.

Trends.—As shown in Table 6–8, the R&D capital stock financed by Federal outlays is estimated to be $817 billion in 1998 in constant 1992 dollars. About two-fifths is the stock of basic research knowledge; about three-fifths is the stock of applied research and development.

The total federally financed R&D stock in 1998 was about evenly divided between defense and nondefense. Although investment in defense R&D has exceeded that of nondefense R&D in every year since 1979, the nondefense R&D stock is actually the larger of the two, because of the different emphasis on basic research and applied research and development. Defense R&D spending is heavily concentrated in applied research and development, which depreciates much more quickly than basic research. The stock of applied research and development is assumed to depreciate at a ten percent geometric rate, while basic research is assumed not to depreciate at all.

Table 6–7. COMPOSITION OF GROSS AND NET FEDERAL AND FEDERALLY FINANCED NONDEFENSE PUBLIC PHYSICAL INVESTMENT

(In billions of 1992 dollars)

Fiscal Year	Total nondefense investment			Direct Federal investment					Investment financed by Federal grants						
							Composition of net investment					Composition of net investment			
	Gross	Depreciation	Net	Gross	Depreciation	Net	Water and power	Other	Gross	Depreciation	Net	Transportation (mainly highways)	Community and regional development	Natural resources and environment	Other
Five year intervals:															
1960	23.7	5.0	18.7	8.7	2.9	5.8	3.0	2.7	15.0	2.1	12.9	12.3	0.1	0.1	0.5
1965	31.6	7.0	24.6	10.4	3.8	6.6	3.1	3.5	21.2	3.2	18.0	15.2	2.0	0.4	0.4
1970	30.6	9.1	21.5	6.9	4.4	2.4	2.0	0.5	23.7	4.7	19.1	11.9	4.8	0.9	1.5
1975	31.9	11.0	20.8	9.6	4.9	4.8	3.7	1.1	22.2	6.2	16.1	7.3	4.0	4.1	0.6
1980	45.0	13.5	31.5	11.5	5.4	6.0	3.9	2.1	33.5	8.1	25.5	12.3	7.0	6.3	–0.2
1985	43.2	16.4	26.7	13.8	6.9	6.9	2.3	4.6	29.4	9.6	19.8	13.1	3.8	3.0	–0.1
1990	43.5	20.6	22.9	15.7	9.6	6.1	2.0	4.1	27.8	11.0	16.8	12.1	1.5	1.9	1.3
Annual data:															
1995	55.5	24.1	31.4	18.8	11.6	7.3	1.5	5.8	36.7	12.6	24.1	15.0	2.5	1.8	4.9
1996	56.8	25.0	31.8	20.3	12.0	8.3	0.6	7.7	36.5	13.0	23.6	14.6	2.7	1.4	4.9
1997	56.6	25.8	30.8	19.7	12.5	7.3	–0.3	7.6	36.9	13.3	23.6	14.9	2.6	1.3	4.8
1998	50.9	26.5	24.4	14.9	12.7	2.2	–0.3	2.5	36.0	13.7	22.3	13.8	2.4	0.9	5.2
1999 est.	58.9	27.1	31.8	20.2	13.0	7.2	0.7	6.5	38.7	14.1	24.6	15.9	2.8	1.1	4.9
2000 est.	61.0	27.8	33.1	20.2	13.3	6.9	0.5	6.4	40.8	14.5	26.2	17.1	2.5	1.3	5.3

Table 6–8. NET STOCK OF FEDERALLY FINANCED RESEARCH AND DEVELOPMENT [1]

(In billions of 1992 dollars)

Fiscal Year	National Defense			Nondefense			Total Federal		
	Total	Basic Research	Applied Research and Development	Total	Basic Research	Applied Research and Development	Total	Basic Research	Applied Research and Development
Five year intervals:									
1970	235	14	221	194	60	133	429	74	354
1975	249	19	231	237	88	149	486	106	380
1980	252	22	229	280	118	162	532	141	391
1985	288	27	260	304	156	148	592	184	408
1990	357	32	325	341	205	137	699	237	462
Annual data:									
1995	371	38	333	407	261	146	778	298	479
1996	372	39	333	418	272	146	790	311	479
1997	372	40	332	431	283	148	803	323	480
1998	372	41	331	445	295	150	817	336	481
1999 est.	370	42	328	461	308	153	831	349	482
2000 est.	367	43	324	476	321	156	843	364	480

[1] Excludes outlays for physical capital for research and development, which are included in Table 6–6.

The defense R&D stock rose slowly during the 1970s, as gross outlays for R&D trended down in constant dollars and the stock created in the 1960s depreciated. A renewed emphasis on defense R&D spending from 1980 through 1989 led to a more rapid growth of the R&D stock. Since then, defense R&D outlays have tapered off, depreciation has grown, and, as a result, the net defense R&D stock has stabilized.

The growth of the nondefense R&D stock slowed from the 1970s to the late 1980s, from an annual rate of 3.8 percent in the 1970s to a rate of 1.7 percent from 1980 to 1988. Gross investment in real terms fell during much of the 1980s, and about three-fourths of new outlays went to replacing depreciated R&D. Since 1988, however, nondefense R&D outlays have been on an upward trend while depreciation has edged down. As a result, the net nondefense R&D capital stock has grown more rapidly.

The Stock of Education Capital

This section presents estimates of the stock of education capital financed by the Federal government.

As shown in Table 6–9, the federally financed education stock is estimated at $814 billion in 1998 in constant 1992 dollars, rising to $887 billion in 2000. The vast majority of the Nation's education stock is financed by State and local governments, and by students and their families themselves. This federally financed portion of the stock represents about 3 percent of the Nation's total education stock.[4] Nearly three-

[4] For estimates of the total education stock, see Table 2–4 in Chapter 2, "Stewardship: Toward a Federal Balance Sheet."

quarters is for elementary and secondary education, while the remaining one quarter is for higher education.

Despite a slowdown in growth during the early 1980s, the stock grew at an average annual rate of 5.1 percent from 1970 to 1998, and the expansion of the education stock is projected to continue under this budget.

Note on Estimating Methods

This note provides further technical detail about the estimation of the capital stock series presented in Tables 6–6 through 6–9.

As stated previously, the capital stock estimates are very rough approximations. Sources of possible error include:

Methodological issues.—The stocks of physical capital and research and development are estimated with the perpetual inventory method. A fundamental assumption of this method is that each dollar of investment spending adds a dollar to the value of the capital stock as of the end of the period in which the spending takes place. In reality, the value of the asset created could be more or less than the investment spending. As an extreme example, if a project were canceled before completion, the spending on the project would not result in the creation of any asset. Even where asset value is equal to investment spending, there might be timing differences in spending and the creation of an asset. For example, payments for constructing an aircraft carrier might be made over a period of years, with the asset only created at the end of the period.

The historical outlay series.—The historical outlay series for physical capital was based on budget records since 1940 and was extended back to 1915 using data from selected sources. There are no consistent outlay data on physical capital for this earlier period, and the estimates are approximations. In addition, the historical outlay series in the budget for physical capital extending back to 1940 may be incomplete. The historical outlay series for the conduct of research and development began in the early 1950s and required selected sources to be extended back to 1940. In addition, separate outlay data for basic research and applied R&D were not available for any years and had to be estimated from obligations and budget authority. For education, data for Federal outlays from the budget were combined with data for non-Federal spending from the institution or jurisdiction receiving Federal funds, which may introduce error because of differing fiscal years and confusion about whether the Federal Government was the original source of funding.

Price adjustments.—The prices for the components of the Federal stock of physical, R&D, and education capital have increased through time, but the rates of increase are not accurately known. Estimates of costs in fiscal year 1992 prices were made through the application of price deflators from the National Income and Product Accounts (NIPAs), but these should be considered only approximations of the costs of these assets in 1992 prices.

Depreciation.—The useful lives of physical, R&D, and education capital, as well as the pattern by which they depreciate, are very uncertain. This is compounded by using depreciation rates for broad classes of assets, which do not apply uniformly to all the components of each group. As a result, the depreciation estimates should also be considered approximations. This limitation is especially important in capital financed by grants, where the specific asset financed with the grant is often subject to the discretion of the recipient jurisdiction.

Research continues on the best methods to estimate these capital stocks. The estimates presented in the text could change as better information becomes available on the underlying investment data and as improved methods are developed for estimating the stocks based on those data.

Table 6–9. NET STOCK OF FEDERALLY FINANCED EDUCATION CAPITAL

(In billions of 1992 dollars)

Fiscal Year	Total Education Stock	Elementary and Secondary Education	Higher Education
Five year intervals:			
1960	64	46	18
1965	88	64	25
1970	203	159	44
1975	292	235	57
1980	410	319	91
1985	502	374	128
1990	650	479	170
Annual data:			
1995	721	523	198
1996	747	542	206
1997	776	562	214
1998	814	590	224
1999 est.	850	616	235
2000 est.	887	647	241

Physical Capital Stocks

For many years, current and constant-cost data on the stock of most forms of public and private physical capital—e.g., roads, factories, and housing—have been estimated annually by the Bureau of Economic Analysis (BEA) in the Department of Commerce. With the January 1996 comprehensive revision of the NIPAs, government investment has taken increased prominence. Government investment in physical capital is now reported separately from government consumption expenditures, and government consumption expenditures include depreciation as a measure of the services provided by the existing capital stock. In addition, estimates of depreciation were improved based on recent empirical research.[5]

The BEA data are not directly linked to the Federal budget, do not extend to the years covered by the budget, and do not separately identify the capital financed but not owned by the Federal Government. For these reasons, OMB prepares separate estimates for budgetary purposes, using techniques that roughly follow the BEA methods.

Method of estimation.—The estimates were developed from the OMB historical data base for physical capital outlays and grants to State and local governments for physical capital. These are the same major public physical capital outlays presented in Part I. This data base extends back to 1940 and was supplemented by rough estimates for 1915–1939.

The deflators used to convert historical outlays to constant 1992 dollars were based on composite NIPA deflators for Federal, State, and local consumption of durables and gross investment. For 1915 through 1929, deflators were estimated from Census Bureau historical statistics on constant price public capital formation.

The resulting capital stocks were aggregated into nine categories and depreciated using geometric rates roughly following those of BEA, which estimates depreciation using much more detailed categories. The geometric rates were 1.9 percent for water and power projects; 2.4 percent for other direct non-defense construction and rehabilitation; 20.3 percent for non-defense equipment; 14.0 percent for defense equipment; 2.1 percent for defense structures; 1.6 percent for transportation grants; 1.7 percent for community and regional development grants; 1.5 percent for natural resources and environment grants; and 1.8 percent for other nondefense grants.

Research and Development Capital Stocks

Method of estimation.—The estimates were developed from a data base for the conduct of research and development largely consistent with the data in the *Historical Tables.* Although there is no consistent time series on basic and applied R&D for defense and nondefense outlays back to 1940, it was possible to estimate the data using obligations and budget authority. The data are for the conduct of R&D only and exclude outlays for physical capital for research and development, because those are included in the estimates of physical capital. Nominal outlays were deflated by the chained price index for gross domestic product (GDP) in fiscal year 1992 dollars to obtain estimates of constant dollar R&D spending.

The appropriate depreciation rate of intangible R&D capital is even more uncertain than that of physical capital. Empirical evidence is inconclusive. It was assumed that basic research capital does not depreciate and that applied research and development capital has a ten percent geometric depreciation rate. These are the same assumptions used in a study published by the Bureau of Labor Statistics estimating the R&D stock financed by private industry.[6] More recent experimental work at BEA, extending estimates of tangible capital stocks to R&D, used slightly different assumptions. This work assumed straight-line depreciation for all R&D over a useful life of 18 years, which is roughly equivalent to a geometric depreciation rate of 11 percent. The slightly higher depreciation rate and its extension to basic research would result in smaller stocks than the method used here.[7]

Education Capital Stocks

Method of estimation.—The estimates of the federally financed education capital stock in Table 6–9 were calculated by first estimating the Nation's total stock of education capital, based on the current replacement cost of the total years of education of the population, including opportunity costs. To derive the Federal share of this total stock, the Federal share of total educational expenditures was applied to the total amount. The percent in any year was estimated by averaging the prior years' share of Federal education outlays in total education costs. The stock estimates are reduced from those reported last year, due to revisions in the estimated opportunity cost of education. For more information, refer to the technical note in Chapter 2, "Stewardship: Toward a Federal Balance Sheet."

The stock of capital estimated in Table 6–9 is based only on spending for education. Stocks created by other human capital investment outlays included in Table 6–1, such as job training and vocational rehabilitation, were not calculated because of the lack of historical data prior to 1962 and the absence of estimates of depreciation rates.

[5] BEA explained its new methods in "Improved Estimates of Fixed Reproducible Tangible Wealth, 1929–95," *Survey of Current Business,* May 1997, pp. 69–76. BEA's most recent estimates of capital stocks appear in "Fixed Reproducible Tangible Wealth in the United States: Revised Estimates for 1995–97 and Summary Estimates for 1925–97," *Survey of Current Business,* September 1998, pp. 36–46.

[6] See U.S. Department of Labor, Bureau of Labor Statistics, *The Impact of Research and Development on Productivity Growth, Bulletin 2331,* September 1989.

[7] See "A Satellite Account for Research and Development," *Survey of Current Business,* November 1994, pp. 37–71.

Part IV: ALTERNATIVE CAPITAL BUDGET AND CAPITAL EXPENDITURE PRESENTATIONS

A capital budget would separate Federal expenditures into two categories: spending for investment and all other spending. In this sense, Part I of the present chapter provides a capital budget for the Federal Government, distinguishing outlays that yield long-term benefits from all others. But alternative capital budget presentations have also been suggested, and a capital budget process may take many different forms.

The Federal budget mainly finances investment for two quite different types of reasons. It invests in capital—such as office buildings, computers, and weapons systems—that primarily contributes to its ability to provide governmental services to the public; some of these services, in turn, are designed to increase economic growth. And it invests in capital—such as highways, education, and research—that contributes more directly to the economic growth of the Nation. Most of the capital in the second category, unlike the first, is not owned or controlled by the Federal Government. In the discussion that follows, the first is called "Federal capital" and the second is called "national capital." Table 6–10 compares total Federal investment as defined in Part I of this chapter with investment in Federal capital, which was defined as "capital assets" in Part II of this chapter, and with investment in national capital. Some Federal investment is not classified as either Federal or national capital, and a relatively small part is included in both categories.

Capital budgets and other changes in Federal budgeting have been suggested from time to time for the Government's investment in both Federal and national capital. These proposals differ widely in coverage, depending on the rationale for the suggestion. Some would include all the investment shown in Table 6–1, or more, whereas others would be narrower in various ways. These proposals also differ in other respects, such as whether investment would be financed by borrowing

Table 6–10. ALTERNATIVE DEFINITIONS OF INVESTMENT OUTLAYS, 2000

(In millions of dollars)

	Investment Outlays		
	All types of capital [1]	Federal capital	National capital
Construction and rehabilitation:			
Grants:			
Transportation	31,032	.....	31,032
Natural resources and environment	2,625	.....	2,621
Community and regional development	6,130	.....	1,168
Housing assistance	7,237	.....	.....
Other grants	206	.....	64
Direct Federal:			
National defense	4,461	4,461	.....
General science, space, and technology	551	510	551
Natural resources and environment	5,128	3,754	4,829
Energy	843	843	843
Transportation	361	347	361
Veterans and other health facilities	1,588	1,588	1,588
Postal Service	1,225	1,225	1,225
GSA real property activities	1,016	1,016	.....
Other construction	2,316	1,844	1,036
Total construction and rehabilitation	64,719	15,588	45,318
Acquisition of major equipment (direct):			
National defense	47,207	47,207	.....
Postal Service	736	736	736
Air transportation	2,019	2,019	2,019
Other	4,849	4,251	2,998
Total major equipment	54,811	54,213	5,753
Purchase or sale of land and structures	489	489	.....
Other physical assets (grants)	1,178	.....	92
Total physical investment	121,197	70,290	51,163
Research and development:			
Defense	37,662	.....	1,150
Nondefense	35,942	.....	35,460
Total research and development	73,604	.....	36,610
Education and training	52,456	.....	52,132
Total investment outlays	247,257	70,290	139,905

[1] Total outlays for "all types of capital" are equal to the total for "major Federal investment outlays" in Table 6-1. Some capital is not classified as either Federal or national capital, and a relatively small part is included in both categories.

and whether the non-investment budget would necessarily be balanced. Some of these proposals are discussed below and illustrated by alternative capital budget and other capital expenditure presentations, although the discussion does not address matters of implementation such as the effect on the Budget Enforcement Act. The planning and budgeting process for capital assets, which is a different subject, is discussed in Part II of this chapter together with the steps this Administration is taking to improve it.

Investment in Federal Capital

The goal of investment in Federal capital is to deliver the right amount of Government services as efficiently and effectively as possible. The Congress allocates resources to Federal agencies to accomplish a wide variety of programmatic goals. Because these goals are diverse and most are not measured in dollars, they are difficult to compare with each other. Policy judgments must be made as to their relative importance.

Once amounts have been allocated for one of these goals, however, analysis may be able to assist in choosing the most efficient and effective means of delivering service. This is the context in which decisions are made on the amount of investment in Federal capital. For example, budget proposals for the Department of Justice must consider whether to increase the number of FBI agents, the amount of justice assistance grants to State and local governments, or the number of Federal prisons in order to accomplish the department's objectives. The optimal amount of investment in Federal capital derives from these decisions. There is no efficient target for total investment in Federal capital as such either for a single agency or for the Government as a whole.

The universe of Federal capital encompasses all federally owned capital assets. It excludes Federal grants to States for infrastructure, such as highways, and it excludes intangible investment, such as education and research. Investment in Federal capital in 2000 is estimated to be $70.3 billion, or 28 percent of the total Federal investment outlays shown in Table 6–1. Of the investment in Federal capital, 74 percent is for defense and 26 percent for nondefense purposes.

A Capital Budget for Capital Assets

Discussion of a capital budget has often centered on Federal capital, called "capital assets" in Part II of this chapter—buildings, other construction, and equipment that support the delivery of Federal services. This includes capital commonly available from the commercial sector, such as office buildings, computers, military family housing, veterans hospitals, research and development facilities, and associated equipment; it also includes special purpose capital such as weapons systems, military bases, the space station, and dams. This definition excludes capital that the Federal Government has financed but does not own.[8]

[8] This definition of "capital assets" is the same as used in the budget for the last two years. Narrower definitions of "fixed assets" were used in earlier budgets.

Some capital budget proposals would partition the unified budget into a capital budget, an operating budget, and a total budget. Table 6–11 illustrates such a capital budget for capital assets as defined above. It is accompanied by an operating budget and a total budget. The operating budget consists of all expenditures except those included in the capital budget, plus depreciation on the stock of assets of the type purchased through the capital budget. The capital budget consists of expenditures for capital assets and, on the income side of the account, depreciation. The total budget is the present unified budget, largely based on cash for its measure of transactions, which records all outlays and receipts of the Federal Government. It consolidates the operating and capital budgets by adding them together and netting out depreciation as an intragovernmental transaction. The operating budget has a smaller surplus than the unified budget. This reflects both the relatively small Federal investment in new capital assets and the offsetting effect of depreciation on the existing stock. Depreciation is larger than capital expenditures by $12 billion. The figures in Table 6–11 and the subsequent tables of this section are rough estimates, intended only to be illustrative and to provide a basis for broad generalizations.

Table 6–11. CAPITAL, OPERATING, AND UNIFIED BUDGETS: FEDERAL CAPITAL, 2000 [1]

(In billions of dollars)

Operating Budget	
Receipts	1,883
Expenses:	
Depreciation	82
Other	1,695
Subtotal, expenses	1,777
Surplus or deficit (–)	105
Capital Budget	
Income: depreciation	82
Capital expenditures	70
Surplus or deficit (–)	12
Unified Budget	
Receipts	1,883
Outlays	1,766
Surplus or deficit (–)	117

[1] Historical data to estimate the capital stocks and calculate depreciation are not readily available for Federal capital. Depreciation estimates were based on the assumption that outlays for Federal capital were a constant percentage of the larger categories in which such outlays were classified. They are also subject to the limitations explained in Part III of this chapter. Depreciation is measured in terms of current cost, not historical cost.

Some proposals for a capital budget would exclude defense capital (other than military family housing). These exclusions—weapons systems, military bases, and so forth—would comprise three-fourths of the expenditures shown in the capital budget of Table 6–11. If they were excluded, the operating budget would have a surplus that was a little more than the unified budget surplus: a surplus $6 billion higher than the unified budget surplus instead of $12 billion lower as shown above for the complete coverage of Federal capital. Ex-

cluding defense makes such a large difference because of its large relative size and the recent pattern of capital asset purchases. The large defense buildup that began in the early 1980s raised the capital stock and depreciation; the buildup was followed by a sharp decline in purchases, while the capital stock and depreciation have declined more slowly. (See the previous section of this chapter.) As a result, capital expenditures for defense in 2000 are estimated to be $18 billion less than depreciation, whereas capital expenditures for nondefense purposes (plus military family housing) are estimated to be $6 billion more.

Budget Discipline and a Capital Budget

Many proposals for a capital budget, though not all, would effectively dispense with the unified budget and make expenditure decisions on capital asset acquisitions in terms of the operating budget instead. When the Government proposed to purchase a capital asset, the operating budget would include only the estimated depreciation. For example, suppose that an agency proposed to buy a $50 million building at the beginning of the year with an estimated life of 25 years and with depreciation calculated by the straightline method. Operating expense in the budget year would increase by $2 million, or only 4 percent of the asset cost. The same amount of depreciation would be recorded as an increase in operating expense for each year of the asset's life.[9]

Recording the annual depreciation in the operating budget each year would provide little control over the decision about whether to invest in the first place. Most Federal investments are sunk costs and as a practical matter cannot be recovered by selling or renting the asset. At the same time, there is a significant risk that the need for a capital asset may change over a period of years, because either the need was not permanent, it was initially misjudged, or other needs become more important. Since the cost is sunk, however, control cannot be exercised later on by comparing the annual benefit of the asset services with depreciation and interest and then selling the asset if its annual services are not worth this expense. Control can only be exercised up front when the Government commits itself to the full sunk cost. By spreading the real cost of the project over time, however, use of the operating budget for expenditure decisions would make the budgetary cost of the capital asset appear very cheap when decisions were being made that compared it to alternative expenditures. As a result, there would be an incentive to purchase capital assets with little regard for need, and also with little regard for the least-cost method of acquisition.

A budget is a financial plan for allocating resources—deciding how much the Federal Government should spend in total, program by program, and for the parts of each program. The budgetary system provides a process for proposing policies, making decisions, implementing them, and reporting the results. The budget needs to measure costs accurately so that decision makers can compare the cost of a program with its benefit, the cost of one program with another, and the cost of alternative methods of reaching a specified goal. These costs need to be fully included in the budget up front, when the spending decision is made, so that executive and congressional decision makers have the information and the incentive to take the total costs into account in setting priorities.

The unified budget does this for investment. By recording investment on a cash basis, it causes the total cost to be compared up front in a rough and ready way with the total expected future net benefits. Since the budget measures only cost, the benefits with which these costs are compared, based on policy makers' judgment, must be presented in supplementary materials. Such a comparison of total cost with benefits is consistent with the formal method of cost-benefit analysis of capital projects in government, in which the full cost of a capital asset as the cash is paid out is compared with the full stream of future benefits (all in terms of present values).[10] This comparison is also consistent with common business practice, in which capital budgeting decisions for the most part are made by comparing cash flows. The cash outflow for the full purchase price is compared with expected future cash inflows, either through a relatively sophisticated technique of discounted cash flows—such as net present value or internal rate of return—or through cruder methods such as payback periods.[11] Regardless of the specific technique adopted, it usually requires comparing future returns with the entire cost of the asset up front—not spread over time through annual depreciation.[12]

Practice Outside the Federal Government

The proponents of making investment decisions on the basis of an operating budget with depreciation have sometimes claimed that this is the common practice outside the Federal Government. However, while the practice of others may differ from the Federal budget and the terms "capital budget" and "capital budgeting"

[9] The amount of depreciation that typically would be recorded as an expense in the budget year is overstated by this illustration. First, most assets are purchased after the beginning of the year, in which case less than a full year's depreciation would be recorded. Second, assets may be constructed or built to order, in which case no depreciation would be recorded until the work was completed and the asset put into service. This could be several years after the initial expenditure.

[10] For example, see Edward M. Gramlich, *A Guide to Benefit-Cost Analysis* (2nd ed.; Englewood Cliffs: Prentice Hall, 1990), chap. 6; or Joseph E. Stiglitz, *Economics of the Public Sector* (2nd ed.; New York: Norton, 1988), chap. 10. This theory is applied in formal OMB instructions to Federal agencies in OMB Circular No. A–94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs* (October 29, 1992). General Accounting Office, *Discount Rate Policy*, GAO/OCE–17.1.1 (May 1991), discusses the appropriate discount rate for such analysis but not the foundation of the analysis itself, which is implicitly assumed.

[11] For a full textbook analysis of capital budgeting techniques in business, see Harold Bierman, Jr., and Seymour Smidt, *The Capital Budgeting Decision* (8th ed.; Saddle River, N.J.: Prentice-Hall, 1993). Shorter analyses from the standpoints of corporate finance and cost accounting may be found, for example, in Richard A. Brealey and Stewart C. Myers, *Principles of Corporate Finance* (5th ed.; New York: McGraw-Hill, 1996), chap. 2, 5, and 6; Charles T. Horngren *et al.*, *Cost Accounting* (9th ed.; Upper Saddle River, N.J.: Prentice-Hall, 1997), chap. 22 and 23; Jerold L. Zimmerman, *Accounting for Decision Making and Control* (Chicago: Irwin, 1995), chap. 3; and Surendra S. Singhvi, "Capital-Investment Budgeting Process" and "Capital-Expenditure Evaluation Methods," chap. 19 and 20 in Robert Rachlin, ed., *Handbook of Budgeting* (4th ed.; New York: Wiley, 1999).

[12] Two surveys of business practice conducted a few years ago found that such techniques are predominant. See Thomas Klammer *et al.*, "Capital Budgeting Practices—A Survey of Corporate Use," *Journal of Management and Accounting Research*, vol. 3 (Fall 1991), pp. 113–30; and Glenn H. Petry and James Sprow, "The Theory and Practice of Finance in the 1990s," *The Quarterly Review of Economics and Finance*, vol. 33 (Winter 1993), pp. 359–82. Petry and Sprow also found that discounted cash flow techniques are recommended by the most widely used textbooks in managerial finance.

are often used, these terms do not normally mean that capital asset acquisitions are decided on the basis of annual depreciation cost. The use of these terms in business and State government also does not mean that businesses and States finance all their investment by borrowing. Nor does it mean that under a capital budget the extent of borrowing by the Federal Government to finance investment would be limited by the same forces that constrain business and State borrowing for investment.

Private business firms call their investment decision making process "capital budgeting," and they record the resulting planned expenditures in a "capital budget." However, decisions are normally based on up-front comparisons of the cash outflows needed to make the investment with the resulting cash inflows expected in the future, as explained above, and the capital budget records the period-by-period cash outflows proposed for capital projects.[13] This supports the business's goal of deciding upon and controlling the use of its resources.

The cash-based focus of business budgeting for capital is in contrast to business financial statements—the income statement and balance sheet—which use accrual accounting for a different purpose, namely, to record how well the business is meeting its objective of earning profit and accumulating wealth for its owners. For this purpose, the income statement shows the profit in a year from earning revenue net of the expenses incurred. These expenses include depreciation, which is an allocation of the cost of capital assets over their estimated useful life. With similar objectives in mind, the Office of Management and Budget, the Treasury Department, and the General Accounting Office have adopted the use of depreciation on general property, plant, and equipment owned by the Federal Government as a measure of expense in financial statements and cost accounting for Federal agencies.[14]

Businesses finance investment from net income and other sources as well as borrowing. When they borrow to finance investment, they are constrained in ways that Federal borrowing is not. The amount that a business borrows is limited by its own profit motive and the market's assessment of its capacity to repay. The greater a business's indebtedness, other things equal, the more risky is any additional borrowing and the higher is the cost of funds it must pay. Since the profit motive ensures that a business will not want to borrow unless the expected return is at least as high as the cost of funds, the amount of investment that a business will want to finance is limited; it has an incentive to borrow only for projects where the expected return is as high or higher than the cost of funds. Furthermore, if the risk is great enough, a business may not be able to find a lender.

No such constraint limits the Federal Government—either in the total amount of its borrowing for investment, or in its choice of which assets to buy—because of its sovereign power to tax and the wide economic base that it taxes. It can tax to pay for investment; and, if it borrows, its power to tax ensures that the credit market will judge U.S. Treasury securities free from any risk of default even if it borrows "excessively" or for projects that do not seem worthwhile.

Most ***States*** also have a "capital budget," but the operating budget is not like the operating budget envisaged by proponents of making Federal investment decisions on the basis of depreciation. State capital budgets differ widely in many respects but generally relate some of the State's purchases of capital assets to borrowing and other earmarked means of financing. For the debt-financed portion of investment, the interest and repayment of principal are usually recorded as expenditures in the operating budget. For the portion of investment purchased in the capital budget but financed by Federal grants or by taxes, which may be substantial, State operating budgets do not record any amount. No State operating budget is charged for depreciation.[15]

States also do not record depreciation expense in the financial accounting statements for governmental funds. They record depreciation expense only in their proprietary (commercial-type) funds and in those trust funds where net income, expense, or capital maintenance is measured.[16] Under a proposed change in financial reporting standards, however, depreciation on general capital assets would be recognized as an expense in entity-wide financial statements.[17]

State borrowing to finance investment, like business borrowing, is subject to limitations that do not apply to Federal borrowing. Like business borrowing, it is constrained by the credit market's assessment of the State's capacity to repay, which is reflected in the credit ratings of its bonds. Furthermore, borrowing is usually designated for specified investments, and it is almost always subject to constitutional limits or referendum requirements.

Other ***developed nations*** tend to show a more systematic breakdown between investment and operating expenditures within their budgets than does the United States, even while they record capital expenditures on a cash basis within the same budget totals. The French budget, for example, is divided into separate titles of

[13] A business capital budget is depicted in Glenn A. Welsch et al., *Budgeting: Profit Planning and Control* (5th ed.; Englewood Cliffs: Prentice Hall, 1988), pp. 396–99.

[14] Office of Management and Budget, Statement of Federal Financial Accounting Standards No. 6, *Accounting for Property, Plant, and Equipment* (November 30, 1995), pp. 5–14 and 34–35. Depreciation is not used as a measure of expense for heritage assets, or for weapons systems and other national defense property, plant, and equipment. Depreciation also is not used as a measure of expense for physical property financed by the Federal Government but owned by State and local governments, or for investment that the Federal Government finances in human capital and research and development.

[15] The characteristics of State capital budgets were examined in a survey of State budget officers for all 50 States in 1986. See Lawrence W. Hush and Kathleen Peroff, "The Variety of State Capital Budgets: A Survey," *Public Budgeting and Finance* (Summer 1988), pp. 67–79. More detailed results are available in an unpublished OMB document, "State Capital Budgets" (July 7, 1987). Two GAO reports examined State capital budgets and reached similar conclusions on the issues in question. See *Budget Issues: Capital Budgeting Practices in the States*, GAO/AFMD–86–63FS (July 1986), and *Budget Issues: State Practices for Financing Capital Projects*, GAO/AFMD–89–64 (July 1989). For further information about state capital budgeting, see National Association of State Budget Officers, *Capital Budgeting in the States* (September 1997).

[16] Governmental Accounting Standards Board (GASB), *Codification of Governmental Accounting and Financial Reporting Standards as of June 30, 1998*, sections 1100.107 and 1400.114–1400.118.

[17] Governmental Accounting Standard Board, Exposure Draft, *Basic Financial Statements—and Management's Discussion and Analysis—for State and Local Governments* (January 31, 1997), paragraphs 33–37 and 273–81.

which some are for current expenditures and others for capital expenditures. However, a recent study of European countries found only four that had a real difference between a current budget and a capital budget (Greece, Ireland, Luxembourg, and Portugal);[18] and a survey by the Congressional Budget Office in 1993 found only two developed nations, Chile and New Zealand, that recognize depreciation in their budgets.[19] New Zealand, moreover, while budgeting on an accrual basis that generally includes depreciation, requires the equivalent of appropriations for the full cost up front before a department can make net additions to its capital assets.[20] Some countries—including Sweden, Denmark, Finland, and the Netherlands—formerly had separate capital budgets but abandoned them a number of years ago.[21] The United Kingdom has adopted a rule that it will borrow only for net investment (after depreciation), averaged over the economic cycle; and it has announced plans to budget on an accrual basis, including the depreciation for capital assets, beginning with its budget for 2001–02.

Conclusions

It is for reasons such as these that the General Accounting Office issued a report in 1993 that criticized budgeting for capital in terms of depreciation. Although the criticisms were in the context of what is termed "national capital" in this chapter, they apply equally to "Federal capital."

> "Depreciation is not a practical alternative for the Congress and the administration to use in making decisions on the appropriate level of spending intended to enhance the nation's long-term economic growth for several reasons. Currently, the law requires agencies to have budget authority before they can obligate or spend funds. Unless the full amount of budget authority is appropriated up front, the ability to control decisions when total resources are committed to a particular use is reduced. Appropriating only annual depreciation, which is only a fraction of the total cost of an investment, raises this control issue."[22]

After further study of the role of depreciation in budgeting for national capital, GAO reiterated that conclusion in another study in 1995.[23] "The greatest disadvantage... was that depreciation would result in a loss of budgetary control under an obligation-based budgeting system."[24] Although that study also focused primarily on what is termed "national capital" in this chapter, its analysis applies equally to "Federal capital." In 1996 GAO extended its conclusions to Federal capital as well. "If depreciation were recorded in the federal budget in place of cash requirements for capital spending, this would undermine Congress' ability to control expenditures because only a small fraction of an asset's cost would be included in the year when a decision was made to acquire it."[25]

Investment in National Capital

A Target for National Investment

The Federal Government's investment in national capital has a much broader and more varied form than its investment in Federal capital. The Government's goal is to support and accelerate sustainable economic growth for the Nation as a whole and in some instances for specific regions or groups of people. The Government's investment concerns for the Nation are two-fold:

- *The effect of its own investment in national capital on the output and income that the economy can produce.* Reducing expenditure on consumption and increasing expenditure on investment that supports economic growth is a major priority for the Administration. It has reordered priorities in its budgets by proposing increases in selected investments.
- *The effect of Federal taxation, borrowing, and other policies on private investment.* The Administration's deficit reduction policy has brought about an expansion of private investment, most notably in producers' durable equipment.

In its 1993 report, *Incorporating an Investment Component in the Federal Budget*, the General Accounting Office (GAO) recommended establishing an investment component within the unified budget—but not a separate capital budget or the use of depreciation—for this type of investment.[26] GAO defined this investment as "federal spending, either direct or through grants, that is directly intended to enhance the private sector's long-term productivity."[27] To increase investment—both public and private—GAO recommended establishing targets for the level of Federal investment and for a declining path of unified budget deficits over time.[28] Such a target for investment in national capital would focus attention on policies for growth, encourage a conscious decision about the overall level of growth-enhancing investment, and make it easier to set spending priorities in terms of policy goals for aggregate forma-

[18] M. Peter van der Hoek, "Fund Accounting and Capital Budgeting: European Experience," *Public Budgeting and Financial Management*, vol. 8 (Spring 1996), pp. 39–40.

[19] Robert W. Hartman, Statement before the Subcommittee on Economic Development, Committee on Public Works and Transportation, U.S. House of Representatives (May 26, 1993). Hartman stated: "to our knowledge, only two developed countries, Chile and New Zealand, recognize depreciation in their budgets."

[20] New Zealand's use of depreciation in its budget is discussed in GAO, *Budget Issues: The Role of Depreciation in Budgeting for Certain Federal Investments*, GAO/AIMD–95–34 (February 1995), pp. 13 and 16–17.

[21] The budgets in Sweden, Great Britain, Germany, and France are described in GAO, *Budget Issues: Budgeting Practices in West Germany, France, Sweden, and Great Britain*, GAO/AFMD–87–8FS (November 1986). Sweden had separate capital and operating budgets from 1937 to 1981, together with a total consolidated budget from 1956 onwards. The reasons for abandoning the capital budget are discussed briefly in the GAO report and more extensively by a government commission established to recommend changes in the Swedish budget system. One reason was that borrowing was no longer based on the distinction between current and capital budgets. See Sweden, Ministry of Finance, *Proposal for a Reform of the Swed ish Budget System: A Summary of the Report of the Budget Commission Published by the Ministry of Finance* (Stockholm, 1974), chapter 10.

[22] GAO, *Budget Issues: Incorporating an Investment Component in the Federal Budget*, GAO/AIMD–94–40 (November 1993), p. 11. GAO had made the same recommendation in earlier reports but with less extensive analysis.

[23] GAO, *Budget Issues: The Role of Depreciation in Budgeting for Certain Federal Investments*, GAO/AIMD–95–34 (February 1995), pp. 1 and 19–20.

[24] *Ibid.*, p. 17. Also see pp. 1–2 and 16–19.

[25] GAO, *Budget Issues: Budgeting for Federal Capital*, GAO/AIMD–97–5 (November 1996), p. 28. Also see p. 4.

[26] *Incorporating an Investment Component in the Federal Budget*, pp. 1–2, 9–10, and 15.

[27] *Ibid.*, pp. 1 and 5.

[28] *Ibid.*, pp. 2 and 13–16.

tion of national capital. GAO reiterated its recommendation in another report in 1995.[29]

Table 6–12. UNIFIED BUDGET WITH NATIONAL INVESTMENT COMPONENT, 2000

(In billions of dollars)

Receipts	1,883
Outlays:	
National investment	140
Other	1,626
Subtotal, outlays	1,766
Surplus or deficit (–)	117

Table 6–12 illustrates the unified budget reorganized as GAO recommends to have a separate component for investment in national capital. This component is roughly estimated to be $140 billion in 2000. It includes infrastructure outlays financed by Federal grants to State and local governments, such as highways and sewer projects, as well as direct Federal purchases of infrastructure, such as electric power generation equipment. It also includes intangible investment for nondefense research and development, for basic research financed through defense, and for education and training. Much of this expenditure consists of grants and credit assistance to State and local governments, nonprofit organizations, or individuals. Only 12 percent of national investment consists of assets to be owned by the Federal Government. Military investment and some other "capital assets" as defined previously are excluded, because that investment does not primarily enhance economic growth.

A Capital Budget for National Investment

Table 6–13 roughly illustrates what a capital budget and operating budget would look like under this definition of investment—although it must be emphasized that this is *not* GAO's recommendation. Some proponents of a capital budget would make spending decisions within the framework of such a capital budget and operating budget. But the limitations that apply to the use of depreciation in deciding on investment decisions for Federal capital apply even more strongly in deciding on investment decisions for national capital. Most national capital is neither owned nor controlled by the Federal Government. Such investments are sunk costs completely and can be controlled only by decisions made up front when the Government commits itself to the expenditure.[30]

In addition to these basic limitations, the definition of investment is more malleable for national capital than Federal capital. Many programs promise long-term intangible benefits to the Nation, and depreciation rates are much more difficult to determine for intangible investment such as research and education than they are for physical investment such as highways and office buildings. These and other definitional questions are hard to resolve. The answers could significantly affect budget decisions, because they would determine whether the budget would record all or only a small part of the cost of a decision when policy makers were comparing the budgetary cost of a project with their judgment of its benefits. The process of reaching an answer with a capital budget would open the door to manipulation, because there would be an incentive to make the operating expenses and deficit look smaller by classifying outlays as investment and using low depreciation rates. This would "justify" more spending by the program or the Government overall.[31]

Table 6–13. CAPITAL, OPERATING, AND UNIFIED BUDGETS: NATIONAL CAPITAL, 2000 [1]

(In billions of dollars)

Operating Budget	
Receipts	1,846
Expenses:	
Depreciation [2]	73
Other	1,626
Subtotal, expenses	1,699
Surplus or deficit (–)	147
Capital Budget	
Income:	
Depreciation [2]	73
Earmarked tax receipts [3]	37
Subtotal, income	110
Capital expenditures	140
Surplus or deficit (–)	–30
Unified Budget	
Receipts	1,883
Outlays	1,766
Surplus or deficit (–)	117

[1] For the purpose of this illustrative table only, education and training outlays are arbitrarily depreciated over 30 years by the straight-line method. This differs from the treatment of education and training elsewhere in this chapter and in Chapter 2. All depreciation estimates are subject to the limitations explained in Part III of this chapter. Depreciation is measured in terms of current cost, not historical cost.

[2] Excludes depreciation on capital financed by earmarked tax receipts allocated to the capital budget.

[3] Consists of tax receipts of the highway and airport and airways trust funds, less trust fund outlays for operating expenditures. These are user charges earmarked for financing capital expenditures.

A Capital Budget and the Analysis of Saving and Investment

Data from the Federal budget may be classified in many different ways, including analyses of the Government's direct effects on saving and investment. As Parts I and III of this chapter have shown, the unified budget provides data that can be used to calculate Federal investment outlays and federally financed capital stocks. However, the budget totals themselves do not make this distinction. In particular, the budget surplus

[29] *The Role of Depreciation in Budgeting for Certain Investments,* pp. 2 and 19–20.

[30] GAO's conclusions about the loss of budgetary control that were quoted at the end of the section on Federal capital came from studies that predominantly considered "national capital."

[31] These problems are also pointed out in GAO, *Incorporating an Investment Component in the Federal Budget,* pp. 11–12. They are discussed more extensively with respect to highway grants, research and development, and human capital in GAO, *The Role of Depreciation in Budgeting for Certain Federal Investments,* pp. 11–14. GAO found no government that budgets for the depreciation of infrastructure (whether or not owned by that government), human capital, or research and development (except that New Zealand budgets for the depreciation of research and development if it results in a product that is intended to be used or marketed).

or deficit does not measure the Government's contribution to the nation's net saving (i.e., saving net of depreciation). A capital budget, it is sometimes contended, is needed for this purpose.

This purpose, however, is now fulfilled by the Federal sector of the national income and product accounts (NIPAs) according to one definition of investment. The NIPA Federal sector measures the impact of Federal receipts, expenditures, and deficit on the national economy. It is part of an integrated set of measures of aggregate U.S. economic activity that is prepared by the Bureau of Economic Analysis in the Department of Commerce in order to measure gross domestic product (GDP), the income generated in its production, and many other variables used in macroeconomic analysis. The NIPA Federal sector for recent periods is published monthly in the *Survey of Current Business* with separate releases for historical data. Estimates for the President's proposed budget through the budget year are normally published in the budget documents. The NIPA translation of the budget, rather than the budget itself, is ordinarily used by economists to analyze the effect of Government fiscal policy on the aggregate economy.[32]

Until three years ago the NIPA Federal sector did not divide government purchases of goods and services between consumption and investment. With the comprehensive revision of the national income and product accounts in early 1996, it now makes that distinction.[33] The revised NIPA Federal Government account for receipts and expenditures is a current account or an operating account for the Federal Government. The current account excludes expenditures for structures and equipment owned by the Federal Government; it includes depreciation on the federally owned stock of structures and equipment as a measure of the cost of using capital assets and thus as part of the Federal Government's current expenditures. It applies this treatment to a comprehensive definition of federally owned structures and equipment, both defense and nondefense, similar to the definition of "capital assets" in this chapter.[34]

The NIPA "current surplus or deficit" of the Federal Government thus measures the Government's direct contribution to the Nation's net saving (given the definition of investment that is employed). The 1998 Federal Government current account surplus was reduced $9.4 billion by including depreciation rather than gross investment, because depreciation of federally owned structures and equipment was more than gross investment. The 2000 Federal current account surplus is estimated to be reduced $6.5 billion. This is unlike a few years earlier, when the Federal current account deficit was reduced, in some years substantially.[35] A capital budget is not needed to capture this effect.

Borrowing to Finance a Capital Budget

A further issue raised by a capital budget is the financing of capital expenditures. Some have argued that the Government ought to balance the operating budget and borrow to finance the capital budget—capital expenditures less depreciation. The rationale is that if the Government borrows for net investment and the rate of return exceeds the interest rate, the additional debt does not add a burden onto future generations. Instead, the burden of paying interest on the debt and repaying its principal is spread over the generations that will benefit from the investment. The additional debt is "justified" by the additional assets.

This argument is at best a justification to borrow to finance *net* investment, after depreciation is subtracted from *gross* outlays, not to borrow to finance *gross* investment. To the extent that capital is used up during the year, there are no additional assets to justify additional debt. If the Government borrows to finance *gross* investment, the additional debt exceeds the additional capital assets. The Government is thus adding onto the amount of future debt service without providing the additional capital that would produce the additional income needed to service that debt.

This justification, furthermore, requires that depreciation be measured in terms of the current replacement cost, not the historical cost. Current cost depreciation is needed in order to measure all activities in the budget on a consistent basis, since other outlays and receipts are automatically measured in the prices of the current year. Current cost depreciation is also needed to obtain a valid measure of net investment. This requires that the addition to the capital stock from new purchases and the subtraction from depreciation on existing assets both be measured in the prices of the same year. When prices change, historical cost depreciation does not measure the extent to which the capital stock is used up each year.

As a broad generalization, Tables 6–11 and 6–13 suggest that this rationale would not currently justify much Federal borrowing, if any at all, under the two capital budgets roughly illustrated in this chapter. For *Federal capital,* Table 6–11 indicates that current cost depreciation is more than gross investment for Federal capital—the capital budget surplus is $12 billion. The rationale of borrowing to finance net investment would not justify the Federal Government borrowing at all to finance its investment in Federal capital; instead, it would have to repay this amount of debt ($12 billion). For *national capital,* Table 6–13 indicates that current

[32] See chapter 16 of this volume, "National Income and Product Accounts," for the NIPA current account of the Federal Government based on the budget estimates for 1999 and 2000, and for a discussion of the NIPA Federal sector and its relationship to the budget.

[33] This distinction is also made in the national accounts of most other countries and in the System of National Accounts (SNA), which is guidance prepared by the United Nations and other international organizations. Definitions of investment may vary. Other countries and the SNA do not include the purchase of military equipment as investment.

[34] The revised NIPA Federal sector is explained in *Survey of Current Business*, "Preview of the Comprehensive Revision of the National Income and Product Accounts: Recognition of Government Investment and Incorporation of a New Methodology for Calculating Depreciation" (September 1995), pp. 33–39. As is the case of private sector investment, government investment does not include expenditures on research and development or on education and training. Government purchases of structures and equipment remain a part of gross domestic product (GDP) as a separate component. The NIPA State and local government account has been revised in the same way and includes depreciation on structures and equipment owned by State and local governments that were financed by Federal grants as well as by their own resources. Depreciation is not displayed as a separate line item in the government account: depreciation on general government capital assets is included in government "consumption expenditures"; and depreciation on the capital assets of government enterprises is subtracted in calculating the "current surplus of government enterprises."

[35] See actuals and estimates for 1989–2000 in table 16–2 of chapter 16 of this volume, "National Income and Product Accounts."

cost depreciation (plus the excise taxes earmarked to finance capital expenditures for highways and airports and airways[36]) is less than gross investment but not by a great deal—the capital budget deficit is $30 billion. The rationale of borrowing to finance net investment would justify the Federal Government borrowing this amount ($30 billion) and no more to finance its investment in national capital.[37]

Even with depreciation calculated in current cost, the rationale for borrowing to finance net investment is not persuasive. The Federal Government, unlike a business or household, is responsible not only for its own affairs but also for the general welfare of the Nation. To maintain and accelerate national economic growth and development, the Government needs to sustain private investment as well as its own national investment. For more than a decade, however, net national saving has been low, both by historical standards and in comparison to the amounts needed to meet the challenges expected in the decades ahead.

To the extent that the Government finances its own investment in a way that results in lower private investment, the net increase of total investment in the economy is less than the increase from the additional Federal capital outlays alone. The net increase in total investment is significantly less if the Federal investment is financed by borrowing than if it is financed by taxation, because borrowing primarily draws upon the saving available for private (and State and local government) investment whereas much of taxation instead comes out of private consumption. Therefore, the net effect of Federal investment on economic growth would be reduced if it were financed by borrowing. This would be the result even if the rate of return on Federal investment was higher than the rate of return on private investment. For example, if a Federal investment that yielded a 15 percent rate of return crowded out private investment that yielded 10 percent, the net social return would still be positive but it would only be 5 percent.[38]

From its outset, this Administration has taken major steps to increase the saving available for private investment while also increasing Federal investment for national capital. During the past six years, the large deficit has been replaced by a substantial surplus, and available resources have been shifted to investment in education and training and in science and technology. The present budget proposes to continue to run substantial surpluses, paying down the debt to make room for financing private investment, while protecting high priority Federal investment. A capital budget is not a justification to relax the budget constraints that are contributing to this accomplishment. Any easing would undo the gains from achieving a surplus that have already been achieved and the further gains from the proposals in this budget.

[36] The capital budget deficit would be about $26 billion larger if current cost depreciation were used instead of earmarked excise taxes for investment in highways and airports and airways.

[37] This discussion abstracts from non-budgetary transactions that affect Federal borrowing requirements, such as changes in the Treasury operating cash balance and the net financing disbursements of the direct loan and guaranteed loan financing accounts. See chapter 12 of this volume, "Federal Borrowing and Debt," and the explanation of Table 12–2.

[38] GAO considered deficit financing of investment but did not recommend it. See *Incorporating an Investment Component in the Federal Budget*, pp. 12–13.

Part V: SUPPLEMENTAL PHYSICAL CAPITAL INFORMATION

The Federal Capital Investment Program Information Act of 1984 (Title II of Public Law 98–501; hereafter referred to as the Act) requires that the budget include projections of Federal physical capital spending and information regarding recent assessments of public civilian physical capital needs. This section is submitted to fulfill that requirement.

This part is organized in two major sections. The first section projects Federal outlays for public physical capital and the second section presents information regarding public civilian physical capital needs.

Projections of Federal Outlays For Public Physical Capital

Federal public physical capital spending is defined here to be the same as the "major public physical capital investment" category in Part I of this chapter. It covers spending for construction and rehabilitation, acquisition of major equipment, and other physical assets. This section excludes outlays for human capital, such as the conduct of education and training, and outlays for the conduct of research and development.

The projections are done generally on a current services basis, which means they are based on 1999 enacted appropriations and adjusted for inflation in later years. The current services concept is discussed in Chapter 14, "Current Services Estimates."

Federal public physical capital spending was $109.8 billion in 1998 and is projected to increase to $146.2 billion by 2008 on a current services basis. The largest components are for national defense and for roadways and bridges, which together accounted for almost three-fourths of Federal public physical capital spending in 1998.

Table 6–14 shows projected current services outlays for Federal physical capital by the major categories specified in the Act. Total Federal outlays for transportation-related physical capital were $28.5 billion in 1998, and current services outlays are estimated to increase to $42.3 billion by 2008. Outlays for nondefense housing and buildings were $12.5 billion in 1998 and are estimated to be $15.5 billion in 2008. Physical capital outlays for other nondefense categories were $15.2 billion in 1998 and are projected to be $26.8 billion by 2008. For national defense, this spending was $53.6 billion in 1998 and is estimated on a current services basis to be $61.6 billion in 2008.

Table 6–15 shows current services projections on a constant dollar basis, using fiscal year 1992 as the base year.

Table 6–14. CURRENT SERVICES OUTLAY PROJECTIONS FOR FEDERAL PHYSICAL CAPITAL SPENDING

(In billions of dollars)

	1998 Actual	Estimate									
		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Nondefense:											
Transportation-related categories:											
Roadways and bridges	20.2	23.2	25.5	26.7	27.2	27.6	28.1	28.8	29.4	30.1	30.7
Airports and airway facilities	3.8	3.6	3.9	4.0	4.2	4.3	4.4	4.5	4.6	4.7	4.9
Mass transportation systems	3.9	3.8	3.9	4.6	4.9	5.4	5.5	5.6	5.7	5.9	6.0
Railroads	0.6	0.4	0.5	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8
Subtotal, transportation	28.5	31.0	33.8	35.9	37.0	38.0	38.8	39.7	40.6	41.4	42.3
Housing and buildings categories:											
Federally assisted housing	7.9	6.9	8.0	8.8	8.8	9.1	9.1	9.0	9.2	9.2	9.4
Hospitals	1.8	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Public buildings [1]	2.8	3.3	3.4	3.7	3.9	4.0	4.0	4.1	4.2	4.2	4.3
Subtotal, housing and buildings categories	12.5	12.1	13.3	14.3	14.6	14.9	14.9	14.9	15.2	15.3	15.5
Other nondefense categories:											
Wastewater treatment and related facilities	2.5	2.8	2.9	3.1	3.1	3.2	3.3	3.3	3.4	3.5	3.5
Water resources projects	2.3	3.3	3.1	3.1	3.0	3.2	3.2	3.3	3.4	3.5	3.5
Space and communications facilities	3.1	2.7	3.2	3.4	3.6	3.5	3.8	3.2	3.3	3.3	3.4
Energy programs	0.9	1.1	0.8	0.9	1.2	1.3	1.5	1.5	1.5	1.6	1.6
Community development programs	5.3	5.5	5.4	5.5	5.6	5.7	5.8	6.0	6.1	6.2	6.4
Other nondefense	1.1	7.2	6.6	7.2	6.8	7.5	7.6	7.7	7.9	8.2	8.4
Subtotal, other nondefense.	15.2	22.6	22.1	23.3	23.2	24.4	25.3	25.0	25.6	26.2	26.8
Subtotal, nondefense	56.2	65.7	69.2	73.5	74.8	77.3	79.0	79.5	81.4	82.9	84.6
National defense	53.6	53.5	52.0	54.5	55.7	56.9	58.2	59.5	59.1	60.4	61.6
Total	109.8	119.1	121.3	128.0	130.5	134.2	137.2	139.1	140.4	143.3	146.2

[1] Excludes outlays for public buildings that are included in other categories in this table.

Table 6–15. CURRENT SERVICES OUTLAY PROJECTIONS FOR FEDERAL PHYSICAL CAPITAL SPENDING

(In billions of constant 1992 dollars)

	1998 Actual	Estimate				
		1999	2000	2001	2002	2003
Nondefense:						
Transportation-related categories:						
Roadways and bridges	17.7	20.0	21.5	21.9	21.9	21.7
Airports and airway facilities	3.6	3.4	3.5	3.5	3.6	3.7
Mass transportation systems	3.4	3.3	3.3	3.8	4.0	4.2
Railroads	0.6	0.4	0.5	0.6	0.6	0.6
Subtotal, transportation	25.3	27.0	28.8	29.9	30.0	30.2
Housing and buildings categories:						
Federally assisted housing	7.1	6.0	6.8	7.2	7.1	7.2
Hospitals	1.8	1.8	1.8	1.7	1.7	1.6
Public buildings [1]	2.8	3.3	3.3	3.4	3.6	3.6
Subtotal, housing and buildings categories	11.7	11.0	11.9	12.4	12.4	12.4
Other nondefense categories:						
Wastewater treatment and related facilities	2.2	2.4	2.5	2.6	2.5	2.5
Water resources projects	2.2	3.2	2.9	2.9	2.7	2.8
Space and communications facilities	3.0	2.6	3.1	3.2	3.3	3.1
Energy programs	0.9	1.1	0.8	0.8	1.1	1.1
Community development programs	4.7	4.7	4.6	4.5	4.5	4.5
Other nondefense	0.9	6.9	6.2	6.5	6.0	6.6
Subtotal, other nondefense	13.9	20.9	20.0	20.6	20.2	20.7
Subtotal, nondefense	50.9	58.9	60.7	62.9	62.6	63.3
National defense	49.5	48.7	46.5	47.7	47.7	47.8
Total	100.4	107.7	107.2	110.7	110.3	111.1

[1] Excludes outlays for public buildings that are included in other categories in this table.

Public Civilian Capital Needs Assessments

The Act requires information regarding the state of major Federal infrastructure programs, including highways and bridges, airports and airway facilities, mass transit, railroads, federally assisted housing, hospitals, water resources projects, and space and communications investments. Funding levels, long-term projections, policy issues, needs assessments, and critiques, are required for each category.

Capital needs assessments change little from year to year, in part due to the long-term nature of the facilities themselves, and in part due to the consistency of the analytical techniques used to develop the assessments and the comparatively steady but slow changes in underlying demographics. As a result, the practice has arisen in reports in previous years to refer to earlier discussions, where the relevant information had been carefully presented and changes had been minimal.

The needs assessment material in reports of earlier years is incorporated this year largely by reference to earlier editions and by reference to other needs assessments. The needs analyses, their major components, and their critical evaluations have been fully covered in past Supplements, such as the 1990 Supplement to Special Analysis D.

It should be noted that the needs assessment data referenced here have not been determined on the basis of cost-benefit analysis. Rather, the data reflect the level of investment necessary to meet a predefined standard (such as maintenance of existing highway conditions). The estimates do not address whether the benefits of each investment would actually be greater than its cost or whether there are more cost-effective alternatives to capital investment, such as initiatives to reduce demand or use existing assets more efficiently. Before investing in physical capital, it is necessary to compare the cost of each project with its estimated benefits, within the overall constraints on Federal spending.

Significant Factors Affecting Infrastructure Needs Assessments

Highways

1. Projected annual average growth in travel to the year 2015	1.96 percent
2. Annual cost to maintain overall 1995 conditions and performance on highways eligible for Federal-aid	$33.4 billion (1995 dollars)
3. Annual cost to maintain overall 1995 conditions on bridges	$5.6 billion (1995 dollars)

Airports and Airway Facilities

1. Airports in the National Plan of Integrated Airport Systems with scheduled passenger traffic	528
2. Air traffic control towers	451
3. Airport development eligible under airport improvement program for period 1993–1997	$29.7 billion ($9.4 billion for capacity) (1992 dollars)

Mass Transportation Systems

1. Yearly cost to maintain condition and performance of rail facilities over a period of 20 years	$6.1 billion (1995 dollars)
2. Yearly cost to replace and maintain the urban, rural, and special services bus fleet and facilities	$3.6 billion (1995 dollars)

Wastewater Treatment

1. Total remaining needs of sewage treatment facilities	$128 billion (1996 dollars)
2. Total Federal expenditures under the Clean Water Act of 1972 through 1999	$72 billion
3. The population served by centralized treatment facilities: percentage that benefits from at least secondary sewage treatment systems (1996)	91 percent
4. States and territories served by State Revolving Funds	51

Housing

1. Total unsubsidized very low income renter households with worst case needs (5.3 million*)	
A. In severely substandard units	0.4 million
B. With a rent burden greater than 50 percent	5.0 million

*The total is less than the sum because some renter families have both problems.

Indian Health (IHS) Care Facilities

1. IHS hospital occupancy rates (1998)	45.0 percent
2. Average length of stay, IHS hospitals (days) (1998)	4.1
3. Hospital admissions (1998)	57,114
4. Outpatient visits (1997)	4,224,095
5. Eligible population (1999)	1,485,508

Department of Veterans Affairs (VA) Hospitals (1998)

1. Hospitals	166
2. Ambulatory clinics	544
3. Domiciliaries	40
4. Vet centers	206
5. Nursing homes	132

Water Resources

Water resources projects include navigation (deepwater ports and inland waterways); flood and storm damage protection; irrigation; hydropower; municipal and industrial water supply; recreation; fish and wildlife mitigation, enhancement, and restoration; and soil conservation.

Potential water resources investment needs typically consist of the set of projects that pass both a benefit-cost test for economic feasibility and a test for environmental acceptability. In the case of fish and wildlife mitigation or restoration projects, the set of eligible projects includes those that pass a cost-effectiveness test.

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