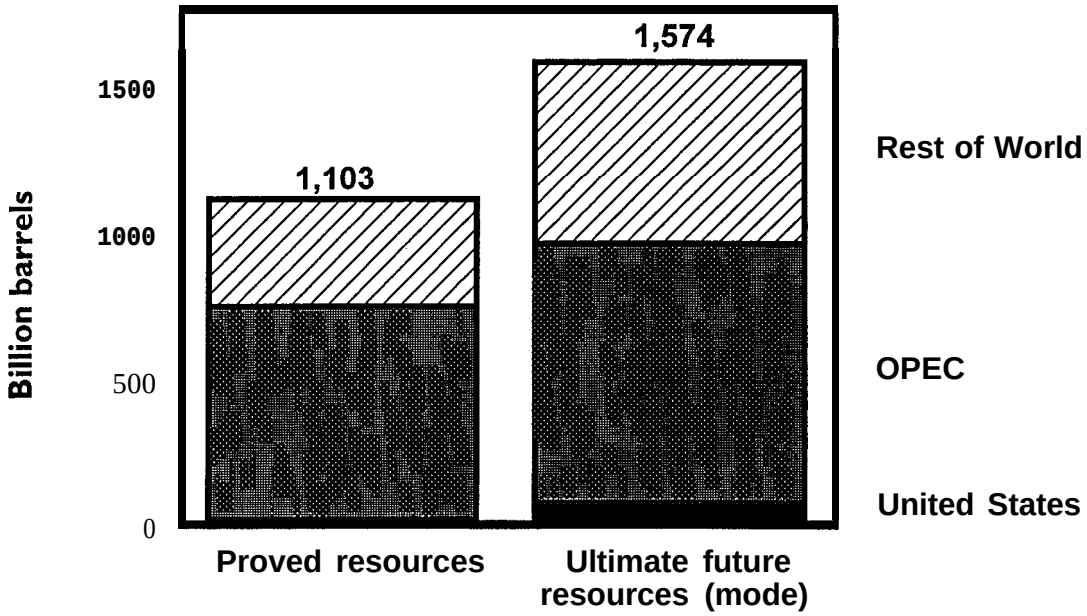
Chapter 1
Petroleum

Summary Statistics from Tables/Figures in this Chapter

Source			
Figure 1.1	World oil proved resources, 1993 (most recent survey)		billion barrels
	Proved resources (USGS)		*1,092*
	Ultimate resources (USGS)		*1,574*
Table 1.2	World Oil Production, 1997		
	U.S. Oil Production (million barrels per day)		*6.4*
	U.S. Share		*9.7%*
Table 1.3	World Oil Consumption, 1996		
	U.S. Oil Consumption (million barrels per day)		*18.3*
	U.S. Share		*25.6%*
Figure 1.6	Refinery yield, 1997	OECD	North America
	Gasoline	*31.1%*	*41.7%*
	Diesel fuel	*28.1%*	*22.3%*
	Residual fuel	*11.8%*	*5.5%*
	Kerosene	*8.9%*	*9.3%*
	Other	*20.2%*	*21.2%*
Table 1.8	U.S. transportation oil use as a percent of U.S. oil production, 1998		196%
Table 1.8	Net imports as a percentage of U.S. oil consumption, 1998		51%
Table 1.9	Transportation share of oil consumption, 1998		*66%*

No one knows the exact amount of oil which is in the Earth. The U.S. Geological Survey (USGS) produces estimates of the ultimate world oil resources periodically -- the latest done in 1993. Because of the evolving understanding of world recoverable resources, the USGS assessments are valid for the perceptions at that point in time. The surveys that produced the data shown in Table 1.1 were conducted using consistent methodologies and the same core group ofgeologists. The differences among the surveys are largely due to better understanding of world recoverable resources and technological change. As understanding of the subject grows, so may the estimates of world oil resources. A new study will be available in the year 2000.

Figure 1.1. USGS World Oil Resource Estimates, 1993



Source:
U.S. Geological Survey, *U.S. Geological Survey Fact Sheet,* FS-145-97, 1997. Also see: Masters C. D., E. D. Attanasi and D. H. Root, *World Petroleum Assessment and Analysis,* U.S. Geological Survey, National Center, Reston, VA, 1994, Table 1. (Additional resources: http://energy.er.usgs.gov)

Table 1.1
Summary of Recent World Oil Assessments
(billion barrels of oil)

	Effective date of assessment			
	1/1/81	1/1/83	1/1/90	1/1/93
1. Cumulative production	445	524	629	699
2. Identified (discovered) resources	724	795	1,053	1,103
3. Undiscovered conventional resources (mode)	550	425	489	471
4. Future resources (mode) (categories 2+3)	1,274	1,220	1,542	1,574
5. Total resources (categories 1+2+3)	1,719	1,744	2,171	2,273

Source:
U.S. Geological Survey, U.S. *Geological Survey Fact Sheet,* FS-145-97, 1997.
(Additional resources: http://energy.er.usgs.gov)

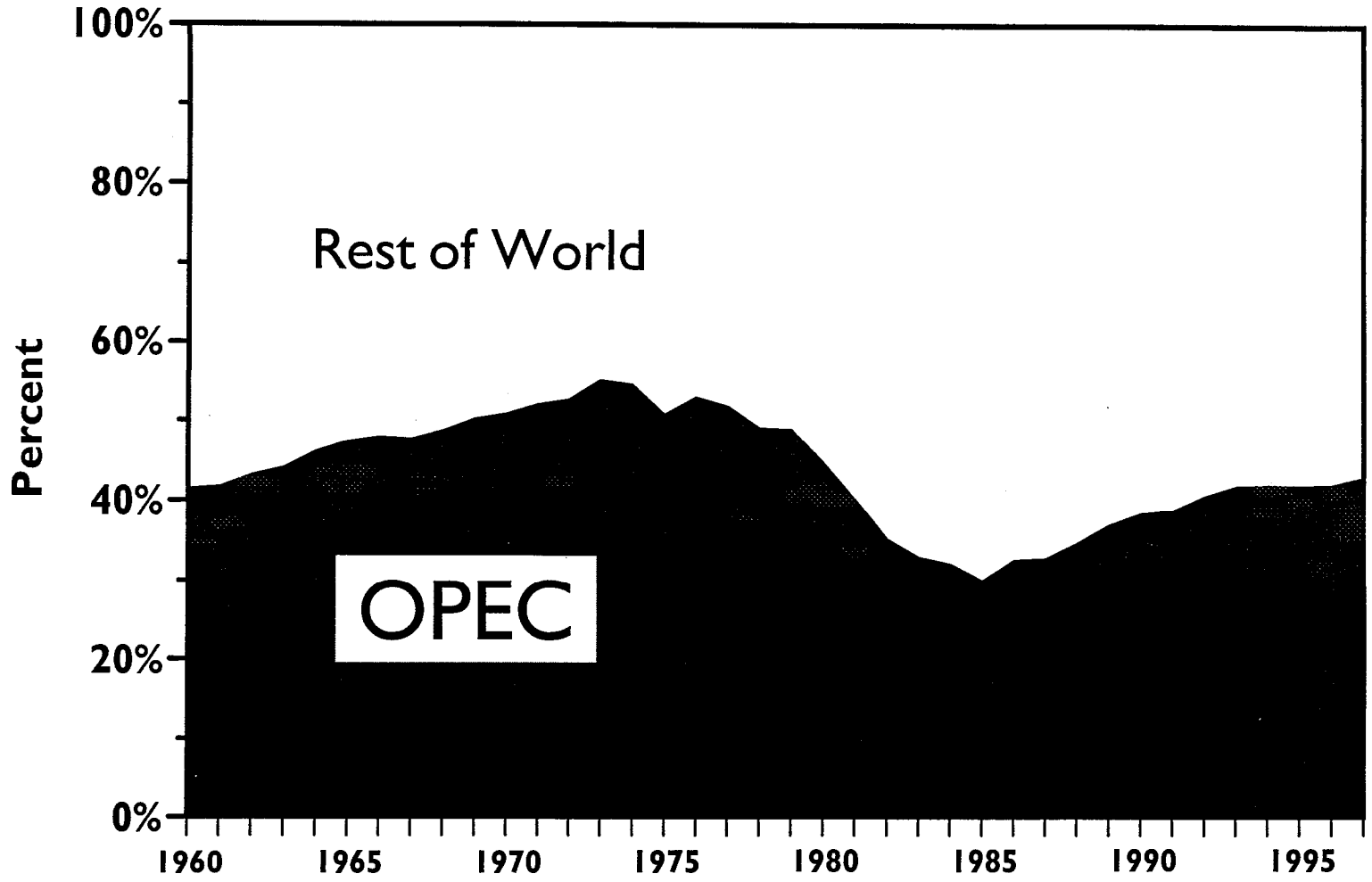
Table 1.2
'World Crude Oil Production, 1960-97[a]
(million barrels per day)

Year	United States	U.S. Share	Total OPEC[b]	Total Non-OPEC	Persian Gulf nations[c]	World
1960	7.04	33.5%	8.70	12.29	5.27	**20.99**
1965	7.80	25.7%	14.35	15.98	8.37	30.33
1970	9.64	21.0%	23.30	22.59	13.39	45.89
1971	9.46	19.5%	25.21	23.31	15.77	48.52
1972	9.44	18.5%	26.89	24.25	17.54	51.14
1973	9.21	16.5%	30.63	25.05	20.67	55.68
1974	8.77	15.7%	30.35	25.37	21.28	55.72
1975	8.37	15.8%	26.77	26.06	18.93	52.83
1976	8.13	14.2%	30.33	27.01	21.51	57.34
1977	8.24	13.8%	30.89	28.82	21.73	59.71
1978	8.71	14.5%	29.46	30.70	20.61	60.16
1979	8.55	13.6%	30.58	32.09	21.07	62.67
1980	8.60	14.4%	26.61	32.99	17.96	59.60
1981	8.57	15.3%	22.48	33.60	15.25	56.08
1982	8.65	16.2%	18.78	34.70	12.16	53.48
1983	8.69	16.3%	17.50	35.76	11.08	53.26
1984	8.88	16.3%	17.44	37.05	10.78	54.49
1985	8.97	16.6%	16.18	37.80	9.63	53.98
1986	8.68	15.4%	18.28	37.95	11.70	56.23
1987	8.35	14.7%	18.52	38.15	12.10	56.67
1988	8.14	13.9%	20.32	38.42	13.46	58.74
1989	7.61	12.7%	22.07	37.79	14.84	59.86
1990	7.36	12.2%	23.20	37.37	15.28	60.57
1991	7.42	12.3%	23.27	36.94	14.74	60.21
1992	7.17	11.9%	24.40	35.82	15.97	60.22
1993	6.85	11.4%	25.12	35.13	16.71	60.25
1994	6.66	10.9%	25.51	35.49	16.96	61.00
1995	6.56	10.5%	26.09	36.36	17.30	62.45
1996	6.46	10.1%	26.77	37.23	17.37	63.97
1997	6.41	9.7%	28.36	37.91	18.50	66.27
			Average annual percentage change			
1960-97	-0.3%		3.2%	3.1%	3.5%	3.2%
1970-97	-1.5%		0.7%	1.9%	1.2%	1.4%
1987-97	-2.6%		4.4%	-0.1%	4.3%	1.6%

Source:
U.S. Department of Energy, Energy Information Administration, *Annual Energy Review 1997,* Washington, DC, July 1998, p. 273.

"Includes lease condensate. Excludes natural gas plant liquids.
[b]Organization of Petroleum Exporting Countries. See Glossary for membership.
"See Glossary for Persian Gulf nations.

Figure 1.2. OPEC Market Share, 1960-97



Source:
U.S. Department of Energy, Energy Information Administration, *Annual Energy Review* 1997, Washington, DC, July 1998, p. 273.

These data are the latest available; oil consumption data generally lags behindproduction data (previous table) by one year.

Table 1.3
World Oil Consumption, 1960-96
(million barrels per day)

Year	United States	U.S. Share	Total OECD"	Total Non-OECD	World
1960	9.80	45.9%	15.78	5.56	21.34
1965	11.51	37.0%	22.81	8.33	31.14
1970	14.70	31.4%	34.49	12.32	46.81
1971	15.21	30.8%	36.07	13.35	49.42
1972	16.37	30.8%	38.74	14.35	53.09
1973	17.31	30.2%	41.53	15.71	57.24
1974	16.65	29.4%	40.12	16.56	56.68
1975	16.32	29.0%	38.82	17.38	56.20
1976	17.46	29.3%	41.39	18.28	59.67
1977	18.43	29.8%	42.43	19.40	61.83
1978	18.85	29.4%	43.62	20.54	64.16
1979	18.51	28.4%	44.01	21.21	65.22
1980	17.06	27.0%	41.41	21.66	63.07
1981	16.06	26.4%	39.14	21.76	60.90
1982	15.30	25.7%	37.45	22.05	59.50
1983	15.23	25.9%	36.59	22.15	58.74
1984	15.73	26.3%	37.43	22.41	59.84
1985	15.73	26.2%	37.23	22.87	60.10
1986	16.28	26.4%	38.28	23.48	61.76
1987	16.67	26.5%	38.96	24.04	63.00
1988	17.28	26.7%	40.24	24.58	64.82
1989	17.33	26.3%	40.88	25.04	65.92
1990	16.99	25.7%	40.92	25.07	65.99
1991	16.71	25.1%	41.40	25.18	66.58
1992	17.03	25.5%	42.41	24.33	66.74
1993	17.24	25.7%	43.05	23.99	67.04
1994	17.72	25.9%	44.20	24.11	68.31
1995	17.72	25.3%	45.07	24.86	69.93
1996	18.31	25.6%	46.15	25.37	71.52
		Average annualpercentage change			
1960-96	1.8%		3.0%	4.3%	3.4%
1970-96	0.8%		1.1%	2.8%	1.6%
1986-96	1.2%		1.9%	0.8%	1.5%

Source:
U.S. Department of Energy, Energy Information Administration, *Annual Energy Review* 1997, Washington, DC, July 1998, p. 283.

[a] Organization for Economic Cooperation and Development. See Glossary for membership.

The United States has increased its petroleum stocks by 55% from 1973 to 1984; there has been no significant change in the stocks since 1984. Petroleum demand, however, has increased 87% in that same time period (see Table 1.3). The Strategic Petroleum Reserve accountedfor 36% of total U.S. stocks at the end of 1997.

Table 1.4
Petroleum Stocks in OECD Countries, End of Year 1973-97"
(million barrels)

Year	France	Germany[b]	Italy	United Kingdom	Other OECD[c] Europe	OECD[c] Europe	Canada	Japan	U.S. Strategic Petroleum Reserve	United States total	Other OECD[d]	OECD[c]
1973	201	181	152	156	380	1,070	140	303	[e]	1,008	67	2,588
1975	225	187	143	165	434	1,154	174	375	[e]	1,133	67	2,903
1980	243	319	170	168	564		164	495	108		72	
1981	214	297	167	143	516	1,337	161	482	230	1,484	67	3,531
1982	193	272	179	125	489	1,258	136	484	294	1,430	68	3,376
1983	153	249	149	118	473	1,142	121	470	379	1,454	68	3,255
1985	139	233	157	123	440	1,092	113	494	493	1,519	66	3,362
1986	127	252	155	124	475		111	509	512		72	
1987	127	259	169	121	454	1,130	126	540	541	1,607	71	3,474
1988	140	266	155	112	445	1,118	116	538	560	1,597	71	3,440
1989	138	271	164	118	442	1,133	114	577	580	1,581	71	3,476
1990	140	265	172	112	474	1,163	121	590	586	1,621	73	3,568
1992	153	310	174	113	476	1,219	107	603	575	1,592	67	3,588
1993	158	309	163	118	475	1,221	105	618	587	1,647	69	3,661
1994	158	312	164	115	490	1,240	119	645	592	1,653	69	3,726
1995	159	301	162	107	499	1,228	109	630	592	1,563	71	3,601
1996	158	300	152	108	538	1,256	103	651	566	1,507	74	3,591
1997	164	298	147	105	542	1,256	115	685	563	1,560	74	3,689
					Average annualpercentage change							
1973–97	-0.8%	2.1%	-0.1%	-1.6%	1.5%	0.7%	-0.8%	3.5%	[e]	1.8%	0.4%	1.5%
1987–97	2.6%	1.4%	-1.4%	-1.4%	1.8%	1.1%	-0.9%	2.4%	0.4%	-0.3%	0.4%	0.6%

Source:
Country stocks - U.S. Department of Energy, Energy Information Administration, *International Petroleum Statistics Report*, Washington, DC, January 1999.
U.S. Strategic Petroleum Reserve - U.S. Department of Energy, Energy Information Administration, *Annual Energy Review, 1997*, Washington, DC, July 1998, p. 147.

[a] Includes crude oil (including strategic reserves), lease condensate, natural gas plant liquids, unfinished oils, and finished petroleum products. Oil stocks include all non-military stocks held by importers, refiners, Governments, major non-importing final consumers and by foreign entities in certain facilities. See *Stocks* in Glossary for details.

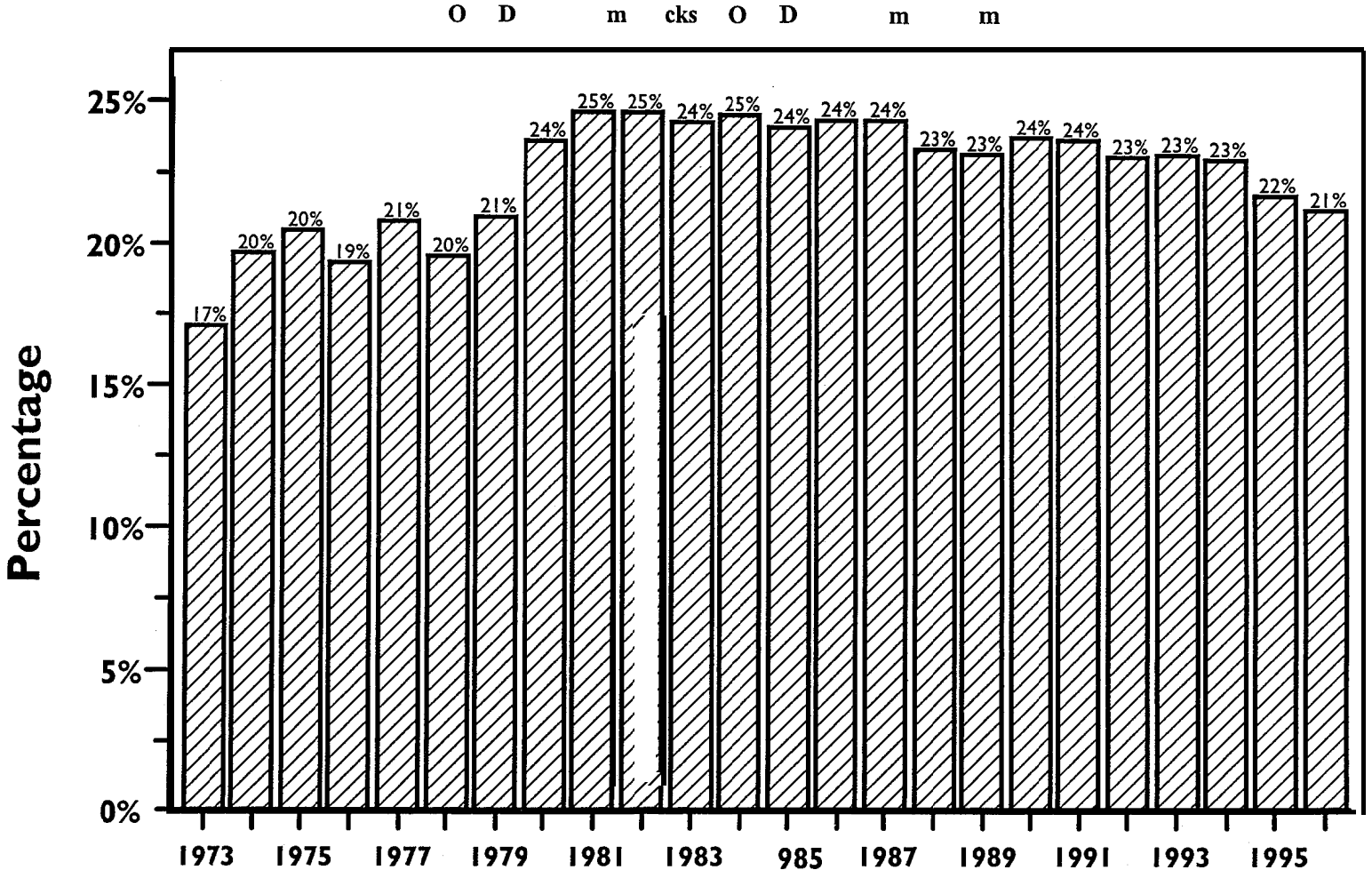
[b] Through 1990, the data for Germany are for the former West Germany only. Beginning in 1991, the data for Germany are for the unified Germany, i.e., the former East Germany and West Germany.

[c] Organization for Economic Cooperation and Development (OECD). See Glossary for membership.

[d] Australia, New Zealand, and United States Territories. Data for Mexico, which joined the OECD on May 18, 1994, are not available.

[e] Data are not available. The Energy Policy and Conservation Act, effective February 1976, authorized the establishment of the U.S. Strategic Petroleum Reserve.

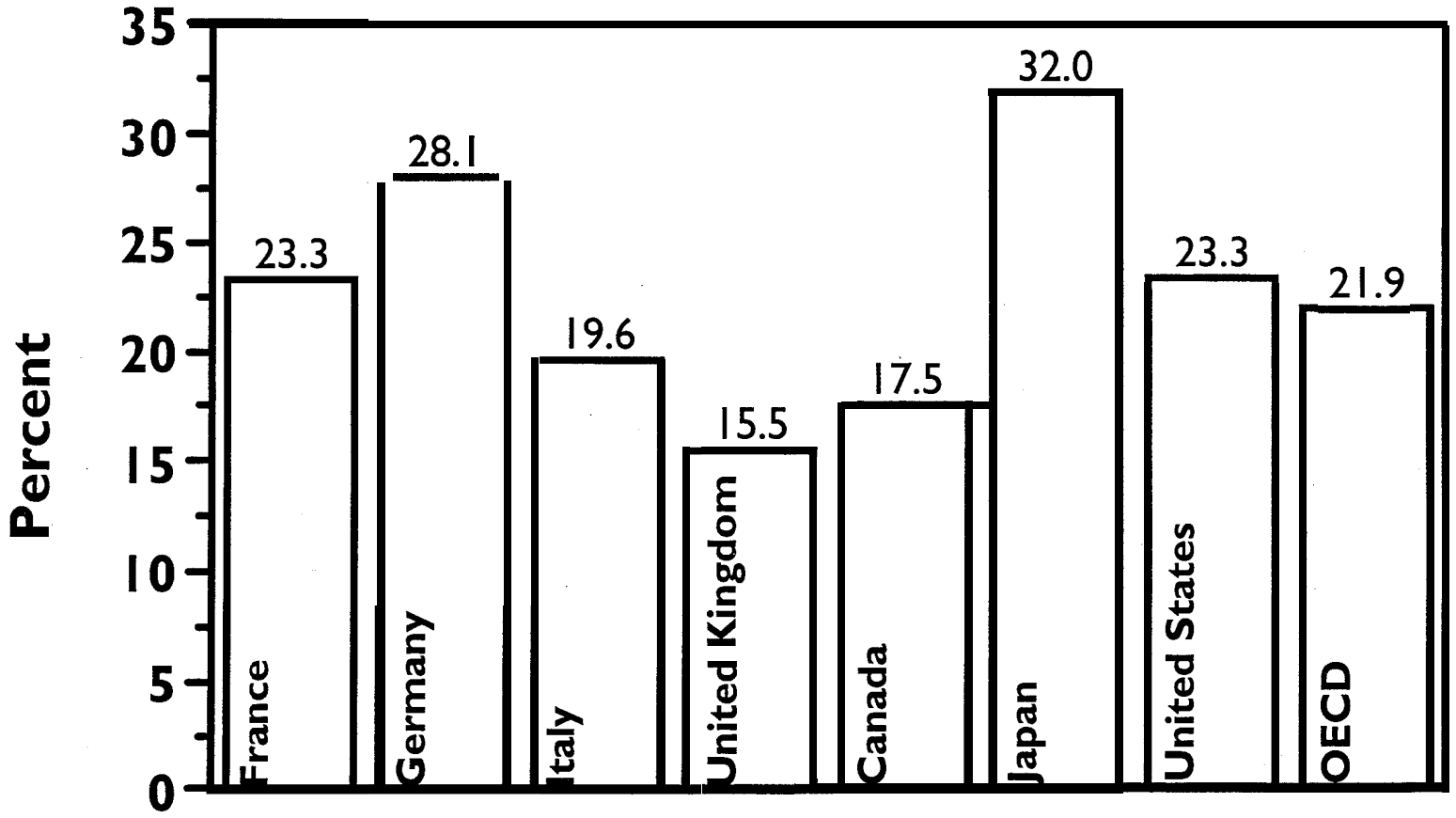
The countri vhich make up the Organization for Economic Cooperation and Development (OECD) had combined stocks which to ed 21% of the petroleum c umption in 1996; this is up from 17% in 1973. This includes stocks which are privately-controlled as well as governmer wned holding



Source: See Tables 1.3 and 1.4.

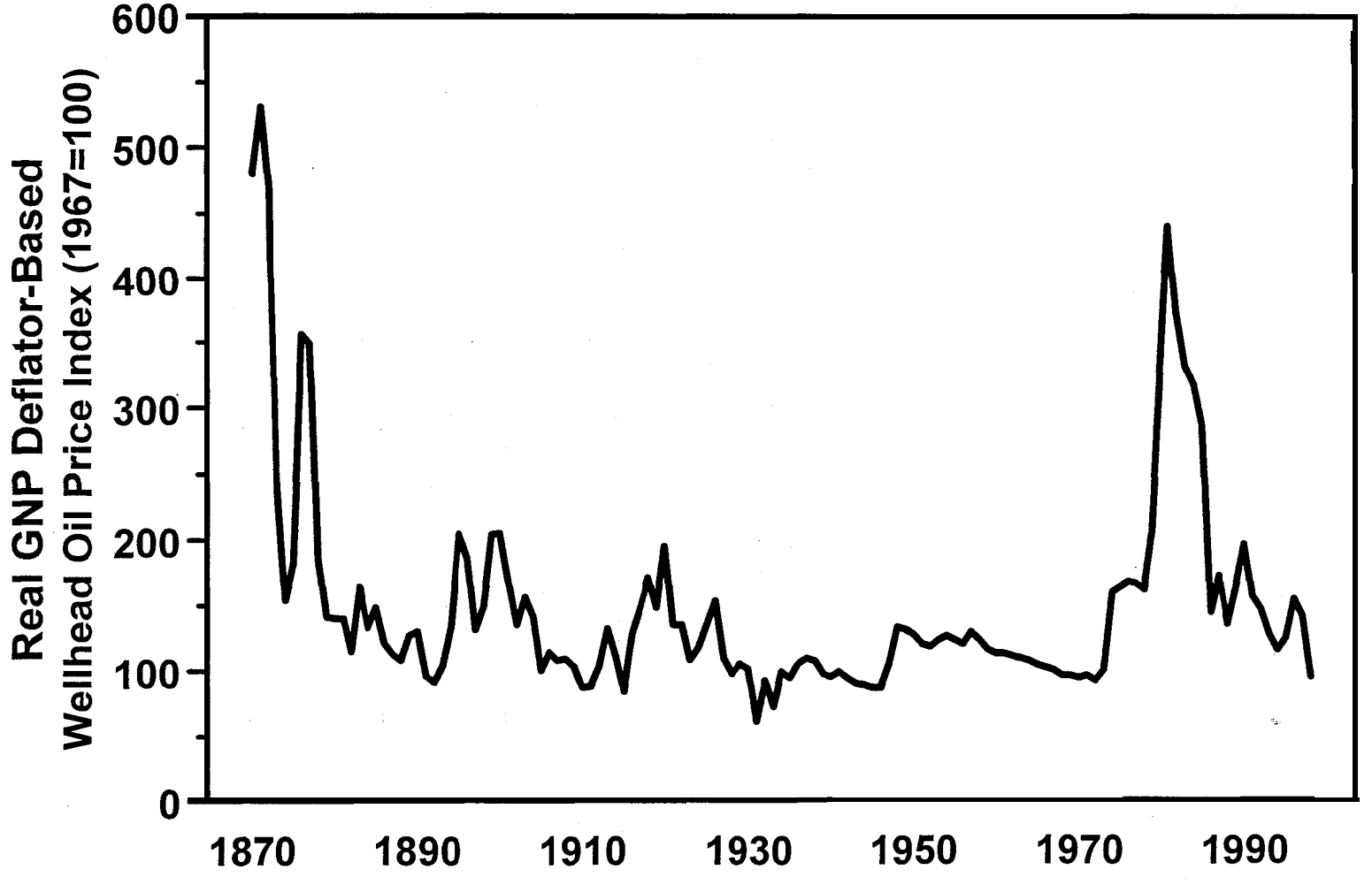
The United States had petroleum stocks of almost one quarter of U.S. petroleum consumption in 1996, which was slightly above the average for OECD countries. Germany and Japan held higher reserves relative to their consumption of petroleum.

Figure 1.4. Share of Petroleum Stocks to Petroleum Consumption by Country, 1996



Source: Table 1.4 and U.S. Department of Energy, Energy Information Administration, *Annual Energy Review, 1997*, Washington, DC, July 1998, p. 307.

Figure 1.5. Crude Oil Prices, 1870–98



Source:
Santini, Danilo J., "An Assessment of Oil Supply and Its Implications for Future Prices," *Nonrenewable Resources*, Vol. 7, No. 2, 1998, pp. 101-121, and 1994–98 data update.

Table 1.5
U.S. Petroleum Net Imports by World Region of Origin, 1960-97
(thousand barrels per day)

Year	Total OPEC[a]	Total Non-OPEC	Persian Gulf nations[b]	Total net imports	OPEC share of net imports	OPEC share of consumption[c]
1960	1,311	302	[d]	1,613	81.3%	13.4%
1965	1,475	806	[d]	2,281	64.7%	12.8%
1970	1,343	1,817	[d]	3,161	42.5%	9.1%
1971	1,671	2,030	[d]	3,701	45.2%	11.0%
1972	2,061	2,458	[d]	4,519	45.6%	12.6%
1973	2,991	3,034	[d]	6,025	49.6%	17.3%
1974	3,277	2,615	[d]	5,892	55.6%	19.7%
1975	3,599	2,248	[d]	5,846	61.6%	22.1%
1976	5,063	2,027	[d]	7,090	71.4%	29.0%
1977	6,190	2,375	[d]	8,565	72.3%	33.6%
1978	5,747	2,255	[d]	8,002	71.8%	30.5%
1979	5,633	2,352	[d]	7,985	70.5%	30.4%
1980	4,293	2,071	[d]	6,365	67.5%	25.2%
1981	3,315	2,086	1,215	5,401	61.4%	20.6%
1982	2,136	2,163	692	4,298	49.7%	14.0%
1983	1,843	2,469	439	4,312	42.7%	12.1%
1984	2,037	2,679	502	4,715	43.2%	13.0%
1985	1,821	2,465	309	4,286	42.5%	11.6%
1986	2,828	2,611	909	5,439	52.0%	17.4%
1987	3,055	2,859	1,074	5,914	51.7%	18.3%
1988	3,513	3,074	1,529	6,587	53.3%	20.3%
1989	4,124	3,078	1,858	7,202	57.3%	23.8%
1990	4,285	2,876	1,962	7,161	59.8%	25.2%
1991	4,065	2,561	1,833	6,626	61.3%	24.3%
1992	4,071	2,867	1,773	6,938	58.7%	23.9%
1993	4,253	3,365	1,774	7,618	55.8%	24.7%
1994	4,233	3,822	1,723	8,054	52.6%	23.9%
1995	3,980	3,906	1,563	7,886	50.5%	22.5%
1996	4,193	4,305	1,596	8,498	49.3%	22.9%
1997	4,461	4,443	1,731	8,904	50.1%	24.0%
			Average annual percentage change			
1960-97	3.4%	7.5%	[d]	4.7%		
1970-97	4.5%	3.4%	[d]	3.9%		
1987-97	3.9%	4.5%	4.9%	4.2%		

Source:
U.S. Department of Energy, Energy Information Administration, *Annual Energy Review 1997,* Washington, DC, July 1998, p. 149.

[a] Organization of Petroleum Exporting Countries. See Glossary for membership.
[b] See Glossary for Persian Gulf nations.
[c] See Table 1.8 for U.S. petroleum consumption.
[d] Data are not available.

Estimates of 1996 military expenditures for defending oil supplies in the Middle East rangefrom $6 to $60 billion per year. This wide range in estimates reflects the difficulty in assigning a precise figure to the military cost of defending the U.S. interests in the Middle East. The two main reasons for the difficulty are 1) the Department of Defense does not divide the budget into regional defense sectors and 2) it is difficult to determine how much of the cost is attributable to defending Persian Gulf oil.

Table 1.6
Summary of 1996 Military Expenditures for Defending Oil Supplies from the Middle East

Source	Original estimates (billion dollars)	Year of original estimate	1996 estimate (constant 1996 billion dollars)
General Accounting Office [1]	$33	1990	$28"
Congressional Research Service [2]	$6.4	1990	$6"
Greene and Leiby [3]	$14.3	1990	$12"
Ravenal [4]	$50	1992	$60[b]
Kaufinann and Steinbruner [5]	$64.5	1990	$55[b]
Delucchi and Murphy" [6]	$20-40	1996	$20–40[b]
Average estimate is $32 billion, with a standard deviation of $22 billion.			

[1] U.S. General Accounting Offices, *Southwest Asia: Cost of Protecting U.S. Interests,* GAO/NSIAD-9 l-250, Washington, DC, August 199 1.

[2] Congressional Research Service, *The External Costs of Oil Used in Transportation,* prepared for the U.S. Alternative Fuels Council, Washington, DC, June 1992.

[3] Greene, D.L., and P. Leiby, *The Social Costs to the U.S. of Monopolization of the World Oil Market, 1972-* 199 l , ORNL-6744, Oak Ridge National Laboratory, Oak Ridge, TN, March 1993.

[4] Ravenal, E.C., *Designing Defense for a New World Order: The Military Budget in 1992 and Beyond,* Cato Institute, Washington, DC, 199 1.

[5] Kaufmann, W.W., and J.D. Steinbruner, *Decisions for Defense: Prospects for a New Order, The* Brookings Institution, Washington, DC, 1991.

[6] Delucchi, M.A., and J. Murphy, *U.S. Military Expenditures to Protect the Use of Persian-Gulf Oil for Motor Vehicles,* UCD-ITS-RR-96-3 (15), University of California, Davis, California, April 1996.

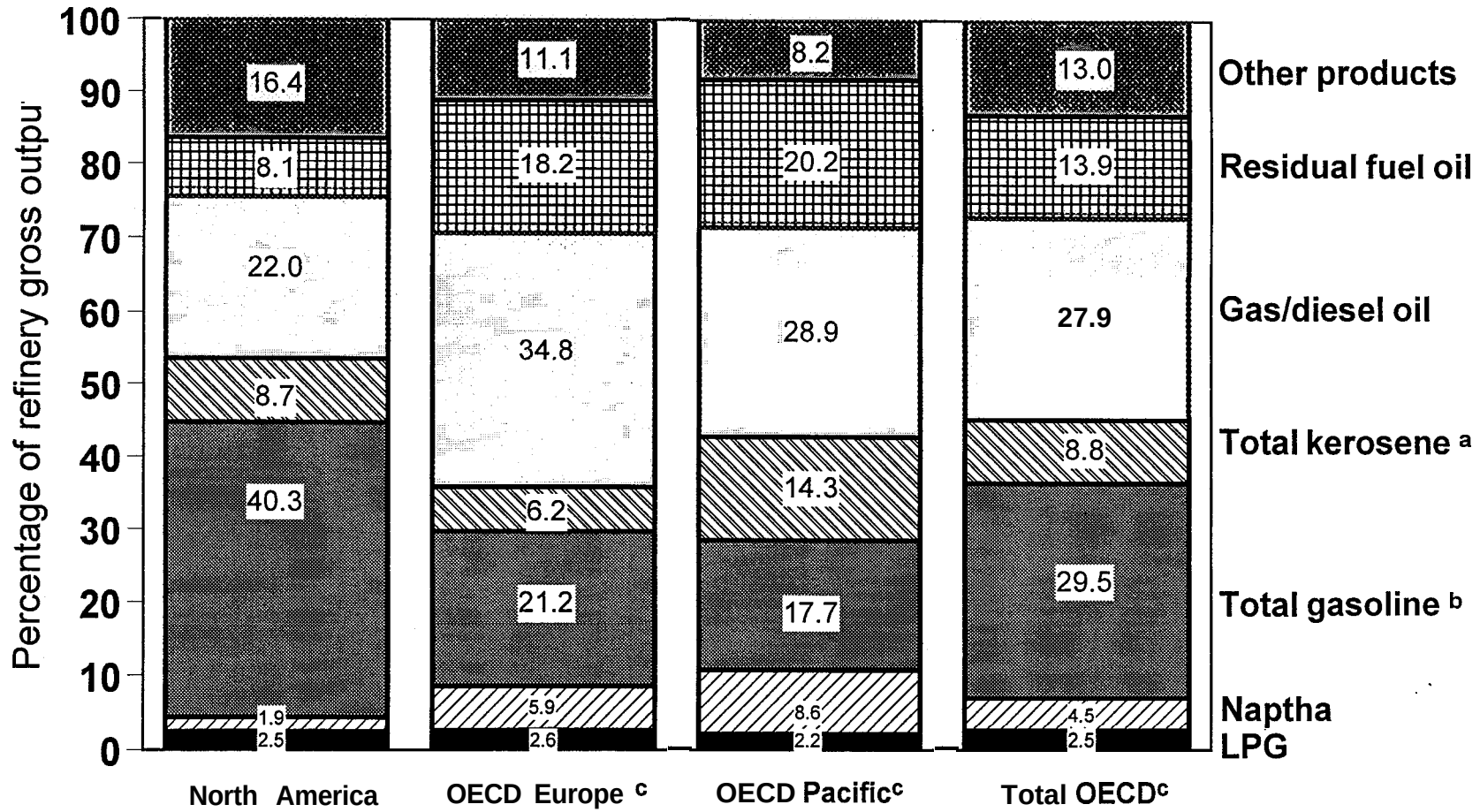
Source:
Hu, P.S., "Estimates of 1996 U.S. Military Expenditures on Defending Oil Supplies from the Middle East: A Literature Review," Oak Ridge National Laboratory, Oak Ridge, TN, March 1996.

[a]Estimated based on a 3% annual inflation rate and a decrease of 30% in the total Defense budget from 1990 to 1996.

[b]Provided by the author(s); thus, assumptions used for the projection are different from those used in the other estimates.

"Annual cost to defend all U.S. interests in the Persian Gulf.

Figure 1.6. Refinery Gross Output by World Region, 1998



Source:
International Energy Agency, *Monthly Oil Survey*, January 1999, Paris, France, Table 7.

---

[a] Includes jet kerosene and other kerosene.
[b] Includes motor gasoline, jet gasoline, and aviation gasoline.
[c] Organization for Economic Cooperation and Development. See Glossary for membership.

Oxygenate refinery input increased significantly in 1995, most certainly due to the Clean Air Act Amendments of 1990 which mandated the sale of reformulated gasoline in certain areas beginning in January 1995.

Table 1.7
U.S. Refinery Input of Crude Oil and Petroleum Products, 1987-97
(thousand barrels)

Year	Crude oil	Natural gas liquids	Oxygenates				Other hydrocarbons[a]	Other liquids	Total input to refineries
			Fuel ethanol	Methanol	MTBE[a]	Other oxygenates[b]			
1987	4,691,783	280,889	[d]	[d]	[d]	[d]	23,304	220,296	5,105,392
1988	4,848,175	304,566	[d]	[d]	[d]	[d]	19,515	203,794	5,258,386
1989	4,891,381	182,109					21,757	202,040	5,297,287
1990	4,894,379	170,589	[d]	[d]	[d]	[d]	28,642	23 1,466	5,325,076
1991	4,855,016	172,306	[d]	[d]	[d]	[d]	31,574	248,691	5,307,587
1992	4,908,603	171,701	[d]	[d]	[d]	[d]	47,918	224,758	5,352,980
1993	4,968,641	179,213	3,351	782	49,393	1,084	15,543	264,531	5,482,538
1994	5,061,111	169,868	3,620	242	52,937	1,676	14,130	179,678	5,483,262
1995	5,100,317	172,026	9,055	246	79,396	3,876	14,668	175,743	5,555,327
1996	5,195,265	164,552	11,156	126	79,407	3,444	20,587	193,695	5,668,232
1997	5,351,466	151,769	11,803	496	86,240	3,750	22,976	178,292	5,806,792
			Average annualpercentage change						
1987-97	1.3%	-6.0%	[e]	[e]	[e]	[e]	-0.1%	-2.1%	1.3%
1993-97	1.9%	-4.1%	37.0%	-10.8%	15.0%	36.4%	10.3%	-9.4%	1.4%

Source:
U.S. Department of Energy, Energy Information Administration, *Petroleum Supply Annual, 1997,* Vol. 1, June 1998, Table 16, p. 49, and annual.
(Additional resources: http://www.eia.doe.gov)

[a] Methyl tertiary butyl ether (MTBE).
[b] Includes ethyl tertiary butyl ether (ETBE), tertiary amyl methyl ether (TAME), tertiary butyl alcohol (TBA), and other aliphatic alcohols and ethers intended for motor gasoline blending.
[c] For 1987-92, includes other hydrocarbons/hydrogen/oxygenates. For 1993-on, includes other hydrocarbons/hydrogen.
[d] Reported in "Other hydrocarbons" category in this year.
[e] Data are not available.

When crude oil and other hydrocarbons are processed into products that are, on average, less dense than the input, a processing volume gain occurs. Due to this gain, the product yield from a barrel of crude oil is more than 100%. The processing volume gain has been growing over the years.

Table 1.8
Refinery Yield of Petroleum Products from a Barrel of Crude Oil, 1978-97
(percentage)

Year	Motor gasoline	Distillate fuel oil	Jet fuel	Liquified petroleum gas	Other[a]	Total[b]
1978	44.1	21.4	6.6	2.3	29.6	104.0
1979	43.0	21.5	6.9	2.3	30.3	104.0
1980	44.5	19.7	7.4	2.4	30.0	104.0
1981	44.8	20.5	7.6	2.4	28.7	104.0
1982	46.4	21.5	8.1	2.2	26.2	104.4
1983	47.6	20.5	8.5	2.7	24.8	104.1
1984	46.7	21.5	9.1	2.9	24.2	104.4
1985	45.6	21.6	9.6	3.1	24.6	104.5
1986	45.7	21.2	9.8	3.2	24.8	104.7
1987	46.4	20.5	10.0	3.4	24.5	104.8
1988	46.0	20.8	10.0	3.6	24.4	104.8
1989	45.7	20.8	10.1	4.0	24.2	104.8
1990	45.6	20.9	10.7	3.6	24.1	104.9
1991	45.7	21.3	10.3	3.8	24.1	105.2
1992	46.0	21.2	9.9	4.3	24.0	105.4
1993	46.1	21.9	10.0	4.1	23.3	105.4
1994	45.5	22.3	10.1	4.2	23.2	105.3
1995	46.4	21.8	9.7	4.5	22.9	105.3
1996	45.7	22.7	10.4	4.5	22.4	105.7
1997	45.7	22.5	10.3	4.6	22.5	105.6

Source:
Department of Energy, Energy Information Administration, *Petroleum Supply Annual 1997*, Vol. 1, June 1998, Table 19, p. 54, and annual. (Additional resources: http://www.eia.doe.gov)

[a] Includes aviation gasoline, kerosene, naphtha and other oils for petrochemical feedstock use, special naphthas, lubricants, waxes, petroleum coke, asphalt and road oil, still gas, and miscellaneous products.
[b] Products sum greater than 100% due to processing gain. The processing gain for years 1978 to 1980 is assumed to be 4%.

Table 1.9
United States Petroleum Production and Consumption, 1973-98
(million barrels per day)

Year	Domestic crude oil production	Net imports			Exports		U.S. petroleum consumption[a]	World petroleum consumption	Net imports as a percentage of U.S. petroleum consumption	U.S. petroleum consumption as a percentage of world consumption	Transportation petroleum use as a percentage of domestic production[b]
		Crude oil	Petroleum products	Total	Crude oil	Petroleum products					
1973	9.21	3.24	2.78	6.03	0.00	0.23	17.31	56.39	34.8%	30.7%	76.7%
1974	8.77	3.47	2.42	5.89	*0.00*	0.22	16.65	55.91	35.4%	29.8%	78.3%
1975	8.37	4.10	1.75	5.85	0.00	0.20	16.32	55.48	35.8%	29.4%	82.8%
1976	8.13	5.28	1.81	7.09	0.00	0.22	17.46	58.74	40.6%	29.7%	89.5%
1977	8.25	6.57	2.00	8.57	0.05	0.19	18.43	61.63	46.5%	29.9%	91.7%
1978	8.71	6.20	1.80	8.00	0.16	0.20	18.85	63.30	42.5%	29.8%	91.7%
1979	8.55	6.28	1.70	7.99	0.24	0.24	18.51	65.17	43.1%	28.4%	92.0%
1980	8.60	4.98	1.39	6.37	0.29	0.26	17.06	63.07	37.3%	27.0%	87.9%
1981	8.57	4.17	1.23	5.40	0.23	0.37	16.06	60.87	33.6%	26.4%	86.9%
1982	8.65	3.25	1.05	4.30	0.24	0.58	15.30	59.50	28.1%	25.7%	84.9%
1983	8.69	3.17	1.15	4.3 1	0.16	0.58	15.23	58.74	28.3%	25.9%	85.3%
1984	8.88	3.25	1.47	4.72	0.18	0.54	15.73	59.84	30.0%	26.3%	86.0%
1985	8.97	3.00	1.29	4.29	0.20	0.58	15.73	60.10	27.3%	26.2%	86.6%
1986	8.68	4.02	1.41	5.44	0.15	0.63	16.28	61.76	33.4%	26.4%	93.1%
1987	8.35	4.52	1.39	5.91	0.15	0.61	16.67	63.00	35.5%	26.5%	98.5%
1988	8.14	4.95	1.63	6.59	0.16	0.66	17.28	64.82	38.1%	26.7%	104.1%
1989	7.61	5.70	1.50	7.20	0.14	0.72	17.33	65.92	41.6%	26.3%	112.1%
1990	7.36	4.79	1.38	7.16	0.11	0.75	16.99	65.98	42.2%	25.8%	114.5%
1991	7.42	5.67	0.96	6.63	0.12	0.89	16.71	66.57	39.6%	25.1%	110.6%
1992	7.17	5.99	0.94	6.94	0.09	0.86	17.03	66.74	40.7%	25.5%	114.5%
1993	6.85	6.69	0.93	7.62	0.10	0.90	17.24	66.99	44.2%	25.7%	118.7%
1994	6.66	6.96	1.09	8.05	0.10	0.84	17.72	68.30	45.5%	25.9%	124.7%
1995	6.56	7.14	0.75	7.89	0.10	0.86	17.73	69.89	44.5%	25.4%	127.6%
1996	6.47	7.40	1.10	8.50	0.11	0.87	18.31	71.32	46.4%	25.7%	130.8%
1997	6.45	8.12	1.04	9.16	0.11	0.90	18.62	73.01	49.2%	25.5%	132.3%
1998	6.24	8.44	1.01	9.45	0.11	0.82	18.68		50.6%	[c]	137.0%
					Average annual percentage change						
1973-98	-1.5%	3.9%	-4.0%	1.8%	[c]	5.2%	0.3%	1.0%[d]			
1988-98	-2.6%	5.5%	-4.7%	3.7%	-3.7%	2.2%	0.8%	1.2%[d]			

Source:
U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review, March 1999,* Washington, DC, 1999, pp. 42–47.
World petroleum consumption - U.S. Department of Energy, Energy Information Administration, *International Energy Annual 1997*, April 1999, Table1.1.
(Additional resources: http://www.eia.doe.gov)

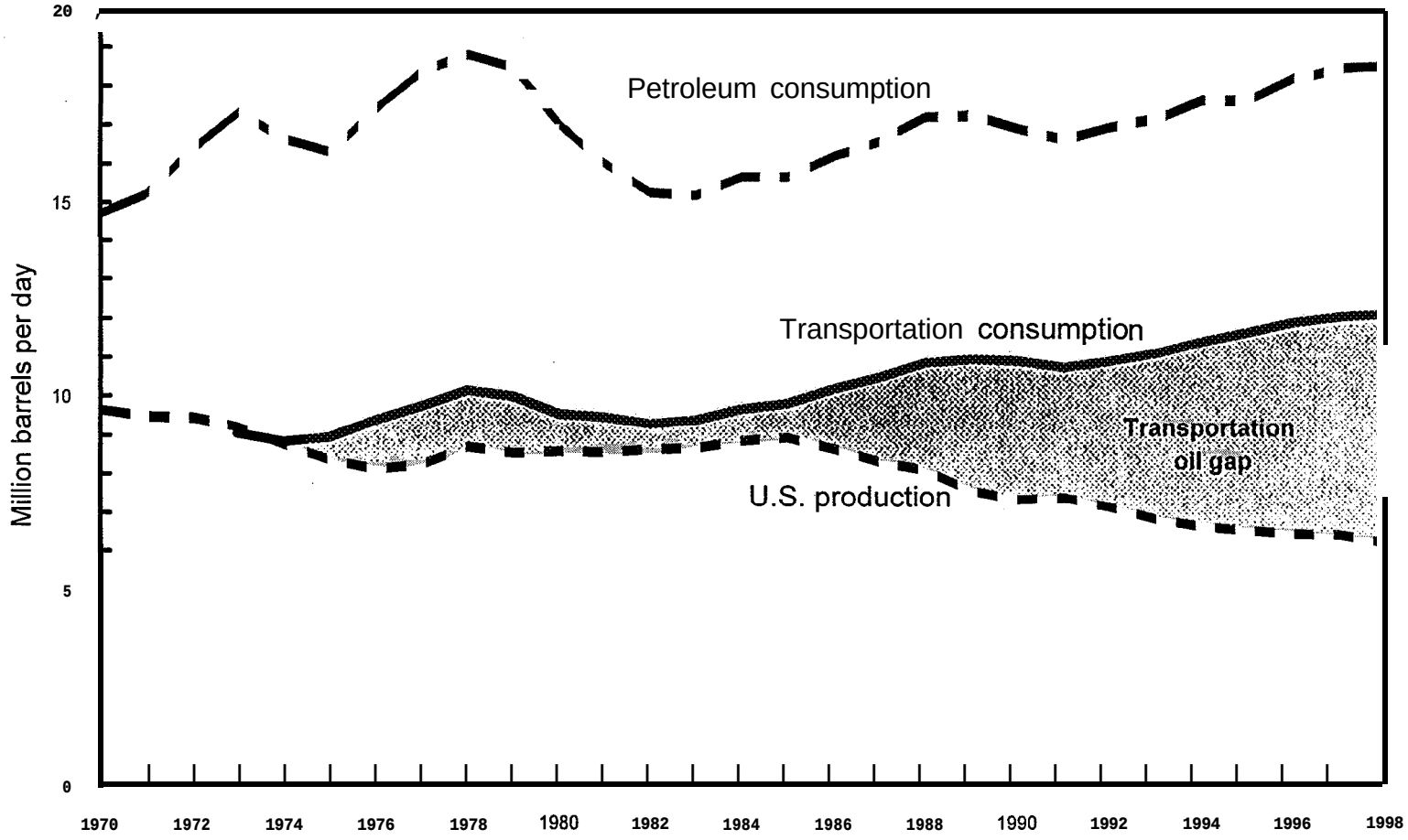
[a] Best estimate for U.S. petroleum consumption is the amount of petroleum products supplied to the U.S. in a given year. This is not the sum of crude oil production and net imports due to processing gain and stock changes.

[b] Transportation petroleum use can be found on Table 1.10. This column has been revised to include domestic production of crude oil, natural gas plant liquids, and other hydrocarbons/hydrogen/oxygenates as shown in the *Monthly Energy Review,* Table 3.1 a.

[c] Data are not available.

[d] Average annual percentage change is to the latest possible year.

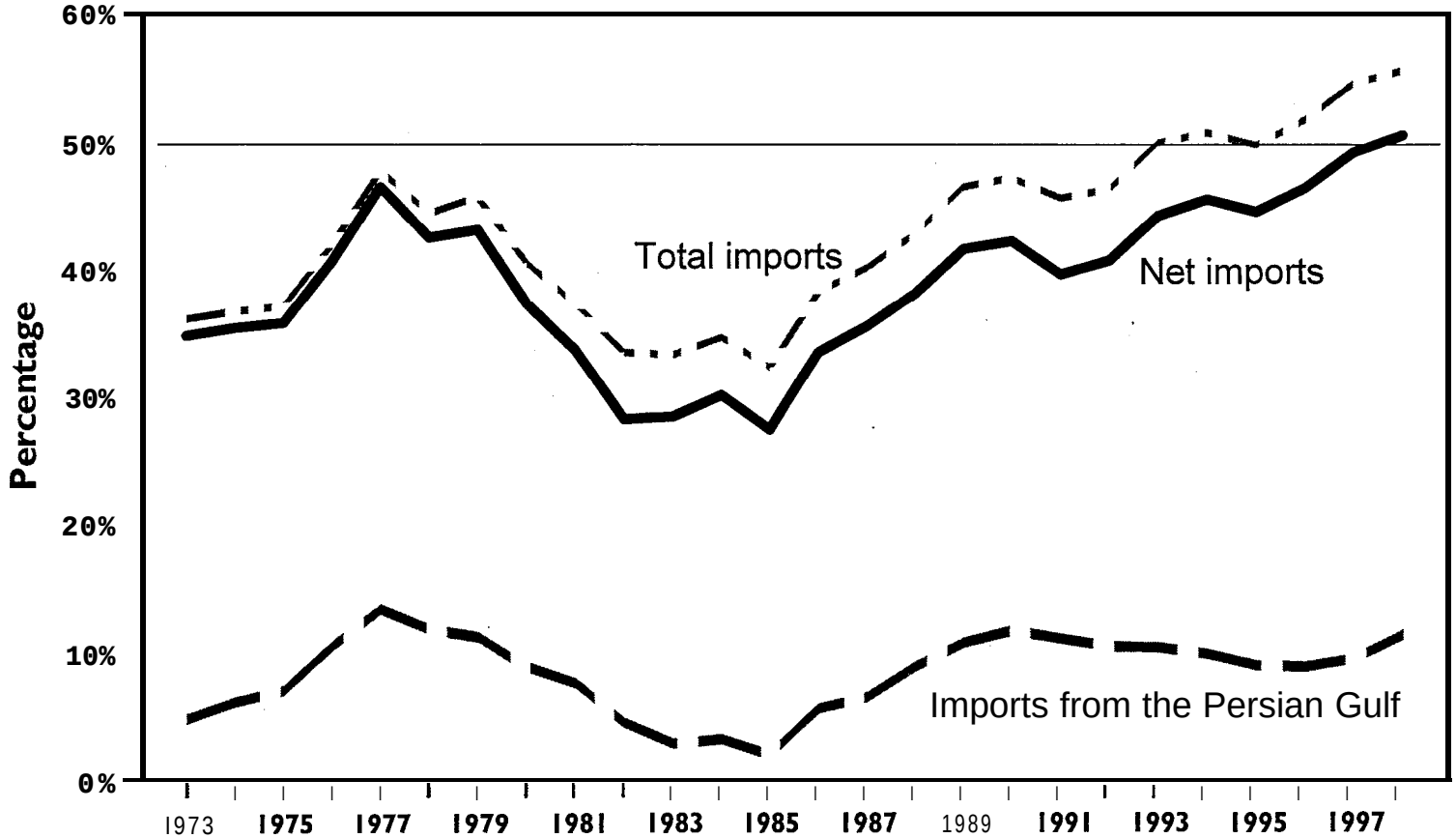
Figure 1.7. United States Petroleum Production and Consumption, 1973-98



Source: See Tables 1.8 and 1.9.

The share ofpetroleum imported to the U.S. can be calculated using total imports or net imports. Net imports, which is the preferred data, rose to 50% for the first time in 1998, while total imports reached 50% for the first time in 1993. The reliance on imports from the Persian Gulf region has increased in 1998 to the highest point since 1990.

Figure 1.8. Import Share of U.S. Petroleum Consumption, 1973-98



Source: Table 1.8 and the U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review, March* 1999, Washington, DC, 1999, p. 15.

Table 1.10
Consumption of Petroleum by End-Use Sector, 1973-98
(quadrillion Btu)

Year	Transportation	Percentage	Residential and commercial	Percentage	Industrial	Percentage	Electric utilities	Percentage	Total	Total in million barrels per day[a]
1973	17.83	51.2%	4.39	12.6%	9.10	**26.1%**	3.52	10.1%	34.84	17.31
1974	17.40	52.0%	4.00	12.0%	**8.69**	26.0%	3.37	10.1%	33.46	16.66
1975	17.61	53.8%	3.81	11.6%	8.15	24.9%	3.17	9.7%	32.74	16.33
1976	18.51	52.6%	4.18	11.9%	9.01	25.6%	3.48	9.9%	35.18	17.51
1977	19.24	51.8%	4.21	11.3%	9.77	26.3%	3.90	10.5%	37.12	18.43
1978	20.04	52.8%	4.07	10.7%	9.87	26.0%	3.99	10.5%	37.97	18.85
1979	19.83	53.4%	3.45	9.3%	10.57	28.5%	3.28	8.8%	37.13	18.52
1980	19.01	55.6%	3.04	8.9%	9.53	27.9%	2.63	7.7%	34.21	17.11
1981	18.81	58.9%	2.63	8.2%	8.29	26.0%	2.20	6.9%	31.93	16.06
1982	18.42	60.9%	2.45	8.1%	7.79	25.8%	1.57	5.2%	30.23	15.29
1983	18.59	61.9%	2.50	8.3%	7.42	24.7%	1.54	5.1%	30.05	15.23
1984	19.22	61.9%	2.54	8.2%	8.01	25.8%	1.29	4.2%	31.06	15.77
1985	19.50	63.1%	2.52	8.2%	7.81	25.3%	1.09	3.5%	30.92	15.73
1986	20.27	63.0%	2.56	8.0%	7.92	24.6%	1.45	4.5%	32.20	16.28
1987	20.87	63.5%	2.59	7.9%	8.15	24.8%	1.26	3.8%	32.87	16.67
1988	21.63	63.2%	2.60	7.6%	8.43	24.6%	1.56	4.6%	34.22	17.33
1989	21.87	63.9%	2.53	7.4%	8.13	23.8%	1.69	4.9%	34.22	17.33
1990	21.81	65.0%	2.17	6.5%	8.32	24.8%	1.25	3.7%	33.55	16.99
1991	21.46	65.3%	2.15	6.5%	8.06	24.5%	1.18	3.6%	32.85	16.72
1992	21.81	65.0%	2.13	6.4%	8.64	25.8%	0.95	2.8%	33.53	17.08
1993	22.20	65.6%	2.14	6.3%	8.45	25.0%	1.05	3.1%	33.84	17.24
1994	22.82	65.7%	2.09	6.0%	8.85	25.5%	0.97	2.8%	34.73	17.72
1995	23.31	67.2%	2.08	6.0%	8.62	24.9%	0.66	1.9%	34.67	17.73
1996	23.84	66.5%	2.20	6.1%	9.10	25.4%	0.73	2.0%	35.87	18.36
1997	24.11	66.3%	2.14	5.9%	9.31	25.6%	0.82	2.3%	36.38	18.62
1998	24.25	66.3%	2.11	5.8%	9.05	24.7%	1.17	3.2%	36.58	18.69
				Average annual percentage change						
1973-98	1.2%		-2.9%		0.0%		-4.3%		0.2%	0.3%
1988-98	1.1%		-2.1%		0.70,		-2.8%		0.70,	0.8%

Source:
U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review, March 1999,* pp. 27, 29, 3 1, 33.
(Additional resources: http://www.eia.doe.gov)

[a] Calculated from Total column using Table A.3. Approximate Heat Content of Petroleum Products, Weighted Average, from the *Monthly Energy Review,* March 1997.

Table 1.11
Transportation of Petroleum and Petroleum Products in the U.S. by Mode, 1975-97

	Pipelines[a]		Water carriers		Motor carriers[b]		Railroads		Total
Year	(billion ton-miles)	(percent)	(billion ton-miles)	(percent)	(billion ton-miles)	(percent)	(billion ton-miles)	(percent)	(billion ton-miles)
1975	507.0	59.88%	298.0	35.20%	27.6	3.26%	14.1	1.66%	846.7
1976	515.0	59.35%	306.9	35.37%	32.5	3.75%	13.3	1.53%	867.7
1977	546.0	59.13%	333.3	36.09%	29.6	3.21%	14.5	1.57%	923.4
1978	585.8	50.49%	530.6	45.73%	30.6	2.65%	13.2	1.14%	1,160.2
1979	608.3	51.78%	522.9	44.51%	30.1	2.56%	13.5	1.15%	1,174.8
1980	588.2	47.24%	617.8	49.61%	26.8	2.15%	12.5	1.00%	1,245.3
1981	563.7	46.27%	617.2	50.66%	24.9	2.04%	12.6	1.03%	1,218.4
1982	565.7	46.44%	616.9	50.64%	22.7	1.86%	12.9	1.06%	1,218.2
1983	556.1	45.45%	630.5	51.53%	25.1	2.05%	11.8	0.97%	1,223.5
1984	568.1	48.14%	570.7	48.36%	29.2	2.47%	12.2	1.03%	1,180.2
1985	564.3	47.20%	590.4	49.39%	28.7	2.40%	12.1	1.01%	1,195.5
1986	577.9	48.65%	568.1	47.83%	29.7	2.50%	12.1	1.02%	1,187.8
1987	586.8	49.09%	566.5	47.37%	30.4	2.54%	12.8	1.08% 1.01%	1,195.8
1988									
1989	584.2	53.39%	466.2	42.61%	30.4	2.78%	13.4	1.22%	1,094.2
1990	584.1	54.24%	449.0	41.70%	29.7	2.76%	14.0	1.30%	1,076.8
1991	578.5	53.27%	465.0	42.81%	28.8	2.65%	13.8	1.27%	1,086.1
1992	588.8	53.93%	459.3	42.07%	28.8	2.64%	14.8	1.36%	
1993	592.9	57.31%	401.7	38.82%	24.8	2.40%	15.2	1.47%	1,034.6
1994	591.4	56.50%	411.4	39.31%	28.1	2.68%	15.8	1.51%	1,046.7
1995	601.1	57.53%	400.9	38.37%	26.3	2.51%	16.6	1.59%	1,044.9
1996	619.2	60.58%	356.5	34.88%	29.7	2.90%	16.8	1.64%	1,022.2
1997	616.5	64.45%	295.6	30.90%	27.7	2.90%	16.7	1.75%	956.5
					Average annual percentage change				
1975-97	0.9%		0.0%		0.0%		0.8%		0.6%
1987-97	0.5%		-6.3%		-0.9%		3.3%		-2.2%

Source:
Association of Oil Pipelines, *Shifts in Petroleum Transportation*, Washington, DC, February 1999, Table 1.

[a] The amounts carried by pipeline are based on ton-miles of crude and petroleum products for Federally regulated pipelines (84 percent) plus au estimated breakdown of crude and petroleum products of the ton-miles for pipelines not Federally regulated (16 percent).

[b] The amounts carried by motor carriers are estimated.