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 Executive Branch 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.

In all of the following presentations, Department of Defense projections for 2002 and beyond represent estimates based on historical program and spending levels. The most notable exceptions are the inclusion in these estimates of $2.6 billion for a new research and development initiative and $400 million for a housing initiative, both proposed for 2002. All other projections, beginning in 2002, are subject to change as a result of the Defense Strategy Review now underway. Further information on Department of Defense projections can be found in Chapter 7, "Research and Development Funding," in this volume, and in the National Defense chapter in the main Budget volume.

Part I: DESCRIPTION OF FEDERAL INVESTMENT

For more than fifty years, the Federal budget has included a chapter on Federal investment—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 2006.

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 25, "Budget System and Concepts and Glossary."

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 $253.6 billion in 2000. They are estimated to increase to $270.8 billion in 2001 and, subject to the Defense Strategic Review mentioned in the introduction to this chapter, are projected to increase further to $298.5 billion in 2002. Major Federal investment outlays will comprise an estimated 15.2 percent of total Federal outlays in 2002 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 Part. 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 $145.7 billion in 2002. Physical investment outlays are for construction and rehabilitation, the purchase of major equipment, and the purchase or sale of land and structures. More than 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 $56.1 billion in 2000 and are estimated to increase to $58.1 billion in 2001 and $62.3 billion in 2002. Almost all of these outlays, or an estimated $57.1 billion in 2002, 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.

Outlays for direct physical investment for nondefense purposes are estimated to be $27.1 billion in 2002. These outlays include $16.3 billion for construction and rehabilitation. This amount includes funds for water, power, and natural resources projects of the 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; facilities for space and science programs, and Indian Health Service hospitals and clinics. Outlays for the acquisition of major equipment are estimated to be $10.3 billion in 2002. The largest amounts are for the air traffic control system. For the purchase or sale of land and structures, disbursements are estimated to exceed collections by $0.4 billion in 2002. These purchases are largely for buildings and land for parks and other recreation purposes.

Grants to State and local governments for physical investment are estimated to be $56.3 billion in 2002. Almost two-thirds of these outlays, or $37.4 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

Table 6–1. COMPOSITION OF FEDERAL INVESTMENT OUTLAYS

(In billions of dollars)

	2000 Actual	Estimate	
		2001	2002
Federal Investment			
Major public physical capital investment:			
Direct Federal:			
National defense	56.1	58.1	62.3
Nondefense	25.4	26.6	27.1
Subtotal, direct major public physical capital investment	81.5	84.8	89.4
Grants to State and local governments	48.7	52.9	56.3
Subtotal, major public physical capital investment	130.2	137.7	145.7
Conduct of research and development:			
National defense	41.0	41.6	46.8
Nondefense	32.9	36.8	40.4
Subtotal, conduct of research and development	73.9	78.4	87.2
Conduct of education and training:			
Grants to State and local governments	31.4	35.2	39.4
Direct Federal	18.0	19.6	26.2
Subtotal, conduct of education and training	49.5	54.8	65.6
Major Federal investment outlays	**253.6**	**270.8**	**298.5**
MEMORANDUM			
Major Federal investment outlays:			
National defense	97.1	99.7	109.2
Nondefense	156.4	171.1	189.3
Total, major Federal investment outlays	253.6	270.8	298.5
Miscellaneous physical investments:			
Commodity inventories	–*	0.3	–0.4
Other physical investment (direct)	2.8	3.7	3.6
Total, miscellaneous physical investment	2.8	4.0	3.2
Total, Federal investment outlays, including miscellaneous physical investment	256.3	274.8	301.7

to be $87.2 billion in 2002. 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. More than half of these outlays, an estimated $46.8 billion in 2002, are for national defense. Physical investment for research and development facilities and equipment is included in the physical investment category.

Nondefense outlays for the conduct of research and development are estimated to be $40.4 billion in 2002. This 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 $65.6 billion in 2002. 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 $39.4 billion in 2002, 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 Federal education and training outlays are estimated to be $26.2 billion in 2002. 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 $0.4 billion in 2002.

Outlays for other miscellaneous physical investment are estimated to be $3.6 billion in 2002. This category includes primarily conservation programs. These are entirely direct Federal outlays.

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 2006. 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		2000 Actual	Estimate					
			2001	2002	2003	2004	2005	2006
NATIONAL DEFENSE								
Major public physical investment:								
Construction and rehabilitation	**BA**	**5,596**	**5,043**	**5,843**	**6,022**	**6,186**	**6,356**	**6,529**
	O	4,713	4,925	5,113	5,181	5,360	5,580	5,694
Acquisition of major equipment	**BA**	**54,573**	**62,496**	**60,147**	**62,026**	**63,747**	**65,528**	**67,353**
	O	51,388	53,205	57,239	57,540	59,592	62,167	63,423
Purchase or sale of land and structures	**BA**	**–45**	**–20**	**–19**	**–41**	**–41**	**–42**	**–42**
	O	–45	–20	–19	–40	–41	–42	–42
Subtotal, major public physical investment	**BA**	**60,124**	**67,519**	**65,971**	**68,007**	**69,892**	**71,842**	**73,840**
	O	56,056	58,110	62,333	62,681	64,911	67,705	69,075
Conduct of research and development	**BA**	**42,326**	**44,484**	**48,289**	**49,769**	**51,133**	**52,544**	**53,991**
	O	41,050	41,596	46,850	47,145	48,803	50,850	51,883
Conduct of education and training (civilian)	**BA**	**10**	**9**	**9**	**11**	**11**	**12**	**12**
	O	8	9	15	17	18	18	19
Subtotal, national defense investment	**BA**	**102,460**	**112,012**	**114,269**	**117,787**	**121,036**	**124,398**	**127,843**
	O	97,114	99,715	109,198	109,843	113,732	118,573	120,977
NONDEFENSE								
Major public physical investment:								
Construction and rehabilitation:								
Highways	**BA**	**29,451**	**35,786**	**34,666**	**30,859**	**31,718**	**32,581**	**33,516**
	O	24,910	27,093	29,222	30,383	31,371	32,353	33,225
Mass transportation	**BA**	**7,108**	**5,979**	**6,453**	**7,163**	**7,358**	**7,557**	**7,770**
	O	5,100	5,222	5,415	5,539	6,148	6,888	7,179
Rail transportation	**BA**	**10**	**54**	**21**	**21**	**22**	**22**	**23**
	O	15	55	30	26	20	22	23
Air transportation	**BA**	**2,872**	**2,637**	**2,985**	**3,416**	**3,505**	**3,596**	**3,689**
	O	1,637	2,185	2,788	3,120	3,327	3,466	3,595
Community development block grants	**BA**	**4,809**	**5,113**	**4,802**	**4,909**	**5,019**	**5,130**	**5,245**
	O	4,955	4,940	5,044	4,979	4,913	4,944	5,042
Other community and regional development	**BA**	**1,552**	**2,246**	**1,732**	**1,762**	**1,797**	**1,831**	**1,865**
	O	1,368	1,781	1,774	1,800	1,857	1,832	1,808
Pollution control and abatement	**BA**	**4,065**	**3,954**	**3,569**	**3,629**	**3,690**	**3,414**	**2,935**
	O	4,152	4,013	3,904	3,945	3,909	3,907	3,836
Water resources	**BA**	**3,281**	**3,717**	**3,053**	**3,125**	**3,191**	**3,274**	**3,340**
	O	3,634	3,692	3,455	3,373	3,394	3,442	3,333
Housing assistance	**BA**	**6,892**	**7,324**	**6,624**	**6,771**	**6,922**	**7,076**	**7,235**
	O	7,169	7,904	7,989	7,804	7,587	7,590	7,634
Energy	**BA**	**1,152**	**1,179**	**1,315**	**1,230**	**1,316**	**1,316**	**1,318**
	O	1,151	1,177	1,318	1,232	1,318	1,318	1,319
Veterans hospitals and other health	**BA**	**1,269**	**1,444**	**1,684**	**1,785**	**1,821**	**1,861**	**1,902**
	O	1,548	1,407	1,650	1,727	1,819	1,862	1,909
Postal Service	**BA**	**1,231**	**825**	**858**	**1,331**	**983**	**1,114**	**1,048**
	O	1,500	935	975	1,025	1,083	1,068	1,083
GSA real property activities	**BA**	**766**	**1,173**	**1,489**	**1,459**	**1,532**	**1,598**	**1,634**
	O	956	1,027	1,175	1,432	1,944	2,153	2,139
Other programs	**BA**	**5,294**	**7,797**	**6,632**	**6,593**	**6,648**	**6,745**	**6,880**
	O	5,276	6,771	6,879	6,975	6,734	6,720	6,832
Subtotal, construction and rehabilitation	**BA**	**69,752**	**79,228**	**75,883**	**74,053**	**75,522**	**77,115**	**78,400**
	O	63,371	68,202	71,618	73,360	75,424	77,565	78,957
Acquisition of major equipment:								
Air transportation	**BA**	**1,979**	**2,546**	**2,836**	**2,901**	**2,966**	**3,032**	**3,100**
	O	2,060	2,005	2,302	2,523	2,704	2,940	3,006
Postal Service	**BA**	**676**	**778**	**493**	**900**	**1,000**	**675**	**675**
	O	592	735	749	821	1,204	1,021	848
Other	**BA**	**6,418**	**6,801**	**6,996**	**6,930**	**7,014**	**7,131**	**7,263**
	O	6,420	6,813	7,339	7,049	7,223	7,381	7,510
Subtotal, acquisition of major equipment	**BA**	**9,073**	**10,125**	**10,325**	**10,731**	**10,980**	**10,838**	**11,038**
	O	9,072	9,553	10,390	10,393	11,131	11,342	11,364
Purchase or sale of land and structures	**BA**	**663**	**685**	**246**	**263**	**576**	**567**	**574**
	O	781	747	377	451	838	938	985

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

(in millions of dollars)

Description		2000 Actual	Estimate					
			2001	2002	2003	2004	2005	2006
Other physical assets (grants)	**BA**	**950**	**1,247**	**1,437**	**1,470**	**1,497**	**1,531**	**1,556**
	O	873	1,051	962	992	1,135	1,077	1,112
Subtotal, major public physical investment	**BA**	**80,438**	**91,285**	**87,891**	**86,517**	**88,575**	**90,051**	**91,568**
	O	74,097	79,553	83,347	85,196	88,528	90,922	92,418
Conduct of research and development:								
General science, space and technology	**BA**	**10,513**	**11,666**	**11,676**	**12,653**	**13,396**	**13,885**	**14,333**
	O	10,103	10,746	11,549	12,072	13,052	13,593	14,081
Energy	**BA**	**1,066**	**1,429**	**1,174**	**1,180**	**1,359**	**1,405**	**1,467**
	O	1,265	1,401	1,195	1,264	1,307	1,383	1,419
Transportation	**BA**	**1,586**	**1,650**	**1,665**	**1,569**	**1,607**	**1,608**	**1,645**
	O	1,440	1,467	1,657	1,785	1,653	1,682	1,697
Health	**BA**	**17,694**	**20,376**	**22,799**	**26,736**	**27,239**	**27,850**	**28,470**
	O	15,220	17,738	20,470	23,310	25,983	27,051	27,713
Natural resources and environment	**BA**	**1,944**	**2,055**	**1,995**	**2,041**	**2,084**	**2,130**	**2,179**
	O	1,687	1,835	1,782	1,804	1,822	1,846	1,885
All other research and development	**BA**	**3,444**	**3,967**	**3,626**	**3,712**	**3,691**	**3,772**	**3,859**
	O	3,182	3,592	3,743	3,784	3,711	3,719	3,798
Subtotal, conduct of research and development	**BA**	**36,247**	**41,143**	**42,935**	**47,891**	**49,376**	**50,650**	**51,953**
	O	32,897	36,779	40,396	44,019	47,528	49,274	50,593
Conduct of education and training:								
Education, training, employment and social services:								
Elementary, secondary, and vocational education [1]	**BA**	**17,066**	**24,593**	**44,326**	**30,429**	**31,107**	**31,798**	**32,510**
	O	20,524	23,276	25,601	29,603	30,384	30,954	31,608
Higher education	**BA**	**11,859**	**10,954**	**16,715**	**16,832**	**17,422**	**18,054**	**18,701**
	O	10,137	9,622	15,626	16,325	16,605	17,278	17,982
Research and general education aids	**BA**	**2,280**	**2,720**	**2,240**	**2,287**	**2,338**	**2,388**	**2,439**
	O	2,212	2,635	2,587	2,430	2,429	2,448	2,503
Training and employment [1]	**BA**	**2,848**	**5,506**	**7,442**	**5,463**	**5,382**	**5,501**	**5,624**
	O	4,758	5,815	6,798	6,170	5,545	5,474	5,534
Social services [1]	**BA**	**6,703**	**9,478**	**11,218**	**10,258**	**10,511**	**10,772**	**11,041**
	O	7,616	8,237	9,422	9,831	10,105	10,357	10,611
Subtotal, education, training, and social services	**BA**	**40,756**	**53,251**	**81,941**	**65,269**	**66,760**	**68,513**	**70,315**
	O	45,247	49,585	60,034	64,359	65,068	66,511	68,238
Veterans education, training, and rehabilitation	**BA**	**1,663**	**2,314**	**2,397**	**2,467**	**2,549**	**2,653**	**2,788**
	O	1,694	2,293	2,400	2,476	2,559	2,680	2,807
Health	**BA**	**1,099**	**1,407**	**1,216**	**1,370**	**1,395**	**1,424**	**1,455**
	O	962	1,173	1,248	1,267	1,360	1,402	1,430
Other education and training	**BA**	**1,805**	**1,889**	**1,981**	**2,117**	**1,957**	**2,006**	**2,046**
	O	1,541	1,748	1,909	1,999	2,043	2,046	2,044
Subtotal, conduct of education and training	**BA**	**45,323**	**58,861**	**87,535**	**71,223**	**72,661**	**74,596**	**76,604**
	O	49,444	54,799	65,591	70,101	71,030	72,639	74,519
Subtotal, nondefense investment	**BA**	**162,008**	**191,289**	**218,361**	**205,631**	**210,612**	**215,297**	**220,125**
	O	156,438	171,131	189,334	199,316	207,086	212,835	217,530
Total, Federal investment [1]	**BA**	**264,468**	**303,301**	**332,630**	**323,418**	**331,648**	**339,695**	**347,968**
	O	253,552	270,846	298,532	309,159	320,818	331,408	338,507

[1] Budget authority for several programs in this category and in the total does not reflect program level, since budget authority is distorted by the use of advance appropriations in 2000, 2001 and 2002. Budget authority for 2002 is significantly overstated because of a one-time adjustment proposed by the Administration to reverse the misleading budget practice of using advance appropriations simply to avoid spending limitations. For additional information on this issue, see Chapter 13, ''Preview Report,'' in this volume.

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

(in millions of dollars)

Description		2000 Actual	Estimate					
			2001	2002	2003	2004	2005	2006
GRANTS TO STATE AND LOCAL GOVERNMENTS								
Major public physical investments:								
Construction and rehabilitation:								
Highways	**BA**	**29,451**	**35,786**	**34,666**	**30,859**	**31,718**	**32,581**	**33,516**
	O	24,909	27,090	29,218	30,382	31,371	32,353	33,225
Mass transportation	**BA**	**7,108**	**5,979**	**6,453**	**7,163**	**7,358**	**7,557**	**7,770**
	O	5,100	5,222	5,415	5,539	6,148	6,888	7,179
Rail transportation	**O**	7	7	.....	.....	.....	.....	.....
Air transportation	**BA**	**2,799**	**2,623**	**2,969**	**3,400**	**3,488**	**3,579**	**3,672**
	O	1,578	2,173	2,764	3,103	3,311	3,448	3,577
Pollution control and abatement	**BA**	**2,907**	**2,851**	**2,466**	**2,501**	**2,538**	**2,235**	**1,730**
	O	2,700	2,719	2,766	2,817	2,780	2,783	2,694
Other natural resources and environment	**BA**	**49**	**52**	**28**	**29**	**29**	**30**	**31**
	O	67	68	79	52	47	41	42
Community development block grants	**BA**	**4,809**	**5,113**	**4,722**	**4,827**	**4,935**	**5,045**	**5,158**
	O	4,955	4,940	5,036	4,927	4,836	4,861	4,957
Other community and regional development	**BA**	**1,222**	**1,651**	**1,278**	**1,305**	**1,336**	**1,366**	**1,396**
	O	1,077	1,347	1,367	1,378	1,349	1,336	1,315
Housing assistance	**BA**	**6,864**	**7,290**	**6,590**	**6,736**	**6,886**	**7,040**	**7,198**
	O	7,160	7,875	7,955	7,772	7,554	7,556	7,598
Other construction	**BA**	**195**	**1,416**	**294**	**300**	**306**	**312**	**319**
	O	200	319	671	497	390	332	339
Subtotal, construction and rehabilitation	**BA**	**55,404**	**62,761**	**59,466**	**57,120**	**58,594**	**59,745**	**60,790**
	O	47,753	51,760	55,271	56,467	57,786	59,598	60,926
Other physical assets	**BA**	**997**	**1,333**	**1,493**	**1,528**	**1,555**	**1,591**	**1,617**
	O	902	1,143	1,023	1,039	1,186	1,130	1,166
Subtotal, major public physical capital	**BA**	**56,401**	**64,094**	**60,959**	**58,648**	**60,149**	**61,336**	**62,407**
	O	48,655	52,903	56,294	57,506	58,972	60,728	62,092
Conduct of research and development:								
Agriculture	**BA**	**263**	**289**	**264**	**309**	**284**	**289**	**295**
	O	231	276	257	286	276	258	263
Other	**BA**	**244**	**347**	**319**	**306**	**317**	**324**	**332**
	O	174	210	324	343	355	368	384
Subtotal, conduct of research and development	**BA**	**507**	**636**	**583**	**615**	**601**	**613**	**627**
	O	405	486	581	629	631	626	647
Conduct of education and training:								
Elementary, secondary, and vocational education [1]	**BA**	**15,287**	**22,165**	**43,407**	**29,623**	**30,283**	**30,957**	**31,649**
	O	19,352	21,498	23,587	28,184	29,325	29,949	30,587
Higher education	**BA**	**321**	**431**	**362**	**369**	**428**	**444**	**454**
	O	176	396	409	405	414	458	483
Research and general education aids	**BA**	**483**	**502**	**426**	**440**	**451**	**460**	**470**
	O	546	583	533	476	480	478	489
Training and employment [1]	**BA**	**2,090**	**4,015**	**5,453**	**3,981**	**3,918**	**4,005**	**4,094**
	O	3,484	4,491	5,184	4,608	4,090	4,014	4,057
Social services [1]	**BA**	**6,375**	**9,103**	**10,845**	**9,900**	**10,144**	**10,396**	**10,656**
	O	7,359	7,678	9,074	9,467	9,731	9,972	10,218
Agriculture	**BA**	**434**	**438**	**420**	**464**	**446**	**455**	**465**
	O	442	425	466	441	457	462	470
Other	**BA**	**126**	**136**	**121**	**122**	**125**	**128**	**130**
	O	88	110	112	112	114	115	117
Subtotal, conduct of education and training	**BA**	**25,116**	**36,790**	**61,034**	**44,899**	**45,795**	**46,845**	**47,918**
	O	31,447	35,181	39,365	43,693	44,611	45,448	46,421
Subtotal, grants for investment	**BA**	**82,024**	**101,520**	**122,576**	**104,162**	**106,545**	**108,794**	**110,952**
	O	80,507	88,570	96,240	101,828	104,214	106,802	109,160
DIRECT FEDERAL PROGRAMS								
Major public physical investment:								
Construction and rehabilitation:								
National defense:								
Military construction and family housing	**BA**	**5,079**	**4,673**	**5,292**	**5,459**	**5,610**	**5,767**	**5,928**

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

(in millions of dollars)

Description		2000 Actual	Estimate					
			2001	2002	2003	2004	2005	2006
	O	4,202	4,521	4,589	4,616	4,783	4,990	5,091
Atomic energy defense activities and other	**BA**	**517**	**370**	**551**	**563**	**576**	**589**	**601**
	O	511	404	524	565	577	590	603
Subtotal, national defense	**BA**	**5,596**	**5,043**	**5,843**	**6,022**	**6,186**	**6,356**	**6,529**
	O	4,713	4,925	5,113	5,181	5,360	5,580	5,694
International affairs	**BA**	**370**	**727**	**1,308**	**1,337**	**1,367**	**1,397**	**1,429**
	O	240	356	860	1,023	1,189	1,302	1,359
General science, space, and technology	**BA**	**2,968**	**2,990**	**2,562**	**2,522**	**2,489**	**2,495**	**2,536**
	O	2,978	2,961	2,764	2,652	2,611	2,601	2,630
Water resources projects	**BA**	**3,237**	**3,665**	**3,025**	**3,096**	**3,162**	**3,244**	**3,309**
	O	3,568	3,630	3,376	3,321	3,347	3,401	3,291
Other natural resources and environment	**BA**	**1,582**	**1,627**	**1,588**	**1,622**	**1,658**	**1,698**	**1,734**
	O	1,829	1,841	1,618	1,615	1,617	1,629	1,644
Energy	**BA**	**1,152**	**1,179**	**1,315**	**1,230**	**1,316**	**1,316**	**1,318**
	O	1,151	1,177	1,318	1,232	1,318	1,318	1,319
Postal Service	**BA**	**1,231**	**825**	**858**	**1,331**	**983**	**1,114**	**1,048**
	O	1,500	935	975	1,025	1,083	1,068	1,083
Transportation	**BA**	**260**	**243**	**240**	**244**	**252**	**256**	**261**
	O	209	340	263	207	222	238	249
Housing assistance	**BA**	**28**	**34**	**34**	**35**	**36**	**36**	**37**
	O	9	29	34	32	33	34	36
Veterans hospitals and other health facilities	**BA**	**1,179**	**1,344**	**1,634**	**1,734**	**1,769**	**1,808**	**1,847**
	O	1,444	1,322	1,559	1,658	1,743	1,811	1,857
Federal Prison System	**BA**	**441**	**711**	**700**	**716**	**732**	**748**	**765**
	O	477	743	542	918	898	788	806
GSA real property activities	**BA**	**766**	**1,173**	**1,489**	**1,459**	**1,532**	**1,598**	**1,634**
	O	956	1,027	1,175	1,432	1,944	2,153	2,139
Other construction	**BA**	**1,134**	**1,949**	**1,664**	**1,607**	**1,632**	**1,660**	**1,692**
	O	1,257	2,081	1,863	1,778	1,633	1,624	1,618
Subtotal, construction and rehabilitation	**BA**	**19,944**	**21,510**	**22,260**	**22,955**	**23,114**	**23,726**	**24,139**
	O	20,331	21,367	21,460	22,074	22,998	23,547	23,725
Acquisition of major equipment:								
National defense:								
Department of Defense	**BA**	**54,454**	**62,418**	**60,030**	**61,906**	**63,625**	**65,403**	**67,225**
	O	51,272	53,125	57,132	57,428	59,477	62,049	63,303
Atomic energy defense activities	**BA**	**119**	**78**	**117**	**120**	**122**	**125**	**128**
	O	116	80	107	112	115	118	120
Subtotal, national defense	**BA**	**54,573**	**62,496**	**60,147**	**62,026**	**63,747**	**65,528**	**67,353**
	O	51,388	53,205	57,239	57,540	59,592	62,167	63,423
General science and basic research	**BA**	**391**	**449**	**422**	**432**	**441**	**452**	**462**
	O	318	427	409	395	402	415	423
Space flight, research, and supporting activities	**BA**	**869**	**977**	**815**	**769**	**731**	**720**	**726**
	O	871	967	763	777	743	725	724
Energy	**BA**	**121**	**118**	**115**	**115**	**115**	**115**	**115**
	O	121	118	115	115	115	115	115
Postal Service	**BA**	**676**	**778**	**493**	**900**	**1,000**	**675**	**675**
	O	592	735	749	821	1,204	1,021	848
Air transportation	**BA**	**1,979**	**2,546**	**2,836**	**2,901**	**2,966**	**3,032**	**3,100**
	O	2,060	2,005	2,302	2,523	2,704	2,940	3,006
Water transportation (Coast Guard)	**BA**	**830**	**248**	**464**	**474**	**485**	**496**	**507**
	O	340	445	441	376	430	463	488
Other transportation (railroads)	**BA**	**571**	**520**	**521**	**533**	**544**	**557**	**569**
	O	594	554	834	533	545	557	570
Social security	O	66	69	57	60	64	69	73
Hospital and medical care for veterans	**BA**	**687**	**775**	**605**	**622**	**636**	**650**	**664**
	O	1,014	695	781	802	820	838	856
Department of Justice	**BA**	**567**	**612**	**519**	**535**	**546**	**559**	**572**
	O	659	599	573	563	575	588	600
Department of the Treasury	**BA**	**709**	**1,113**	**1,415**	**1,336**	**1,368**	**1,400**	**1,434**
	O	856	1,188	1,390	1,357	1,400	1,437	1,458
GSA general supply fund	**BA**	**626**	**664**	**656**	**656**	**656**	**656**	**656**

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

(in millions of dollars)

Description		2000 Actual	Estimate					
			2001	2002	2003	2004	2005	2006
	O	584	664	656	656	656	656	656
Other	**BA**	**1,000**	**1,239**	**1,408**	**1,400**	**1,434**	**1,466**	**1,497**
	O	968	995	1,259	1,368	1,422	1,465	1,493
Subtotal, acquisition of major equipment	**BA**	**63,599**	**72,535**	**70,416**	**72,699**	**74,669**	**76,306**	**78,330**
	O	60,431	62,666	67,568	67,886	70,672	73,456	74,733
Purchase or sale of land and structures:								
National defense	**BA**	**–45**	**–20**	**–19**	**–41**	**–41**	**–42**	**–42**
	O	–45	–20	–19	–40	–41	–42	–42
International affairs	**BA**	**15**	**28**	**1**	.....	.....	.....	.....
	O	55	90	2	2	2	2	2
Privatization of Elk Hills	**BA**	.....	.....	.....	**–323**	.....	.....	.....
	O	.....	.....	.....	–323	.....	.....	.....
Other	**BA**	**648**	**657**	**245**	**586**	**576**	**567**	**574**
	O	726	657	375	772	836	936	983
Subtotal, purchase or sale of land and structures	**BA**	**618**	**665**	**227**	**222**	**535**	**525**	**532**
	O	736	727	358	411	797	896	943
Subtotal, major public physical investment	**BA**	**84,161**	**94,710**	**92,903**	**95,876**	**98,318**	**100,557**	**103,001**
	O	81,498	84,760	89,386	90,371	94,467	97,899	99,401
Conduct of research and development:								
National defense								
Defense military	**BA**	**39,567**	**41,391**	**45,144**	**46,554**	**47,847**	**49,185**	**50,555**
	O	38,279	38,504	43,706	43,907	45,496	47,471	48,430
Atomic energy and other	**BA**	**2,759**	**3,093**	**3,145**	**3,215**	**3,286**	**3,359**	**3,436**
	O	2,771	3,092	3,144	3,238	3,307	3,379	3,453
Subtotal, national defense	**BA**	**42,326**	**44,484**	**48,289**	**49,769**	**51,133**	**52,544**	**53,991**
	O	41,050	41,596	46,850	47,145	48,803	50,850	51,883
International affairs	**BA**	**200**	**216**	**206**	**211**	**215**	**221**	**225**
	O	179	183	183	185	185	186	196
General science, space and technology								
NASA	**BA**	**5,513**	**6,232**	**6,320**	**7,178**	**7,820**	**8,183**	**8,505**
	O	5,411	5,724	6,298	6,673	7,449	7,917	8,288
National Science Foundation	**BA**	**2,747**	**3,057**	**3,033**	**3,100**	**3,149**	**3,220**	**3,291**
	O	2,446	2,644	2,928	3,044	3,202	3,222	3,284
Department of Energy	**BA**	**2,253**	**2,377**	**2,323**	**2,375**	**2,427**	**2,482**	**2,537**
	O	2,246	2,378	2,323	2,355	2,401	2,454	2,509
Subtotal, general science, space and technology	**BA**	**10,713**	**11,882**	**11,882**	**12,864**	**13,611**	**14,106**	**14,558**
	O	10,282	10,929	11,732	12,257	13,237	13,779	14,277
Energy	**BA**	**1,066**	**1,429**	**1,174**	**1,180**	**1,359**	**1,405**	**1,467**
	O	1,265	1,401	1,195	1,264	1,307	1,383	1,419
Transportation:								
Department of Transportation	**BA**	**404**	**517**	**571**	**550**	**562**	**574**	**589**
	O	348	423	535	566	555	570	578
NASA	**BA**	**999**	**926**	**890**	**831**	**852**	**836**	**852**
	O	958	901	879	963	839	845	845
Subtotal, transportation	**BA**	**2,469**	**2,872**	**2,635**	**2,561**	**2,773**	**2,815**	**2,908**
	O	2,571	2,725	2,609	2,793	2,701	2,798	2,842
Health:								
National Institutes of Health	**BA**	**16,916**	**19,483**	**21,993**	**25,909**	**26,391**	**26,979**	**27,580**
	O	14,568	16,941	19,619	22,488	25,155	26,203	26,846
All other health	**BA**	**765**	**818**	**726**	**742**	**757**	**776**	**793**
	O	639	768	809	769	765	776	788
Subtotal, health	**BA**	**17,681**	**20,301**	**22,719**	**26,651**	**27,148**	**27,755**	**28,373**
	O	15,207	17,709	20,428	23,257	25,920	26,979	27,634
Agriculture	**BA**	**1,160**	**1,265**	**1,171**	**1,263**	**1,219**	**1,243**	**1,272**
	O	1,063	1,189	1,210	1,287	1,283	1,287	1,309

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

(in millions of dollars)

Description		2000 Actual	Estimate					
			2001	2002	2003	2004	2005	2006
Natural resources and environment	BA	**1,944**	**2,055**	**1,995**	**2,041**	**2,084**	**2,130**	**2,179**
	O	1,687	1,835	1,782	1,804	1,822	1,846	1,885
National Institute of Standards and Technology	BA	**332**	**355**	**318**	**325**	**332**	**340**	**348**
	O	396	395	423	388	345	349	353
Hospital and medical care for veterans	BA	**642**	**700**	**719**	**736**	**753**	**770**	**788**
	O	658	683	717	752	767	769	786
All other research and development	BA	**799**	**1,077**	**913**	**835**	**855**	**878**	**900**
	O	628	828	914	852	822	841	860
Subtotal, conduct of research and development	BA	**78,066**	**84,991**	**90,641**	**97,045**	**99,908**	**102,581**	**105,317**
	O	73,542	77,889	86,665	90,535	95,700	99,498	101,829
Conduct of education and training:								
Elementary, secondary, and vocational education	BA	**1,779**	**2,428**	**919**	**806**	**824**	**841**	**861**
	O	1,172	1,778	2,014	1,419	1,059	1,005	1,021
Higher education	BA	**11,538**	**10,523**	**16,353**	**16,463**	**16,994**	**17,610**	**18,247**
	O	9,961	9,226	15,217	15,920	16,191	16,820	17,499
Research and general education aids	BA	**1,797**	**2,218**	**1,814**	**1,847**	**1,887**	**1,928**	**1,969**
	O	1,666	2,052	2,054	1,954	1,949	1,970	2,014
Training and employment	BA	**758**	**1,491**	**1,989**	**1,482**	**1,464**	**1,496**	**1,530**
	O	1,274	1,324	1,614	1,562	1,455	1,460	1,477
Health	BA	**1,085**	**1,393**	**1,202**	**1,356**	**1,380**	**1,409**	**1,440**
	O	948	1,159	1,234	1,253	1,346	1,388	1,415
Veterans education, training, and rehabilitation	BA	**1,663**	**2,314**	**2,397**	**2,467**	**2,549**	**2,653**	**2,788**
	O	1,694	2,293	2,400	2,476	2,559	2,680	2,807
General science and basic research	BA	**640**	**797**	**938**	**956**	**854**	**873**	**892**
	O	513	666	787	867	897	874	861
National defense	BA	**8**	**7**	**7**	**7**	**7**	**8**	**8**
	O	6	7	13	13	14	14	15
International affairs	BA	**305**	**232**	**243**	**248**	**254**	**260**	**265**
	O	306	306	275	279	250	256	261
Other	BA	**644**	**677**	**648**	**703**	**664**	**685**	**698**
	O	465	816	633	682	717	742	747
Subtotal, conduct of education and training	BA	**20,217**	**22,080**	**26,510**	**26,335**	**26,877**	**27,763**	**28,698**
	O	18,005	19,627	26,241	26,425	26,437	27,209	28,117
Subtotal, direct Federal investment	BA	**182,444**	**201,781**	**210,054**	**219,256**	**225,103**	**230,901**	**237,016**
	O	173,045	182,276	202,292	207,331	216,604	224,606	229,347
Total, Federal investment[1]	BA	**264,468**	**303,301**	**332,630**	**323,418**	**331,648**	**339,695**	**347,968**
	O	253,552	270,846	298,532	309,159	320,818	331,408	338,507

[1] Budget authority for several programs in this category and the total does not reflect program level, since budget authority is distorted by the use of advance appropriations in 2000, 2001 and 2002. Budget authority for 2002 is significantly overstated because of a one-time adjustment proposed by the Administration to reverse the misleading budget practice of using advance appropriations simply to avoid spending limitations. For additional information on this issue, see Chapter 13, ''Preview Report,'' in this volume.

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 Executive Branch 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 life-cycle 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. The Congress has expressed its concern about planning for capital assets with legislation and other actions that complemented Executive Branch 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.

Executive Branch concern. For many years, the Executive Branch has devoted particular attention to improving the process of planning, budgeting, and acquiring capital assets. The current 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 2000) (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. This guidance encourages the Executive Branch agencies to be responsible for using good capital programming principles for managing the capital assets they use, and asks the agencies 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,* a Supplement to Part 3. 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, this budget reissues 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.

The *Report of the President's Commission to Study Capital Budgeting* (February 1999) proposed a series of recommendations to improve each part of the budget process; setting priorities, making current budget decisions, reporting on these decisions, and subsequently evaluating them. The Commission's broadest and most fundamental conclusion was that insufficient attention is paid to the long-run consequences of all budget decisions. The report included two recommendations to facilitate the setting of priorities among all programs, not just those involving capital expenditures. The first recommended integration of the planning under the Government Performance and Results Act (GPRA) with budgeting in the form of annually revised five-year plans, and greater emphasis by decision-makers in the Executive Branch and Congress on the longer-run implications of current year decisions. The second recommended an ongoing effort within the Federal government to analyze the benefits and costs of all major government programs as a guide to future policies. The report also recommended evaluating the benefits and costs of major investment projects undertaken in the past.

From Planning to Budgeting

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) and also in its more recent letter to the Chairman of the Senate Budget Committee, entitled "Budget Issues: Incremental Funding of Capital Asset Acquisitions (February 26, 2001)." Full funding was also endorsed in the *Report of the President's Commission to Study Capital Budgeting* (February 1999).

The full funding principle 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.

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 acquisition 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.

[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" (November 20, 2000), 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 systems.

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 Executive Branch efforts, 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.

Part 3 incorporates 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.

As a result of these 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 Administration will work with the Congress to promote full upfront funding for capital projects or usable segments thereof, and to improve capital planning and integrate capital planning with GPRA strategic plans.

Major Acquisition Proposals

For the definition of major capital assets described above, this budget requests $90.7 billion of budget authority for 2002. This includes $65.3 billion for the Department of Defense, subject to the Defense Strategy Review mentioned in the introduction to this chapter, and $25.4 billion for other agencies. The major requests are shown in 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.

Construction and Rehabilitation

This budget includes $20.8 billion of budget authority for 2002 for construction and rehabilitation.

Department of Defense.—The budget projects $5.3 billion for 2002 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; and
- correct safety deficiencies and environmental problems.

Table 6–4. CAPITAL ASSET ACQUISITIONS

(Budget authority in billions of dollars)

	2000 Actual	2001 Estimate	2002 Proposed
MAJOR ACQUISITIONS			
Construction and rehabilitation:			
Defense military construction and family housing	5.1	4.7	5.3
Corps of Engineers	2.8	3.2	2.7
National Aeronautics and Space Administration	2.8	2.6	2.2
General Services Administration	0.8	1.2	1.5
Department of State	0.4	0.7	1.3
Department of Energy	0.9	0.9	1.1
Other agencies	5.9	6.6	6.8
Subtotal, construction and rehabilitation	18.6	19.8	20.8
Major equipment:			
Department of Defense	54.5	62.4	60.0
Department of Transportation	2.8	2.8	3.3
Department of the Treasury	0.7	1.1	1.4
National Aeronautics and Space Administration	0.9	1.0	0.8
Department of Commerce	0.6	0.8	0.8
Department of Veterans Affairs	0.7	0.8	0.6
Other agencies	2.7	2.9	2.8
Subtotal, major equipment	62.8	71.8	69.7
Purchases of land and structures	0.6	0.7	0.2
Total, major acquisitions [1]	82.1	92.3	90.7

[1] This total is derived from the direct Federal major public physical investment budget authority on Table 6–3 ($92.9 billion for 2002). Table 6–4 excludes an estimate of spending for assets not owned by the Federal Government ($2.2 billion for 2002).

Corps of Engineers.—This budget requests $2.7 billion for 2002 for construction and rehabilitation for the 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.

National Aeronautics and Space Administration.—The budget includes $2.2 billion for continued investments in construction of the Space Station, and for research facilities for science, aeronautics, and technology.

General Services Administration (GSA).—The 2002 budget includes $1.5 billion in budget authority for GSA for the construction or major renovation of buildings. These funds will allow for new construction and the acquisition of courthouses, border stations, and general purpose office space in locations where long-term needs show that ownership is preferable to leasing.

Department of State.—The Administration requests $1.3 billion in budget authority to support embassy security, construction, and major renovations. These funds are needed to help modernize Department of State facilities around the world.

Department of Energy.—This budget requests $1.1 billion for 2002 for construction and rehabilitation for the Department of Energy. This includes funds for nuclear waste disposal, scientific research, power marketing, and other activities.

Other agencies.—This budget includes $6.8 billion in budget authority for construction and rehabilitation for

other agencies in 2002. This includes amounts for the Tennessee Valley Authority ($1.1 billion); Department of the Interior ($1.1 billion), largely for the Bureau of Indian Affairs, water resources, and parks; the Department of Health and Human Services ($0.9 billion), largely for the National Institutes of Health and the Indian Health Service; and the Postal Service ($0.9 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 $69.7 billion in budget authority for 2002 for the purchase of major equipment. For information on information technology investments, see Chapter 22 in this volume, "Program Performance Benefits from Major Information Technology Investments."

Department of Defense.—The budget includes $60.0 billion for equipment purchases primarily related to procurement for 2002 of 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 $3.3 billion in budget authority for the Department of Transportation for major equipment, which includes $2.8 billion to modernize the air traffic control system and $0.5 billion for the Coast Guard to acquire vessels and other equipment.

Department of the Treasury.—The budget requests $1.4 billion in budget authority for major equipment. The largest amounts are $0.6 billion to modernize information technology systems for the Internal Revenue Service.

National Aeronautics and Space Administration (NASA).—The budget requests $0.8 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 Commerce.—The budget requests $0.8 billion for the Department of Commerce, largely for the continued acquisition of more sophisticated and advanced weather satellites and related technology.

Department of Veterans Affairs.—This budget requests $0.6 billion for medical equipment for health care facilities. These funds will be used to continue to provide quality health care services for veterans.

Other agencies.—This budget requests $2.8 billion for major equipment for other agencies for 2002. This includes amounts for the General Services Administration ($0.7 billion), largely for vehicles; the Department Justice ($0.6 billion), including funds for the Federal Bureau of Investigation; and the Postal Service ($0.5 billion).

Purchase and Sale of Land and Structures

This budget includes $0.2 billion for 2002 for the purchase and sale of land and structures. This includes $0.4 billion for Federal land acquisition by the Departments of the Interior and Agriculture for parks, forests, refuges, and other recreational purposes. These and other purchases are partially offset by sales of land and structures in other agencies.

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

Introduction and Summary

The Executive Branch 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 appor-

tionment 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 compliance plan for this budget year; 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, new or continued funding will be recommend 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.")

Because good information on capital planning is essential to long-term success, the Executive Branch 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 2000).

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 is 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 2000).
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 2000).

Funding

Full funding: Full funding means that appropriations—regular appropriations or advance appropria-

tions—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) establishing 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 6–5 shows the value of the net federally financed physical capital stock since 1960, in constant fiscal year 1996 dollars. The total stock grew at a 2.2 percent average annual rate from 1960 to 2000, with periods of faster growth during the late 1960s and the 1980s. The stock amounted to $1,921 billion in 2000 and is estimated to increase slightly to $1,994 billion by 2002. In 2000, the national defense capital stock accounted for $635 billion, or 33 percent of the total, and nondefense stocks for $1,286 billion, or 67 percent of the total. [3]

Real stocks of defense and nondefense capital show very different trends. Nondefense stocks have grown consistently since 1970, increasing from $455 billion in 1970 to $1,286 billion in 2000. With the investments proposed in the budget, nondefense stocks are estimated to grow to $1,370 billion in 2002. During the 1970s, the nondefense capital stock, grew at an average annual rate of 4.9 percent. In the 1980s, however, the growth rate slowed to 2.9 percent annually, with growth continuing at about that rate since then.

[3] The historical stock estimates are reduced from those published last year because of an assumed faster depreciation rate for highways and the full incorporation of revised price indexes from the Bureau of Economic Analysis, as explained in the note on estimating methods at the end of this part. The revisions leave the year-to-year trends virtually unchanged.

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, a large defense buildup began to increase the stock of defense capital. By 1986, the defense stock had exceeded its earlier Vietnam-era peak. In the last few years, depreciation on the increased stocks, together with a slower pace of defense physical capital investment allowed by the collapse of the Soviet Union and the closure or realignment of unneeded military bases, reduced the stock from its previous levels. The increased defense investment in this budget would slow the rate of decline markedly, with the stock estimated to decrease from $635 billion in 2000 to $624 billion in 2002.

Another trend in the Federal physical capital stocks is the shift from direct Federal assets to grant-financed assets. In 1960, 42 percent of federally financed nondefense capital was owned by the Federal Government, and 58 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 2000, 27 percent of the nondefense stock was owned by the Federal Government and 73 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

Table 6–5. NET STOCK OF FEDERALLY FINANCED PHYSICAL CAPITAL

(In billions of 1996 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	806	572	234	98	61	36	136	82	25	20	9
1965	892	554	338	128	78	51	209	146	30	21	12
1970	1,044	589	455	155	94	61	301	213	44	25	19
1975	1,091	521	570	176	109	67	394	261	71	39	23
1980	1,216	484	732	206	130	76	526	317	112	73	25
1985	1,422	569	853	234	143	90	619	368	135	92	24
1990	1,696	721	975	269	154	114	706	429	147	105	26
Annual data:											
1995	1,832	712	1,119	311	164	146	809	496	156	115	43
1996	1,845	691	1,153	319	165	154	834	511	159	116	48
1997	1,858	672	1,186	327	165	162	859	526	162	118	53
1998	1,869	657	1,212	330	165	165	882	540	165	119	59
1999	1,890	644	1,246	338	166	173	908	556	167	120	65
2000	1,921	635	1,286	350	167	183	936	574	170	121	70
2001 est.	1,956	628	1,328	362	169	194	966	594	173	123	76
2002 est.	1,994	624	1,370	373	170	203	997	614	176	124	82

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 6–6 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. For some categories in the table, such as water and power programs, however, 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 6–5.

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 6–7, the R&D capital stock financed by Federal outlays is estimated to be $914 billion in 2000 in constant 1996 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 2000 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 1981, 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.

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 1990 led to a more rapid growth of the R&D stock. Since then, real 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 1980s, from an annual rate of 3.8 percent in the 1970s to a rate of 2.1 percent in the 1980s. 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 6–8, the federally financed education stock is estimated at $1,030 billion in 2000 in constant 1996 dollars, rising to $1,157 billion in 2002. The vast majority of the Nation's education stock is

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

(In billions of 1996 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	22.7	4.7	18.1	7.0	2.2	4.7	2.5	2.3	15.7	2.4	13.3	12.6	0.1	0.1	0.5
1965	32.5	6.9	25.6	10.1	3.0	7.1	3.3	3.8	22.3	3.8	18.5	15.5	2.1	0.4	0.5
1970	32.1	9.4	22.6	6.9	3.8	3.1	2.3	0.8	25.1	5.6	19.5	11.9	5.1	0.9	1.6
1975	32.9	11.6	21.3	9.0	4.3	4.8	3.6	1.2	23.8	7.4	16.5	7.0	4.3	4.5	0.7
1980	46.9	14.6	32.4	11.0	4.9	6.0	3.9	2.2	36.0	9.6	26.4	12.3	7.5	6.8	–0.2
1985	45.4	17.8	27.7	13.7	6.4	7.4	2.6	4.8	31.7	11.4	20.3	13.0	4.1	3.2	–0.1
1990	46.3	22.3	24.0	16.2	9.2	7.0	2.4	4.5	30.1	13.1	17.1	11.9	1.7	2.1	1.4
Annual data:															
1995	59.9	26.3	33.5	19.5	11.4	8.2	1.8	6.3	40.3	15.0	25.4	15.2	2.8	2.0	5.4
1996	61.1	27.3	33.8	20.7	11.8	8.9	0.9	8.0	40.3	15.4	24.9	14.9	3.0	1.6	5.5
1997	60.9	28.2	32.7	20.0	12.3	7.7	–0.1	7.8	40.9	15.9	25.0	15.2	2.9	1.5	5.3
1998	55.5	29.0	26.5	15.5	12.6	2.9	–*	2.9	40.0	16.4	23.7	14.1	2.7	1.1	5.8
1999	63.4	29.7	33.7	21.3	12.9	8.4	0.7	7.7	42.2	16.8	25.3	16.1	2.7	1.2	5.3
2000	71.0	30.9	40.1	25.5	13.5	12.0	1.5	10.5	45.5	17.4	28.1	18.1	2.7	1.6	5.7
2001 est.	74.0	32.1	41.9	26.2	14.2	11.9	1.5	10.4	47.9	17.9	30.0	19.5	2.8	1.6	6.1
2002 est.	75.5	33.4	42.1	26.0	14.9	11.1	1.3	9.8	49.5	18.5	31.0	20.7	2.7	1.5	6.2

*$50 million or less.

Table 6–7. NET STOCK OF FEDERALLY FINANCED RESEARCH AND DEVELOPMENT [1]

(In billions of 1996 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	247	15	233	204	63	140	451	78	373
1975	262	19	242	249	92	157	511	112	399
1980	265	24	242	295	125	170	560	148	412
1985	304	29	276	321	165	156	626	194	432
1990	381	34	347	362	217	146	744	251	493
Annual data:									
1995	399	40	359	436	278	158	835	318	517
1996	401	41	360	448	290	158	850	332	518
1997	403	42	360	463	303	160	866	346	520
1998	403	44	360	478	316	163	882	359	523
1999	402	45	358	495	329	166	897	374	523
2000	401	46	356	512	344	169	914	389	524
2001 est.	400	47	353	533	359	174	933	406	527
2002 est.	403	48	355	556	377	179	959	425	534

[1] Excludes outlays for physical capital for research and development, which are included in Table 6-5.

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-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 5.4 percent from 1970 to 2000, and the expansion of the education stock is projected to continue under this budget.

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

Note on Estimating Methods

This note provides further technical detail about the estimation of the capital stock series presented in Tables 6–5 through 6–8.

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 in 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,

Table 6–8. NET STOCK OF FEDERALLY FINANCED EDUCATION CAPITAL

(In billions of 1996 dollars)

Fiscal Year	Total Education Stock	Elementary and Secondary Education	Higher Education
Five year intervals:			
1960	67	48	19
1965	93	67	26
1970	213	167	46
1975	307	247	60
1980	434	338	96
1985	535	399	137
1990	703	519	184
Annual data:			
1995	792	574	218
1996	822	596	226
1997	856	621	235
1998	909	661	248
1999	969	708	261
2000	1,030	762	268
2001 est.	1,088	813	275
2002 est.	1,157	869	289

in cases where a project is canceled before completion, the spending on the project does 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 a capital asset. For example, payments for constructing an aircraft carrier might be made over a period of years, with the capital 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 1996 prices were made through the application of price measures from the National Income and Product Accounts (NIPAs), but these should be considered only approximations of the costs of these assets in 1996 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.

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 two recent comprehensive revisions of the NIPAs in January 1996 and October 1999, 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. Government purchases of software are now included as investment.[5] In addition, as part of the most recent revisions, a new NIPA table explicitly links investment and capital stocks by reporting the net stock of Government physical capital and decomposing the annual change in the stock into investment, depreciation, extraordinary changes such as disasters, and revaluation.[6]

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 1996 dollars were based on chained NIPA price indexes for Federal, State, and local consumption of durables and gross investment. The price indexes were updated this year consistent with revised data back to 1930 from BEA's October 1999 comprehensive NIPA revisions. 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.[7] The geometric rates were 1.9 percent for water and power projects; 2.4 percent for other direct nondefense construction and rehabilitation; 20.3 percent for nondefense equipment; 14.0 percent for defense equipment; 2.1 percent for defense structures; 2.0 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. The depreciation rate for transportation grants was increased from the 1.6 percent rate used last year, consistent with a revised as-

[5] This change aligns BEA's treatment of software with OMB's definitions, which include purchase and in-house development of major software as investment.

[6] BEA presented estimates of capital stocks consistent with its October 1999 comprehensive revisions in "Fixed Assets and Consumer Durable Goods," *Survey of Current Business,* April 2000, pp. 17–30.

[7] BEA presented its depreciation methods and rates in "Improved Estimates of Fixed Reproducible Tangible Wealth, 1929–95," *Survey of Current Business,* May 1997, pp. 69–76.

sumption for the service life of highways adopted by BEA in its October 1999 revisions.

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 1996 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.[8] 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.[9]

Education Capital Stocks

Method of estimation.—The estimates of the federally financed education capital stock in Table 6–8 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. For more information, refer to the technical note in Chapter 2, "Stewardship: Toward a Federal Balance Sheet."

The stock of capital estimated in Table 6–8 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.

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 President's Commission to Study Capital Budgeting recently considered capital budgets and the broader question of the planning and budgeting process for capital assets. It made a series of recommendations to improve budgeting for capital, but it did not recommend any kind of capital budget or target for investment in the sense discussed in this section.[10] This section is intended to show the implications of budgeting for capital separately or changing the basis for measuring capital investment in the budget.

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 6–9 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.

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

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

[10] *Report of the President's Commission to Study Capital Budgeting* (February 1999). To be specific, the Commission did not recommend changing the budget to alter the basis for measuring capital investment, to make the size of the deficit or surplus depend on the amount of expenditures defined as capital, to finance capital spending by borrowing, or to make a single decision about how much to spend for "capital" under some definition.

Table 6–9. ALTERNATIVE DEFINITIONS OF INVESTMENT OUTLAYS, 2002

(In millions of dollars)

	Investment Outlays		
	All types of capital [1]	Federal capital	National capital
Construction and rehabilitation:			
Grants:			
Transportation	37,397	.....	37,397
Natural resources and environment	2,845	.....	2,845
Community and regional development	6,403	.....	1,120
Housing assistance	7,955	.....	.....
Other grants	671	.....	571
Direct Federal:			
National defense	5,113	5,113	.....
General science, space, and technology	2,764	2,733	2,764
Natural resources and environment	4,994	3,915	4,591
Energy	1,318	1,318	1,318
Transportation	263	233	263
Veterans and other health facilities	1,559	1,559	1,559
Postal Service	975	975	975
GSA real property activities	1,175	1,175	.....
Other construction	3,299	2,893	1,277
Total construction and rehabilitation	76,731	19,914	54,680
Acquisition of major equipment (direct):			
National defense	57,239	57,239	.....
Postal Service	749	749	749
Air transportation	2,302	2,302	2,302
Other	7,278	6,247	4,165
Total major equipment	67,568	66,537	7,216
Purchase or sale of land and structures	358	358	.....
Other physical assets (grants)	1,023	.....	61
Total physical investment	145,680	86,809	61,957
Research and development:			
Defense	46,850	.....	1,206
Nondefense	40,396	.....	40,029
Total research and development	87,246	.....	41,235
Education and training	65,606	.....	65,203
Total investment outlays	298,532	86,809	168,395

[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.

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. The 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 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.

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 2002 is estimated to be $86.8 billion, or 29 percent of the total Federal investment outlays shown in Table 6–1. Of the investment in Federal capital, 72 percent is for defense and 28 percent for nondefense purposes. (The estimates for defense investment throughout this section are subject to change as a result of the Defense Strategy Review mentioned in the introduction to this chapter.)

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, equipment, and software 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.

Some capital budget proposals would partition the unified budget into a capital budget, an operating budget, and a total budget. Table 6–10 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 larger surplus than the unified budget by a small amount, $7 billion, because capital expenditures are larger than depreciation by $7 billion. This reflects both the relatively small Federal investment in new capital assets ($87 billion) and the offsetting effect of depreciation on the existing stock ($80 billion). The figures in Table 6–10 and the subsequent tables of this section are rough estimates, intended only to be illustrative and to provide a basis for broad generalizations.

Table 6–10. CAPITAL, OPERATING, AND UNIFIED BUDGETS: FEDERAL CAPITAL, 2002 [1]

(In billions of dollars)

Operating Budget	
Receipts	2,192
Expenses:	
Depreciation	80
Other	1,874
Subtotal, expenses	1,954
Surplus or deficit (–)	238
Capital Budget	
Income: depreciation	80
Capital expenditures	87
Surplus or deficit (–)	–7
Unified Budget	
Receipts	2,192
Outlays	1,961
Surplus or deficit (–)	231

[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 6–10. For 2002, this exclusion would make little difference to the operating budget surplus. If defense capital was excluded, the operating budget would have a surplus that was $10 billion more than the unified budget surplus instead of $7 billion more as shown above for the complete coverage of Federal capital. Capital expenditures for defense in 2002 are estimated to be $3 billion less than depreciation, whereas capital expenditures for nondefense purposes (plus military family housing) are estimated to be $10 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 an agency 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.[11]

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 is not permanent, it is 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 present 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).[12] 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.[13] 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.[14]

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" 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.[15] 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

[11] 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, in which case the budget would record no expense at all in the budget year.

[12] 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.

[13] 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).

[14] 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.

[15] 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.

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 lives. With similar objectives in mind, the Federal Accounting Standards Advisory Board has 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. [16]

Businesses finance investment from net income, cash on hand, 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 State taxes, which may be substantial, State operating budgets do not record any amount. No State operating budget is charged for depreciation. [17]

States do not currently 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. [18] Under new financial accounting standards, however, depreciation on most capital assets will be recognized as an expense in government-wide financial statements. This requirement will be phased in over the next three years and is effective for larger governments for fiscal years beginning after June 2001. [19]

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. Rating agencies place significant weight on the amount of debt outstanding compared to the economic output generated by the State. 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, has traditionally been divided into separate titles of which some are for current expenditures and others for capital expenditures. A recent study of European countries found only four, however, that had a real difference between a current budget and a capital budget (Greece, Ireland, Luxembourg, and Portugal). [20]

In addition, four developed countries have recently begun to adopt accrual budgets that include the use of depreciation in place of capital expenditures. These four countries, however, require appropriations for the full cost or current cash disbursements as an additional control under some or all circumstances. New Zealand, the first country to shift to an accrual budget, requires the equivalent of appropriations for the full cost up front before a department can make net additions to its capital assets or before the government can acquire

[16] Statement of Federal Financial Accounting Standards No. 6, *Accounting for Property, Plant, and Equipment,* pp. 5–14 and 34–35. (The Federal Accounting Standards Advisory Board was established by the Office of Management and Budget, Department of Treasury, and General Accounting Office to develop accounting standards and concepts for the Federal government. The American Institute of Certified Public Accountants has designated it as the body to establish generally accepted accounting principles (GAAP) for Federal government entities.) 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.

[17] 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* (November 1999).

[18] Governmental Accounting Standards Board (GASB), *Codification of Governmental Accounting and Financial Reporting Standards as of June 30, 2000,* sections 1100.107 and 1400.114–1400.118.

[19] Governmental Accounting Standards Board, Statement No. 34, *Basic Financial Statements—and Management's Discussion and Analysis—for State and Local Governments* (June 1999), paragraphs 18–29 and 44–45. For discussion of the basis for conclusions of these new standards, see paragraphs 330–43.

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

certain capital assets such as state highways. Australia, which adopted an accrual budget as of its 1999–2000 budget, requires an appropriation for departments that do not have adequate reserves to purchase assets. The United Kingdom plans to budget on an accrual basis starting with its budget for 2001–02. In addition to the depreciation in the budget there would be an appropriation for cash payments for capital assets made in the fiscal year. Parliamentary approval would be needed for both the "resource budget," which would include depreciation, and the cash requirement, which would include the cash payments made for capital assets. Canada plans to publish its 2001–02 budget on a full accrual basis, for the first time including depreciation of capital assets, but it distinguishes between its budget and its "estimates." The budget sets forth the overall fiscal framework, while the "estimates" comprise the detailed departmental appropriations. The estimates are on a modified cash basis that does not make use of depreciation.

A country with an accrual budget may calculate its measure of fiscal position on other bases as well. The Australian budget has several measures of fiscal position. The primary fiscal measure, the fiscal balance, is close to a cash basis and includes the purchase of property, plant, and equipment rather than depreciation.[21]

On the other hand, some countries—including Sweden, Denmark, Finland, and the Netherlands—formerly had separate capital budgets but abandoned them a number of years ago.[22]

Many ***developing countries*** operate a dual budget system comprising a regular or recurrent budget and a capital or development budget. The World Bank staff has concluded that:

> "The dual budget may well be the single most important culprit in the failure to link planning, policy and budgeting, and poor budgetary outcomes. The dual budget is misconceived because it is based on a false premise that capital expenditure by government is more productive than current expenditure. Separating development and recurrent budgets usually leads to the development budget having a lower hurdle for entry. The result is that everyone seeks to redefine their expenditure as capital so it can be included in the development budget. Budget realities are left to the recurrent budget to deal with, and there is no pretension that expenditure proposals relate to policy priorities."[23]

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."[24]

After further study of the role of depreciation in budgeting for national capital, GAO reiterated that conclusion in another study in 1995.[25] "The greatest disadvantage . . . was that depreciation would result in a loss of budgetary control under an obligation-based budgeting system."[26] 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 expressly 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."[27]

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.*
- *The effect of Federal taxation, borrowing, and other policies on private investment.*

[21] GAO, *Accrual Budgeting: Experiences of Other Nations and Implications for the United States,* GAO/AIMD–00–57 (February 2000).

[22] Denmark had accrual budgets generally, not just for capital assets, but abandoned that practice a number of years ago. The budgets in Sweden, Great Britain, Germany, and France as of the middle 1980s 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 Swedish Budget System: A Summary of the Report of the Budget Commission Published by the Ministry of Finance* (Stockholm, 1974), chapter 10.

[23] The World Bank, *Public Expenditure Management Handbook* (Washington, D.C.: The World Bank, 1998), Box 3.11, page 53.

[24] 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.

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

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

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

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.[28] 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."[29] 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.[30] 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 formation of national capital. GAO reiterated its recommendation in another report in 1995.[31]

Table 6–11. UNIFIED BUDGET WITH NATIONAL INVESTMENT COMPONENT, 2002

(In billions of dollars)

Receipts	2,192
Outlays:	
National investment	168
Other	1,792
Subtotal, outlays	1,961
Surplus or deficit (–)	231

Table 6–11 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 $168 billion in 2002. 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 6–12 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.[32]

Table 6–12. CAPITAL, OPERATING, AND UNIFIED BUDGETS: NATIONAL CAPITAL, 2002[1]

(In billions of dollars)

Operating Budget	
Receipts	2,156
Expenses:	
Depreciation[2]	77
Other	1,792
Subtotal, expenses	1,869
Surplus or deficit (–)	287
Capital Budget	
Income:	
Depreciation[2]	77
Earmarked tax receipts[3]	36
Subtotal, income	113
Capital expenditures	168
Surplus or deficit (–)	–56
Unified Budget	
Receipts	2,192
Outlays	1,961
Surplus or deficit (–)	231

[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.

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

[28] *Incorporating an Investment Component in the Federal Budget,* pp. 1–2, 9–10, and 15.
[29] *Ibid.*, pp. 1 and 5.
[30] *Ibid.*, pp. 2 and 13–16.
[31] *The Role of Depreciation in Budgeting for Certain Investments,* pp. 2 and 19–20.
[32] 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."

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.[33]

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 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 (NIPA) according to one definition of investment. The NIPA Federal sector measures the impact of Federal current receipts, current expenditures, and the current surplus or 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.[34]

Until a few 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.[35] The revised NIPA Federal Government account is a current account or an operating account for the Federal Government and accordingly shows current receipts and current expenditures. It excludes expenditures for structures, equipment, and software owned by the Federal Government; it includes depreciation on the federally owned stock of structures, equipment, and software as a proxy for the services of capital assets consumed in production and thus as part of the Federal Government's current expenditures. It applies this treatment to a comprehensive definition of federally owned structures, equipment, and software, both defense and nondefense, similar to the definition of "capital assets" in this chapter.[36]

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 2000 Federal Government current account surplus was increased $6 billion by including depreciation rather than gross investment, because depreciation of federally owned structures, equipment, and software was less than gross investment. The 2002 Federal current account surplus is estimated to be increased $14 billion.[37] A capital budget is not needed to capture this effect.

Borrowing to Finance a Capital Budget

A further issue traditionally 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.

As this argument has traditionally been framed, it might appear as though it did not apply under present circumstances. The Government now has a large surplus, which is mostly used to repay Federal debt held by the public, and a large surplus is estimated to continue throughout the projection period of this budget. It does not "borrow" in the sense of increasing its debt from year to year, and it is not estimated to borrow during the projection period. However, the argument is fundamentally about the proper target for Federal debt and whether that target should be higher if the Government has net investment. If the Government has deficits financed by selling debt, should it *borrow more than otherwise* because of its net investment? Or if the Government has surpluses used to repay debt, should it *repay less than otherwise* because of its net

[33]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 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).

[34]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 2001 and 2002, and for a discussion of the NIPA Federal sector and its relationship to the budget.

[35]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 vary. For example, the SNA does not include the purchase of military equipment as investment.

[36]The treatment of investment (except for the recent recognition of software) in the 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, equipment, and software remain a part of gross domestic product (GDP) as a separate component. The NIPA State and local government account is defined in the same way and includes depreciation on structures, equipment, and software 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."

[37]See actuals and estimates for 2000–02 in Table 16–2 of chapter 16 of this volume, "National Income and Product Accounts."

investment? This section follows the traditional way of discussing the issue by referring to "borrowing to finance net investment." However, for the present analysis, "borrowing more" is equivalent to "repaying less debt."

This argument about financing capital expenditures 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 6–10 and 6–12 suggest that this rationale would currently justify some change in borrowing (or debt repayment) under the two capital budgets roughly illustrated in this chapter, but for Federal capital the change would not be much. For *Federal capital,* Table 6–10 indicates that current cost depreciation is less than gross investment for Federal capital—the capital budget deficit is $7 billion. The rationale of borrowing to finance net investment would justify the Federal Government borrowing this amount ($7 billion) and no more to finance its investment in Federal capital. For *national capital,* Table 6–12 indicates that current cost depreciation (plus the excise taxes earmarked to finance capital expenditures for highways and airports and airways [38]) is less than gross investment—the capital budget deficit is $56 billion. The rationale of borrowing to finance net investment would justify the Federal Government borrowing this amount ($56 billion) and no more to finance its investment in national capital. [39]

Even with depreciation calculated in current cost, the rationale for borrowing to finance net investment—or, under present circumstances, the rationale for reducing debt repayment because of 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. A high level of net national saving is needed to meet the demographic and other 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. [40]

The present budget proposes to continue to run substantial surpluses, reducing the debt to make room for financing private 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 realized and the further gains from the proposals in this budget.

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.

[38] The capital budget deficit would be about $22 billion larger if current cost depreciation were used instead of earmarked excise taxes for investment in highways and airports and airways.

[39] 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 12–3.

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

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 2001 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 $130.2 billion in 2000 and is projected to increase to $182.2 billion by 2010 on a current services basis. The largest components are for national defense and for roadways and bridges, which together accounted for more than three-fifths of Federal public physical capital spending in 2000.

Table 6–13 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 $34.4 billion in 2000, and current services outlays are estimated to increase to $50.6 billion by 2010. Outlays for nondefense housing and buildings were $13.1 billion in 2000 and are estimated to be $19.0 billion in 2010. Physical capital outlays for other nondefense categories were $26.7 billion in 2000 and are projected to be $34.8 billion by 2010. For national defense, this spending was $56.1 billion in 2000 and is estimated on a current services basis to be $77.8 billion in 2010.

Table 6–14 shows current services projections on a constant dollar basis, using fiscal year 1996 as the base year.

Table 6–13. CURRENT SERVICES OUTLAY PROJECTIONS FOR FEDERAL PHYSICAL CAPITAL SPENDING

(In billions of dollars)

	2000 Actual	Estimate									
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Nondefense:											
Transportation-related categories:											
Roadways and bridges	25.0	27.1	30.0	31.7	32.9	33.9	34.8	35.7	36.5	37.3	38.1
Airports and airway facilities	3.7	4.2	5.0	5.5	5.8	6.2	6.3	6.4	6.6	6.7	6.9
Mass transportation systems	5.1	5.2	4.9	4.7	4.5	4.5	4.6	4.7	4.8	4.9	5.0
Railroads	0.6	0.7	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7
Subtotal, transportation	34.4	37.2	40.5	42.5	43.8	45.2	46.4	47.5	48.5	49.6	50.6
Housing and buildings categories:											
Federally assisted housing	7.6	8.4	8.5	8.5	8.6	8.8	9.0	9.3	9.1	9.3	9.5
Hospitals	2.2	1.7	1.7	1.8	1.8	1.9	1.9	2.0	2.0	2.1	2.2
Public buildings[1]	3.3	4.5	4.6	5.6	6.4	6.7	6.8	6.9	7.0	7.2	7.3
Subtotal, housing and buildings	13.1	14.6	14.8	15.9	16.9	17.4	17.7	18.2	18.2	18.6	19.0
Other nondefense categories:											
Wastewater treatment and related facilities	2.9	3.2	3.2	3.4	3.5	3.6	3.7	3.8	3.9	3.9	4.0
Water resources projects	3.7	3.7	3.9	4.1	4.2	4.3	4.2	4.3	4.4	4.5	4.7
Space and communications facilities	6.3	5.7	6.1	6.4	6.9	6.9	6.8	7.8	7.6	7.6	7.8
Energy programs	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.5	1.5	1.5
Community development programs	5.6	5.8	6.0	6.1	6.3	6.5	6.6	6.8	6.9	7.0	7.2
Other nondefense	7.0	8.0	7.8	7.7	8.4	8.5	8.7	8.9	9.2	9.4	9.6
Subtotal, other nondefense	26.7	27.8	28.4	29.1	30.7	31.1	31.4	33.0	33.5	34.1	34.8
Subtotal, nondefense	74.1	79.6	83.7	87.4	91.4	93.8	95.6	98.6	100.3	102.2	104.4
National defense	56.1	58.1	61.7	63.4	66.5	69.6	71.7	73.1	74.1	75.9	77.8
Total	130.2	137.7	145.5	150.9	157.9	163.3	167.2	171.7	174.4	178.2	182.2

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

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

(In billions of constant 1996 dollars)

	2000 Actual	Estimate				
		2001	2002	2003	2004	2005
Nondefense:						
Transportation-related categories:						
Roadways and bridges	23.3	24.6	26.4	27.1	27.3	27.4
Airports and airway facilities	3.6	3.9	4.6	4.9	5.1	5.2
Mass transportation systems	4.8	4.7	4.3	4.0	3.8	3.6
Railroads	0.6	0.6	0.6	0.6	0.6	0.6
Subtotal, transportation	32.3	33.9	35.9	36.6	36.7	36.8
Housing and buildings categories:						
Federally assisted housing	7.1	7.7	7.5	7.3	7.2	7.2
Hospitals	2.2	1.6	1.7	1.7	1.7	1.7
Public buildings [1]	3.3	4.4	4.4	5.2	5.8	5.9
Subtotal, housing and buildings	12.6	13.7	13.6	14.2	14.7	14.8
Other nondefense categories:						
Wastewater treatment and related facilities	2.7	2.9	2.8	2.9	2.9	2.9
Water resources projects	3.7	3.6	3.8	3.9	3.9	3.9
Space and communications facilities	6.3	5.6	5.8	6.0	6.4	6.2
Energy programs	1.3	1.3	1.3	1.3	1.3	1.3
Community development programs	5.3	5.3	5.3	5.3	5.3	5.2
Other nondefense	6.9	7.8	7.4	7.1	7.6	7.5
Subtotal, other nondefense	26.1	26.5	26.4	26.4	27.3	27.0
Subtotal, nondefense	71.0	74.0	75.9	77.3	78.7	78.7
National defense	57.0	57.9	60.2	60.6	62.3	63.8
Total	128.0	131.9	136.1	137.8	141.0	142.4

[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 2017	2.16 percent
2. Annual cost to maintain 1997 physical conditions on highways	$50.8 billion (1997 dollars)
3. Annual cost to maintain 1997 physical conditions on bridges	$5.8 billion (1997 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	$7.7 billion (1997 dollars)
2. Yearly cost to replace and maintain the urban, rural, and special services bus fleet and facilities	$3.1 billion (1997 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 2000	$76 billion
3. The population served by centralized treatment facilities: percentage that benefits from at least secondary sewage treatment systems	99 percent
4. States and territories served by State Revolving Funds	51

Housing

1. Total unsubsidized very low income renter households with worst case needs (4.9 million*)	
A. In severely substandard units	0.5 million
B. With a rent burden greater than 50 percent	4.6 million

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

Indian Health Service (IHS) Health Care Facilities

1. IHS hospital occupancy rates (2000)	39.9 percent
2. Average length of stay, IHS hospitals (days) (2000)	4.0
3. Hospital admissions (2000)	64,837
4. Outpatient visits (2000)	8,318,609
5. Eligible population (2000)	1,511,135

Department of Veterans Affairs (VA) Hospitals (2001)

1. Medical Centers	172
2. Outpatient clinics	781
3. Domiciliaries	43
4. Vet centers	206
5. Nursing homes	135

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.

Investment Needs Assessment References

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