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**Energy
Information
Administration**

**Annual Report
to Congress**

**Statistics and Trends
of Energy Supply, Demand,
and Prices**

Published: May 1978

Domestic Energy Supply, Demand, and Price
Statistics, and Energy Trends from 1947 Through 1977;
Interpretation of Fundamental Energy Patterns and
Significant Changes.

ADMINISTRATOR'S FOREWORD

This compendium of statistical charts and tables is the third, and final, volume of the first *Annual Report to Congress* of the Energy Information Administration. The information all relates to the past; there are no projections in this volume. The topics which are treated deal with U.S. national energy statistics, especially supply, demand, and price. International energy matters appear only as total imports of energy to the United States.

The interested reader may find that fuller information concerning particular subjects is available in recurrent publications of the Energy Information Administration; the tables contain many such references; in addition, Chapter 4 of Volume 1 of this *Annual Report* lists recurrent reports.

Many of the statistical series in this volume have long histories—in different predecessor organizations. As a consequence, many minor discrepancies have come to light during preparation, and some remain in the volume as it is now being published. Between Volume II and Volume III most discrepancies are no more than 3 percent, or 0.2 quadrillion Btu; instances exceeding these limits are as follows:

Year	Volume II	Volume III	Percentage Difference	Reason
Energy Production by Primary Energy Type—Coal				
1975	14.6Q	15.395Q	5.2	Different Btu conversion factors and inclusion of Anthracite in Volume III.
1977	16.94Q	15.924Q	6.4	Volume II is a forecast and the above reason.

Energy Consumption by Primary Energy Type—Coal

1976	13.037Q	13.748Q	5.2	Two different forms: BOM 1419/EIA-6, Distribution (Volume II) and BOM 6-1400/EIA-3, Consumption (Volume III), and inclusion of Anthracite in Volume III.
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Consumption of Bituminous Coal and Lignite by End-Use Sector—General Industry and Other, and Retail Dealers

1976	56.5 MMST	67.4 MMST	16.2	Exclusion of retail dealers in Volume II and the above reason.
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Q = Quadrillion Btu.

MMST = million short tons.

A book of charts and tables is dense with information. Its value depends upon the accuracy of the information and the choice of topics treated. The view of readers can be especially valuable in helping to inform a wise choice of topics. Users of the volume are encouraged to offer their views concerning the topic coverage this year; planning for the next *Annual Report* will soon begin.

Lincoln E. Moses
Administrator

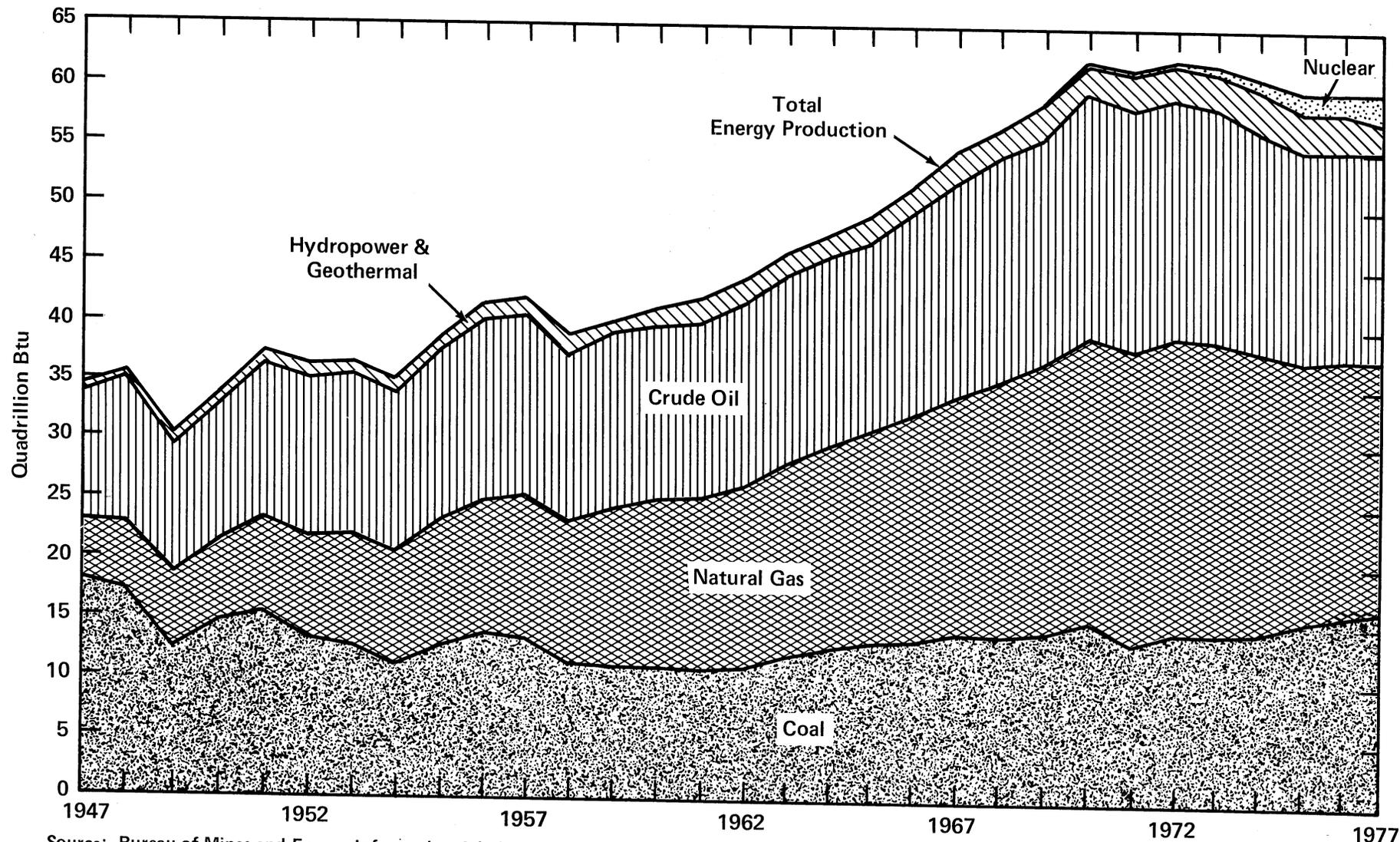
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1
General Energy

Energy Production by Primary Energy Type



Source: Bureau of Mines and Energy Information Administration.

During 1947-1972, total U.S. energy production increased at an annual rate of 2.4 percent to a peak of 62.8 quadrillion Btu. From 1973 to 1975, production declined 1.4 percent per year, then leveled off during 1976 and 1977.

Petroleum production peaked at 20.4 quadrillion Btu in 1970, growing at an annual rate of 2.8 percent from 1947 through 1970. Between 1971 and 1976, petroleum production declined annually by 2.9 percent. This trend reversed again in 1977 when production increased 0.8 percent, primarily due to the startup of Alaskan North Slope oil production. Natural gas production increased from 5.0 quadrillion Btu in 1947 to the 1971-1973

period when it reached 24.8 quadrillion Btu. Production has declined since at a rate of 3.1 percent per year.

U.S. coal production declined from 18.0 quadrillion Btu in 1947 to 10.8 quadrillion Btu in 1961, or an average drop of 3.6 percent per year. From 1962 through 1977, coal production increased at a 2.5 percent annual rate.

Although the combined production of energy form hydropower, nuclear power, and geothermal increased more than 300 percent between 1947 and 1977, it accounted for only 8.4 percent of total production in 1977.

Energy Production by Primary Energy Type, 1947-1977

Year	Coal ¹		Natural Gas ²		Crude Oil ³		Hydropower ⁴		Nuclear Power		Geothermal		Total Gross Energy Production Trillion Btu	Change from Previous Year Percent
	Trillion Btu ⁵	Million Short Tons	Trillion Btu ⁵	Billion Cubic Feet	Trillion Btu ⁵	Million Barrels	Trillion Btu ⁵	Billion kWh	Trillion Btu ⁵	Billion kWh	Trillion Btu ⁵	Billion kWh		
1947	17,975	687.8	5,012	4,582	10,771	1,857	1,223	78.4	—	—	—	—	34,981	—
1948	17,158	656.7	5,615	5,148	11,717	2,020	1,298	82.5	—	—	—	—	35,788	+2.3
1949	12,557	480.6	5,911	5,420	10,683	1,842	1,349	89.7	—	—	—	—	30,500	-14.8
1950	14,647	560.4	6,841	6,262	11,449	1,974	1,340	95.5	—	—	—	—	34,277	+12.4
1951	15,066	576.3	8,106	7,457	13,037	2,248	1,361	99.8	—	—	—	—	37,570	+9.6
1952	13,262	507.4	8,705	8,014	13,282	2,290	1,404	105.1	—	—	—	—	36,653	-2.4
1953	12,767	488.2	9,116	8,397	13,671	2,357	1,356	105.2	—	—	—	—	36,910	+0.7
1954	11,001	420.8	9,488	8,743	13,427	2,315	1,305	107.1	—	—	—	—	35,221	-4.6
1955	12,695	490.8	10,532	9,405	14,407	2,484	1,322	113.0	—	—	—	—	38,956	+10.6
1956	13,747	529.8	11,252	10,082	15,179	2,617	1,398	122.0	—	—	—	—	41,576	+6.7
1957	13,444	518.0	11,885	10,680	15,179	2,617	1,480	130.2	—	—	—	—	41,988	+1.0
1958	11,201	431.6	12,244	11,030	14,204	2,449	1,555	140.3	—	—	—	—	39,204	-6.6
1959	11,105	432.7	13,361	12,046	14,935	2,575	1,512	137.8	2	0.2	—	—	40,915	+4.4
1960	11,140	434.3	14,135	12,771	14,935	2,575	1,566	145.5	5	0.5	—	—	41,781	+2.1
1961	10,751	420.4	14,691	13,254	15,208	2,622	1,617	151.8	18	1.7	—	—	42,285	+1.2
1962	11,211	439.0	15,365	13,877	15,521	2,676	1,777	168.3	25	2.3	—	—	43,899	+3.8
1963	12,176	477.2	16,271	14,747	15,967	2,753	1,738	165.8	34	3.2	—	—	46,186	+5.2
1964	12,854	504.2	17,138	15,547	16,165	2,787	1,853	177.1	35	3.3	—	—	48,045	+4.0
1965	13,395	527.0	17,652	16,040	16,524	2,849	2,027	193.9	39	3.7	—	—	49,637	+3.3
1966	13,836	546.8	18,984	17,207	17,562	3,028	2,029	194.8	59	5.5	—	—	52,470	+5.7
1967	14,215	564.9	20,087	18,171	18,653	3,216	2,311	221.5	82	7.7	—	—	55,348	+5.5
1968	13,955	556.7	21,548	19,322	19,308	3,329	2,314	222.5	133	12.5	—	—	57,258	+3.5
1969	14,223	571.0	22,838	20,698	19,558	3,372	2,614	250.2	148	13.9	—	—	59,381	+3.7
1970	15,248	612.7	24,154	21,921	20,402	3,517	2,593	247.1	232	21.8	11	0.5	62,640	+5.5
1971	13,607	560.9	24,805	22,493	20,031	3,454	2,790	266.3	406	38.1	11	0.5	61,650	-1.6
1972	14,500	602.5	24,785	22,532	20,041	3,455	2,829	272.6	577	54.1	33	1.5	62,765	+1.8
1973	14,382	598.6	24,754	22,648	19,493	3,361	2,829	272.3	885	83.0	43	2.0	62,386	-0.6
1974	14,487	610.0	23,696	21,601	18,575	3,203	3,143	301.0	1,215	114.0	54	2.5	61,170	-1.9
1975	15,394	654.6	22,019	20,109	17,730	3,057	3,122	300.0	1,839	172.5	69	3.2	60,173	-1.6
1976	15,868	684.9	21,827	19,952	17,263	2,976	2,952	283.7	2,037	191.1	78	3.6	60,025	-0.2
1977 ⁶	15,924	694.7	21,817	19,942	17,395	2,999	2,293	220.4	2,675	250.9	78	3.6	60,182	+0.3

¹ Includes anthracite coal, bituminous coal, and lignite.

² Includes natural gas liquids.

³ Includes lease condensate.

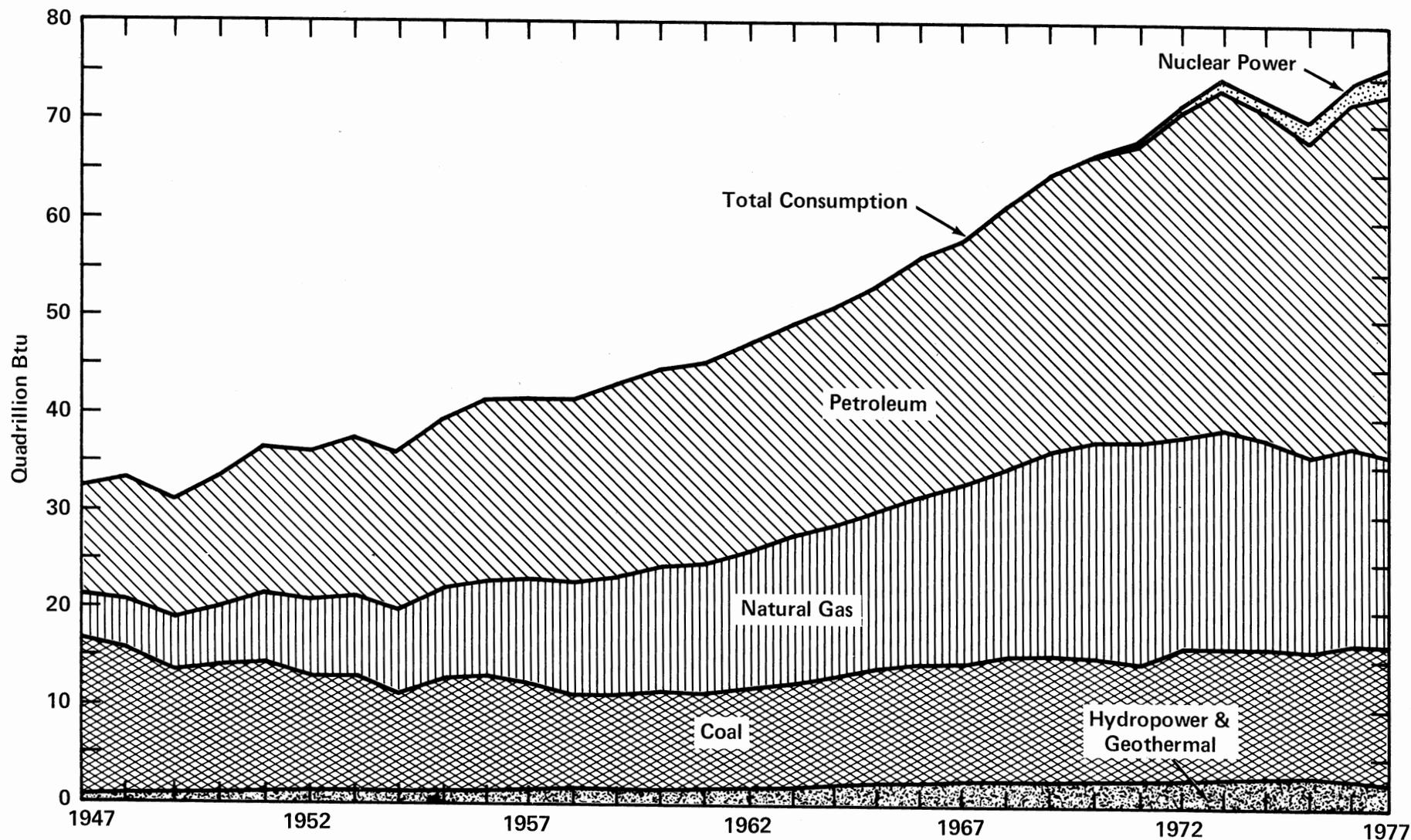
⁴ Does not include industrial generation of hydroelectricity.

⁵ See Units of Measure section for Btu conversion factors.

⁶ Preliminary.

Source: Bureau of Mines and Energy Information Administration.

Energy Consumption by Primary Energy Type



Source: Bureau of Mines and Energy Information Administration.

Between 1947 and 1973, consumption of energy in the United States increased at an annual rate of 3.2 percent. During this period, petroleum and natural gas consumption grew at annual rates of 4.5 percent and 6.4 percent, respectively.

During 1974 and 1975, total U.S. energy consumption fell 2.7 percent per year, but then increased in 1976 and 1977 by 5.3 percent and 2.0 percent, respectively. Petroleum consumption in 1974-1975 decreased 2.9 percent

annually, and then increased an average of 6.2 percent per year in 1976 and 1977. Natural gas consumption declined 3.3 percent annually from 1974 through 1977.

Coal consumption declined 3.9 percent annually from 1947 to 1959, then increased 3.0 percent per year through 1977. In 1947, coal, natural gas, and petroleum held 48.6 percent, 13.9 percent, and 34.9 percent, respectively, of total U.S. energy consumption. In 1977 those shares were 18.6, 25.7, and 48.7 percent, respectively.

Energy Consumption by Primary Energy Type, 1947-1977

Year	Coal ¹		Natural Gas ²		Petroleum ³		Hydropower ⁴		Nuclear Power		Geothermal		Total Gross Energy Consumption	Change from Previous Year
	Trillion Btu ⁵	Million Short Tons	Trillion Btu ⁵	Billion Cubic Feet	Trillion Btu ⁵	Million Barrels	Trillion Btu ⁵	Billion kWh	Trillion Btu ⁵	Billion kWh	Trillion Btu ⁵	Billion kWh	Trillion Btu	Percent
1947	15,824	605	4,518	4,366	11,367	1,990	1,253	80.3	—	—	—	—	32,962	—
1948	14,897	570	5,033	4,862	11,965	2,020	1,322	84.0	—	—	—	—	33,217	+0.8
1949	12,631	483	5,289	5,110	12,120	2,128	1,373	91.3	—	—	—	—	31,413	-5.4
1950	12,913	494	6,150	5,942	13,489	2,375	1,371	97.7	—	—	—	—	33,923	+8.0
1951	13,225	506	7,248	7,003	14,848	2,584	1,391	102.0	—	—	—	—	36,712	+8.2
1952	11,868	454	7,760	7,498	15,334	2,671	1,435	107.4	—	—	—	—	36,397	-0.9
1953	11,893	455	8,156	7,870	16,098	2,775	1,382	107.2	—	—	—	—	37,529	+3.1
1954	10,195	390	8,548	8,259	16,132	2,849	1,333	109.4	—	—	—	—	36,208	-3.5
1955	11,540	447	9,232	8,920	17,524	3,100	1,370	117.1	—	—	—	—	39,666	+9.6
1956	11,752	457	9,834	9,502	18,627	3,233	1,449	126.5	—	—	—	—	41,662	+5.0
1957	11,168	434	10,416	10,064	18,570	3,234	1,521	133.8	—	—	—	—	41,675	negl.
1958	9,849	386	10,995	10,623	19,214	3,371	1,592	143.6	—	—	—	—	41,650	-0.1
1959	9,810	385	11,990	11,585	19,747	3,481	1,551	141.4	2	0.2	—	—	43,100	+3.5
1960	10,140	398	12,699	12,269	20,067	3,611	1,614	150.0	5	0.5	—	—	44,525	+3.3
1961	9,906	390	13,228	12,750	20,487	3,641	1,641	154.1	18	1.7	—	—	45,280	+1.7
1962	10,189	403	14,121	13,612	21,267	3,796	1,782	168.8	25	2.3	—	—	47,384	+4.6
1963	10,714	423	14,843	14,341	21,950	3,925	1,730	165.0	34	3.2	—	—	49,271	+4.0
1964	11,264	446	15,648	15,118	22,386	4,034	1,873	179.0	35	3.3	—	—	51,206	+3.9
1965	11,908	472	16,098	15,598	23,241	4,202	2,027	193.9	39	3.7	—	—	53,313	+4.1
1966	12,495	498	17,393	16,854	24,394	4,111	2,040	195.9	59	5.5	—	—	56,381	+5.8
1967	12,256	491	18,250	17,685	25,335	4,585	2,311	221.5	82	7.7	—	—	58,234	+3.3
1968	12,659	509	19,564	18,957	27,052	4,902	2,314	222.5	133	12.5	—	—	61,722	+6.0
1969	12,733	516	21,020	20,388	28,421	5,160	2,625	251.3	148	13.9	—	—	64,947	+5.2
1970	12,698	524	22,029	21,367	29,537	5,365	2,614	249.1	232	21.8	11	0.5	67,121	+3.3
1971	12,043	502	22,469	21,793	30,570	5,553	2,827	269.8	406	38.1	11	0.5	68,326	+1.8
1972	12,423	523	22,698	22,101	32,966	5,990	2,909	280.3	577	54.1	33	1.5	71,606	+4.8
1973	13,294	563	22,512	22,049	34,851	6,317	2,978	286.6	885	83.0	43	2.0	74,563	+4.1
1974	12,889	558	21,732	21,223	33,468	6,078	3,276	313.7	1,215	114.0	54	2.5	72,634	-2.6
1975	12,814	562	19,948	19,538	32,742	5,958	3,186	306.2	1,839	172.5	69	3.2	70,598	-2.8
1976	13,748	604	20,344	19,946	35,086	6,391	3,042	292.3	2,037	191.1	78	3.6	74,372	+5.3
1977 ⁶	14,117	625	19,613	19,228	36,956	6,724	2,397	230.3	2,675	250.9	78	3.6	75,836	+2.0

¹ Includes anthracite, bituminous coal, lignite, and net imports of coke.

² Excludes natural gas liquids. Prior to 1971, consumption includes adjustments.

³ Includes domestically produced crude oil, natural gas liquids, and condensate, plus imported crude oil and products.

⁴ Does not include industrial generation of hydroelectric power.

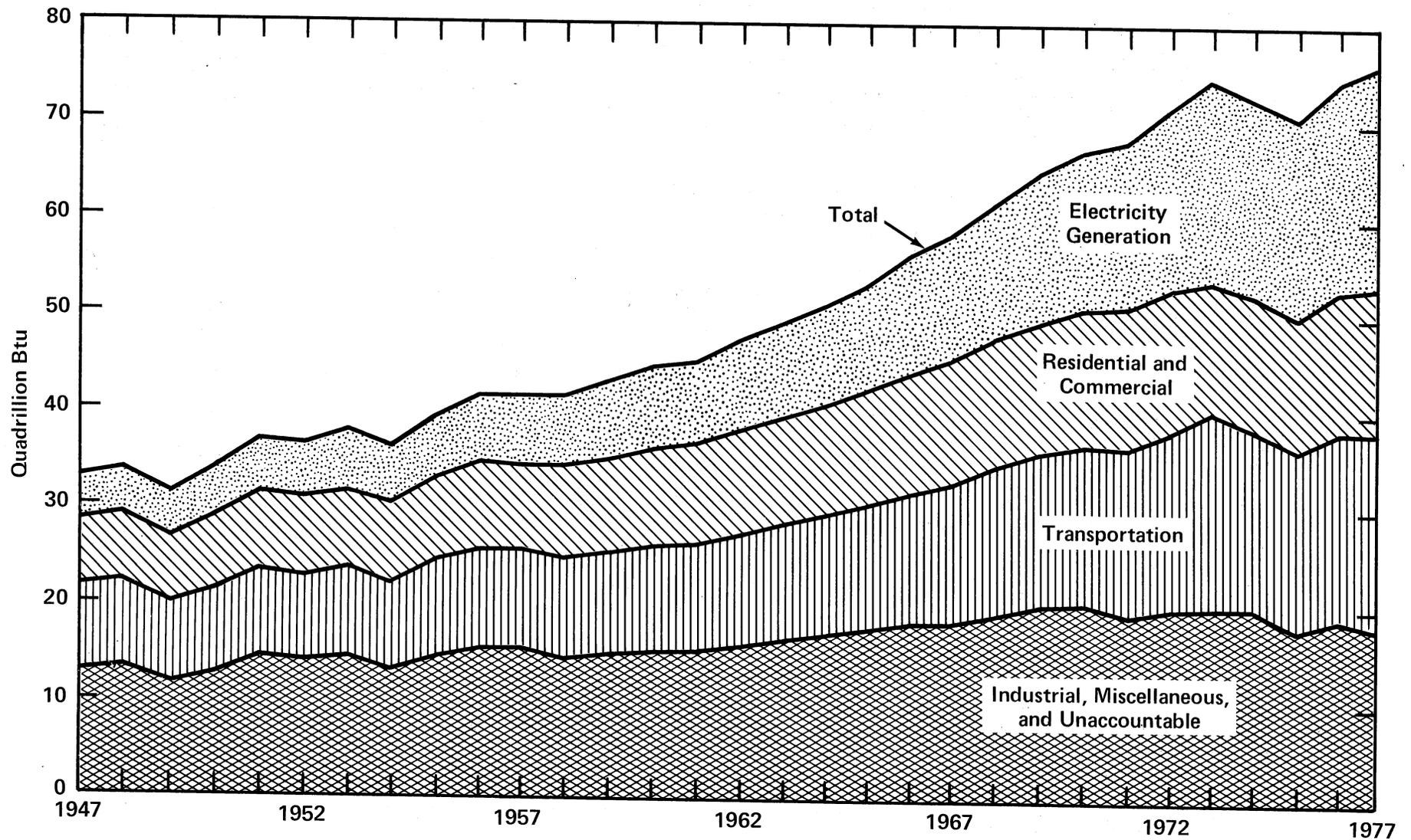
⁵ See Units of Measure section for Btu conversion factors.

⁶ Preliminary.

Negl. = Negligible.

Source: Bureau of Mines and Energy Information Administration.

Primary Energy Consumption by End-Use Sector



Source: Bureau of Mines and Energy Information Administration.

Overall primary energy consumption during 1947-1977 increased from 33.0 to 75.8 quadrillion Btu, an average annual growth of 2.8 percent. The electricity generation sector had the most rapid annual growth rate—

5.7 percent—during this period. The average annual rates of increase for the transportation and residential/commercial sectors were 2.8 and 2.7 percent, respectively.

Primary Energy Consumption by End-Use Sector, 1947-1977
(Quadrillion Btu)

Year	Residential and Commercial	Industrial and Miscellaneous	Transportation	Electricity Generation ¹	Unaccountable	Total
1947	6.8	12.8	8.8	4.3	-0.1	33.0
1948	7.0	12.3	8.8	4.7	0.6	33.2
1949	6.9	11.4	8.1	4.6	—	31.4
1950	7.6	12.4	8.6	5.0	—	33.9
1951	7.9	13.7	9.2	5.3	0.3	36.7
1952	8.0	13.1	9.2	5.5	0.3	36.4
1953	7.8	13.8	9.2	5.9	0.6	37.5
1954	8.0	12.5	9.1	5.9	0.5	36.2
1955	8.6	14.1	9.8	6.5	0.5	39.7
1956	9.0	14.6	10.1	7.1	0.8	41.7
1957	8.7	14.5	10.2	7.3	0.9	41.7
1958	9.5	13.5	10.3	7.3	1.0	41.7
1959	9.7	14.0	10.4	7.9	1.1	43.1
1960	10.2	14.6	10.8	8.3	0.6	44.5
1961	10.4	14.6	11.0	8.5	0.8	45.3
1962	10.9	15.2	11.4	9.1	0.8	47.4
1963	11.0	15.9	12.0	9.7	0.7	49.3
1964	11.1	16.7	12.3	10.4	0.7	51.2
1965	11.8	17.2	12.7	11.1	0.6	53.3
1966	12.4	18.0	13.3	12.1	0.6	56.4
1967	13.0	18.2	14.0	12.7	0.4	58.2
1968	13.1	19.4	15.2	13.9	0.2	61.7
1969	13.6	20.1	15.8	15.3	0.2	64.9
1970	14.0	20.4	16.3	16.2	0.3	67.1
1971	14.5	19.3	17.1	17.2	0.3	68.3
1972	14.9	19.9	18.1	18.5	0.3	71.6
1973	14.9(26.5)	21.3(29.2)	18.7(18.9)	19.7(0)	—	74.6
1974	14.2(25.9)	20.5(28.5)	18.0(18.2)	19.9(0)	—	72.6
1975	14.1(26.1)	18.2(26.1)	18.1(18.4)	20.2(0)	—	70.6
1976	14.7(27.2)	19.2(27.8)	19.1(19.4)	21.4(0)	—	74.4
1977 ²	14.8(28.0)	18.8(27.8)	19.7(20.0)	22.5(0)	—	75.8

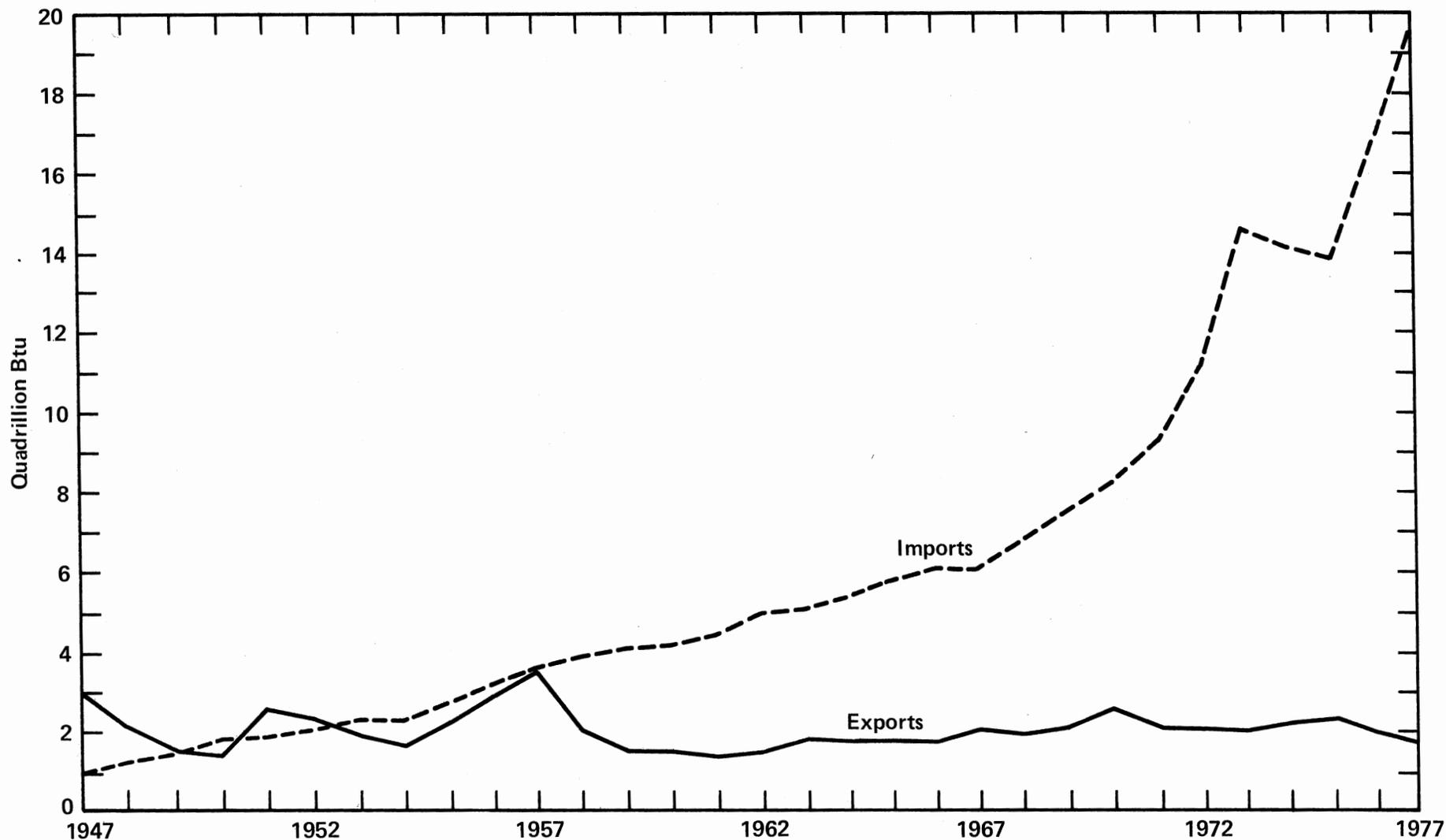
¹ Includes electricity generation from geothermal sources.

² Preliminary.

Note: Numbers in parentheses include electricity distributed and electrical energy losses distributed.

Source: Bureau of Mines and Energy Information Administration.

Trade in Mineral Fuels



Source: Bureau of Mines and Energy Information Administration.

During the 1947-1952 period, except for 1950, U.S. energy exports were greater than imports. The United States has been a net importer of fossil fuels since 1953 with exports remaining fairly constant and imports increasing through 1977 at an average annual rate of 9.4 percent.

Petroleum imports have exceeded exports every year since 1947, growing at an average annual rate of 10.4 percent. In 1977, petroleum imports

constituted 94 percent of total U.S. energy imports. Natural gas imports increased at an average rate of 11.0 percent per annum from 1958 through 1977. Prior to 1958, natural gas imports were not significant.

Coal exports accounted for 73 percent of U.S. fossil fuel exports during 1977.

Trade in Mineral Fuels, 1947-1977

(Trillion Btu)

Year	Exports				Imports				Net Trade ¹			
	Coal	Petroleum ²	Natural Gas	Total	Coal ³	Petroleum ²	Natural Gas	Total	Coal	Petroleum ²	Natural Gas	Total
1947	2,015	944	19	2,971	8	954	—	962	2,007	-10	19	2,016
1948	1,373	786	19	2,178	8	1,151	—	1,159	1,365	-365	19	1,019
1949	856	683	21	1,560	8	1,399	—	1,407	848	-716	21	153
1950	766	639	27	1,432	10	1,862	—	1,872	756	-1,223	27	-440
1951	1,637	888	25	2,550	8	1,857	—	1,865	1,629	-969	25	685
1952	1,365	911	28	2,304	8	2,097	8	2,113	1,357	-1,186	20	191
1953	954	853	29	1,836	7	2,285	—	2,292	947	-1,432	29	-456
1954	885	736	30	1,651	5	2,289	7	2,301	880	-1,553	23	-650
1955	1,493	772	32	2,297	9	2,728	11	2,748	1,484	-1,956	21	-451
1956	2,022	910	37	2,969	9	3,160	11	3,180	2,013	-2,250	26	-211
1957	2,218	1,202	43	3,463	10	3,455	39	3,504	2,208	-2,253	4	-41
1958	1,444	573	40	2,057	8	3,725	141	3,874	1,436	-3,152	-101	-1,871
1959	1,071	439	19	1,529	10	3,875	139	4,024	1,061	-3,436	-120	-2,495
1960	1,044	411	12	1,467	7	3,955	161	4,123	1,037	-3,544	-149	-2,656
1961	1,001	363	11	1,375	4	4,209	227	4,440	997	-3,846	-216	-3,065
1962	1,103	350	16	1,469	6	4,572	416	4,994	1,097	-4,222	-400	-3,525
1963	1,376	427	18	1,821	5	4,654	420	5,079	1,371	-4,227	-402	-3,258
1964	1,351	412	17	1,780	8	4,909	457	5,374	1,343	-4,497	-440	-3,594
1965	1,418	378	27	1,823	5	5,349	471	5,825	1,413	-4,971	-444	-4,002
1966	1,381	400	25	1,806	5	5,592	495	6,092	1,376	-5,192	-470	-4,286
1967	1,382	643	84	2,109	6	5,484	582	6,072	1,376	-4,841	-498	-3,963
1968	1,407	483	97	1,987	6	6,106	673	6,785	1,401	-5,623	-576	-4,798
1969	1,564	482	53	2,099	3	6,805	750	7,558	1,561	-6,323	-697	-5,459
1970	1,991	547	72	2,610	1	7,388	846	8,235	1,990	-6,841	-774	-5,625
1971	1,569	463	83	2,115	3	8,406	964	9,373	1,566	-7,943	-881	-7,258
1972	1,545	464	80	2,089	1	10,112	1,047	11,160	1,544	-9,648	-967	-9,071
1973	1,497	483	79	2,059	31	13,466	1,055	14,552	1,466	-12,983	-976	-12,493
1974	1,685	467	79	2,230	141	13,052	982	14,175	1,544	-12,585	-903	-11,944
1975	1,850	437	74	2,361	79	12,848	973	13,900	1,771	-12,411	-899	-11,539
1976	1,593	465	66	2,124	64	15,653	983	16,700	1,529	-15,188	-917	-14,576
1977 ⁴	1,443	480	61	1,984	92	18,590	1,020	19,702	1,351	-18,110	-959	-17,718

¹ Net trade=exports minus imports.

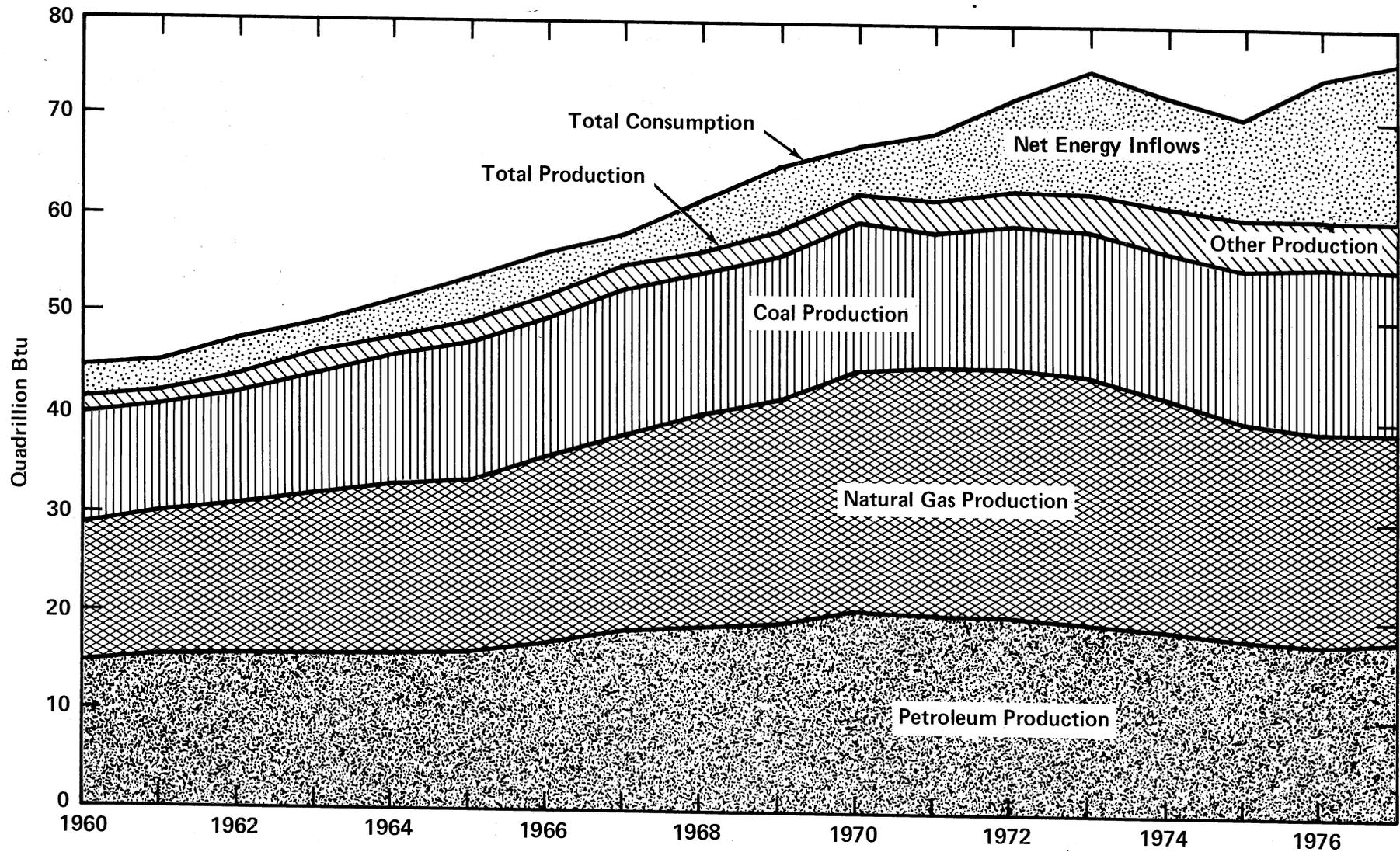
² Includes natural gas liquids.

³ Includes imports of coke, not significant before 1973.

⁴ Preliminary.

Source: Bureau of Mines and Energy Information Administration.

Energy Consumption, Production, and Net Inflows



Sources: United Nations, Bureau of Mines, and Energy Information Administration.

U.S. energy consumption increased at an average annual rate of 4.1 percent between 1960 and 1973, then declined 2.7 percent per year in 1974 and 1975. In 1976–1977, the consumption pattern again reversed, increasing at an average annual rate of 3.6 percent.

The average annual growth rate for U.S. energy production was 3.5 percent from 1960 to 1972. Production declined during the 1973–1975 period at a rate of 1.4 percent per year and then leveled off in 1976 and 1977.

To meet the gap between domestic energy consumption and production, net energy inflows from 1960 through 1977 increased at a 10.9-percent annual rate and now constitute 20.6 percent of total consumption.

Energy Consumption, Production, and Net Inflows, 1960-1977
(Quadrillion Btu)

Activity and Fuel Source	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977¹
Consumption, all fuel sources.....	44.5	45.3	47.4	49.3	51.2	53.3	56.4	58.2	61.7	64.9	67.1	68.3	71.6	74.6	72.6	70.6	74.4	75.8
Petroleum.....	18.6	18.9	19.7	20.2	20.6	21.4	22.4	23.2	24.6	26.0	26.8	28.0	30.4	32.3	31.0	30.3	32.9	34.6
Natural gas ²	14.1	14.8	15.7	16.5	17.4	18.0	19.3	20.4	22.0	23.4	24.5	25.3	25.6	25.3	24.2	22.1	22.6	22.0
Coal.....	10.1	9.9	10.2	10.7	11.3	11.9	12.5	12.3	12.7	12.7	12.7	12.0	12.4	13.3	12.9	12.8	13.7	14.1
Hydropower.....	1.6	1.6	1.8	1.7	1.9	2.0	2.0	2.3	2.3	2.6	2.6	2.8	2.9	3.0	3.3	3.2	3.0	2.4
Nuclear.....	(³)	0.1	0.1	0.2	0.4	0.6	0.9	1.2	1.8	2.0	2.7							
Geothermal.....	—	—	—	—	—	—	—	—	—	—	(³)	(³)	(³)	(³)	0.1	0.1	0.1	0.1
Domestic production, all fuel sources.....	41.8	42.3	43.9	46.2	48.0	49.6	52.5	55.3	57.3	59.4	62.6	61.7	62.8	62.4	61.2	60.2	60.0	60.2
Petroleum.....	14.9	15.2	15.5	16.0	16.2	16.5	17.6	18.7	19.3	19.6	20.4	20.0	20.0	19.5	18.6	17.7	17.3	17.4
Natural gas ²	14.1	14.7	15.4	16.3	17.1	17.7	19.0	20.1	21.5	22.8	24.1	24.8	24.8	24.8	23.7	22.0	21.8	21.8
Coal.....	11.1	10.8	11.2	12.2	12.9	13.4	13.8	14.2	14.0	14.2	15.2	13.8	14.5	14.4	14.5	15.4	15.9	15.9
Hydropower.....	1.6	1.6	1.8	1.7	1.9	2.0	2.0	2.3	2.3	2.6	2.6	2.8	2.8	2.8	3.1	3.1	3.0	2.3
Nuclear.....	(³)	0.1	0.1	0.2	0.4	0.6	0.9	1.2	1.8	2.0	2.7							
Geothermal.....	—	—	—	—	—	—	—	—	—	—	(³)	(³)	(³)	(³)	0.1	0.1	0.1	0.1
Net energy inflows.....	2.7	3.0	3.5	3.1	3.2	3.7	3.9	2.9	4.4	5.5	4.5	6.6	8.8	12.2	11.4	10.4	14.4	15.6
Petroleum.....	3.7	3.7	4.2	4.2	4.4	4.9	4.8	4.5	5.3	6.4	6.4	8.0	10.4	12.8	12.4	12.6	15.6	17.2
Natural gas.....	(³)	(³)	0.3	0.2	0.3	0.3	0.3	0.3	0.5	0.6	0.4	0.5	0.8	0.5	0.5	0.1	0.8	0.2
Coal.....	-1.0	-0.9	-1.0	-1.5	-1.6	-1.5	-1.3	-1.9	-1.3	-1.5	-2.5	-1.8	-2.1	-1.1	-1.6	-2.6	-2.2	-1.4
Hydropower.....	(³)	(³)	(³)	—	(³)	—	(³)	—	—	(³)	(³)	(³)	0.1	0.2	0.2	0.1	(³)	0.1

¹ Preliminary.

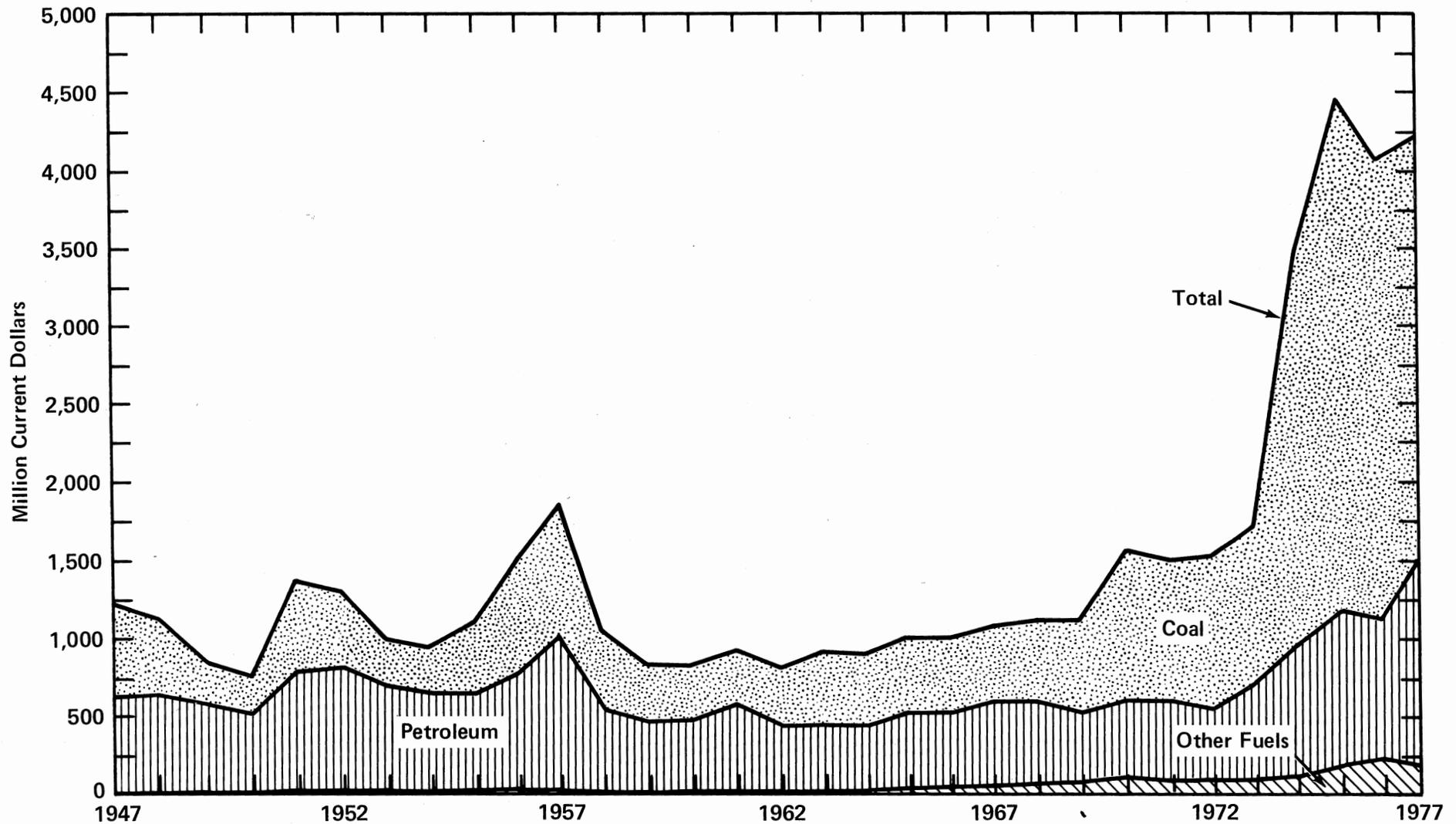
² Includes natural gas liquids.

³ Less than 0.05 quadrillion Btu.

Note: Net energy inflows equals consumption less production, and is the sum of measured net imports, stock changes, and errors of estimate. Sum of components may not equal total due to independent rounding.

Source: Bureau of Mines and Energy Information Administration.

Value of Mineral Fuels Exports



Source: Department of Commerce.

From 1970 to 1977, the value of U.S. mineral fuels exports increased 15.0 percent annually. During this period, the value of these exports rose from \$1.6 billion to \$4.2 billion, a 166-percent increase. Coal accounted

for 63 percent of the total value of U.S. fuel exports in 1977. Refined petroleum products constituted another 28 percent. Crude oil and natural gas exports accounted for 5 percent and 2 percent, respectively.

Value of Mineral Fuels Exports, 1947-1977
(Million Current Dollars)

Year	Coal	Coke and Briquets	Natural Gas	Crude Oil	Petroleum Products	Total ¹
1947	619	14	1	99	502	1,235
1948	479	13	1	117	512	1,122
1949	297	11	2	98	461	870
1950	269	9	3	103	394	778
1951	585	20	3	82	699	1,389
1952	494	16	4	78	739	1,332
1953	335	11	4	60	629	1,040
1954	304	8	4	45	609	970
1955	485	9	7	39	599	1,138
1956	732	13	9	90	667	1,511
1957	830	16	12	173	808	1,839
1958	526	8	15	15	511	1,074
1959	378	9	6	7	451	852
1960	354	7	4	8	467	840
1961	340	8	4	9	572	933
1962	376	7	4	5	433	826
1963	474	9	4	5	428	920
1964	463	10	4	4	422	903
1965	478	16	7	5	496	1,003
1966	470	23	18	10	479	1,000
1967	485	16	32	91	466	1,091
1968	505	19	39	11	539	1,113
1969	598	39	26	6	455	1,123
1970	966	78	31	18	482	1,576
1971	906	45	38	6	521	1,516
1972	988	31	42	2	474	1,537
1973	1,019	33	43	3	628	1,726
1974	2,444	44	70	14	840	3,411
1975	3,268	75	114	(²)	1,001	4,458
1976	2,911	78	141	27	915	4,071
1977 ³	2,655	75	101	209	1,158	4,199

¹ Sum of components may not equal total due to independent rounding.

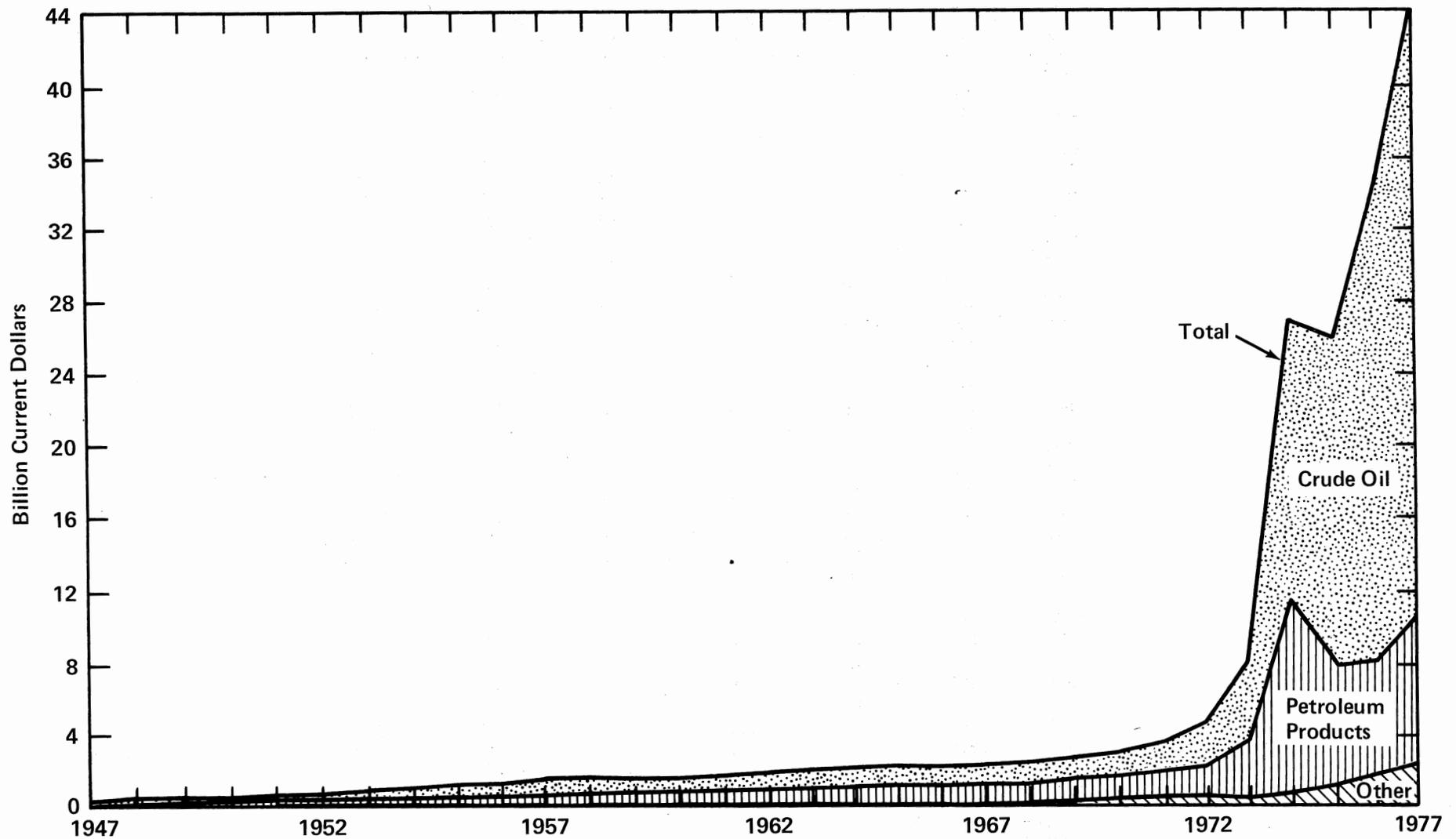
² Less than \$500,000.

³ Preliminary.

Note: Includes value of exports from Puerto Rico to foreign countries; excludes exports to the Virgin Islands.

Source: Department of Commerce.

Value of Mineral Fuels Imports



Source: Department of Commerce.

The value of U.S. mineral fuels imports increased at an annual rate of 14.3 percent between 1947 and 1973. In 1974, the import value jumped

233 percent, then increased at an average annual rate of 52.5 percent per year from 1975 through 1977.

Value of Mineral Fuels Imports, 1947-1977
(Million Current Dollars)

Year	Coal	Coke and Briquets	Natural Gas	Crude Oil	Petroleum Products	Total ¹
1947	2	1	—	162	89	253
1948	2	2	—	283	130	418
1949	2	3	(²)	305	137	447
1950	3	5	(²)	369	215	592
1951	2	2	(²)	375	226	606
1952	2	5	1	423	252	683
1953	2	2	1	510	252	767
1954	2	1	1	545	284	833
1955	3	1	1	655	441	1,102
1956	3	1	1	838	448	1,291
1957	3	2	3	980	567	1,556
1958	3	2	22	940	685	1,651
1959	2	1	26	873	663	1,566
1960	2	2	28	895	731	1,658
1961	1	2	45	933	710	1,691
1962	2	2	86	1,012	753	1,856
1963	2	2	98	1,025	738	1,865
1964	2	2	99	1,080	783	1,967
1965	2	2	105	1,120	924	2,152
1966	2	2	106	1,115	987	2,212
1967	2	2	129	1,064	1,016	2,214
1968	2	2	147	1,184	1,164	2,499
1969	1	3	195	1,298	1,239	2,737
1970	1	4	258	1,260	1,483	3,004
1971	2	5	312	1,687	1,656	3,662
1972	1	5	403	2,369	1,989	4,767
1973	2	40	346	4,240	3,498	8,126
1974	59	194	503	15,253	11,013	27,022
1975	22	157	1,071	18,290	6,768	26,308
1976	18	112	1,612	25,456	6,646	33,843
1977 ³	40	139	1,926	33,398	8,413	43,916

¹ Sum of components may not equal total due to independent rounding.

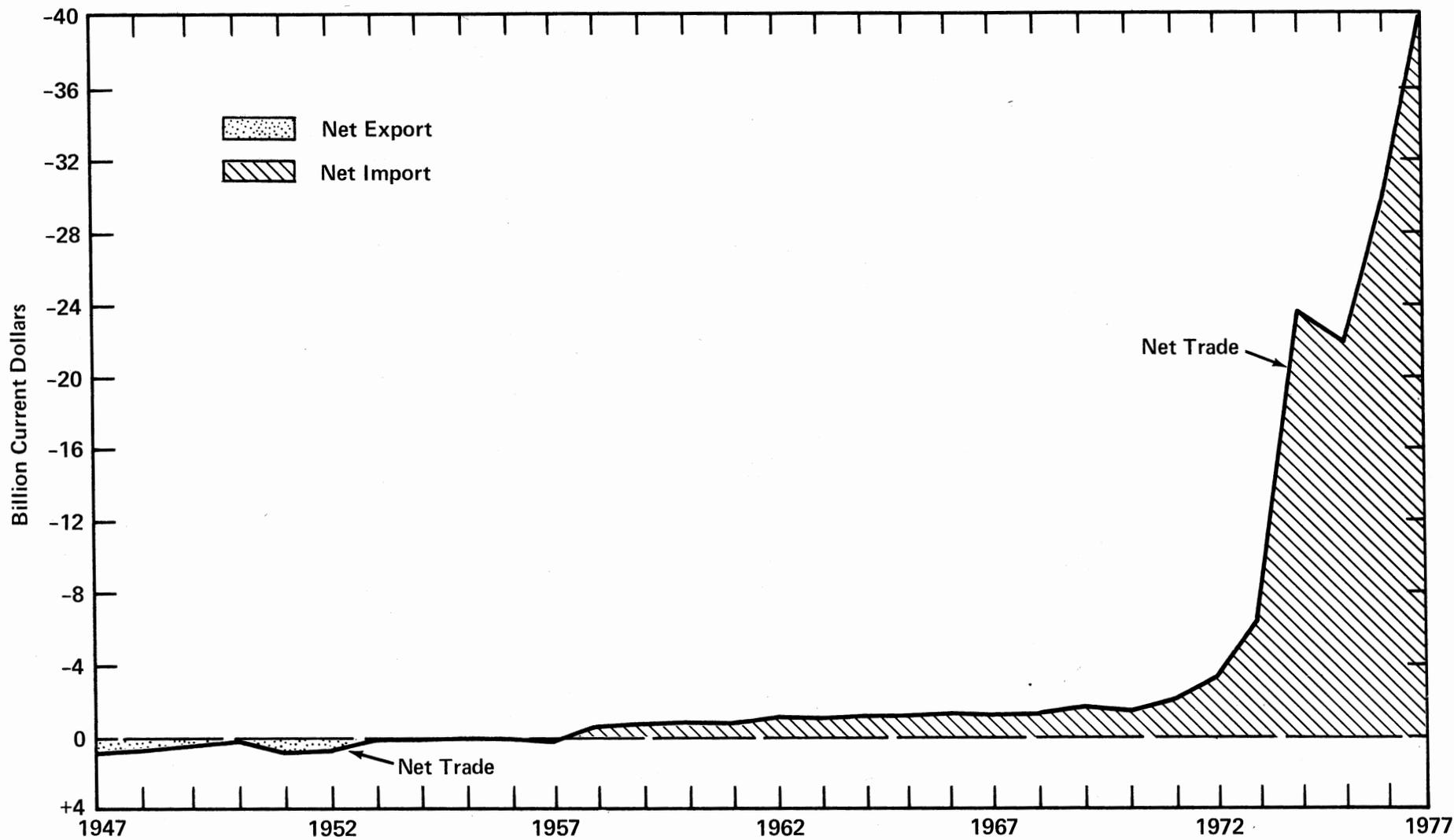
² Less than \$500,000.

³ Preliminary.

Note: Includes value of imports into Puerto Rico; excludes receipts from Virgin Islands.

Source: Department of Commerce.

Value of Net Trade in Mineral Fuels



Source: Department of Commerce.

The value of U.S. mineral fuels exports was greater than the value of fuels imports until 1958. Since then, there has been a deficit in U.S. net trade of mineral fuels.

From 1958 to 1973, the net trade deficit increased at a rate of 17.4 percent per year, then jumped nearly 270 percent in 1974. During the

1975-1977 period, the net trade deficit increased at an annual rate of 18.9 percent.

The large rise in the trade deficit after 1973 primarily was a function of imported petroleum price increases.

Value of Net Trade¹ in Mineral Fuels, 1947-1977
(Million Current Dollars)

Year	Coal	Coke and Briquets	Natural Gas	Crude Oil	Petroleum Products	Total ²
1947	617	13	1	-62	413	982
1948	477	11	1	-167	381	704
1949	295	8	2	-206	324	422
1950	266	3	3	-266	180	186
1951	583	18	3	-293	473	784
1952	492	11	3	-345	487	648
1953	333	9	3	-450	377	273
1954	303	7	3	-500	325	138
1955	482	7	5	-616	158	37
1956	729	12	8	-747	219	220
1957	827	14	9	-807	241	284
1958	523	6	-7	-925	-174	-577
1959	376	8	-20	-866	-211	-713
1960	353	5	-25	-887	-264	-818
1961	338	6	-41	-925	-138	-759
1962	374	5	-82	-1,007	-320	-1,030
1963	471	6	-94	-1,021	-309	-946
1964	461	9	-95	-1,077	-361	-1,064
1965	476	15	-98	-1,115	-427	-1,150
1966	468	21	-88	-1,105	-509	-1,213
1967	483	15	-97	-973	-550	-1,123
1968	503	17	-108	-1,173	-625	-1,386
1969	597	35	-169	-1,292	-784	-1,614
1970	965	75	-227	-1,242	-1,000	-1,429
1971	904	40	-274	-1,681	-1,135	-2,146
1972	988	26	-361	-2,367	-1,515	-3,230
1973	1,017	-7	-303	-4,238	-2,870	-6,400
1974	2,385	-150	-433	-15,239	-10,173	-23,611
1975	3,246	-82	-956	-18,290	-5,767	-21,850
1976	2,893	-34	-1,471	-25,429	-5,730	-29,771
1977 ³	2,615	-64	-1,825	-33,188	-7,255	-39,717

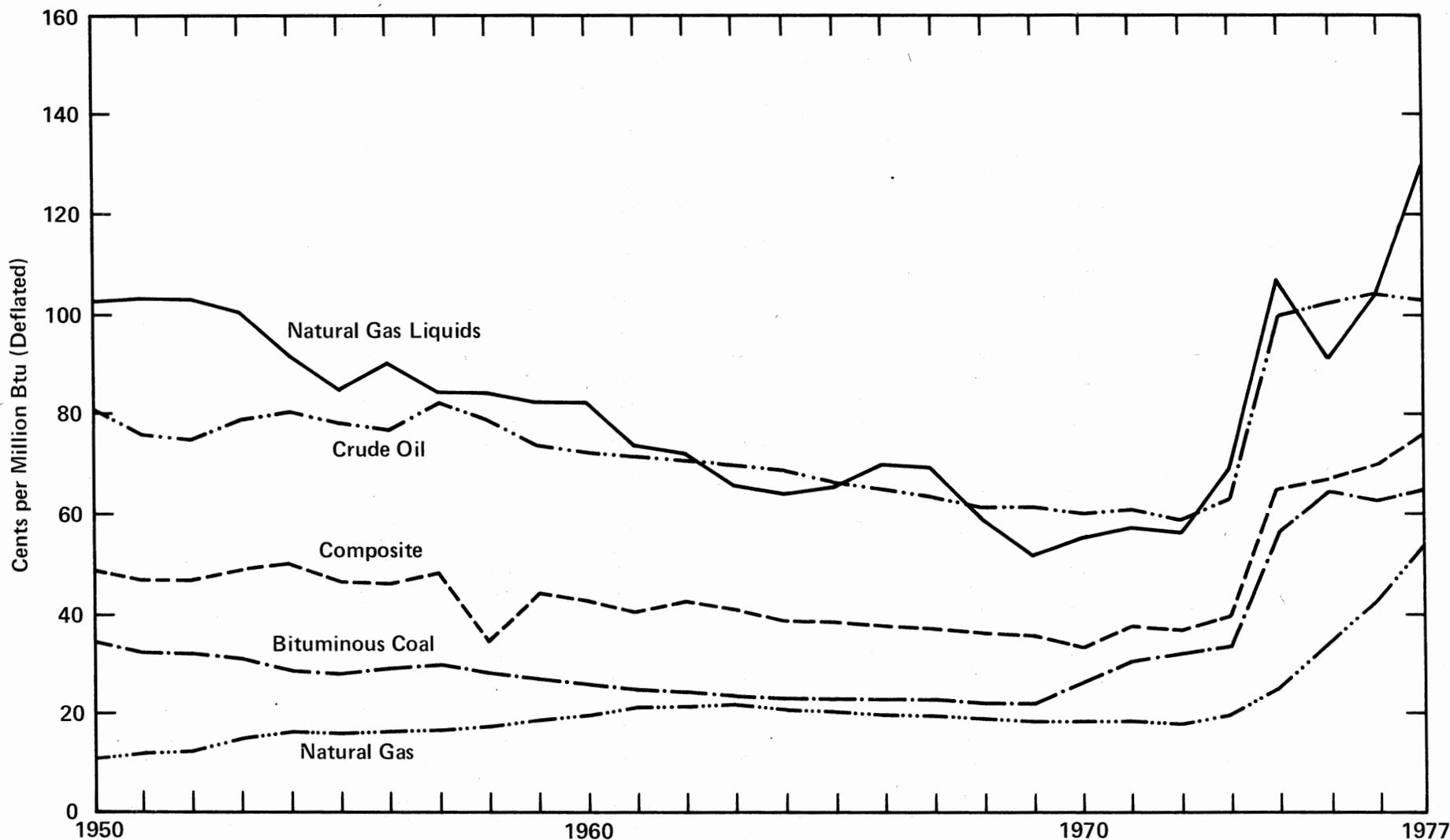
¹ Net trade=exports,minus imports.

² Sum of components may not equal total due to independent rounding.

³ Preliminary.

Source: Department of Commerce.

Prices of Domestically Produced Mineral Fuels



Source: Bureau of Mines and Energy Information Administration.

The deflated (real) composite price of U.S. fossil fuels declined at an annual rate of 0.9 percent from 1950 through 1973. Since 1973, this price has increased at a rate of 17.9 percent per year.

The average real domestic crude oil price decreased 1.1 percent per year between 1950 and 1973, then jumped 58.3 percent in 1974. During the 1975-1977 period, crude oil prices grew at an annual rate of 1.2 percent.

Real natural gas prices increased from 1950 through 1973 at a rate of 2.5 percent per annum. In 1974 this price rose 55.4 percent, and then from 1975 through 1977 increased at an annual rate of 7.4 percent.

Real bituminous coal prices fell an average of 0.1 percent per year between 1950 and 1973, then increased 68.7 percent in 1974. From 1975 through 1977, the annual growth rate for bituminous coal prices was 4.9 percent.

Prices of Domestically Produced Mineral Fuels, 1950-1977¹
(Cents per Million Btu)

Year	Crude Oil		Natural Gas Liquids		Natural Gas		Bituminous Coal		Anthracite Coal		Composite ²		GNP Implicit Price Deflators ³
	Current	Deflated	Current	Deflated	Current	Deflated	Current	Deflated	Current	Deflated	Current	Deflated	
1950	43.3	80.7	55.0	102.5	6.0	11.2	18.5	34.5	35.0	65.2	26.3	49.0	53.64
1951	43.6	76.1	59.0	103.0	7.1	12.4	18.8	32.8	37.4	65.3	26.9	47.0	57.27
1952	43.6	75.2	59.9	103.3	7.5	12.9	18.7	32.2	36.9	63.6	27.3	47.1	58.00
1953	46.2	78.5	59.8	101.6	8.9	15.1	18.8	31.9	38.1	64.7	28.7	48.7	58.88
1954	47.9	80.2	55.0	92.1	9.8	16.4	17.3	29.0	33.5	56.1	29.1	48.8	59.69
1955	47.8	78.4	52.4	85.9	9.8	16.1	17.2	28.2	30.9	50.7	28.5	46.7	60.98
1956	48.1	76.5	56.7	90.1	10.4	16.5	18.4	29.3	32.2	51.2	29.2	46.4	62.90
1957	53.3	82.0	54.8	84.3	10.9	16.8	19.4	29.8	35.4	54.4	31.3	48.1	65.02
1958	51.9	78.6	55.7	84.3	11.6	17.6	18.6	28.2	35.0	53.0	24.8	37.5	66.06
1959	50.0	74.1	56.2	83.2	12.5	18.5	18.2	27.0	32.4	48.0	29.9	44.3	67.52
1960	49.7	72.4	56.7	82.6	13.6	19.8	17.9	26.1	30.8	44.9	29.8	43.4	68.67
1961	49.8	71.9	51.4	74.2	14.6	21.1	17.5	25.3	31.7	45.8	28.0	40.4	69.28
1962	50.0	70.9	50.9	72.1	15.0	21.3	17.1	24.2	31.3	44.4	29.9	42.4	70.55
1963	49.8	69.6	47.4	66.2	15.4	21.5	16.8	23.5	33.1	46.2	29.4	41.1	71.59
1964	49.7	68.4	46.7	64.2	15.0	20.6	17.0	23.4	34.1	46.9	28.9	39.7	72.71
1965	49.3	66.3	49.0	65.9	15.1	20.3	16.9	22.7	33.5	45.1	28.6	38.5	74.32
1966	49.7	64.7	53.3	69.4	15.2	19.8	17.3	22.5	31.8	41.4	29.1	37.9	76.76
1967	50.3	63.7	54.5	69.0	15.5	19.6	17.6	22.3	32.1	40.6	29.8	37.7	79.02
1968	50.7	61.4	48.6	58.9	15.8	19.1	17.8	21.6	34.6	41.9	29.8	36.1	82.57
1969	53.3	61.5	45.2	52.1	16.2	18.7	19.0	21.9	39.0	45.0	30.8	35.5	86.72
1970	54.8	60.0	50.0	54.7	16.6	18.2	23.9	26.2	42.6	46.6	30.4	33.3	91.36
1971	58.4	60.8	54.6	56.9	17.7	18.4	29.1	30.3	46.7	48.6	35.7	37.2	96.02
1972	58.4	58.4	56.2	56.2	18.0	18.0	31.9	31.9	47.2	47.2	36.5	36.5	100.00
1973	67.0	63.3	72.9	68.9	21.0	19.8	35.5	33.5	52.0	49.1	41.9	39.6	105.80
1974	116.2	100.2	124.2	107.1	29.5	25.4	65.6	56.5	86.1	74.2	75.7	65.1	116.02
1975	130.3	102.5	116.4	91.5	43.6	34.3	81.8	64.3	127.2	100.0	85.4	67.2	127.18
1976	140.3	104.8	139.6	104.3	56.6	42.3	84.1	62.8	136.6	102.0	94.6	70.6	133.88
1977 ⁴	146.6	103.8	187.3	132.6	76.4	54.1	92.1	65.2	142.0	100.5	108.0	76.4	141.29

¹ All fuel prices taken as close as possible to the point of production.

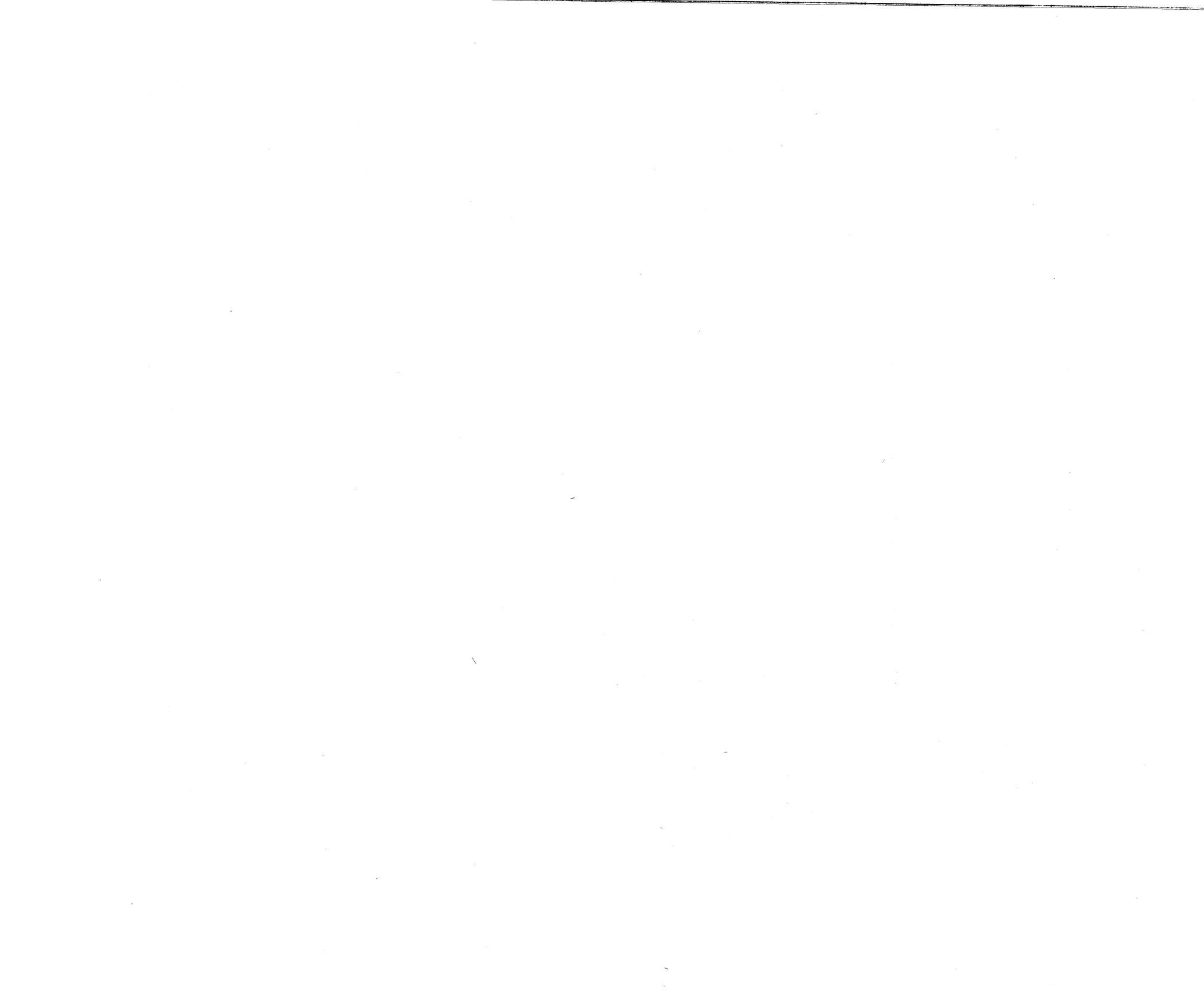
² Weighted by relative importance of individual fuels in total mineral fuels production.

³ GNP implicit price deflators are used in computing the deflated prices shown.

⁴ Preliminary.

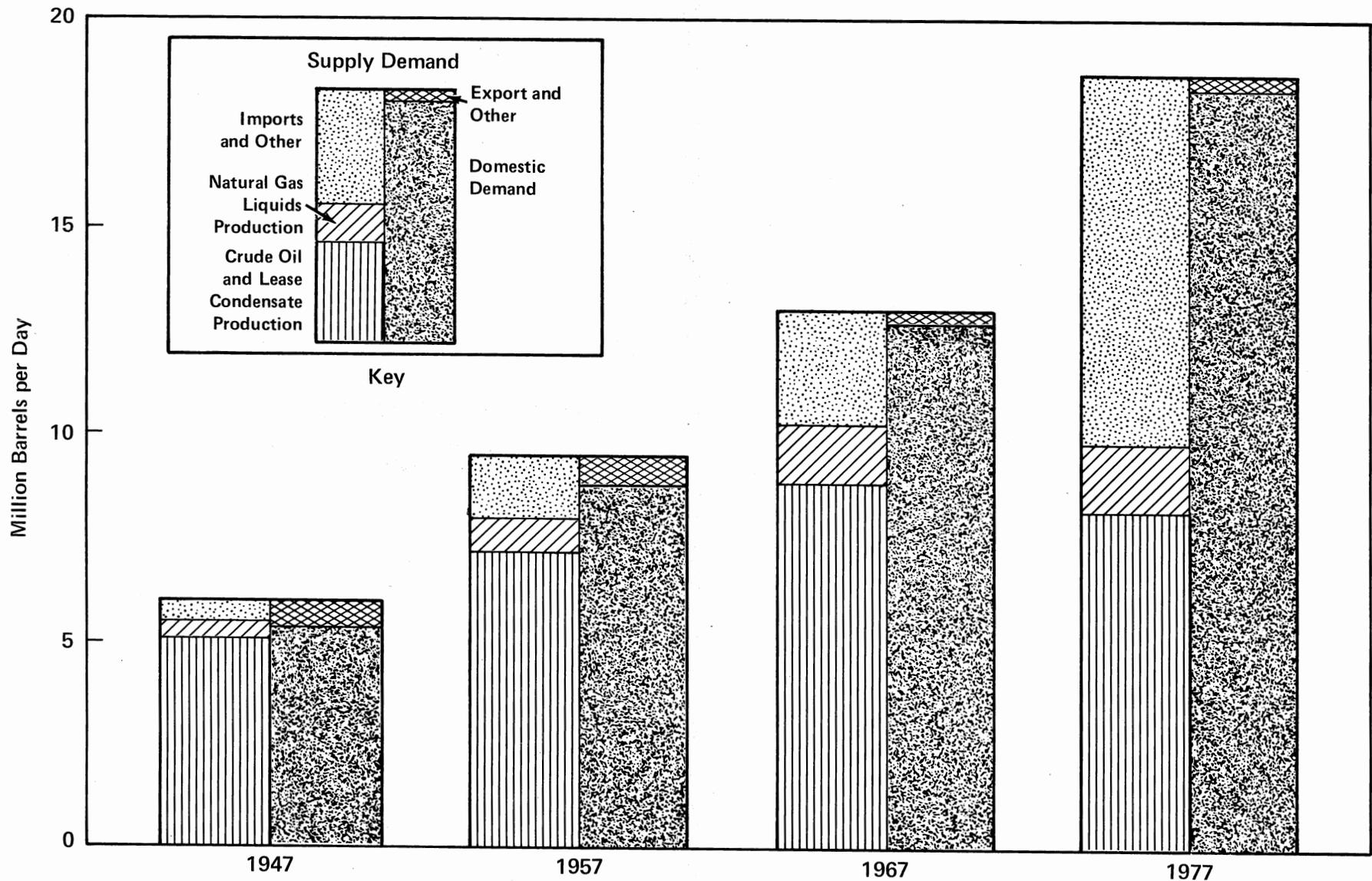
Note: Data are in both current and 1972 prices.

Source: Bureau of Mines and Energy Information Administration.



2
Petroleum and
Natural Gas

Petroleum Supply and Demand Balance



Source: Bureau of Mines and Energy Information Administration.

Crude oil production in the United States peaked in 1970 and declined each year until 1977 when increased production from the Elk Hills field in California, and from the North Slope in Alaska, reversed the trend.

Imports of crude oil have been increasing at a rapid rate since 1971, reflecting both the rise in domestic demand for petroleum products and the decline in U.S. production of crude oil.

Petroleum Supply and Demand Balance, 1947-1977
(Thousand Barrels per Day)

Year	Supply											Demand				
	Production				Imports			Other				Total Supply	Crude Oil Losses	Exports	Domestic Refined Product Demand	Total Demand
	Crude Oil	Lease Condensate	Natural Gas Liquids	Total Production	Crude Oil	Refined Products	Total Imports	Other Refinery Input ¹	Unaccounted for Crude Oil ²	Processing Gain or Losses	Change in Stocks					
1947	5,087	NA	362	5,449	267	170	437	2	NA	-12	-14	5,890	68	451	5,371	5,890
1948	5,520	NA	401	5,921	353	161	514	1	NA	-8	+293	6,135	68	368	5,699	6,135
1949	5,046	NA	430	5,476	421	224	645	1	NA	-2	-8	6,128	38	327	5,763	6,128
1950	5,407	NA	499	5,906	487	363	850	—	NA	2	-56	6,814	51	305	6,458	6,814
1951	6,158	NA	561	6,719	490	354	844	1	NA	7	+102	7,469	31	422	7,016	7,469
1952	6,256	NA	611	6,867	573	379	952	1	NA	7	+108	7,719	17	432	7,270	7,719
1953	6,458	NA	654	7,112	648	386	1,034	1	NA	20	+142	8,025	23	402	7,600	8,025
1954	6,342	NA	691	7,033	656	396	1,052	1	NA	23	-29	8,138	27	355	7,756	8,138
1955	6,807	NA	771	7,578	782	466	1,248	1	NA	34	—	8,861	38	368	8,455	8,861
1956	7,151	NA	800	7,951	934	502	1,436	1	NA	43	+179	9,252	47	430	8,775	9,252
1957	7,170	NA	808	7,978	1,022	552	1,574	1	NA	42	+167	9,428	51	568	8,809	9,428
1958	6,710	NA	807	7,517	953	747	1,700	1	NA	64	-140	9,422	29	275	9,118	9,422
1959	7,053	NA	879	7,932	966	814	1,780	1	NA	86	+51	9,748	10	239	9,499	9,748
1960	7,035	NA	929	7,964	1,015	800	1,815	1	NA	146	-83	10,009	10	202	9,797	10,009
1961	7,183	NA	991	8,174	1,045	872	1,917	—	NA	179	+111	10,159	9	174	9,976	10,159
1962	7,332	NA	1,021	8,353	1,126	956	2,082	—	NA	175	+32	10,578	9	169	10,400	10,578
1963	7,542	NA	1,098	8,640	1,131	992	2,123	—	NA	202	+4	10,961	10	208	10,743	10,961
1964	7,614	NA	1,155	8,769	1,198	1,060	2,258	—	NA	217	+10	11,234	10	201	11,023	11,234
1965	7,804	NA	1,210	9,014	1,238	1,229	2,467	—	NA	220	-8	11,709	10	187	11,512	11,709
1966	8,295	NA	1,284	9,579	1,225	1,348	2,573	—	NA	245	+104	12,293	11	198	12,084	12,293
1967	8,811	NA	1,409	10,220	1,128	1,409	2,537	—	NA	292	+173	12,876	9	307	12,560	12,876
1968	8,660	435	1,504	10,599	1,290	1,550	2,840	9	+20	319	+152	13,635	11	231	13,393	13,635
1969	8,778	460	1,590	10,828	1,409	1,757	3,166	11	-7	335	-48	14,381	12	232	14,137	14,381
1970	9,180	457	1,660	11,297	1,324	2,095	3,419	17	-21	359	+103	14,968	12	259	14,697	14,968
1971	9,032	430	1,694	11,156	1,681	2,244	3,925	17	+41	381	+71	15,449	12	224	15,213	15,449
1972	8,998	443	1,744	11,185	2,216	2,525	4,741	28	+28	388	-232	16,602	12	223	16,367	16,602
1973	8,784	424	1,738	10,946	3,244	3,012	6,256	30	+2	453	+135	17,552	13	231	17,308	17,552
1974	8,375	399	1,688	10,462	3,477	2,635	6,112	36	-25	480	+179	16,886	13	220	16,653	16,886
1975	8,007	367	1,633	10,007	4,105	1,951	6,056	38	+16	460	+32	16,545	14	209	16,322	16,545
1976	7,776	356	1,604	9,736	5,287	2,025	7,312	38	+77	477	-58	17,698	14	223	17,461	17,698
1977 ³	8,217	(4)	1,617	9,834	6,565	2,143	8,708	50	+105	512	+543	18,666	14	230	18,422	18,666

¹ Includes benzol, other hydrocarbons, and hydrogen.

² Represents the difference between supply and indicated demand for crude petroleum, first reported separately in 1968.

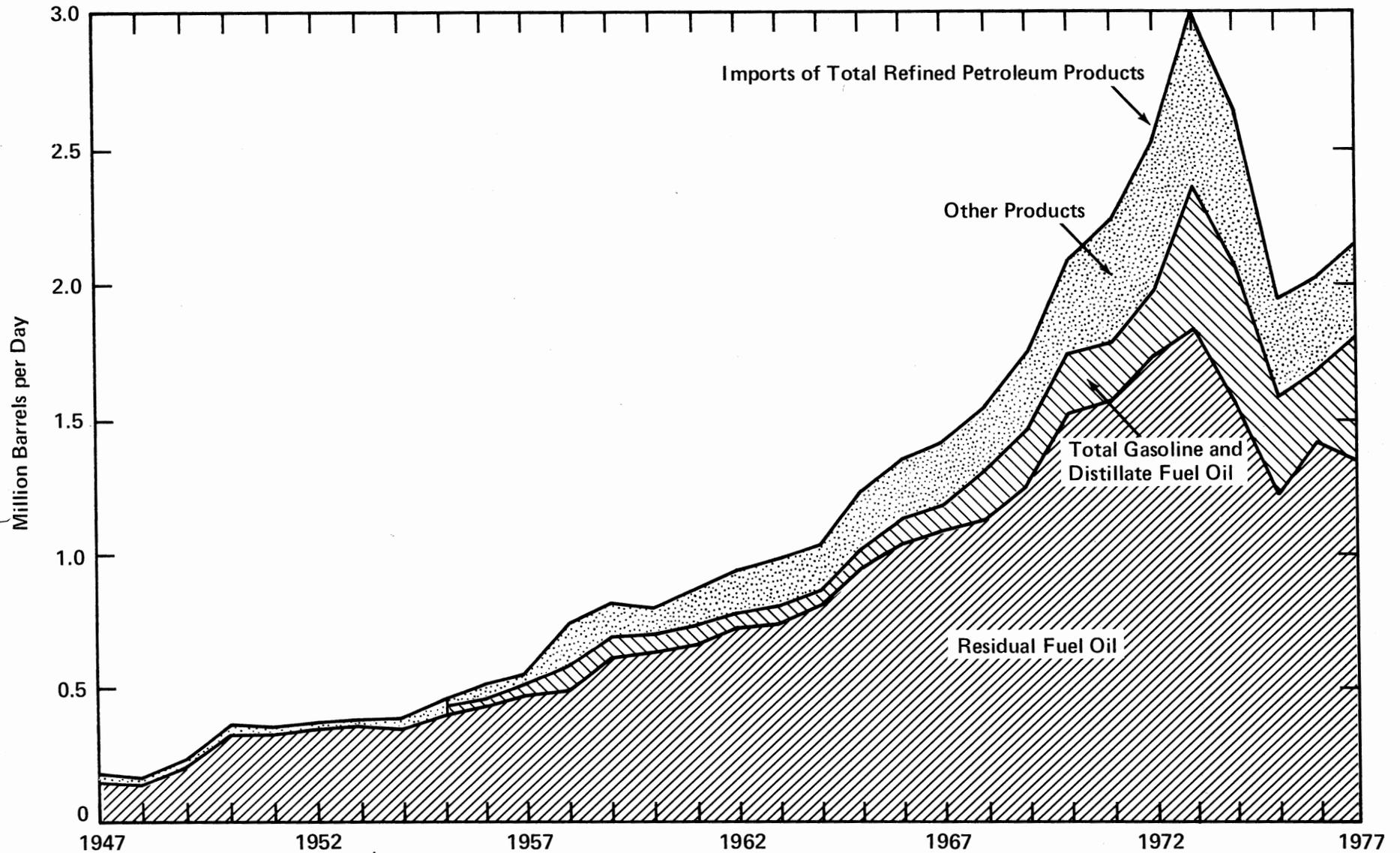
³ Preliminary.

⁴ Included in crude oil.

NA=Not available.

Source: Bureau of Mines and Energy Information Administration.

Imports of Refined Petroleum Products



Source: Bureau of the Census, Bureau of Mines, and Energy Information Administration.

Imports of refined petroleum products have more than doubled during the last 15 years. About two-thirds of these imports are residual fuel oils which were imported for the most part into northeastern United States.

The decline during 1974–1975 reflects primarily the oil embargo and reduced economic activity.

Imports of Refined Petroleum Products, 1947-1977
(Thousand Barrels per Day)

Year	Total Gasoline	Jet Fuel	Distillate Fuel Oil	Residual Fuel Oil	Liquefied Gases	Unfinished Oils	Other Products ¹	Total
1947	1	NA	11	149	—	5	4	170
1948	1	NA	7	146	—	3	4	161
1949	—	NA	5	206	—	10	3	224
1950	—	NA	7	329	—	21	6	363
1951	1	NA	5	326	—	14	8	354
1952	5	NA	8	351	—	14	1	379
1953	1	NA	9	360	—	9	7	386
1954	3	NA	9	354	—	21	9	396
1955	13	NA	12	417	—	15	9	466
1956	5	NA	14	445	—	7	31	502
1957	8	NA	23	475	—	3	43	552
1958	38	NA	41	499	—	91	78	747
1959	37	NA	48	610	—	63	56	814
1960	27	NA	35	637	5	45	51	800
1961	29	NA	48	666	5	69	55	872
1962	38	NA	32	724	6	89	67	956
1963	44	NA	25	747	7	87	82	992
1964	29	NA	32	808	11	89	91	1,060
1965	28	81	36	946	21	92	25	1,229
1966	43	86	38	1,032	29	97	23	1,348
1967	42	89	51	1,085	27	97	18	1,409
1968	59	105	132	1,120	32	80	22	1,550
1969	62	125	139	1,265	35	106	25	1,757
1970	67	144	147	1,528	52	108	49	2,095
1971	59	180	153	1,583	106	124	39	2,244
1972	68	195	182	1,742	174	125	39	2,525
1973	134	212	392	1,853	239	137	45	3,012
1974	204	163	289	1,587	212	121	59	2,635
1975	184	133	155	1,223	185	36	35	1,951
1976	131	76	146	1,413	196	32	31	2,025
1977 ²	215	70	247	1,349	176	26	60	2,143

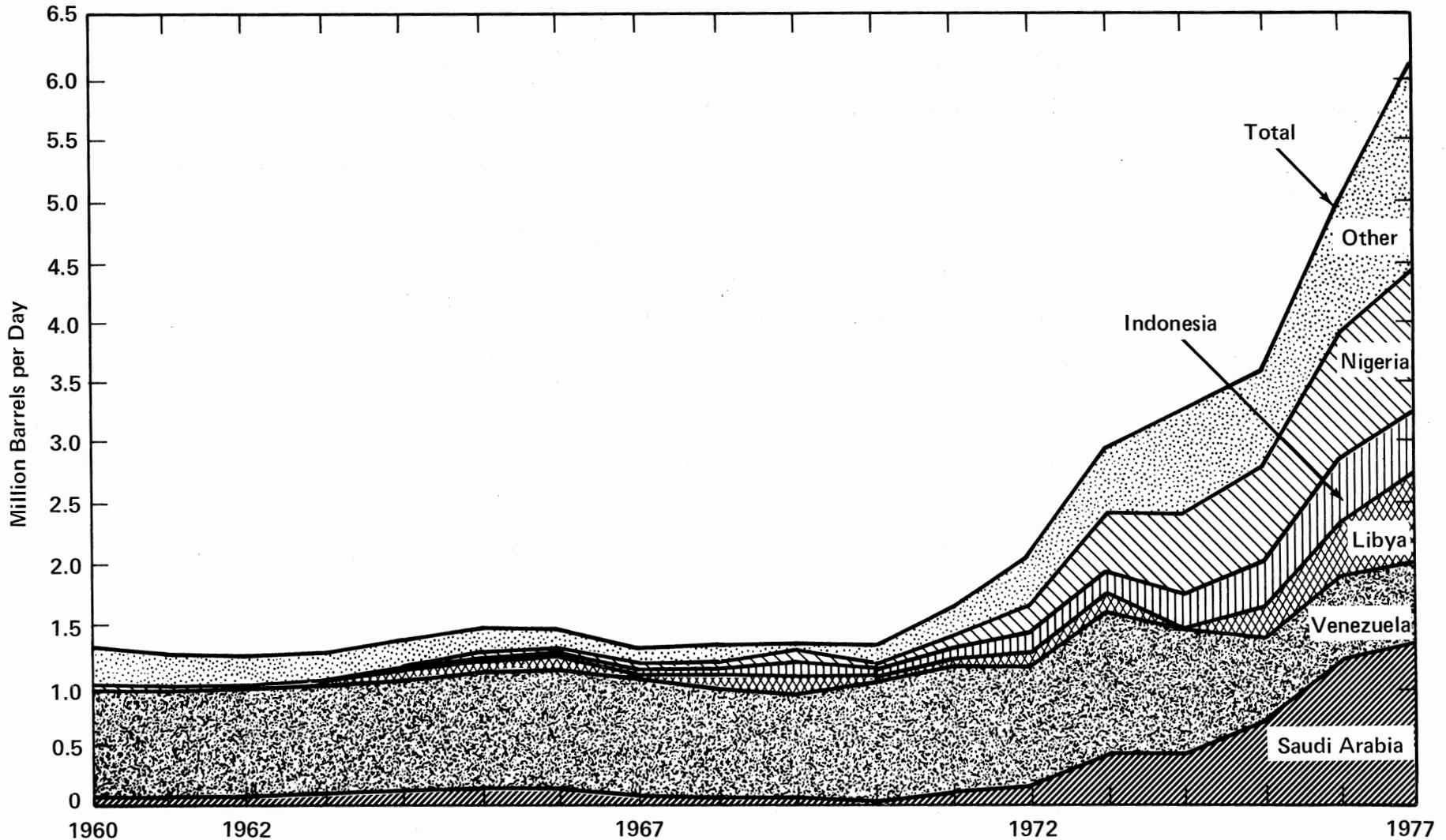
¹ Includes kerosene, petrochemical feedstocks, lubricants, wax, asphalt, and miscellaneous products.

² Preliminary.

NA=Data prior to 1965 are not available on a comparable basis.

Source: Bureau of the Census, Bureau of Mines, and Energy Information Administration.

Petroleum Imported Directly from OPEC Countries



Source: Bureau of the Census, Bureau of Mines, and Energy Information Administration.

Imports from the member countries of the Organization of Petroleum Exporting Countries (OPEC) have increased dramatically since 1970, averaging 24 percent per year. In 1977, direct imports from OPEC nations accounted for 70.7 percent of total U.S. imports, up from 39.0

percent in 1970. The two principal foreign suppliers of petroleum in 1977 were Saudi Arabia and Nigeria, which accounted for 22 and 19 percent, respectively, of the total petroleum imported directly from OPEC countries.

Petroleum Imported Directly from OPEC¹ Countries, 1960-1977
(Thousand Barrels per Day)

Year	Saudi Arabia	Iran	Venezuela	Libya	Indonesia	United Arab Emirates	Algeria	Nigeria	Other ² OPEC	Total OPEC	Arab ³ Members of OPEC
1960	*84	*34	*911	—	77	—	1	—	208	1,315	111
1961	73	61	862	—	62	—	—	—	211	1,269	134
1962	74	49	906	*18	*69	—	—	—	149	1,265	121
1963	108	63	900	19	63	—	1	—	130	1,284	146
1964	131	66	933	40	69	3	6	—	114	1,362	200
1965	158	80	995	41	63	14	9	14	102	1,476	251
1966	147	89	1,018	69	54	13	4	11	67	1,472	259
1967	92	71	938	42	66	*5	5	5	35	1,259	149
1968	74	61	886	114	73	16	6	9	64	1,303	210
1969	64	46	875	134	89	14	*2	49	61	1,334	215
1970	30	39	989	47	70	63	8	50	38	1,334	148
1971	128	112	1,020	58	112	79	15	*102	47	1,673	291
1972	190	142	960	123	164	73	92	251	68	2,063	485
1973	486	223	1,135	164	213	71	136	459	106	2,993	868
1974	461	469	979	5	300	74	190	714	88	3,280	747
1975	715	280	703	232	390	117	282	762	120	3,601	1,366
1976	1,230	299	700	453	539	254	432	1,025	134	5,066	2,419
1977 ⁴	1,373	543	675	726	531	332	550	1,142	284	6,156	3,168

¹ Organization of Petroleum Exporting Countries.

² Includes Ecuador, Gabon, Iraq, Kuwait, and Qatar.

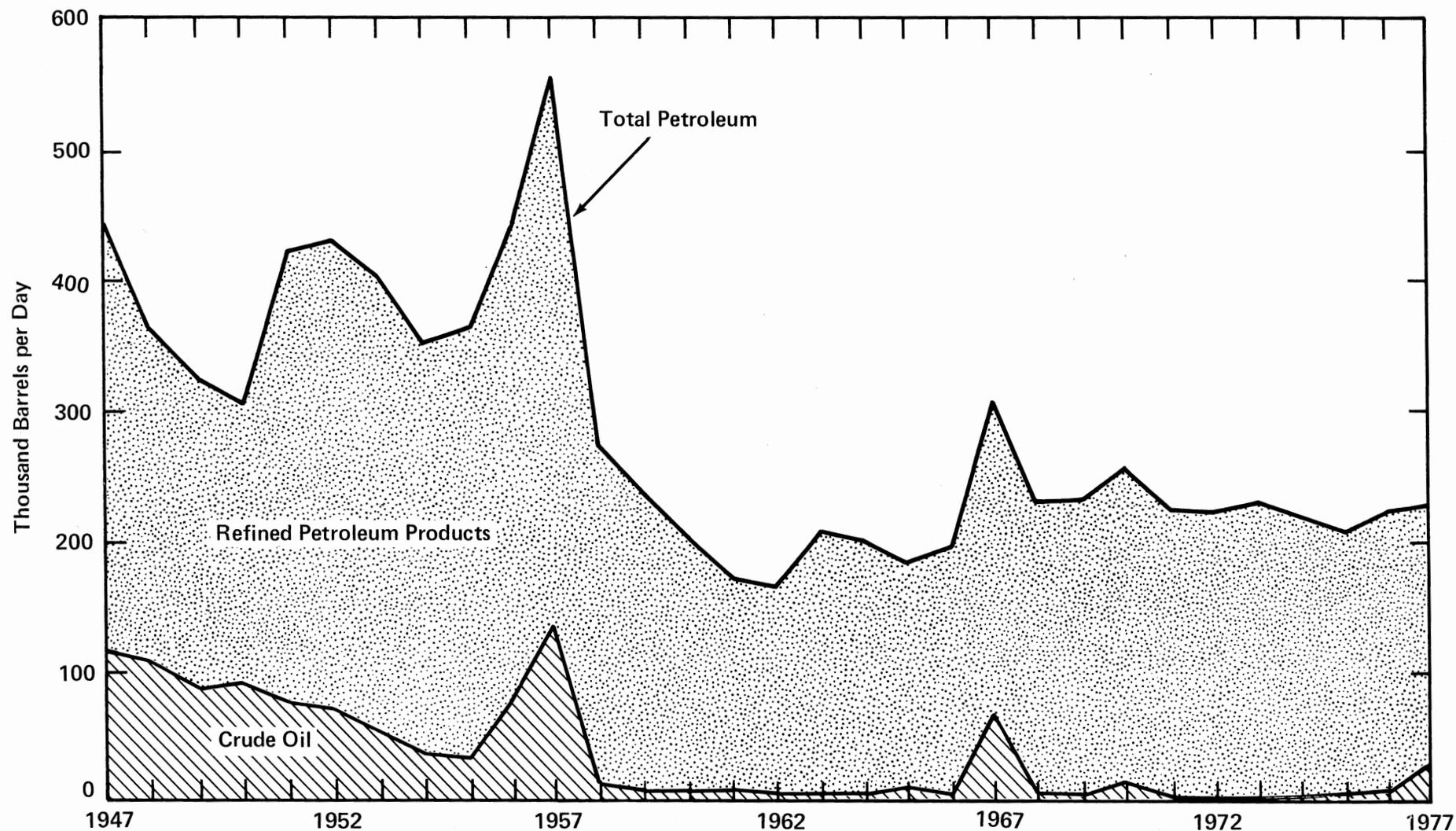
³ Includes Saudi Arabia, Iraq, Qatar, Libya, United Arab Emirates, Algeria, and Kuwait.

⁴ Preliminary.

Note: Includes individual country data prior to their entrance into OPEC. Asterisk indicates year identified countries joined OPEC.

Source: Bureau of the Census, Bureau of Mines and Energy Information Administration.

Exports of Crude Oil and Refined Petroleum Products



Source: Bureau of the Census.

Exports of crude oil and petroleum products have remained at a relatively stable level during the past 20 years because of export control regulations which limit the quantities of petroleum which can be exported. Exports of crude oil are prohibited, although some crude oil is shipped to Canada and to refineries located on islands in the Caribbean

area in exchange, on a barrel-for-barrel basis, for crude oil or refined products. Petroleum coke with a high sulfur content which, because of environmental restrictions cannot be used in the United States, and some nonfuel products, such as lubricants and wax, comprise the major portion of the petroleum products exported from the country.

Exports of Crude Oil and Refined Petroleum Products, 1947-1977
(Thousand Barrels per Day)

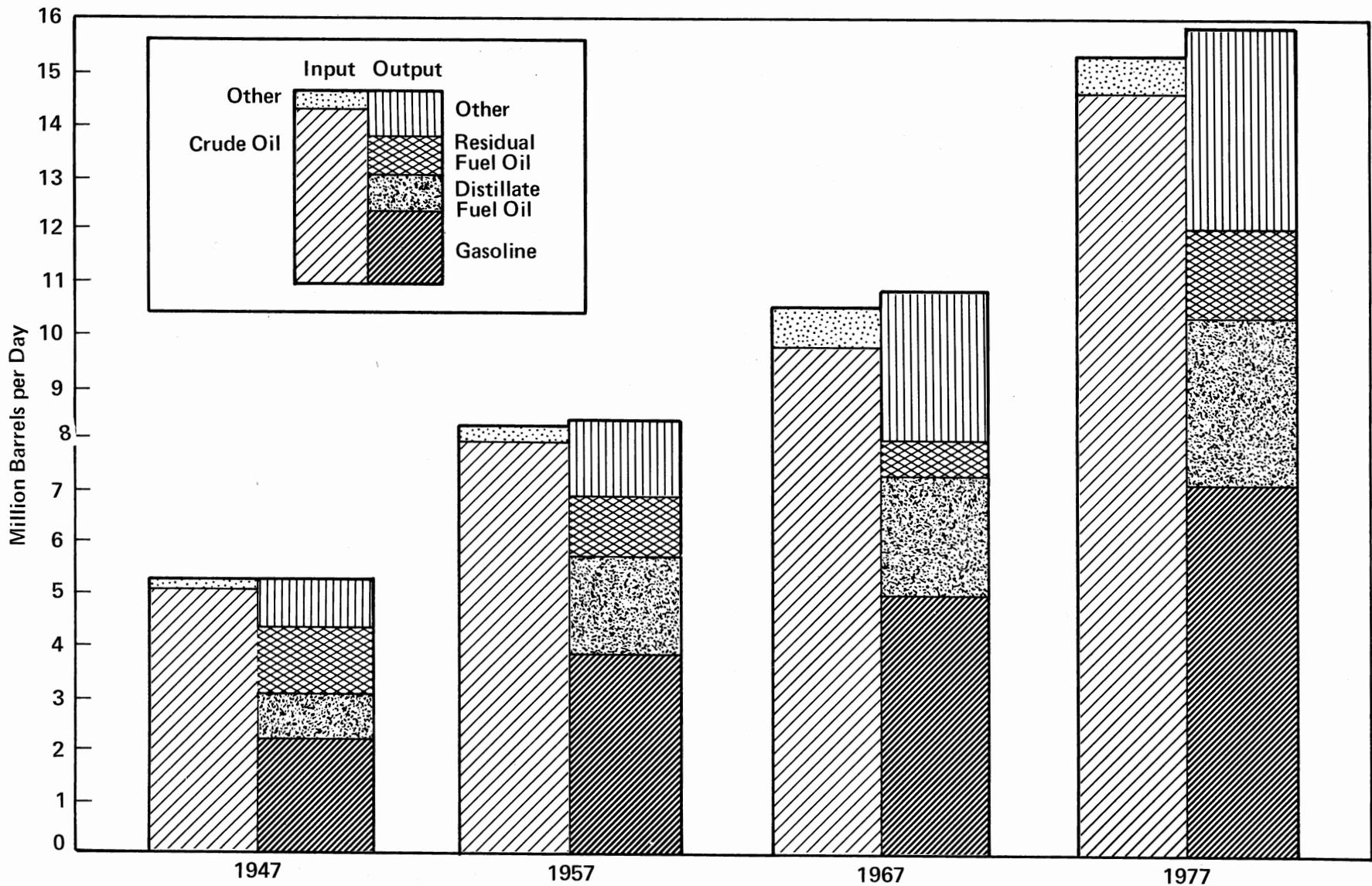
Year	Crude Oil	Refined Products						Total Refined Products	Total Petroleum
		Liquefied Gases	Residual Fuel Oil	Petrochemical Feedstocks	Lubricants	Petroleum Coke	Other Products ¹		
1947	127	4	29	—	41	6	244	324	451
1948	109	3	36	—	37	7	176	259	368
1949	91	4	35	—	35	7	155	236	327
1950	95	4	45	—	39	7	115	210	305
1951	78	6	80	—	48	12	198	344	422
1952	73	7	76	—	44	11	221	359	432
1953	55	8	71	—	36	10	222	347	402
1954	37	11	73	—	41	9	184	318	355
1955	32	12	93	—	39	12	180	336	368
1956	78	12	76	—	38	18	208	352	430
1957	138	13	105	—	38	14	260	430	568
1958	12	8	71	—	36	12	136	263	275
1959	7	6	71	—	38	13	104	232	239
1960	8	8	51	—	43	19	73	194	202
1961	9	10	38	—	47	20	50	165	174
1962	5	8	35	—	48	20	53	164	169
1963	5	13	42	—	50	29	69	203	208
1964	4	15	52	2	50	37	41	197	201
1965	3	21	41	5	45	32	40	184	187
1966	4	22	35	7	47	40	43	194	198
1967	73	25	60	8	51	45	45	234	307
1968	5	29	55	8	48	53	33	226	231
1969	4	35	46	11	45	63	28	228	232
1970	14	27	54	10	44	84	26	245	259
1971	1	26	36	14	43	74	30	223	224
1972	1	31	33	13	41	85	19	222	223
1973	2	27	23	19	35	96	29	229	231
1974	3	25	14	15	33	113	17	217	220
1975	6	26	15	22	25	102	13	203	209
1976	8	25	12	30	26	103	19	215	223
1977 ²	30	20	5	25	25	105	20	200	230

¹ Includes aviation gasoline, motor gasolines, jet fuel, distillate fuel oil, kerosene, special naphthas, wax, asphalt, and miscellaneous products.

² Preliminary.

Source: Bureau of the Census.

Refinery Input and Output



Source: Bureau of Mines and Energy Information Administration.

Petroleum refinery operations in the United States have nearly tripled during the past 30 years. Products showing the greatest increases in refinery output are those used in the transportation sector. These include motor and aviation gasolines, jet fuels, and diesel fuels. Production of residual fuel oils declined, especially during the 1960's when imported

residual fuel oils were abundantly available at low prices. Since the Arab embargo, domestic refinery production has begun to rise steadily. During 1977, approximately 45 percent of the crude oil input to refineries was of foreign origin, compared to 8 percent in 1947.

Refinery Input and Output, 1947-1977
(Thousand Barrels per Day)

Year	Input				Output							Processing Gain or Losses
	Crude Oil	Natural Gas Liquids ¹	Unfinished Oils (net)	Total Input	Total Gasoline ²	Jet Fuel ²	Distillate Fuel Oil	Residual Fuel Oil	Kerosene ²	Other Products ³	Total Output	
1947	5,075	194	+3	5,272	2,232	—	855	1,227	302	644	5,260	-12
1948	5,597	208	-12	5,793	2,448	—	1,036	1,311	333	657	5,785	-8
1949	5,327	234	+27	5,588	2,573	—	934	1,164	280	635	5,586	-2
1950	5,739	259	+19	6,017	2,735	—	1,093	1,165	325	701	6,019	2
1951	6,494	272	+31	6,797	3,038	—	1,304	1,286	372	804	6,804	7
1952	6,670	284	+11	6,965	3,117	57	1,415	1,240	351	792	6,972	7
1953	7,000	305	+1	7,306	3,379	98	1,447	1,233	337	832	7,326	20
1954	6,958	322	+22	7,302	3,378	128	1,486	1,142	335	856	7,325	23
1955	7,480	346	+31	7,857	3,646	155	1,651	1,152	321	966	7,891	34
1956	7,937	369	+11	8,317	3,808	181	1,819	1,166	337	1,049	8,360	43
1957	7,919	411	-4	8,326	3,883	174	1,831	1,139	298	1,043	8,368	42
1958	7,642	376	+89	8,107	3,864	202	1,730	996	301	1,078	8,171	64
1959	7,994	420	+71	8,485	4,038	255	1,860	953	303	1,162	8,571	86
1960	8,067	456	+60	8,583	4,121	241	1,823	908	371	1,265	8,729	146
1961	8,184	464	+53	8,701	4,149	261	1,907	865	387	1,311	8,880	179
1962	8,410	501	+76	8,987	4,303	280	1,971	810	428	1,370	9,162	175
1963	8,687	521	+87	9,295	4,394	271	2,095	756	452	1,529	9,497	202
1964	8,807	583	+75	9,465	4,577	294	2,027	729	459	1,596	9,682	217
1965	9,043	618	+88	9,749	4,640	523	2,096	736	255	1,719	9,969	220
1966	9,444	646	+95	10,185	4,887	590	2,150	723	276	1,804	10,430	245
1967	9,815	671	+94	10,580	5,037	748	2,204	756	271	1,856	10,872	292
1968	10,312	718	+71	11,101	5,284	860	2,293	754	274	1,955	11,420	319
1969	10,629	736	+94	11,459	5,541	881	2,320	729	279	2,044	11,794	335
1970	10,870	780	+104	11,754	5,753	827	2,454	706	259	2,114	12,113	359
1971	11,199	797	+119	12,115	6,021	835	2,495	753	236	2,156	12,496	381
1972	11,696	854	+141	12,691	6,327	847	2,630	799	216	2,260	13,079	388
1973	12,431	844	+125	13,400	6,572	859	2,820	971	218	2,413	13,853	453
1974	12,133	782	+102	13,017	6,401	836	2,668	1,070	155	2,367	13,497	480
1975	12,442	748	+35	13,225	6,555	871	2,653	1,235	152	2,219	13,685	460
1976	13,416	765	+21	14,202	6,874	918	2,924	1,377	152	2,434	14,679	477
1977 ⁴	14,612	720	+20	15,352	7,071	974	3,272	1,746	170	2,645	15,878	526

¹ Includes hydrogen and other hydrocarbons.

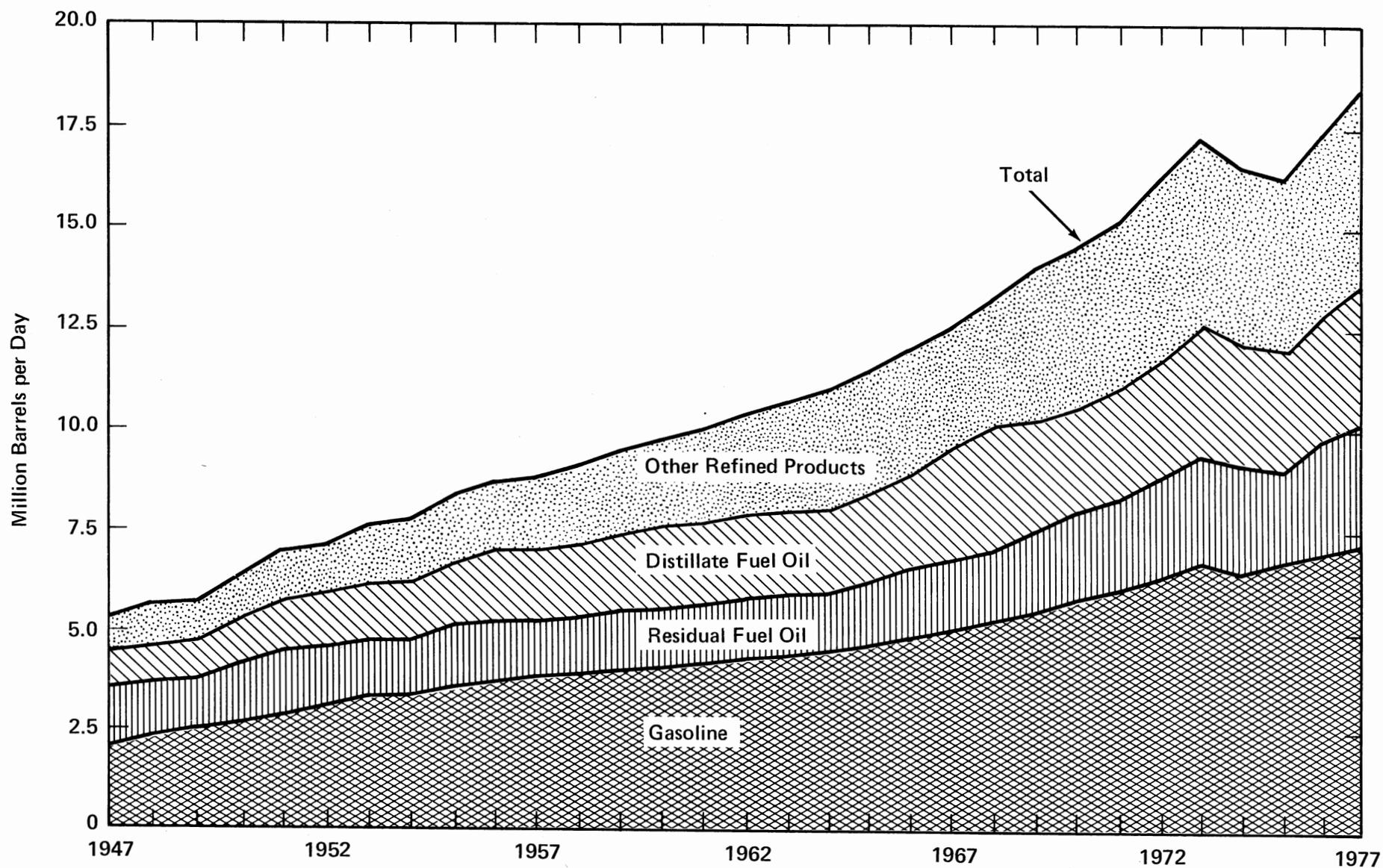
² Prior to 1965 kerosene-type jet fuel was included with kerosene. Prior to 1952 naphtha-type jet fuel was included with gasoline. Prior to 1965 special naphthas were included with gasoline.

³ Includes ethane, liquefied gas, petrochemical feedstocks, special naphthas, lubricants, wax, coke, asphalt, road oil, still gas, and miscellaneous products.

⁴ Preliminary.

Source: Bureau of Mines and Energy Information Administration.

Domestic Demand for Refined Petroleum Products



Source: Bureau of Mines and Energy Information Administration.

Domestic demand for refined petroleum products has more than tripled since World War II. The demand for transportation fuels have shown the greatest increases. Total gasoline demand has increased 231 percent since

1947. The decline in the demand for refined petroleum products in 1974 and 1975 reflected higher prices, conservation, and the decline in economic activity.

Domestic Demand for Refined Petroleum Products, 1947-1977
(Thousand Barrels per Day)

Year	Total Gasoline ¹	Jet Fuel ¹	Distillate Fuel Oil	Residual Fuel Oil	Kerosene ¹	Other Products ²	Total Products	Percentage Change from Previous Year
1947	2,178	—	817	1,421	281	674	5,371	—
1948	2,381	—	817	1,421	281	674	5,371	+6.1
1949	2,503	—	902	1,359	281	718	5,763	+1.1
1950	2,724	—	1,082	1,517	323	812	6,458	+12.1
1951	2,985	—	1,225	1,546	338	922	7,016	+8.6
1952	3,123	55	1,303	1,517	331	941	7,270	+3.6
1953	3,303	94	1,337	1,536	314	1,016	7,600	+4.5
1954	3,371	126	1,442	1,431	324	1,062	7,756	+2.1
1955	3,655	154	1,592	1,526	320	1,208	8,455	+9.0
1956	3,752	197	1,683	1,538	321	1,284	8,775	+3.8
1957	3,816	200	1,688	1,504	295	1,306	8,809	+0.4
1958	3,934	258	1,790	1,455	310	1,371	9,118	+3.5
1959	4,058	285	1,807	1,529	301	1,519	9,499	+4.2
1960	4,130	281	1,872	1,529	362	1,623	9,797	+3.1
1961	4,200	286	1,902	1,503	396	1,689	9,976	+1.8
1962	4,342	308	2,007	1,495	450	1,798	10,400	+4.3
1963	4,472	316	2,047	1,476	472	1,960	10,743	+3.3
1964	4,530	324	2,050	1,515	487	2,117	11,023	+2.6
1965	4,713	602	2,126	1,608	267	2,196	11,512	+4.4
1966	4,913	670	2,185	1,716	277	2,323	12,084	+5.0
1967	5,048	824	2,241	1,786	274	2,387	12,560	+3.9
1968	5,344	955	2,389	1,826	281	2,598	13,393	+6.6
1969	5,596	991	2,466	1,978	275	2,831	14,137	+5.6
1970	5,839	967	2,540	2,204	263	2,884	14,697	+4.0
1971	6,063	1,010	2,661	2,296	249	2,934	15,213	+3.5
1972	6,423	1,045	2,913	2,529	234	3,223	16,367	+7.6
1973	6,720	1,059	3,092	2,822	216	3,399	17,308	+5.7
1974	6,582	993	2,948	2,639	176	3,315	16,653	-3.8
1975	6,713	1,001	2,851	2,461	159	2,137	16,322	-2.0
1976	7,014	987	3,133	2,801	169	3,357	17,461	+7.0
1977 ³	7,214	1,037	3,345	3,048	165	3,613	18,422	+5.5

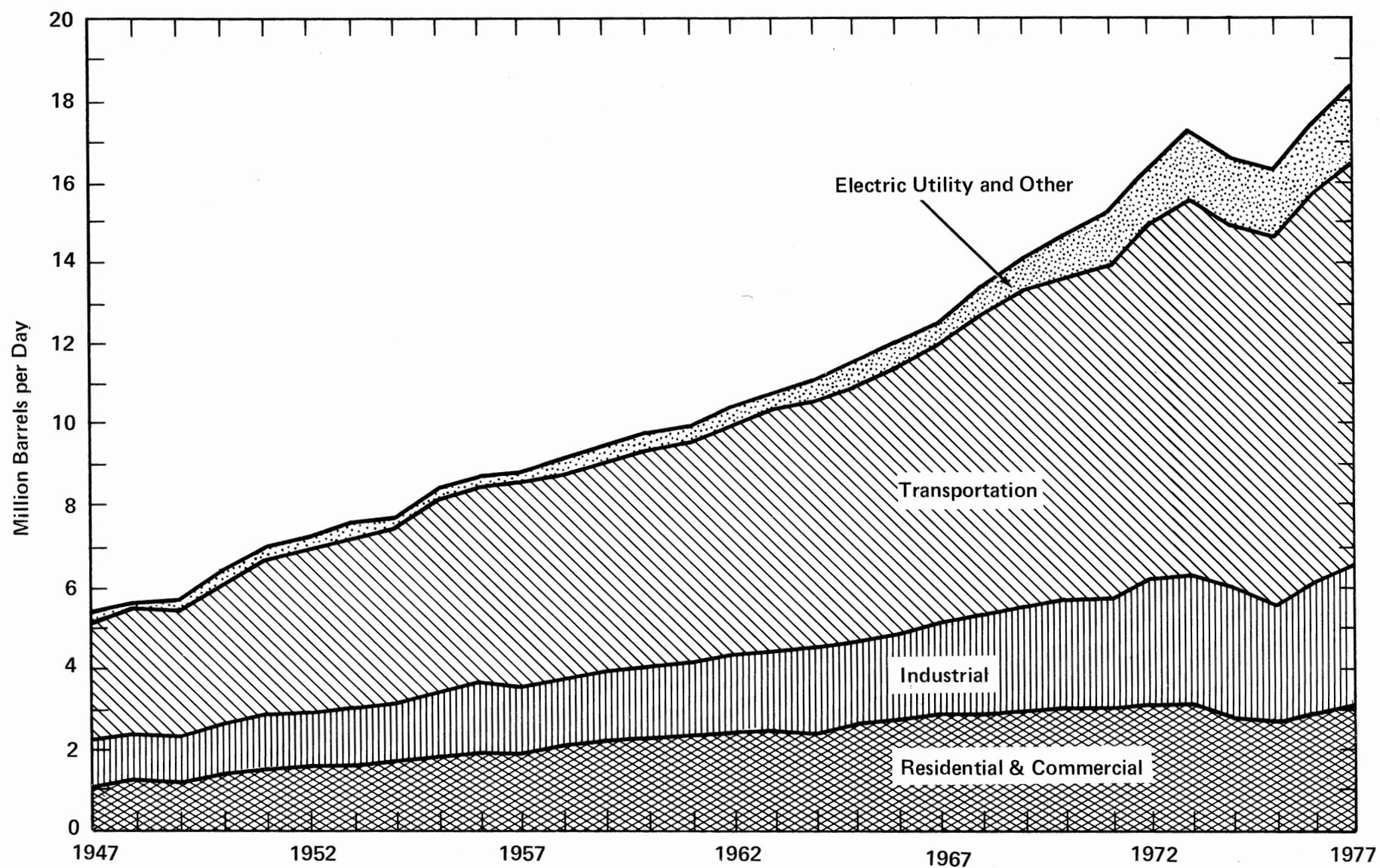
¹ Prior to 1965 kerosene-type jet fuel was included with kerosene. Prior to 1952 naphtha-type jet fuel was included with gasoline. Prior to 1965 special naphthas were included with gasoline.

² Includes ethane, liquefied petroleum gases, petrochemical, feedstocks, special naphthas, lubricants, wax, coke, asphalt, road oil, still gas, plant condensate, and miscellaneous products.

³ Preliminary.

Source: Bureau of Mines and Energy Information Administration.

Domestic Demand for Refined Petroleum Products by End-Use Sector



Source: Bureau of Mines and Energy Information Administration.

The transportation sector consumes more than half of the petroleum products used in the United States. Demand for motor and aviation

gasolines, jet fuels, and diesel fuels have shown the greatest growth rates in demand since 1947.

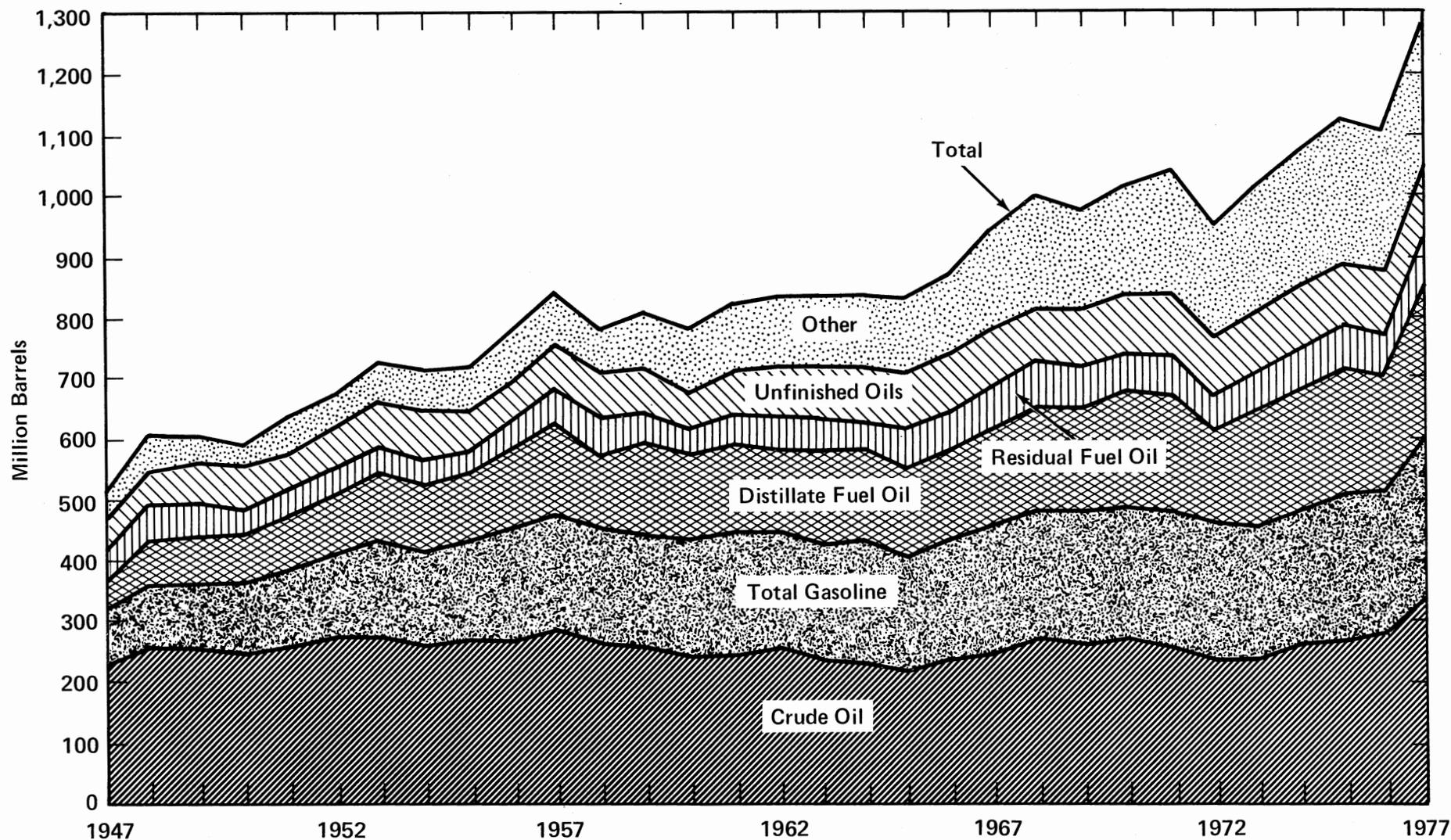
Domestic Demand for Refined Petroleum Products by End-Use Sector,
1947-1977
(Thousand Barrels per Day)

Year	Residential and Commercial	Industrial	Transportation	Electric Utility	Other	Total
1947	1,056	1,159	2,878	207	71	5,371
1948	1,191	1,167	3,078	196	67	5,699
1949	1,166	1,139	3,117	254	87	5,763
1950	1,442	1,224	3,421	291	80	6,458
1951	1,512	1,414	3,774	219	97	7,016
1952	1,578	1,407	3,965	215	105	7,270
1953	1,604	1,462	4,141	253	140	7,600
1954	1,727	1,452	4,250	210	117	7,756
1955	1,895	1,588	4,634	224	114	8,455
1956	1,972	1,726	4,798	217	62	8,775
1957	1,927	1,632	5,019	224	7	8,809
1958	2,160	1,562	5,000	226	170	9,118
1959	2,240	1,713	5,067	239	240	9,499
1960	2,331	1,759	5,284	246	177	9,797
1961	2,389	1,761	5,402	252	172	9,976
1962	2,487	1,860	5,620	253	180	10,400
1963	2,507	1,923	5,881	262	170	10,743
1964	2,469	2,034	6,008	277	235	11,023
1965	2,679	2,028	6,224	325	256	11,512
1966	2,740	2,140	6,528	395	281	12,084
1967	2,956	2,187	6,841	442	134	12,560
1968	2,922	2,451	7,387	514	119	13,393
1969	3,013	2,585	7,715	712	112	14,137
1970	3,092	2,634	7,953	915	103	14,697
1971	3,086	2,658	8,250	1,115	104	15,213
1972	3,194	3,020	8,708	1,376	69	16,367
1973	3,195	3,194	9,175	1,609	135	17,308
1974	2,898	3,126	8,953	1,534	142	16,653
1975	2,760	2,867	9,140	1,420	135	16,322
1976	2,992	3,210	9,571	1,510	178	17,461
1977 ¹	3,180	3,443	9,912	1,708	199	18,442

¹ Preliminary.

Source: Bureau of Mines and Energy Information Administration.

Year-End Primary Stocks of Crude Oil and Refined Petroleum Products



Source: Bureau of Mines and Energy Information Administration.

Primary stocks of crude oil have increased by approximately 50 percent during the last 30 years, while stocks of refined products have tripled.

The rise in stock levels reflects the rise in domestic demand for petroleum products.

Year-End Primary Stocks of Crude Oil and Refined Petroleum Products, 1947-1977
(Million Barrels)

Year	Crude Oil	Refined Products							Total Products	Total Petroleum
		Total Gasoline ¹	Jet Fuel ¹	Distillate Fuel Oil	Residual Fuel Oil	Kerosene ¹	Unfinished Oils	Other ²		
1947	225	87	—	51	47	18	53	20	276	501
1948	257	101	—	71	64	24	55	34	349	606
1949	253	110	—	75	60	21	66	18	350	603
1950	248	116	—	76	42	21	70	24	349	597
1951	256	127	—	87	43	27	67	27	378	634
1952	272	135	2	98	49	27	62	29	402	674
1953	274	158	3	112	49	29	69	32	452	726
1954	258	155	3	108	52	28	74	37	457	715
1955	266	165	3	111	39	27	68	36	449	715
1956	266	187	5	134	44	31	67	46	514	780
1957	281	197	5	149	60	29	69	51	560	841
1958	263	187	6	125	60	26	70	52	526	789
1959	257	187	9	151	53	27	67	57	551	808
1960	240	195	7	138	45	31	62	66	544	784
1961	245	196	8	152	45	32	68	79	580	825
1962	252	189	10	144	50	32	82	75	582	834
1963	237	191	9	157	48	34	82	78	599	836
1964	230	200	10	156	40	36	87	80	609	839
1965	220	183	19	155	56	24	89	90	616	836
1966	238	194	19	154	61	25	89	94	636	874
1967	249	208	22	160	66	25	90	124	695	944
1968	272	212	24	173	67	23	93	136	728	1,000
1969	265	217	28	172	58	27	98	115	715	980
1970	276	214	28	195	54	28	99	124	742	1,018
1971	260	224	28	191	60	24	101	156	784	1,044
1972	246	217	25	154	55	19	95	148	713	959
1973	242	213	29	196	53	21	99	155	766	1,008
1974	265	222	29	200	60	15	106	177	809	1,074
1975	271	238	30	209	74	16	106	189	862	1,133
1976	285	234	32	186	72	13	110	180	827	1,112
1977 ³	339	260	34	250	90	18	113	175	940	1,279

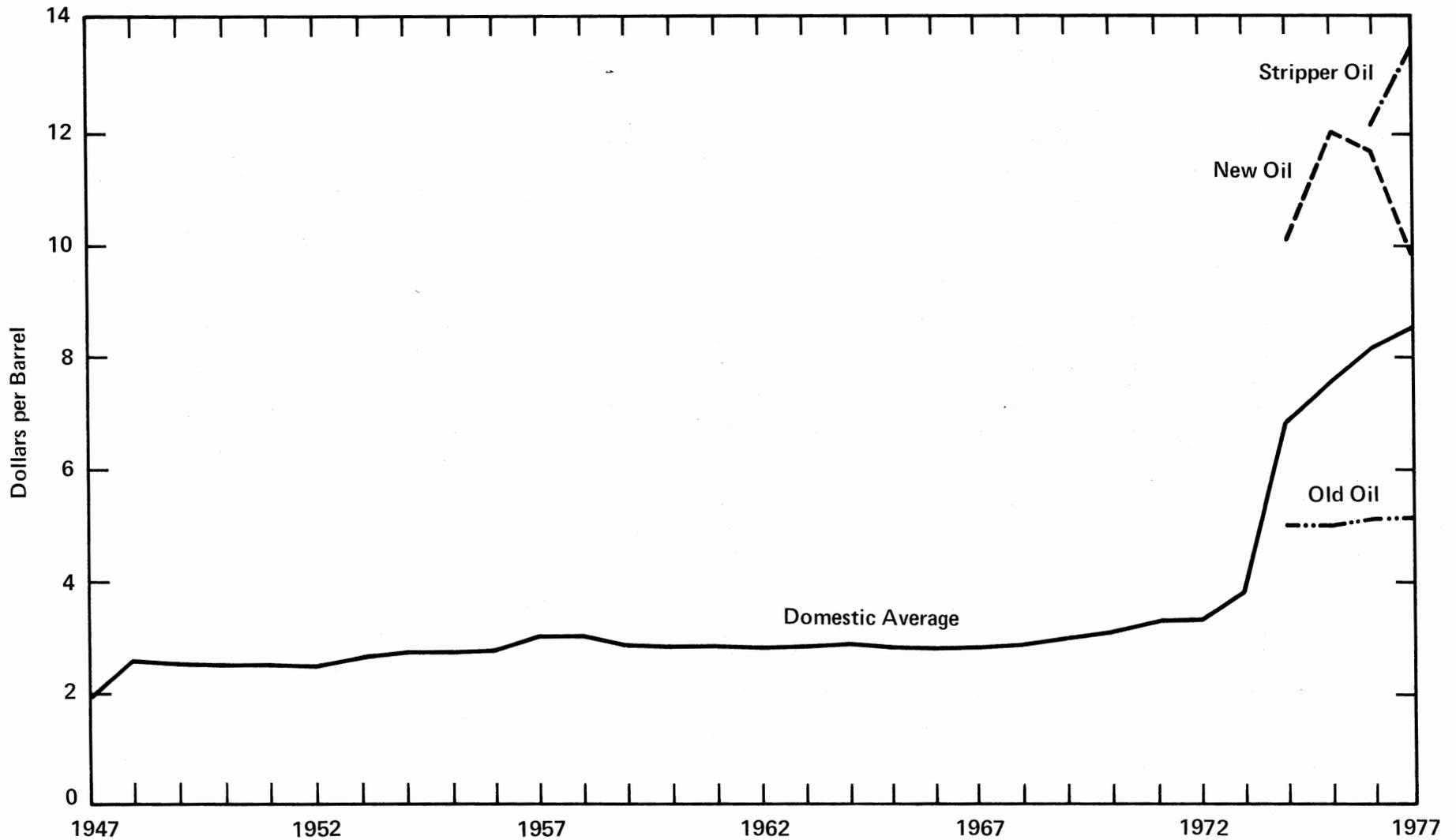
¹ Prior to 1965 kerosene-type jet fuel was included with kerosene. Prior to 1952 naphtha-type jet fuel was included with gasoline. Prior to 1965 special naphthas were included with gasoline.

² Includes ethane, liquefied gases, petrochemical feedstocks, special naphthas, lubricants, wax, coke, asphalt, road oil, plant condensate, and miscellaneous products.

³ Preliminary.

Source: Bureau of Mines and Energy Information Administration.

Crude Petroleum Wellhead Prices



Source: Bureau of Mines, Federal Energy Administration, and Energy Information Administration.

From 1947 through 1972, wellhead prices have gone up from an average of \$1.93 per barrel to an average of \$3.39 per barrel, an increase of 76 percent.

Since 1972, the last full year before OPEC began to raise prices, the domestic average of crude oil prices at the wellhead has risen from \$3.39 per barrel to \$8.57, an increase of 153 percent.

Prices of old oil and new oil were controlled at \$5.19 and \$10.72 per barrel, respectively, on the average during 1977. Stripper oil, which was not controlled during 1977, averaged \$13.59 per barrel that year. The average price of Alaskan North Slope crude oil in 1977 was \$6.35 per barrel and is included in the 1977 new oil price.

Crude Petroleum Wellhead Prices, 1947-1977
(Dollars per Barrel)

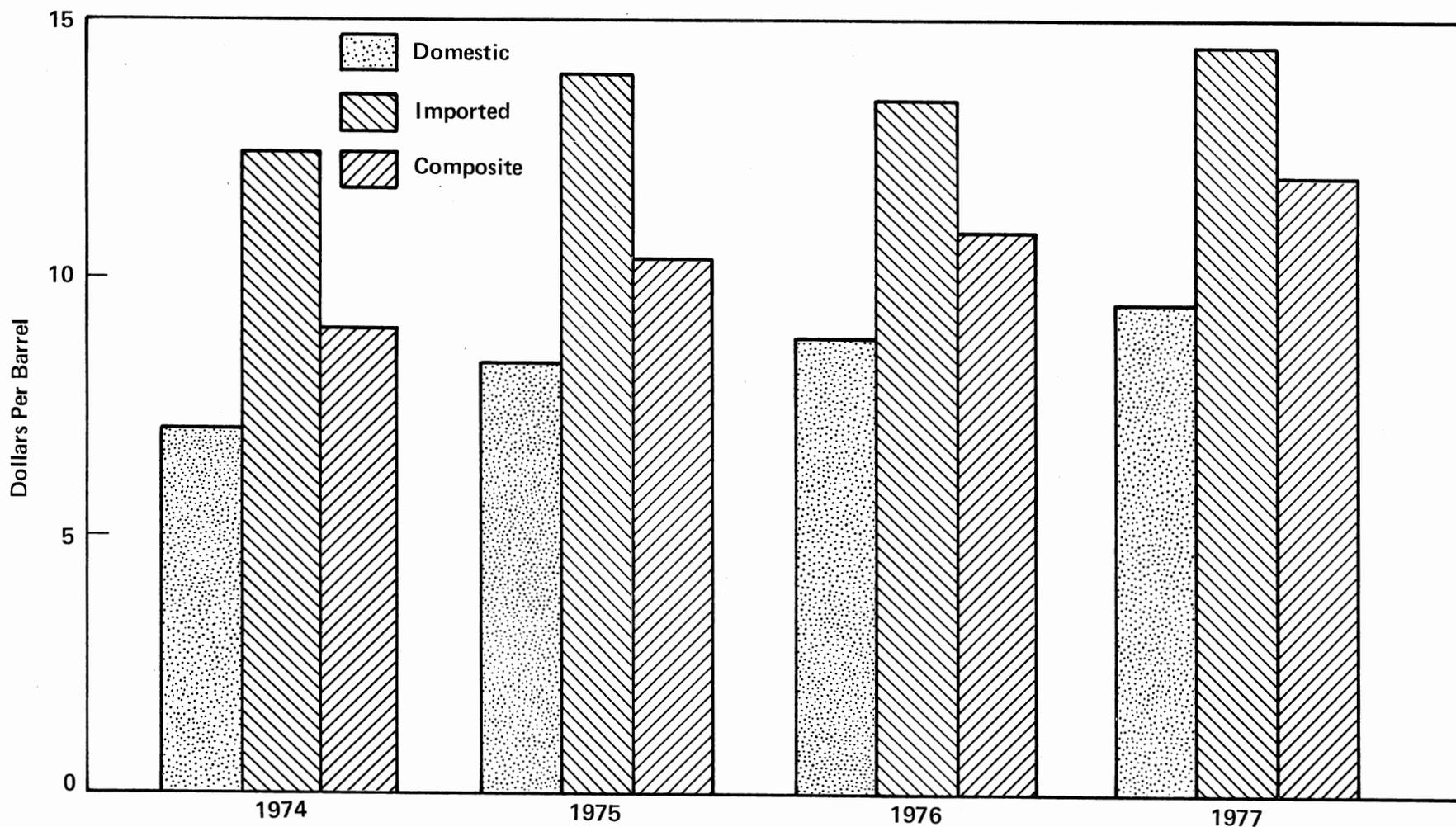
Year	Old Oil	New Oil	Stripper Oil	Domestic Average
1947	NA	NA	NA	1.93
1948	NA	NA	NA	2.60
1949	NA	NA	NA	2.54
1950	NA	NA	NA	2.51
1951	NA	NA	NA	2.53
1952	NA	NA	NA	2.53
1953	NA	NA	NA	2.68
1954	NA	NA	NA	2.78
1955	NA	NA	NA	2.77
1956	NA	NA	NA	2.79
1957	NA	NA	NA	3.09
1958	NA	NA	NA	3.01
1959	NA	NA	NA	2.90
1960	NA	NA	NA	2.88
1961	NA	NA	NA	2.89
1962	NA	NA	NA	2.90
1963	NA	NA	NA	2.89
1964	NA	NA	NA	2.88
1965	NA	NA	NA	2.86
1966	NA	NA	NA	2.88
1967	NA	NA	NA	2.92
1968	NA	NA	NA	2.94
1969	NA	NA	NA	3.09
1970	NA	NA	NA	3.18
1971	NA	NA	NA	3.39
1972	NA	NA	NA	3.39
1973	NA	NA	NA	3.89
1974	5.03	10.13	NA	6.87
1975	5.03	12.03	NA	7.67
1976	5.13	11.71	12.16	8.19
1977 ¹	5.19	10.72	13.59	8.57

¹ Alaskan North Slope crude oil is included in new oil and domestic average.

NA = Not applicable.

Source: Bureau of Mines, Federal Energy Administration and Energy Information Administration.

Refiner Acquisition Cost of Crude Petroleum



Source: Federal Energy Administration and Energy Information Administration.

The average cost per barrel of crude oil delivered to U.S. refineries during 1977 was \$9.55 for domestic crude oil and \$14.53 for imported crude oil. Domestic crude oil prices have been controlled below world levels since June 1973.

Since 1974, when DOE's predecessor agency, FEA, first began to collect

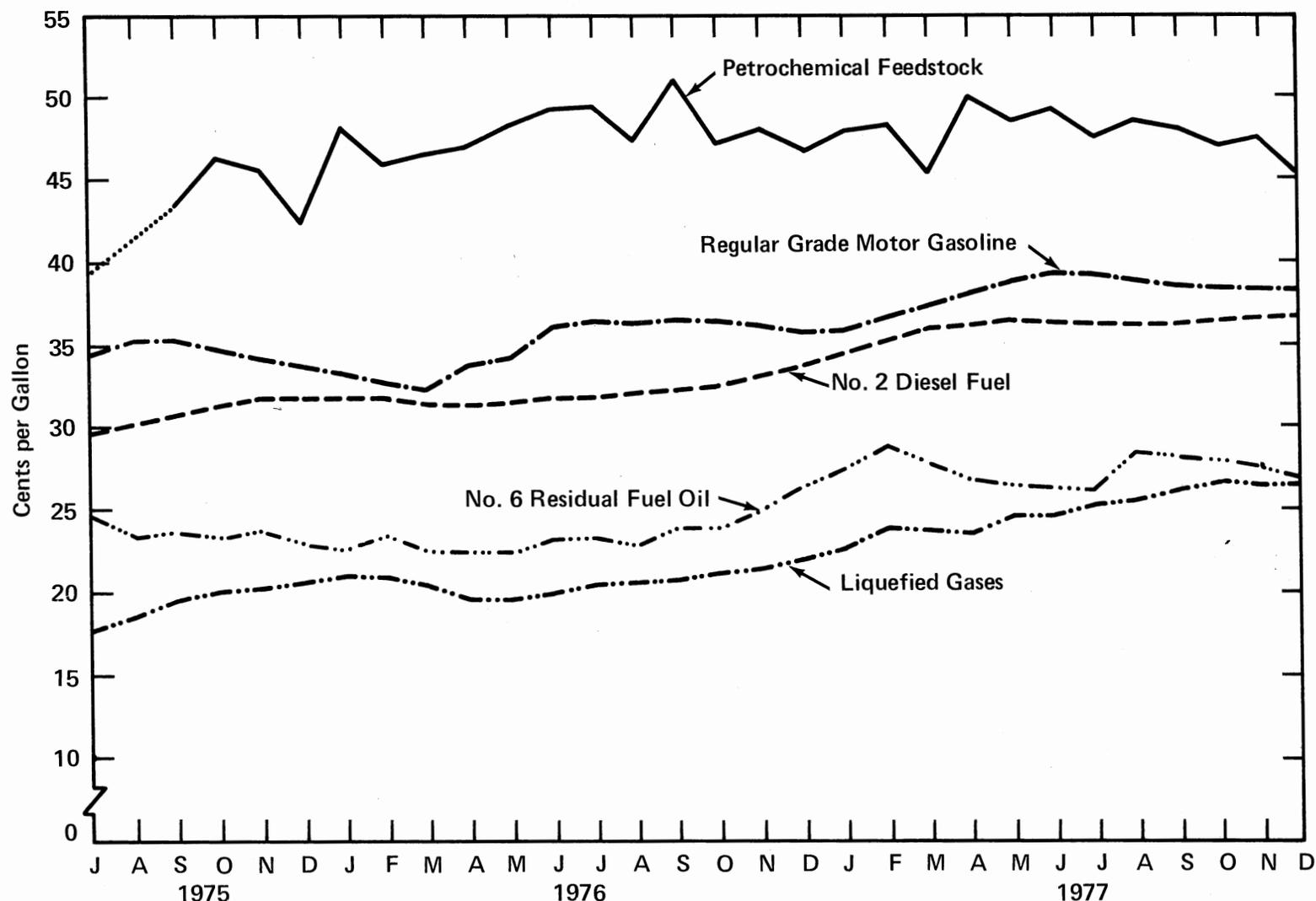
the data, the refiner acquisition cost of domestic crude has risen from \$7.18 per barrel to \$9.55 per barrel, an increase of 33 percent, while the cost of imported crude has increased 16 percent, from \$12.52 to \$14.53 per barrel. The composite cost has climbed from \$9.07 per barrel to \$11.96, or 32 percent.

Refiner Acquisition Cost of Crude Petroleum, 1974-1977
(Dollars per Barrel)

Year	Domestic	Imported	Composite
1974	7.18	12.52	9.07
1975	8.39	13.93	10.38
1976	8.84	13.48	10.89
1977	9.55	14.53	11.96

Source: Federal Energy Administration and Energy Information Administration.

Petroleum Product Wholesale Prices



Source: Federal Energy Administration and Energy Information Administration.

Wholesale prices for regular grade gasoline rose by 3.7 cents per gallon between July 1975 and December 1977.

The price of No. 2 diesel fuel at the wholesale level rose 7.0 cents per gallon during the same period.

The price of No. 6 residual fuel oil with sulfur content of 1.01 percent and above, rose from \$10.25 per barrel in July 1975 to \$10.77 in December 1977. Kerosene-type jet fuel increased in price from 29.2 cents per gallon to 37.8 cents, an increase of 8.6 cents.

Kerosene prices increased from 30.1 cents per gallon to 38.5 cents, a rise of 8.4 cents. Petrochemical feedstocks, costing an average of 39.3 cents in July 1975, were at 45.3 cents by December 1977.

The wholesale price of liquefied petroleum gas (LPG) rose from 17.8 cents per gallon to 26.6 cents, an increase of 8.8 cents.

In terms of percentage increases, the price of LPG rose most, 49 percent, followed by kerosene-type jet fuel, 29 percent, and kerosene, 28 percent. The lowest percentage increases were reported for No. 6 residual, 5 percent, and motor gasoline, 11 percent.

Petroleum Product Wholesale Prices,¹ Monthly—July 1975 Through December 1977
(Cents per Gallon)

Year Month	Regular Grade Motor Gasoline	No. 2 Diesel Fuel	No. 6 Residual Fuel Oil (1.01% Sulfur and Above)	Kerosene- Type Jet ²	Kerosene	Petrochemical Feedstocks	Liquefied Gases ³
1975							
July	34.5	29.7	24.4	29.2	30.1	39.3	17.8
August	35.3	30.1	23.1	29.5	30.6	NA	18.7
September	35.4	30.7	23.5	29.6	30.9	43.2	19.8
October	34.9	31.3	23.2	30.0	31.9	46.3	20.0
November	34.2	31.6	23.6	30.2	32.3	45.6	20.3
December	33.8	31.6	23.0	30.5	33.0	42.5	20.5
1976							
January	33.4	31.7	22.8	31.3	32.8	48.0	21.1
February	32.8	31.7	23.1	31.2	32.6	45.9	21.1
March	32.4	31.2	22.8	30.7	31.8	46.5	20.4
April	32.8	31.1	22.7	30.5	31.2	46.9	19.8
May	34.3	31.3	22.5	30.2	31.3	48.2	19.7
June	36.0	31.7	23.2	30.3	31.4	49.1	20.0
July	36.3	31.7	23.4	30.8	31.9	49.4	20.5
August	36.4	32.0	22.9	31.1	31.7	47.3	20.7
September	36.5	32.1	23.9	31.4	32.6	51.1	20.9
October	36.4	32.3	23.8	31.9	33.0	47.1	21.2
November	36.1	32.8	24.8	32.4	34.0	48.0	21.6
December	35.8	33.5	26.3	32.2	34.8	46.8	22.3
1977							
January	35.8	34.3	27.4	33.2	36.0	47.9	22.9
February	36.6	35.3	28.7	34.1	36.9	48.3	24.0
March	37.3	35.9	27.7	34.6	37.1	45.3	23.9
April	38.1	36.1	26.8	34.9	36.5	50.0	23.7
May	38.7	36.5	26.3	35.1	36.6	48.4	24.8
June	39.1	36.3	26.4	35.7	36.3	49.3	24.7
July	39.1	36.2	26.2	35.8	36.1	47.5	25.2
August	38.8	36.2	28.3	36.0	36.9	48.5	25.6
September	38.4	36.2	28.0	37.0	36.5	48.1	26.2
October	38.3	36.5	27.9	37.3	38.0	47.1	26.7
November	38.2	36.6	27.2	37.5	38.0	47.5	26.4
December	38.2	36.7	25.6	37.8	38.5	45.3	26.6

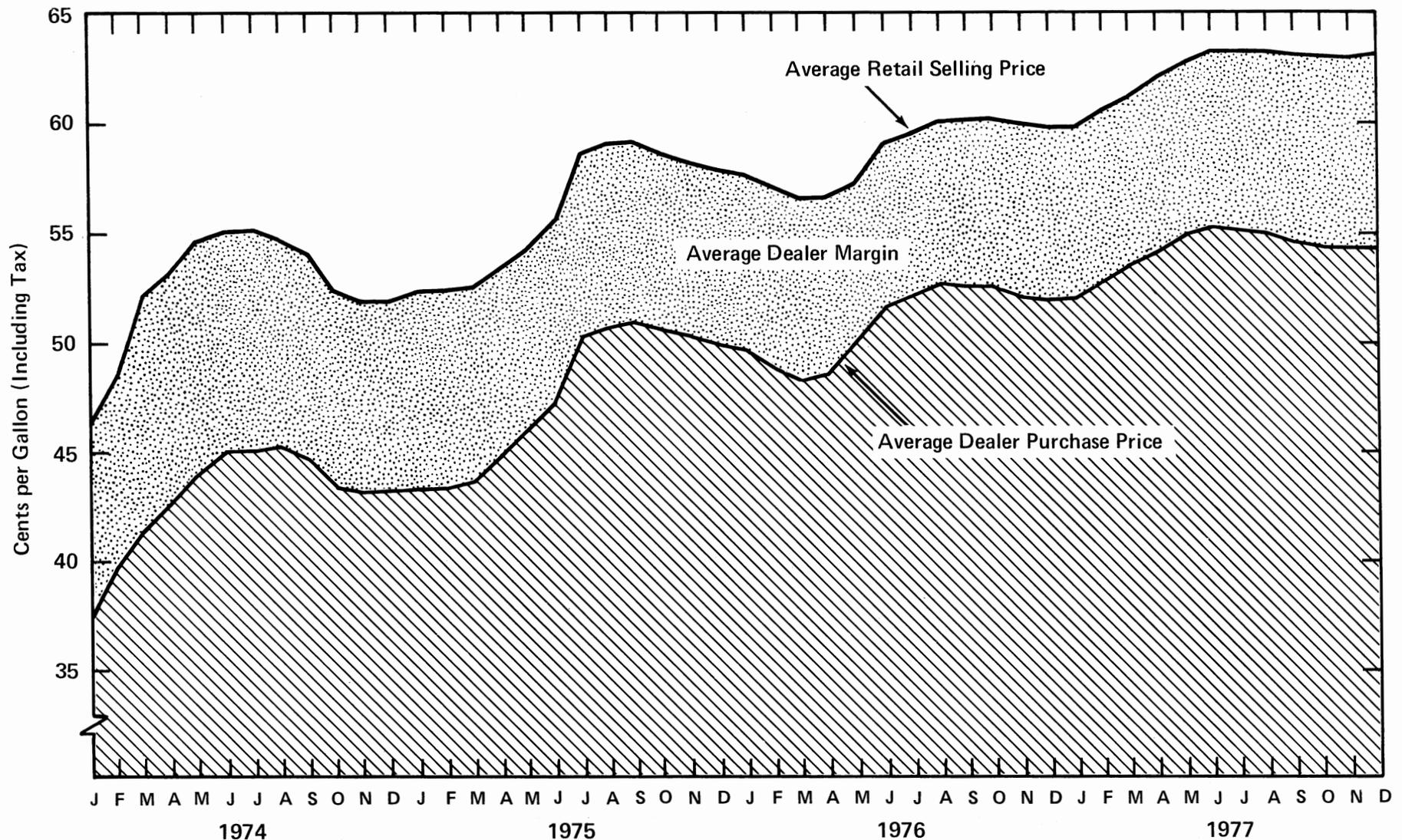
¹ Prices (excluding taxes) as reported by refiners, gas plant operators, and large resellers/retailers.

² Refers to the price of kerosene-type aviation fuel sold to ultimate consumers, including commercial airline and military accounts.

³ Price includes propane and butane sold separately and excludes propane-butane mixes.

Source: Federal Energy Administration and Energy Information Administration.

Gasoline Prices



Source: Federal Energy Administration and Lundberg Survey Inc.

Motor gasoline prices to consumers have risen from 46.3 cents per gallon in January 1974 to 63.3 cents in December 1977. U.S. price controls in effect on gasoline since June 1973 have limited price increases to the extent necessary to cover actual cost increases.

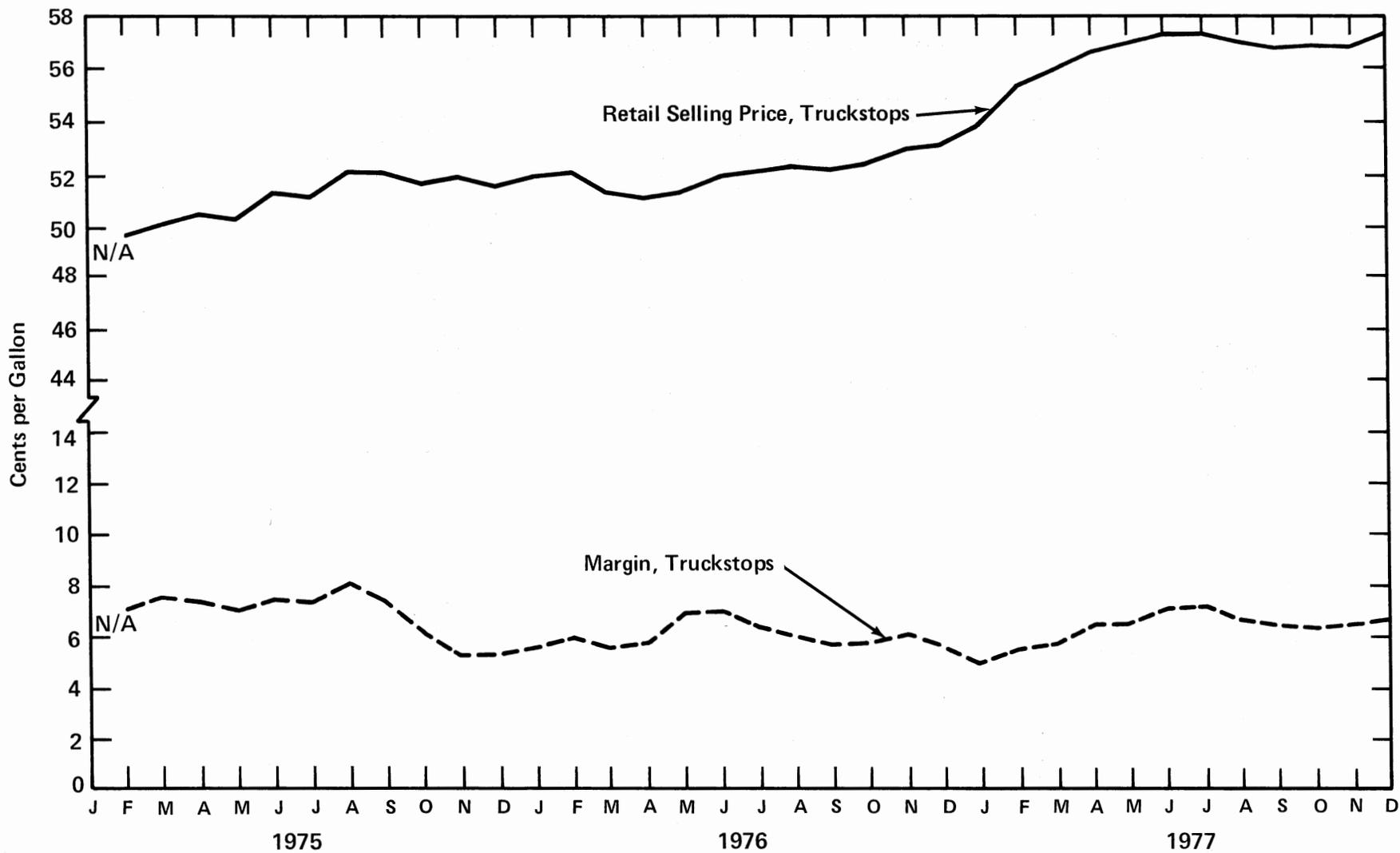
The average dealer margin, however, declined from 9.7 cents per gallon in 1974 to 8.3 cents in 1977. The low point was in 1976, when the margin was 7.7 cents.

Gasoline Prices,¹ Monthly—January 1974 Through December 1977
(Cents per Gallon, Including Tax)

Year Month	Average Retail Selling Price	Average Dealer Purchase Price	Average Dealer Margin	Year Month	Average Retail Selling Price	Average Dealer Purchase Price	Average Dealer Margin
1974				1976			
January -----	46.3	37.4	8.9	January -----	57.7	49.6	8.1
February -----	48.8	39.7	9.1	February -----	57.1	48.8	8.3
March -----	52.3	41.4	10.9	March -----	56.6	48.3	8.3
April -----	53.4	42.7	10.7	April -----	56.6	48.6	8.0
May -----	54.7	44.1	10.6	May -----	57.4	50.0	7.4
June -----	55.1	44.8	10.3	June -----	59.0	51.6	7.4
July -----	55.2	45.0	10.2	July -----	59.6	52.2	7.4
August -----	54.9	45.1	9.8	August -----	60.1	52.7	7.4
September -----	54.2	44.8	9.4	September -----	60.2	52.6	7.6
October -----	52.4	43.4	9.0	October -----	60.2	52.6	7.6
November -----	52.0	43.2	8.8	November -----	60.0	52.2	7.8
December -----	52.0	43.3	8.7	December -----	59.9	52.0	7.9
Average -----	52.8	43.1	9.7	Average -----	58.7	51.0	7.7
1975				1977			
January -----	52.4	43.4	9.0	January -----	59.9	52.0	7.9
February -----	52.5	43.5	9.0	February -----	60.7	52.8	7.9
March -----	52.6	43.8	8.8	March -----	61.3	53.5	7.8
April -----	53.5	44.9	8.6	April -----	62.2	54.1	8.1
May -----	54.3	46.0	8.3	May -----	62.9	55.0	7.9
June -----	55.6	47.5	8.1	June -----	63.4	55.3	8.1
July -----	58.7	50.3	8.4	July -----	63.4	55.1	8.3
August -----	59.2	50.8	8.4	August -----	63.4	55.0	8.4
September -----	59.3	51.1	8.2	September -----	63.3	54.7	8.6
October -----	58.9	50.7	8.2	October -----	63.2	54.4	8.8
November -----	58.4	50.2	8.2	November -----	63.1	54.4	8.7
December -----	58.0	49.9	8.1	December -----	63.3	54.3	9.0
Average -----	56.2	47.8	8.4	Average -----	62.6	54.3	8.3

¹ Prices, including taxes, are for regular gasoline at full service retail outlets.
Source: Federal Energy Administration and Lundberg Survey Inc.

No. 2 Diesel Fuel Prices



Source: Lundberg Survey Inc.

Diesel fuel prices at truckstops have risen from 49.7 cents per gallon in February 1975 to 57.4 cents in December 1977, at a relatively slow rate until 1977.

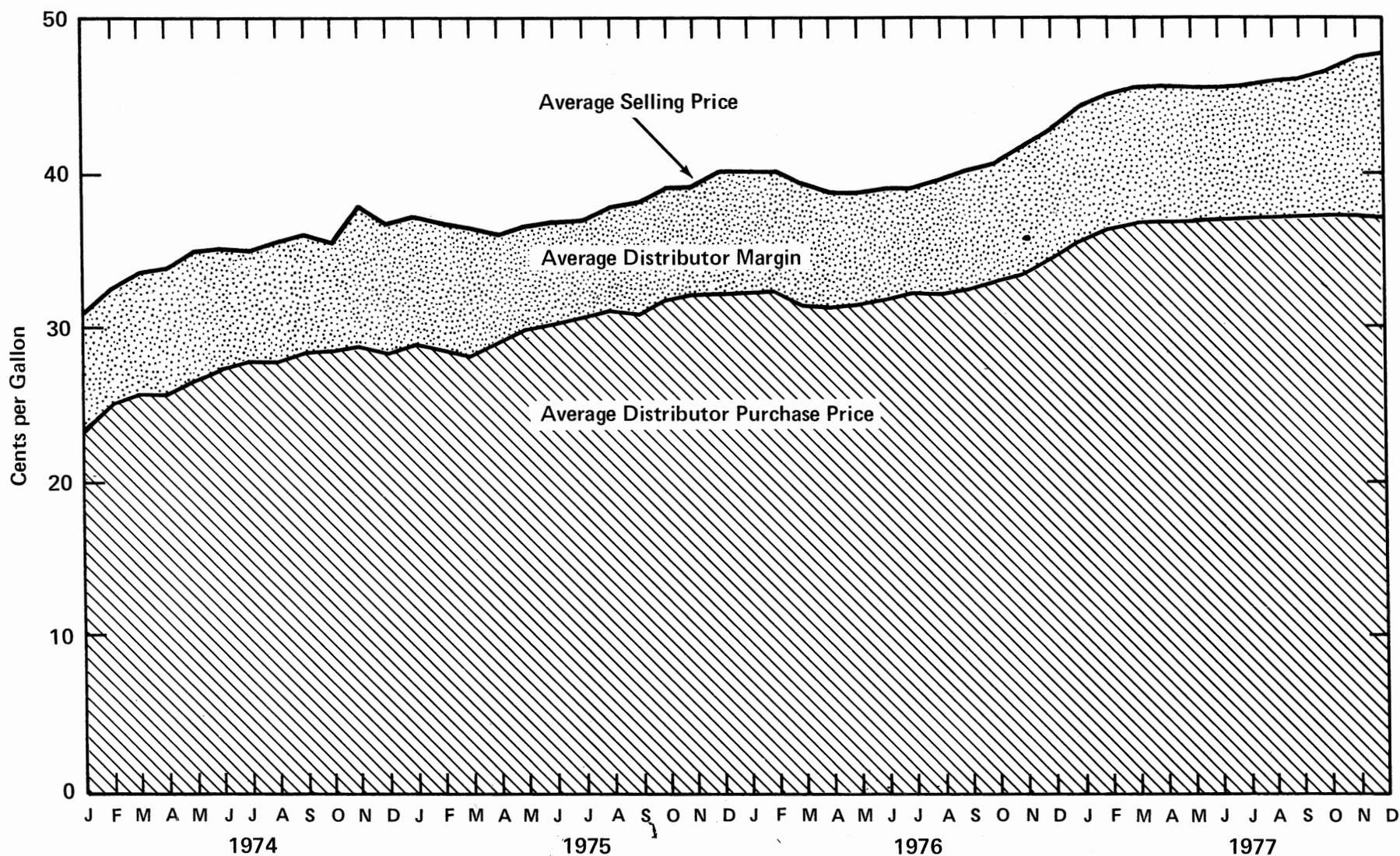
The dealer margin on sales of diesel fuel at truckstops declined 6.9 cents per gallon in 1975 to 6.3 cents in 1977.

No. 2 Diesel Fuel Prices, Monthly—January 1974 Through December 1977
(Cents per Gallon, Including Tax)

Year	Retail Selling Price		Margin		Year	Retail Selling Price		Margin	
	Truckstops	Service Stations	Truckstops	Service Stations		Month	Truckstops	Service Stations	Truckstops
1974					1976				
January ----	NA	46.0	NA	6.7	January ----	52.0	52.5	5.6	7.2
February ---	NA	45.9	NA	6.6	February ---	52.1	52.0	6.0	7.3
March -----	NA	46.8	NA	7.2	March -----	51.4	52.4	5.6	7.1
April -----	NA	48.3	NA	7.2	April -----	51.1	52.8	5.8	7.8
May -----	NA	48.4	NA	7.2	May -----	51.4	52.9	6.9	7.8
June -----	NA	49.3	NA	7.7	June -----	52.0	53.3	7.0	7.7
July -----	NA	49.7	NA	7.3	July -----	52.1	53.1	6.4	7.1
August -----	NA	49.9	NA	7.3	August -----	52.3	53.2	6.0	7.0
September --	NA	49.6	NA	7.4	September --	52.2	53.1	5.7	6.8
October ----	NA	49.3	NA	7.5	October ----	52.4	53.1	5.8	6.5
November --	NA	49.3	NA	7.2	November --	52.9	53.3	6.1	6.4
December ---	NA	49.2	NA	7.5	December ---	53.1	53.5	5.7	5.9
Average ----	NA	48.5	NA	7.2	Average ----	52.1	52.9	6.1	7.1
1975					1977				
January ----	NA	50.6	NA	6.8	January ----	53.9	54.3	4.9	5.3
February ---	49.7	50.2	7.0	7.3	February ---	55.3	55.6	5.5	5.9
March -----	50.1	50.2	7.5	7.4	March -----	56.0	56.4	5.7	6.2
April -----	50.5	50.6	7.4	7.5	April -----	56.6	56.7	6.5	6.7
May -----	50.3	51.0	7.0	7.7	May -----	56.9	57.1	6.5	6.8
June -----	51.4	51.4	7.5	7.9	June -----	57.3	57.4	7.1	7.2
July -----	51.2	52.4	7.3	8.2	July -----	57.3	57.3	7.2	7.2
August -----	52.1	52.6	8.1	8.9	August -----	57.0	57.2	6.7	7.2
September --	52.1	52.7	7.4	8.7	September --	56.8	57.3	6.5	7.1
October ----	51.8	53.0	6.2	7.7	October ----	56.9	57.2	6.4	6.9
November --	52.0	53.0	5.3	6.5	November --	56.9	57.3	6.5	6.7
December ---	51.7	52.4	5.3	6.7	December ---	57.4	57.5	6.6	6.9
Average ----	51.2	51.7	6.9	7.6	Average ----	56.5	56.8	6.3	6.7

Source: Lundberg Survey, Inc.

Residential Heating Oil Prices



Source: Federal Energy Administration and Energy Information Administration.

During the period January 1974 through December 1977, the average selling price of residential heating oil rose from 31 cents to 48 cents per

gallon, a 55 percent increase. The average distributor margin rose from 7.7 cents in January 1974 to 10.4 cents in December 1977, a 35 percent increase.

Residential Heating Oil Prices, Monthly—January 1974 Through December 1977
(Cents per Gallon)

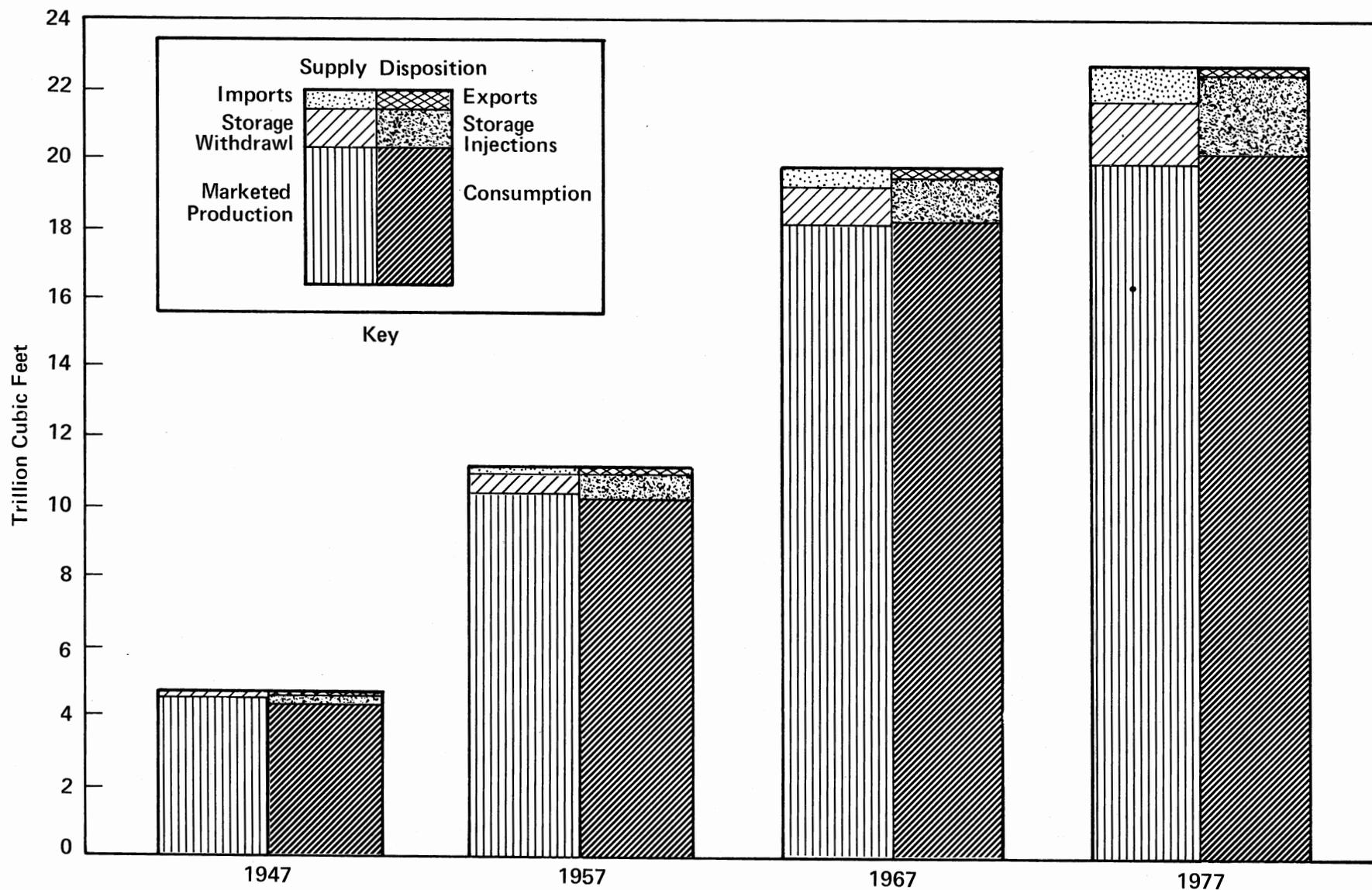
Year Month	Average Selling Price	Average Distributor Purchase Price	Average Distributor Margin	Year Month	Average Selling Price ¹	Average Distributor Purchase Price ¹	Average Distributor Margin ¹
1974				1976			
January -----	31.1	23.4	7.7	January -----	40.2	32.0	8.8
February -----	32.8	25.4	7.4	February -----	40.2	32.0	8.8
March -----	33.8	25.9	7.9	March -----	39.4	31.5	9.2
April -----	34.0	25.9	8.1	April -----	39.0	31.3	9.1
May -----	35.1	26.8	8.3	May -----	39.0	31.4	8.6
June -----	35.3	27.5	7.8	June -----	39.3	31.8	8.6
July -----	35.2	28.1	7.1	July -----	39.3	32.3	8.0
August -----	35.8	28.1	7.7	August -----	39.8	32.2	8.5
September -----	36.3	28.7	7.6	September -----	40.2	32.6	8.7
October -----	35.6	28.9	6.7	October -----	40.7	33.1	8.6
November -----	37.9	29.1	8.8	November -----	41.9	33.4	9.1
December -----	36.9	28.5	8.4	December -----	43.0	34.5	9.2
1975				1977			
January -----	37.4	29.1	8.3	January -----	44.4	35.8	9.3
February -----	37.0	28.7	8.3	February -----	45.3	36.7	9.4
March -----	36.6	28.4	8.2	March -----	45.8	37.0	9.5
April -----	36.1	29.3	6.8	April -----	45.9	37.1	9.6
May -----	36.7	30.0	6.7	May -----	45.7	37.1	9.5
June -----	37.1	30.3	6.8	June -----	45.7	37.1	9.3
July -----	37.2	30.6	6.6	July -----	45.8	37.2	9.3
August -----	38.0	31.2	6.8	August -----	46.0	37.3	9.2
September -----	38.4	31.0	7.4	September -----	46.2	37.4	9.4
October -----	39.3	31.8	7.5	October -----	46.7	37.5	9.8
November -----	39.4	32.1	7.3	November -----	47.6	37.3	10.2
December -----	40.1	32.4	7.7	December -----	47.9	37.2	10.4

¹ The sample survey and method used to derive data for January 1976 forward differ from those used for prior months. Data for January 1974 through December 1975 are derived from a survey of distributors, and prices and margins are computed as unweighted averages. The average distributor purchase price and average dealer margins for January 1976 forward are for distributors only, whereas the average selling price includes both refiners and distributors. Data for January 1976 forward are computed as sales weighted averages.

Note: Prices and margins represent sales for residential heating only.

Source: Federal Energy Administration and Energy Information Administration.

Supply and Disposition of Natural Gas



Source: Bureau of Mines and Energy Information Administration.

Natural gas supply in the United States from domestic and foreign sources grew steadily from 1947, to a high of 25.3 trillion cubic feet in 1972. Successive decreases of 0.4 percent, 3.8 percent, and 5.9 percent

were recorded in 1973, 1974, and 1975, respectively, followed by a leveling trend in 1976 and 1977.

Supply and Disposition of Natural Gas, 1947-1977
(Billion Cubic Feet)

Year	Supply			Disposition					
	Marketed Production ¹	Imports	Withdrawal from Storage	Total Supply ¹	Consumption ¹	Exports	Storage Injections	Adjustments ²	Total Disposition ¹
1947	4,582	—	87	4,669	4,427	18	96	128	4,669
1948	5,148	—	79	5,227	4,945	19	136	127	5,227
1949	5,420	—	106	5,526	5,195	20	172	139	5,526
1950	6,282	—	175	6,457	6,026	26	230	175	6,457
1951	7,457	—	209	7,666	7,103	24	348	192	7,666
1952	8,013	8	222	8,243	7,613	27	399	204	8,243
1953	8,397	9	247	8,653	7,979	28	405	240	8,653
1954	8,743	7	330	9,080	8,403	29	432	216	9,080
1955	9,405	11	437	9,853	9,070	31	505	247	9,853
1956	10,082	10	453	10,545	9,707	36	589	213	10,545
1957	10,680	38	481	11,199	10,280	42	672	205	11,199
1958	11,030	136	621	11,787	10,761	39	704	284	11,787
1959	12,046	134	669	12,849	11,820	18	787	223	12,849
1960	12,771	156	713	13,639	12,509	11	844	274	13,639
1961	13,254	219	698	14,171	13,082	11	844	235	14,171
1962	13,877	402	854	15,133	13,890	16	941	286	15,133
1963	14,747	406	917	16,070	14,640	17	1,047	365	16,070
1964	15,547	443	885	16,875	15,536	20	1,015	304	16,875
1965 ³	16,040	456	960	17,456	16,033	26	1,078	319	17,456
1966	17,207	480	1,142	18,829	17,192	25	1,210	401	18,829
1967	18,171	564	1,133	19,868	18,173	82	1,317	296	19,868
1968	19,322	652	1,330	21,304	19,460	94	1,425	325	21,304
1969	20,698	727	1,379	22,805	20,923	51	1,499	332	22,805
1970	21,921	821	1,459	24,200	22,046	70	1,857	228	24,200
1971	22,493	935	1,508	24,935	22,677	80	1,839	339	24,935
1972	22,532	1,019	1,757	25,308	23,009	78	1,893	328	25,308
1973	22,648	1,033	1,533	25,213	22,966	77	1,974	196	25,213
1974	21,601	959	1,701	24,260	22,111	77	1,784	289	24,260
1975	20,109	953	1,760	22,821	20,409	73	2,104	235	22,821
1976	19,952	964	1,921	22,837	20,801	65	1,756	216	22,837
1977 ⁴	19,942	1,009	1,837	22,788	20,071	60	2,391	266	22,788

¹ Includes natural gas, lost due to extraction of liquids.

² Includes transmission losses, changes in above ground storage, and unaccounted for gas.

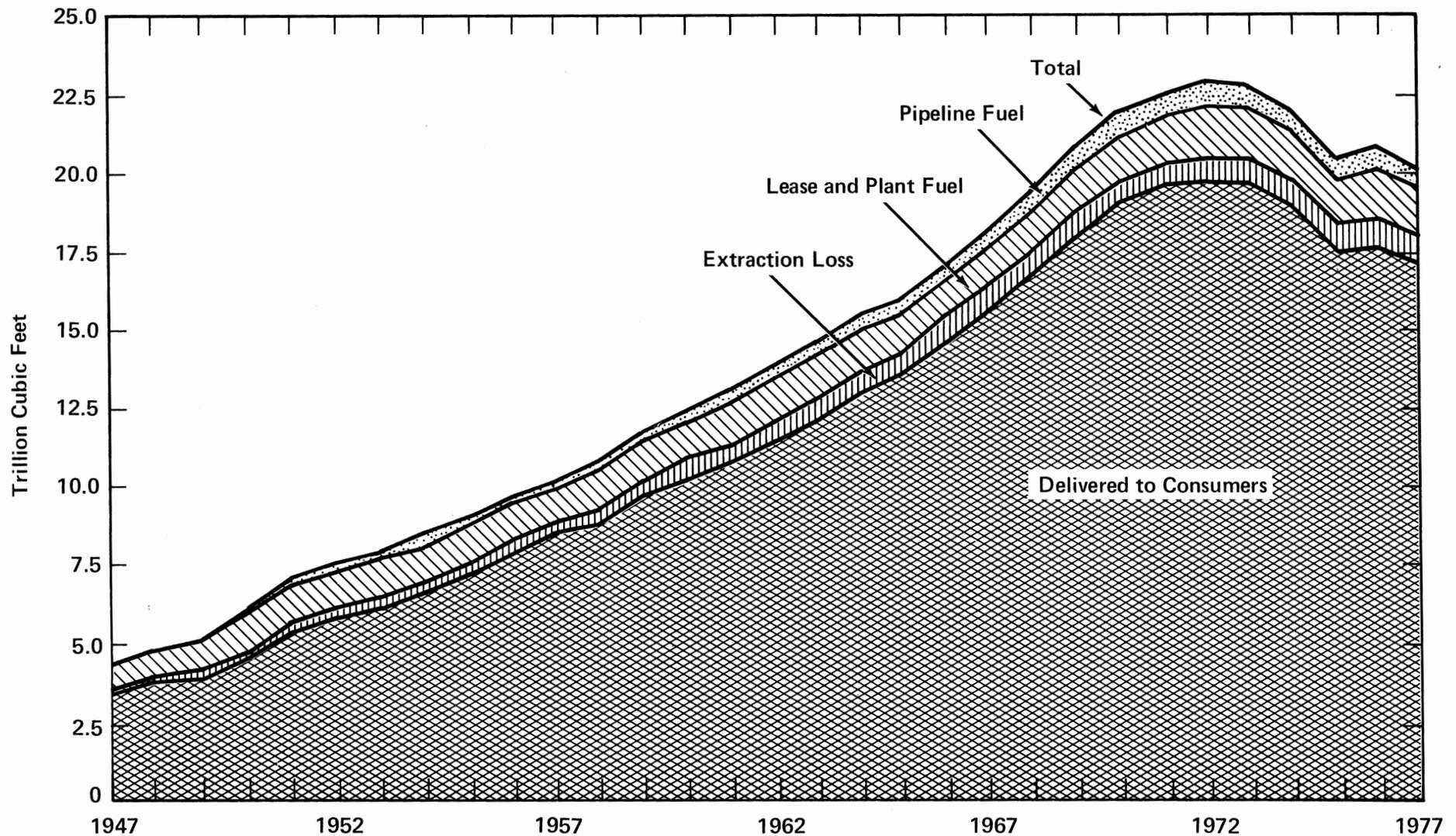
³ Beginning with 1965 data, all volumes are shown on a pressure base of 14.73 p.s.i.a. at 60° F. For prior years the pressure base is 14.65 p.s.i.a. at 60° F.

⁴ Preliminary.

Note: Data may not add to totals due to independent rounding.

Source: Bureau of Mines and Energy Information Administration.

Natural Gas Consumption



Source: Bureau of Mines and Energy Information Administration.

During 1947 through 1972, total natural gas consumption increased more than five-fold at an average annual increase rate of 5.6 percent. Since 1972, consumption has declined, the result of falling domestic production. Consumption in 1977 was at a level of that in 1969.

Other than natural gas delivered to consumers, total natural gas consumption consists of lease fuel, natural gas plant fuel, pipeline fuel, and

transfer of certain gaseous hydrocarbon compounds to liquids (extraction loss). This extraction loss generally accounts for 4 percent of total consumption. Natural gas delivered to consumers, which accounted for 87 percent of total consumption in 1977, has increased from 1947 through 1972 at an average annual rate of 7.2 percent. Since then, the trend has been downward.

Natural Gas Consumption, 1947-1977
(Billion Cubic Feet)

Year	Delivered to Consumers	Extraction ¹ Loss	Lease and Plant Fuel	Pipeline Fuel	Total
1947	3,493	189	745	NA	4,427
1948	3,923	210	812	NA	4,945
1949	4,136	224	835	NA	5,195
1950	4,712	260	928	126	6,026
1951	5,470	292	1,149	192	7,103
1952	5,922	319	1,165	207	7,613
1953	6,278	340	1,131	230	7,979
1954	6,715	354	1,103	231	8,403
1955	7,317	377	1,131	245	9,070
1956	7,990	418	1,003	296	9,707
1957	8,500	435	1,046	299	10,280
1958	8,845	458	1,146	312	10,761
1959	9,734	498	1,239	349	11,820
1960	10,382	543	1,237	347	12,509
1961	10,823	592	1,289	378	13,082
1962	11,514	624	1,370	382	13,890
1963	12,135	670	1,411	424	14,640
1964	13,009	723	1,371	433	15,536
1965	13,623	753	1,156	501	16,033
1966	14,885	739	1,033	535	17,192
1967	15,671	785	1,141	576	18,173
1968	16,804	828	1,237	591	19,460
1969	18,079	867	1,346	631	20,923
1970	19,019	906	1,399	722	22,046
1971	19,637	883	1,414	743	22,677
1972	19,879	908	1,456	766	23,009
1973	19,825	917	1,496	728	22,966
1974	19,077	887	1,477	669	22,111
1975	17,558	872	1,396	583	20,409
1976	17,764	854	1,634	548	20,801
1977 ²	17,390	843	1,288	550	20,071

¹ Quantity converted to natural gas liquids.

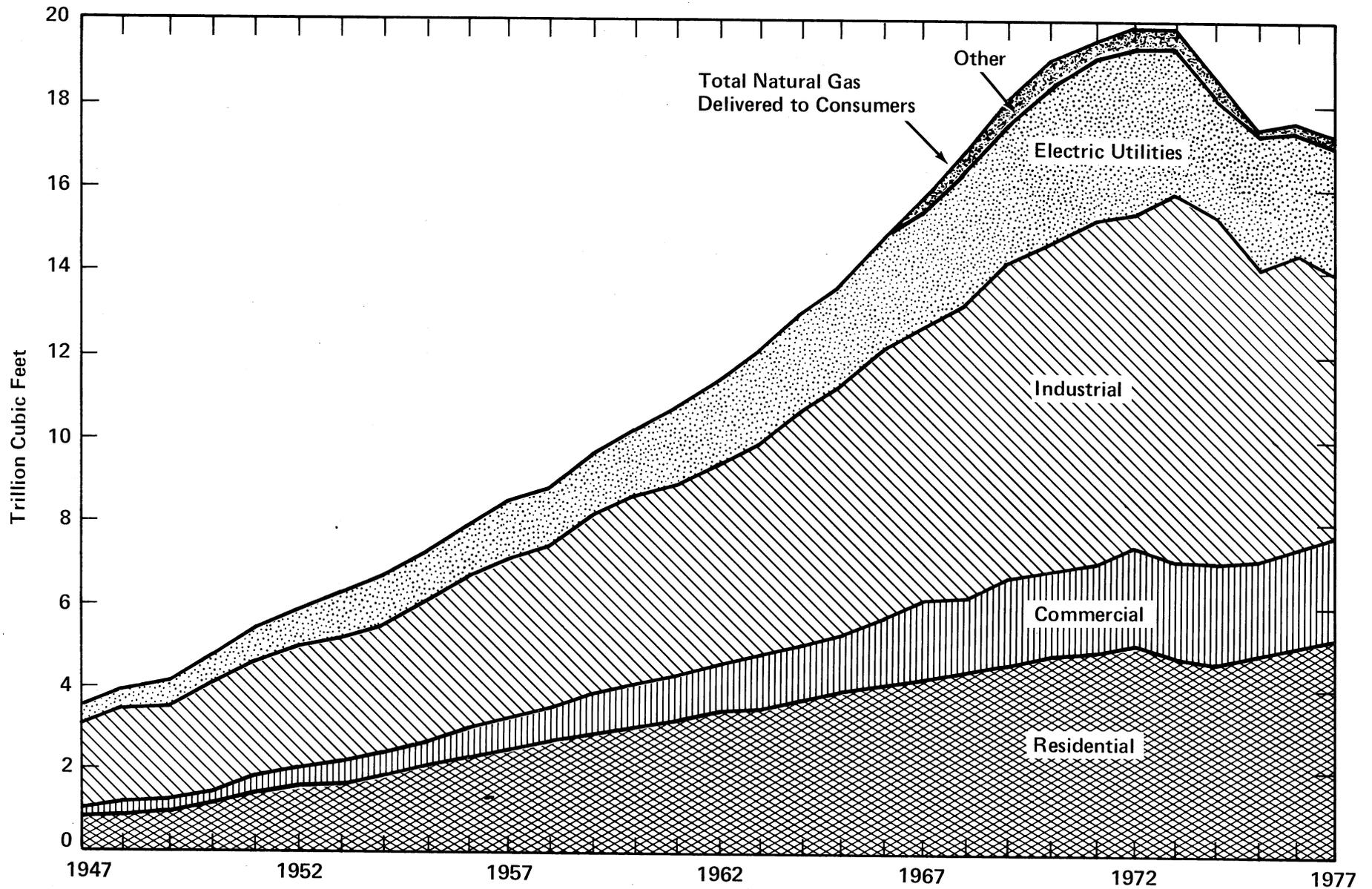
² Estimated.

NA=Not available.

Note: Beginning with 1965 data, all volumes are shown on a pressure base at 14.73 p.s.i.a. at 60° F. For prior years the pressure base is 14.65 p.s.i.a. at 60° F.

Source: Bureau of Mines and Energy Information Administration.

Natural Gas Delivered to Consumers



Source: Bureau of Mines and Energy Information Administration.

The quantity of natural gas for residential use grew from 23.0 percent of total delivered to consumers in 1947 to 28.4 percent in 1976, while the

industrial-use sector accounted for 58.2 percent of total delivered in 1947, compared with 39.2 percent in 1976.

Natural Gas Delivered to Consumers, 1947-1977
(Billion Cubic Feet)

Year	Residential	Commercial	Industrial	Electric Utilities	Other	Total
1947	802	285	2,032	373	NA	3,493
1948	896	323	2,226	478	NA	3,923
1949	993	348	2,245	550	NA	4,136
1950	1,198	388	2,498	629	NA	4,712
1951	1,475	464	2,765	764	NA	5,470
1952	1,622	516	2,875	910	NA	5,922
1953	1,686	531	3,028	1,034	NA	6,278
1954	1,894	585	3,071	1,165	NA	6,715
1955	2,124	629	3,411	1,153	NA	7,317
1956	2,328	717	3,707	1,239	NA	7,990
1957	2,500	776	3,887	1,338	NA	8,500
1958	2,714	872	3,885	1,373	NA	8,845
1959	2,913	975	4,218	1,627	NA	9,734
1960	3,103	1,020	4,535	1,725	NA	10,382
1961	3,249	1,077	4,672	1,825	NA	10,823
1962	3,479	1,207	4,864	1,966	NA	11,514
1963	3,589	1,268	5,136	2,143	NA	12,135
1964	3,787	1,375	5,526	2,322	NA	13,009
1965	3,903	1,444	5,958	2,318	NA	13,623
1966	4,138	1,623	6,514	2,609	NA	14,885
1967	4,313	1,717	6,656	2,743	242	15,671
1968	4,450	1,801	7,134	3,144	275	16,804
1969	4,728	1,955	7,612	3,486	299	18,079
1970	4,837	2,057	7,889	3,894	342	19,019
1971	4,972	2,173	8,164	3,993	336	19,637
1972	5,126	2,287	8,167	3,979	321	19,879
1973	4,879	2,288	8,744	3,605	309	19,825
1974	4,786	2,263	8,306	3,429	293	19,077
1975	4,924	2,268	6,979	3,147	240	17,558
1976	5,051	2,383	6,967	3,078	285	17,764
1977 ¹	5,300	2,400	6,200	3,200	290	17,390

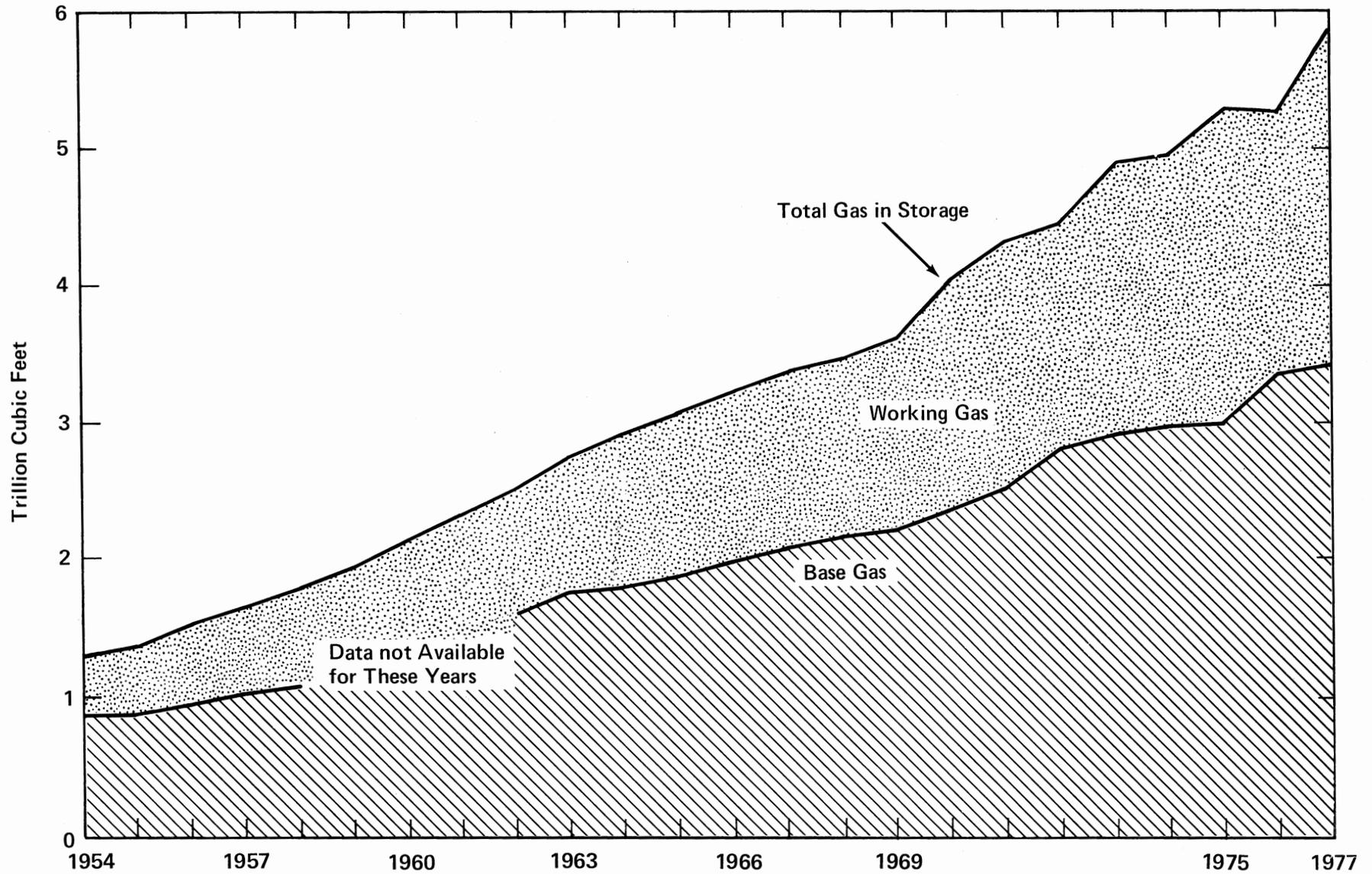
¹ Estimated.

NA=Not available.

Note: Beginning with 1965 data, all volumes are shown on a pressure base of 14.73 p.s.i.a. at 60° F. For prior years the pressure base is 14.65 p.s.i.a. at 60° F.

Source: Bureau of Mines and Energy Information Administration.

Underground Storage of Natural Gas



Source: American Gas Association, Federal Energy Administration, Federal Power Commission, and Energy Information Administration.

The quantity of natural gas held in underground storage has grown steadily as annual injection exceeded withdrawals except during 1972 and 1976. This growth combined with declining production during recent

years has resulted in an increasing dependence on underground storage to meet winter heating season gas demand.

Underground Storage of Natural Gas, 1954-1977
(Billion Cubic Feet)

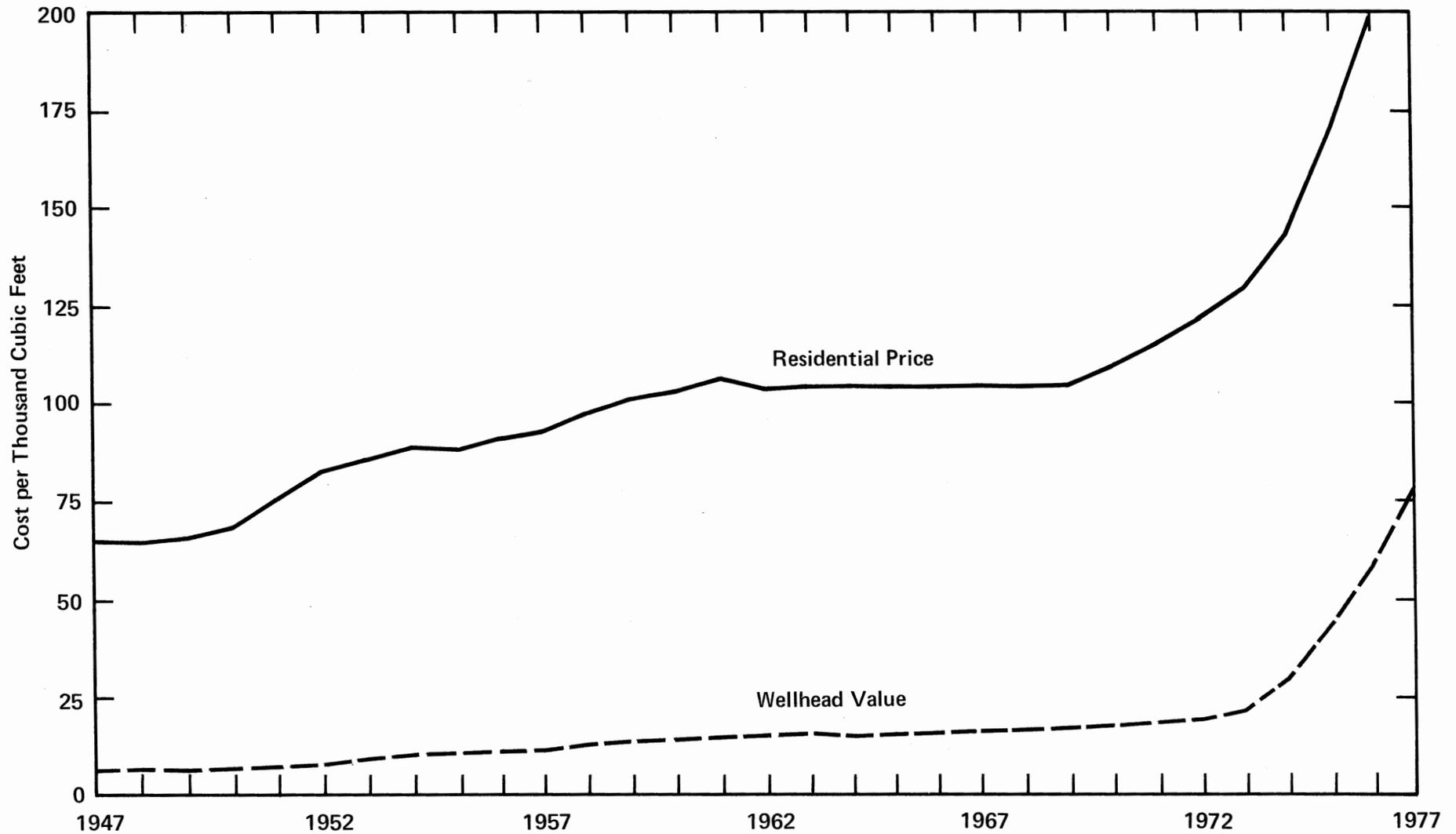
Year	Base Gas ¹	Working Gas	Total Gas in Storage ¹
1954	816	465	1,281
1955	863	505	1,368
1956	919	583	1,502
1957	1,001	673	1,674
1958	1,056	708	1,764
1959	NA	NA	1,901
1960	NA	NA	2,184
1961	NA	NA	2,344
1962	1,571	933	2,504
1963	1,738	1,007	2,745
1964	1,781	1,159	2,940
1965	1,848	1,242	3,090
1966	1,958	1,267	3,225
1967	2,058	1,318	3,376
1968	2,129	1,366	3,495
1969	2,181	1,421	3,602
1970	2,326	1,678	4,004
1971	2,485	1,840	4,325
1972	2,751	1,729	4,480
1973	2,864	2,034	4,898
1974	2,912	2,050	4,962
1975	2,997	2,301	5,298
1976	3,310	1,921	5,231
1977	3,390	2,458	5,848

¹ Includes native gas.

NA=Not available.

Source: American Gas Association, Federal Energy Administration, Federal Power Commission, and Energy Information Administration.

Natural Gas Wellhead Value and Residential Price



Source: Bureau of Mines and Energy Information Administration.

The average wellhead value of natural gas production in the United States increased steadily from 6.0 cents per thousand cubic feet in 1947 to 21.6 cents per thousand cubic feet in 1973, an average annual rate increase of 0.6 cents per thousand cubic feet. Increases for 1974 through 1977 were 8.8, 13.5, and 19.9 cents per thousand cubic feet, respectively.

The value of natural gas for residential use grew at an average annual rate of 2.4 cents per thousand cubic feet from 1947 through 1973. The average annual increase from 1974 through 1976 was 23.0 cents per thousand cubic feet.

Natural Gas Wellhead Value and Residential Price, 1947-1977
(Cents per Thousand Cubic Feet)

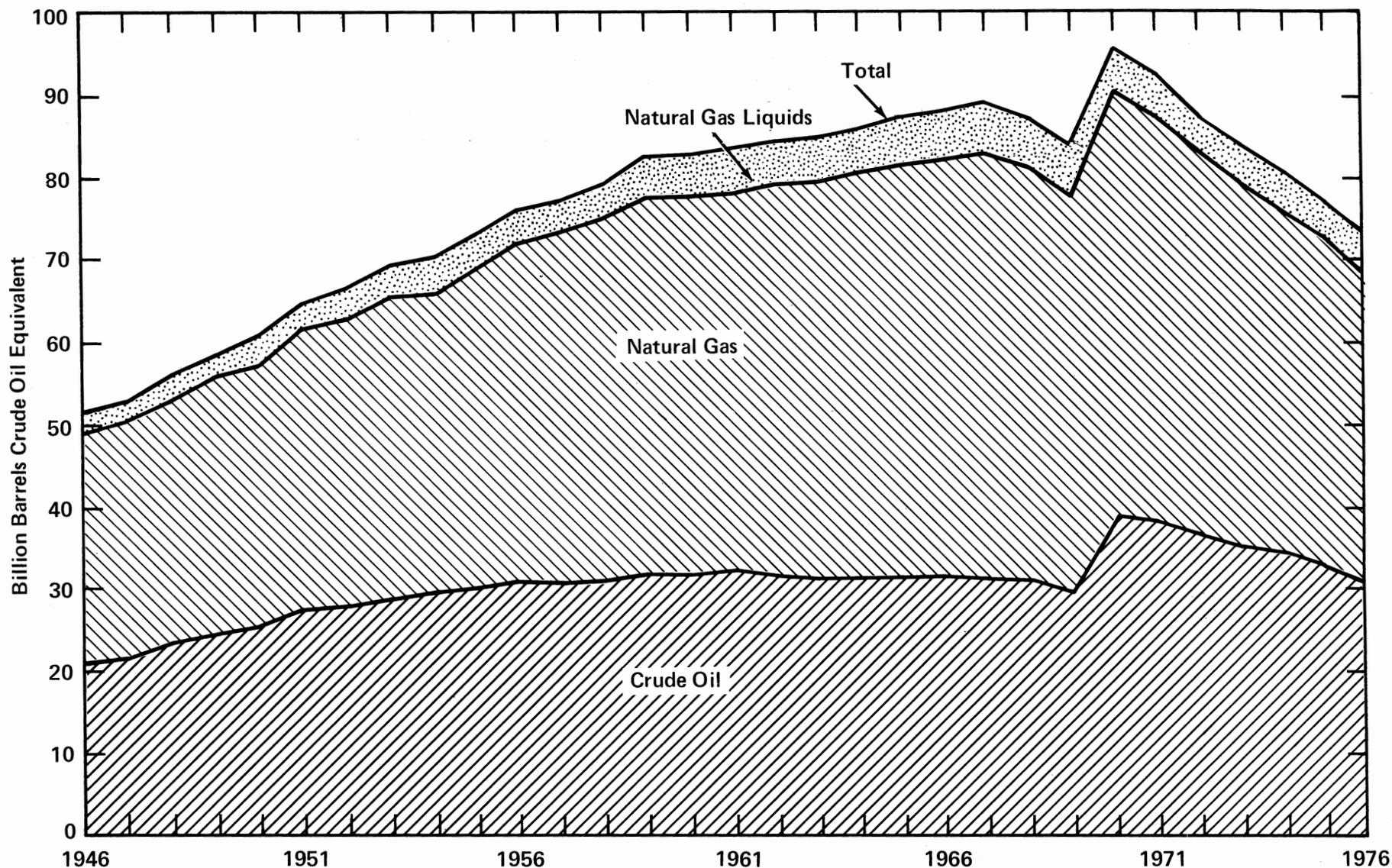
Year	Wellhead Value	Residential Price
1947	6.0	65.6
1948	6.5	65.3
1949	6.3	67.0
1950	6.5	69.0
1951	7.3	76.0
1952	7.8	83.1
1953	9.2	86.5
1954	10.1	89.4
1955	10.4	88.8
1956	10.8	91.4
1957	11.3	93.0
1958	11.9	98.2
1959	12.9	101.1
1960	14.0	103.4
1961	15.1	107.0
1962	15.5	104.3
1963	15.8	104.5
1964	15.4	105.4
1965	15.6	104.8
1966	15.7	104.3
1967	16.0	104.4
1968	16.4	104.2
1969	16.7	104.8
1970	17.1	109.0
1971	18.2	114.9
1972	18.6	121.4
1973	21.6	128.7
1974	30.4	143.1
1975	44.5	170.8
1976	58.0	197.8
1977	77.9 ¹	NA

¹ Preliminary.

NA=Not available.

Source: Bureau of Mines and Energy Information Administration.

Proved Reserves of Liquid and Gaseous Hydrocarbons, Year-End



Source: American Petroleum Institute and American Gas Association.

Total proved reserves of liquid and gaseous hydrocarbons rose at a relatively steady rate through 1967. Since then, discoveries of these hydrocarbons failed to equal production, except in 1970 when northern Alaska reserves were included for the first time. During 1971 through

1976 total proved reserves of liquid and gaseous hydrocarbons fell at an average annual rate of 4.5 percent. At year-end 1976, total reserves were at their lowest level since 1955.

Proved Reserves of Liquid and Gaseous Hydrocarbons, Year-End 1946-1976

Year	Crude Oil	Natural Gas		Natural Gas Liquids		Total
	Billion Barrels	Trillion Cubic Feet	Billion Barrel COE ¹	Billion Barrels	Billion Barrels COE ²	Billion Barrels COE
1946	20.9	159.7	28.2	3.2	2.2	51.3
1947	21.5	165.0	29.0	3.3	2.3	52.8
1948	23.3	172.9	30.4	3.5	2.5	56.2
1949	24.6	179.4	31.6	3.7	2.6	58.8
1950	25.3	184.6	32.4	4.3	3.0	60.7
1951	27.5	192.8	34.0	4.7	3.3	64.8
1952	28.0	198.6	35.0	5.0	3.5	66.5
1953	28.9	210.3	37.0	5.4	3.8	69.7
1954	29.6	210.6	37.1	5.2	3.6	70.3
1955	30.0	222.5	39.2	5.4	3.8	73.0
1956	30.4	236.5	41.6	5.9	4.1	76.1
1957	30.3	245.2	43.2	5.7	3.9	77.4
1958	30.5	252.8	44.5	6.2	4.3	79.3
1959	31.7	261.2	46.0	6.5	4.5	82.2
1960	31.6	262.3	46.2	6.8	4.7	82.5
1961	31.8	266.3	46.9	7.0	4.9	83.6
1962	31.4	272.3	47.9	7.3	5.1	84.4
1963	31.0	276.2	48.6	7.7	5.3	84.9
1964	31.0	281.3	49.5	7.7	5.4	85.9
1965	31.4	286.5	50.4	8.0	5.6	87.4
1966	31.5	289.3	50.9	8.3	5.8	88.2
1967	31.4	292.9	51.6	8.6	6.0	89.0
1968	30.7	287.3	50.6	8.6	6.0	87.3
1969	29.6	275.1	48.4	8.1	5.7	83.7
1970	39.0	290.7	51.2	7.7	5.3	95.5
1971	38.1	278.8	49.1	7.3	5.1	92.3
1972	36.3	266.1	46.8	6.8	4.7	87.8
1973	35.3	250.0	44.0	6.5	4.5	83.8
1974	34.2	237.1	41.7	6.4	4.4	80.3
1975	32.7	228.2	40.2	6.3	4.3	77.2
1976	30.9	216.0	38.0	6.4	4.4	73.3

¹ Crude oil equivalent; converted on a Btu basis—5,680 cubic feet of natural gas for each barrel of crude oil.

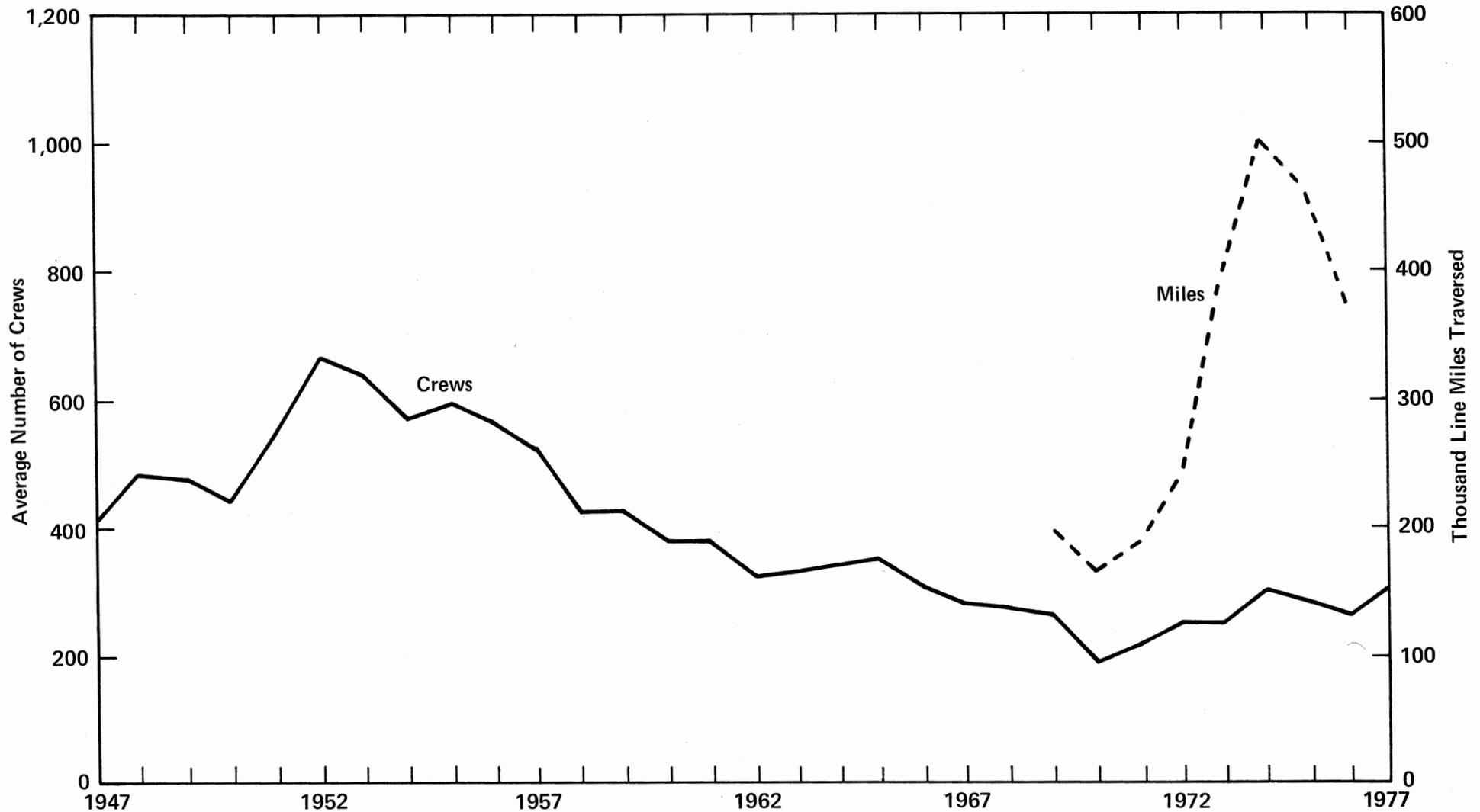
² Crude oil equivalent; converted on a Btu basis—1.44 barrels of natural gas liquids for each barrel of crude oil.

Source: American Petroleum Institute and American Gas Association.



3
**Petroleum and
Natural Gas Exploration
and Development**

Crews Engaged in Seismic Exploration for Oil and Gas



Source: Society of Exploration Geophysicists.

The number of crews engaged in seismic exploration for oil and gas increased rapidly from 1947 through 1952 when the average crew count peaked at 663. Seismic crew activity showed a general downtrend from the early 1950's to late 1960's, falling to a low of 195 crews in 1970.

Seismic exploration crews increased at an annual rate of 12 percent from 1971 through 1974, declined an average of 7 percent per annum in 1975 and 1976, and then increased 18 percent in 1977 to 308.

The number of miles logged by seismic crews peaked at just over one-half million in 1974; seismic traverse mileage declined in both 1975 and 1976 at a rate of 14 percent per year.

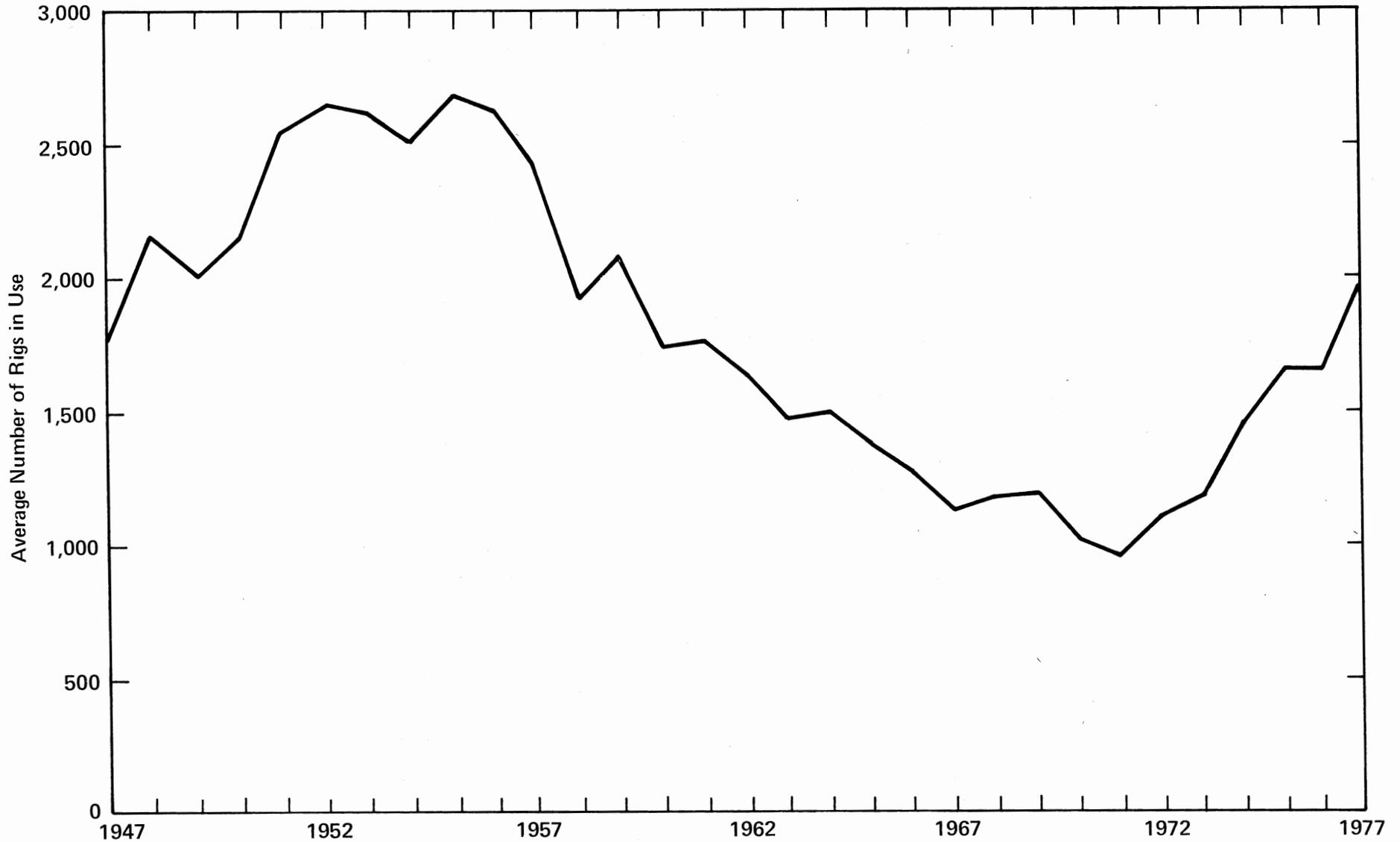
Crews Engaged in Seismic Exploration for Oil and Gas, 1947-1977

Year	Average Number of Crews	Thousand Line Miles Traversed
1947	417	NA
1948	481	NA
1949	476	NA
1950	448	NA
1951	545	NA
1952	663	NA
1953	639	NA
1954	572	NA
1955	591	NA
1956	568	NA
1957	524	NA
1958	422	NA
1959	425	NA
1960	385	NA
1961	380	NA
1962	326	NA
1963	331	NA
1964	342	NA
1965	354	NA
1966	306	NA
1967	278	NA
1968	272	NA
1969	263	199.9
1970	195	167.3
1971	221	191.7
1972	251	235.7
1973	250	386.1
1974	305	500.4
1975	285	460.0
1976	262	369.2
1977	308	NA

NA=Not available.

Source: Society of Exploration Geophysicists.

Rotary Rigs in Operation



Source: Hughes Tool Company.

The number of rotary drilling rigs operating in the United States reached a peak level of 2,686 in 1955, and then declined steadily to a low of 976 rigs in 1971.

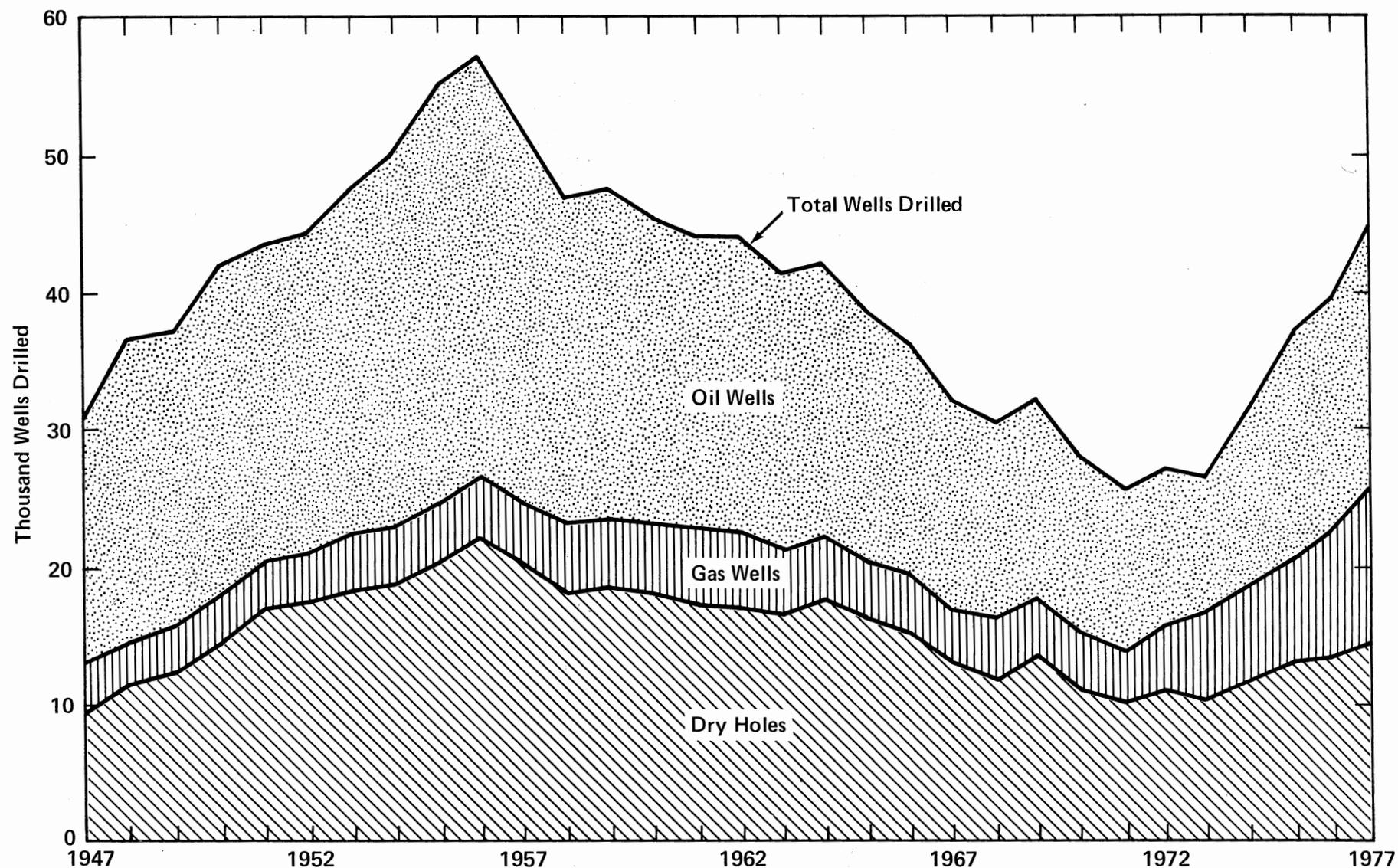
From 1972 through 1977, rotary drilling rig activity increased at an annual rate of 13 percent.

Rotary Rigs in Operation, 1947-1977

Year	Average Number of Rigs in Use
1947	1,783
1948	2,159
1949	2,017
1950	2,154
1951	2,543
1952	2,641
1953	2,613
1954	2,508
1955	2,686
1956	2,620
1957	2,426
1958	1,924
1959	2,071
1960	1,748
1961	1,761
1962	1,641
1963	1,499
1964	1,501
1965	1,387
1966	1,272
1967	1,135
1968	1,171
1969	1,195
1970	1,028
1971	976
1972	1,107
1973	1,194
1974	1,475
1975	1,660
1976	1,656
1977	2,001

Source: Hughes Tool Company.

Total Wells Drilled for Oil and Gas



Source: 1947-1965, *World Oil*; 1966-1977, American Petroleum Institute and American Association of Petroleum Geologists.

The total number of wells drilled for oil and gas increased at an average annual rate of 7.1 percent from 1947 to 1956 when the number of wells drilled peaked at 57,170. During the 1957-1973 period, the number of wells drilled declined at a rate of 4.4 percent per year.

The number of wells drilled that produced oil or gas declined from 69 percent of total wells drilled in 1947 to a low of 57 percent in 1969. This ratio has been steadily increasing since 1973. In 1977, 67 percent of all wells drilled were successful.

In 1977, a total of 44,982 wells were drilled, the most since 1960, and an increase of 13.1 percent over the number drilled in 1976.

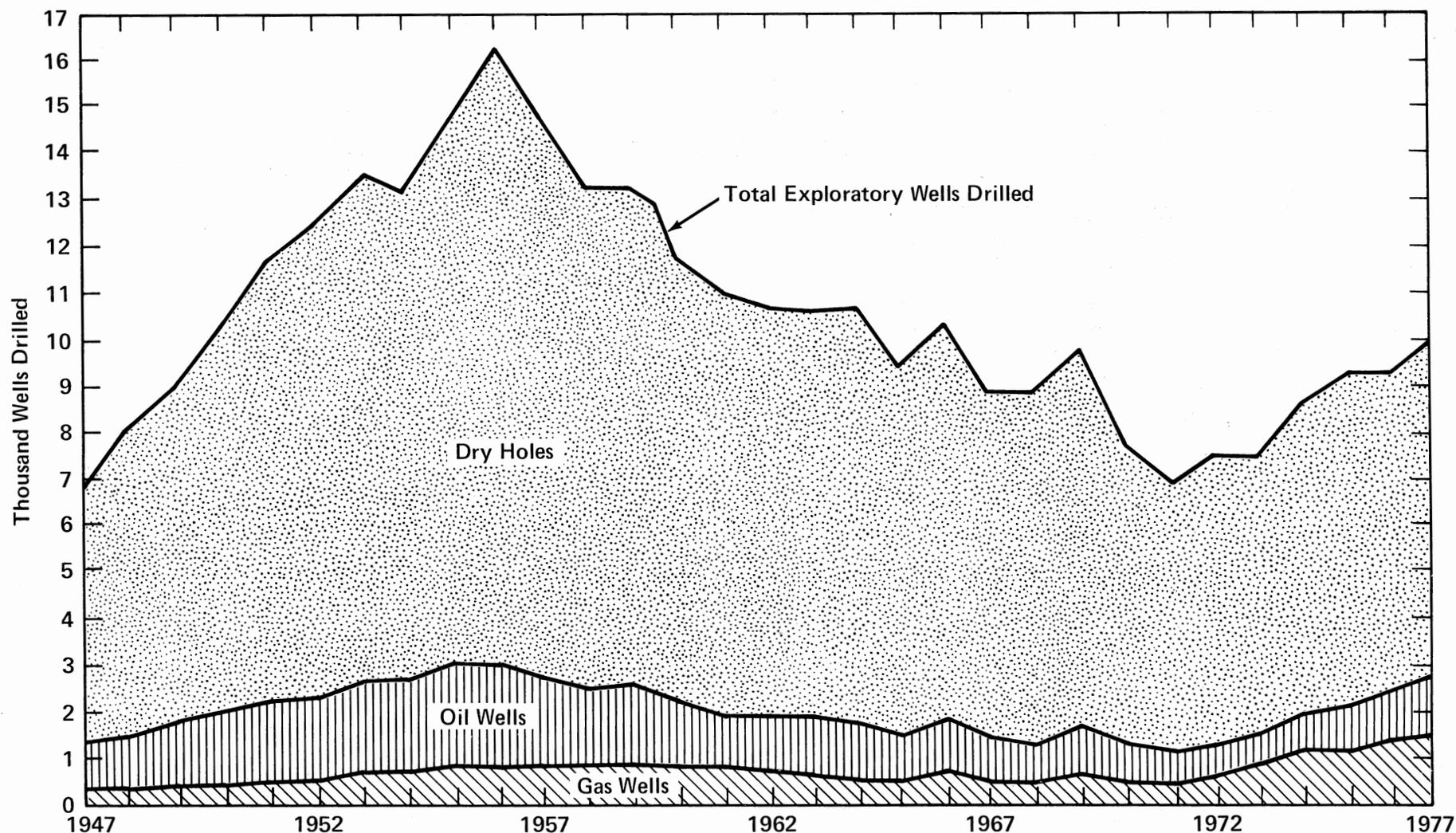
Total Wells Drilled for Oil and Gas, 1947-1977

Year	Total Wells Drilled ¹			Oil Wells			Gas Wells			Dry Holes			Percent Successful Wells
	Total Number	Footage (million feet)	Average Depth (feet)	Total Number	Footage (million feet)	Average Depth (feet)	Total Number	Footage (million feet)	Average Depth (feet)	Total Number	Footage (million feet)	Average Depth (feet)	
1947	30,833	109.4	3,547	17,478	62.8	3,593	3,809	13.2	3,457	9,546	33.4	3,497	69.0
1948	36,659	131.2	3,579	21,760	77.3	3,553	3,387	12.3	3,635	11,512	41.6	3,611	68.6
1949	37,312	135.6	3,635	21,352	79.4	3,720	3,363	12.4	3,698	12,597	43.8	3,473	66.2
1950	42,050	157.4	3,742	23,812	92.7	3,893	3,439	13.7	3,979	14,799	51.0	3,445	64.8
1951	43,643	172.1	3,944	23,179	95.1	4,103	3,438	13.9	4,056	17,026	63.1	3,706	61.0
1952	44,563	184.1	4,132	23,290	98.1	4,214	3,514	15.3	4,342	17,759	70.7	3,983	60.1
1953	47,740	194.2	4,069	25,323	102.1	4,033	3,968	18.2	4,599	18,449	73.9	4,004	61.4
1954	51,109	208.0	4,070	28,141	113.4	4,028	4,038	18.6	4,670	18,930	75.8	4,004	63.0
1955	55,150	226.2	4,101	30,432	121.1	3,981	4,266	19.9	4,672	20,452	85.1	4,161	62.9
1956	57,170	233.3	4,080	30,528	120.4	3,942	4,531	22.7	5,018	22,111	90.2	4,079	61.3
1957	51,995	217.0	4,174	27,364	110.0	4,021	4,475	23.8	5,326	20,156	83.2	4,126	61.2
1958	46,941	193.3	4,118	23,774	93.1	3,916	5,005	25.6	5,106	18,162	74.6	4,110	61.3
1959	47,563	200.7	4,220	24,043	94.6	3,935	4,931	26.6	5,396	18,589	79.5	4,275	60.9
1960	45,547	192.1	4,217	22,233	86.5	3,892	5,129	28.2	5,498	18,185	77.3	4,253	60.1
1961	44,254	189.6	4,285	21,413	85.5	3,993	5,459	29.2	5,345	17,382	74.9	4,312	60.7
1962	44,158	194.6	4,408	21,727	88.4	4,070	5,353	29.0	5,408	17,078	77.3	4,524	61.3
1963	41,467	182.6	4,405	20,135	81.8	4,063	4,570	24.5	5,368	16,762	76.3	4,552	59.6
1964	42,293	187.4	4,431	19,905	80.4	4,042	4,694	25.6	5,453	17,694	81.4	4,598	58.2
1965	38,773	174.9	4,510	18,065	73.3	4,059	4,082	24.9	5,562	16,226	76.6	4,723	58.2
1966	36,384	162.9	4,478	16,780	67.3	4,013	4,377	25.9	5,928	15,227	69.6	4,573	58.1
1967	32,234	141.4	4,385	15,329	58.6	3,825	3,659	21.6	5,898	13,246	61.1	4,616	58.9
1968	30,599	145.0	4,738	14,331	59.5	4,153	3,456	20.7	5,994	12,812	64.7	5,053	58.1
1969	32,187	157.1	4,881	14,368	61.6	4,286	4,083	24.2	5,918	13,736	71.4	5,195	57.3
1970	28,120	139.3	4,953	13,020	57.1	4,385	3,840	22.9	5,961	11,260	59.3	5,265	60.0
1971	25,851	124.2	4,806	11,858	48.6	4,094	3,830	22.6	5,907	10,163	53.1	5,221	60.7
1972	27,291	134.6	4,932	11,306	48.5	4,293	4,928	26.8	5,431	11,057	59.3	5,363	59.5
1973	26,592	136.4	5,129	9,902	44.6	4,508	6,385	35.6	5,576	10,305	56.1	5,449	61.2
1974	31,698	150.6	4,750	12,784	50.2	3,927	7,240	39.0	5,385	11,674	61.4	5,256	63.2
1975	37,235	174.4	4,685	16,408	64.5	3,932	7,580	41.9	5,531	13,247	68.0	5,133	64.4
1976	39,765	181.8	4,571	17,059	66.7	3,910	9,085	47.5	5,229	13,621	67.6	4,961	65.7
1977	44,982	210.8	4,687	18,912	75.3	3,982	11,378	59.5	5,233	14,692	76.0	5,173	67.3

¹ Includes exploratory and development wells; excludes service wells, stratigraphic and core tests.

Source: 1947-65, *World Oil*; 1966-77, American Petroleum Institute and American Association of Petroleum Geologists.

Total Exploratory Wells Drilled for Oil and Gas



Source: American Petroleum Institute and American Association of Petroleum Geologists.

Exploratory drilling peaked in 1956 at 16,207 wells, and then declined at an annual rate of 4.5 percent until 1973 when 7,466 wells were drilled. Since then, exploratory drilling has been on an uptrend. In 1977, 9,961 exploratory wells were drilled, an increase of 7.9 percent from the number drilled in 1976.

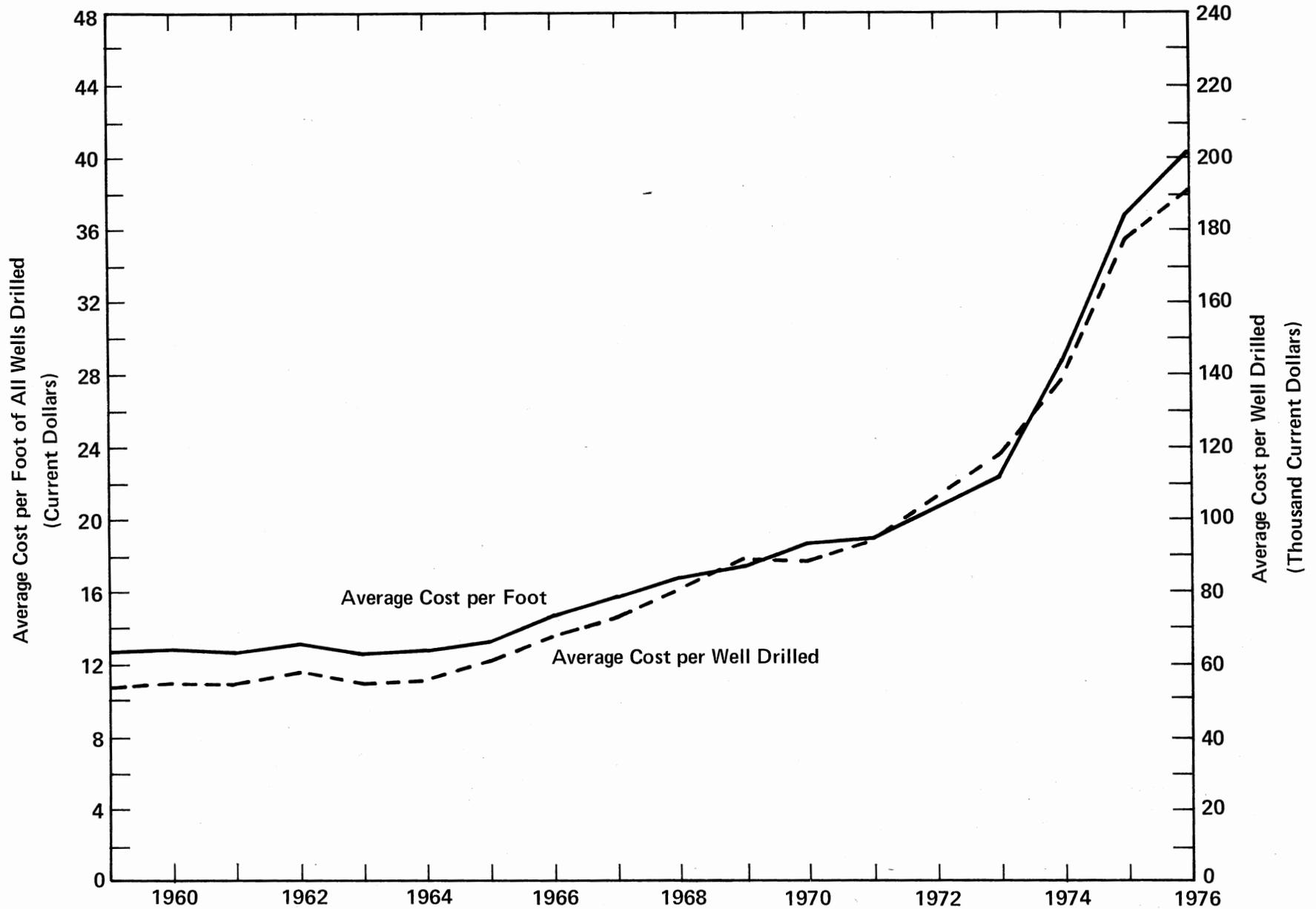
During the 1947–1973 period, only about 18.5 percent of the exploratory wells proved successful. Since 1973, the success ratio has increased, reaching 27.0 percent in 1977.

Total Exploratory Wells Drilled for Oil and Gas, 1947-1977

Year	Total wells drilled			Oil Wells			Gas Wells			Dry holes			Percent Successful Wells
	Total Number	Footage (thousand feet)	Average Depth (feet)	Total Number	Footage (thousand feet)	Average Depth (feet)	Total Number	Footage (thousand feet)	Average Depth (feet)	Total Number	Footage (thousand feet)	Average Depth (feet)	
1947	6,775	26,393	3,896	982	4,281	4,359	396	1,895	4,787	5,397	20,217	3,746	20.3
1948	8,013	32,751	4,087	1,098	4,883	4,447	365	2,306	6,319	6,660	25,562	3,903	18.3
1949	9,058	34,798	3,842	1,406	5,950	4,232	424	2,409	5,682	7,228	26,439	3,658	20.2
1950	10,306	40,175	3,898	1,583	6,862	4,335	431	2,256	5,466	8,292	30,957	3,733	19.5
1951	11,756	49,344	4,197	1,763	8,125	4,609	454	2,496	5,497	9,539	38,723	4,059	18.9
1952	12,425	55,615	4,476	1,776	8,491	4,781	559	3,394	6,071	10,090	43,731	4,334	18.8
1953	13,313	60,664	4,557	1,981	9,432	4,761	699	3,952	5,654	10,633	47,280	4,447	20.1
1954	13,100	59,601	4,550	1,985	9,409	4,740	726	4,399	6,059	10,389	45,792	4,408	20.7
1955	14,942	69,206	4,632	2,236	10,774	4,819	874	5,212	5,964	11,832	53,220	4,498	20.8
1956	16,207	74,337	4,587	2,267	11,111	4,901	822	5,179	6,301	13,118	58,047	4,425	19.1
1957	14,714	69,181	4,702	1,945	9,794	5,036	865	5,967	6,898	11,904	53,420	4,488	19.1
1958	13,199	61,484	4,658	1,745	8,712	4,993	822	5,472	7,657	10,632	47,300	4,449	19.4
1959	13,191	63,253	4,795	1,702	8,545	5,021	912	6,031	6,613	10,577	48,676	4,602	19.8
1960	11,704	55,831	4,770	1,321	6,829	5,170	868	5,466	6,298	9,515	43,535	4,575	18.7
1961	10,992	54,442	4,953	1,157	5,900	5,099	813	5,249	6,457	9,022	43,293	4,799	17.9
1962	10,797	53,616	4,966	1,211	6,205	5,124	771	5,187	6,728	8,815	42,223	4,790	18.4
1963	10,664	53,485	5,015	1,314	6,409	4,877	664	4,230	6,370	8,686	42,847	4,933	18.5
1964	10,747	55,497	5,164	1,219	6,715	5,509	577	4,204	7,285	8,951	44,578	4,980	16.7
1965	9,466	49,204	5,198	946	5,366	5,672	515	3,757	7,295	8,005	40,081	5,007	15.4
1966	10,313	55,709	5,402	1,196	6,817	5,700	698	5,808	8,321	8,419	43,084	5,117	18.4
1967	8,878	47,839	5,388	986	5,678	5,758	532	3,979	7,478	7,360	38,182	5,188	17.1
1968	8,806	50,509	5,736	902	5,339	5,919	465	3,594	7,729	7,439	41,575	5,589	15.5
1969	9,701	57,466	5,924	1,084	6,563	6,054	616	4,985	8,092	8,001	45,918	5,739	17.5
1970	7,693	45,253	5,882	790	5,055	6,399	481	3,675	7,639	6,422	36,524	5,687	16.5
1971	6,922	40,388	5,835	651	3,712	5,701	437	3,328	7,616	5,834	33,347	5,716	15.7
1972	7,539	45,044	5,975	684	4,002	5,851	601	4,592	7,641	6,254	36,500	5,836	17.0
1973	7,466	44,777	5,997	619	3,854	6,226	900	6,171	6,856	5,947	34,753	5,947	20.3
1974	8,619	50,262	5,832	814	4,852	5,961	1,195	7,674	6,422	6,610	37,736	5,709	23.3
1975	9,214	53,846	5,844	972	5,699	5,863	1,171	7,999	6,831	7,071	40,148	5,678	23.3
1976	9,234	52,812	5,719	1,047	6,139	5,864	1,402	9,183	6,550	6,785	37,490	5,525	26.5
1977	9,961	57,655	5,788	1,209	7,054	5,834	1,477	9,675	6,550	7,275	40,926	5,626	27.0

Source: American Petroleum Institute and American Association of Petroleum Geologists.

Average Cost of Oil and Gas Wells Drilled



Source: American Petroleum Institute, Independent Petroleum Association of America, and Mid-Continent Oil and Gas Association.

The average cost per foot of wells drilled increased at 6.4 percent annually from 1965 through 1973, after a relatively stable period from 1959 to 1964.

From 1973 to 1976, the average cost of drilling and equipping wells nearly doubled.

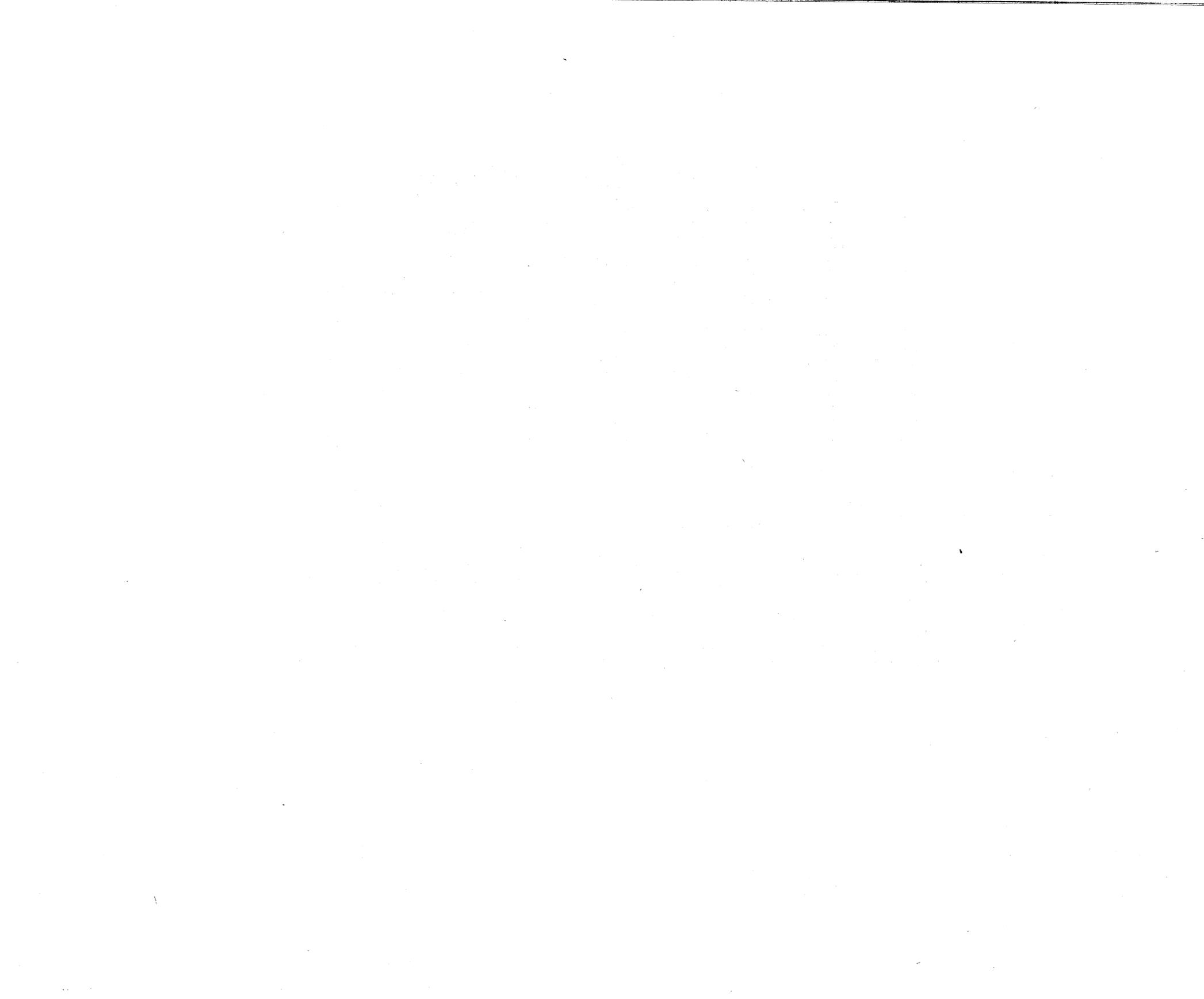
Average Cost¹ of Oil and Gas Wells Drilled, 1959-1976

Year	Productive Oil Wells		Productive Gas Wells		Dry Holes		Total	
	Average Cost per Well (thousand dollars)	Average Cost per Foot (dollars)	Average Cost per Well (thousand dollars)	Average Cost per Foot (dollars)	Average Cost per Well (thousand dollars)	Average Cost per Foot (dollars)	Average Cost per Well (thousand dollars)	Average Cost per Foot (dollars)
1959	52.0	13.63	100.7	18.45	43.0	10.13	53.5	12.90
1960	52.1	13.21	102.6	18.57	44.0	10.56	54.9	13.01
1961	51.3	13.11	94.7	17.57	45.2	10.56	54.5	12.85
1962	54.2	13.41	97.1	18.10	50.8	11.20	58.6	13.31
1963	51.8	13.20	92.4	17.19	48.2	10.58	55.0	12.69
1964	50.6	13.12	104.8	18.57	48.5	10.64	55.8	12.86
1965	56.6	13.94	101.9	18.35	53.1	11.21	60.6	13.44
1966	62.2	15.04	133.8	81.75	56.9	12.34	68.4	14.95
1967	66.6	16.61	141.0	23.05	61.5	12.87	72.9	15.97
1968	79.1	18.63	148.5	24.05	66.2	12.88	81.5	16.83
1969	86.5	19.28	154.3	25.58	70.2	13.23	88.6	17.56
1970	86.7	19.29	160.7	26.75	80.9	15.21	94.9	18.84
1971	78.4	18.41	166.6	27.70	86.8	16.02	94.7	19.03
1972	93.5	20.77	157.8	27.78	94.9	17.28	106.4	20.76
1973	103.8	22.54	155.3	27.46	105.8	19.22	117.2	22.50
1974	110.2	27.82	189.2	34.11	141.7	26.76	138.7	28.93
1975	138.6	34.15	262.0	46.23	177.2	33.86	177.8	36.99
1976	151.1	37.35	270.4	49.78	190.3	36.94	191.6	40.46

¹ Includes all costs for drilling and equipment wells, including wellhead valves; expressed in current dollars.

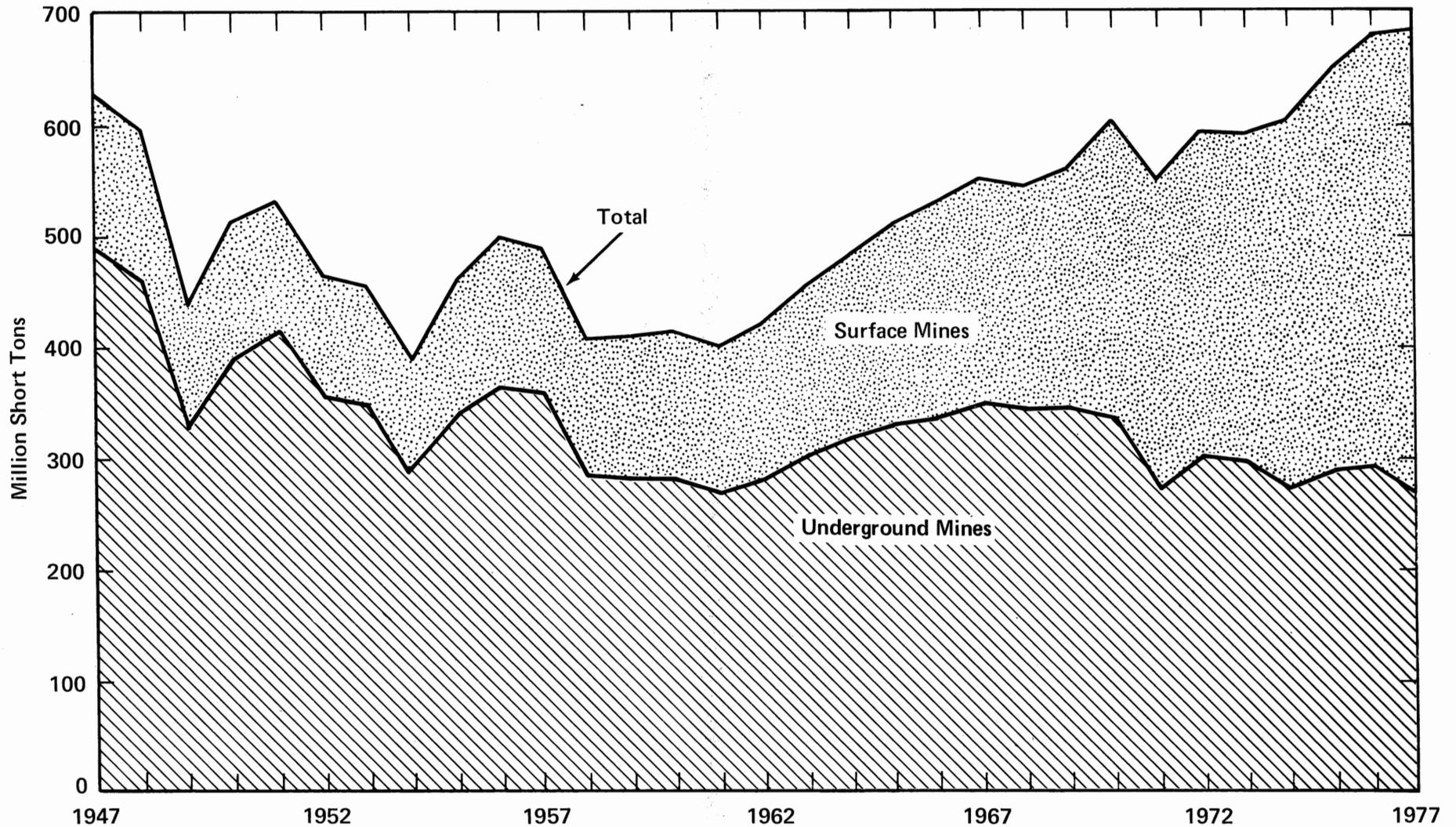
Note: The information reported for 1965 and prior years is not strictly comparable with the more recent surveys.

Source: American Petroleum Institute, Independent Petroleum Association of America, and Mid-Continent Oil and Gas Association.



4
Coal

Production of Bituminous Coal and Lignite



Source: Bureau of Mines and Energy Information Administration.

Although bituminous coal and lignite production varied considerably during 1947 through 1961, the overall trend was downward. Many industrial and electric generating plants converted to oil and natural gas from coal as a fuel source. Since 1961, coal production has trended upward to meet the demand primarily of electric generation plants.

The roles of underground mines and surface has changed significantly since 1947. During 1947, underground mines accounted for 78 percent of production, and surface mines, 22 percent. In 1977, the shares were 39 and 61 percent, respectively. During 1947-1977 underground mine production declined 44.7 percent, while surface mine production increased nearly 200 percent.

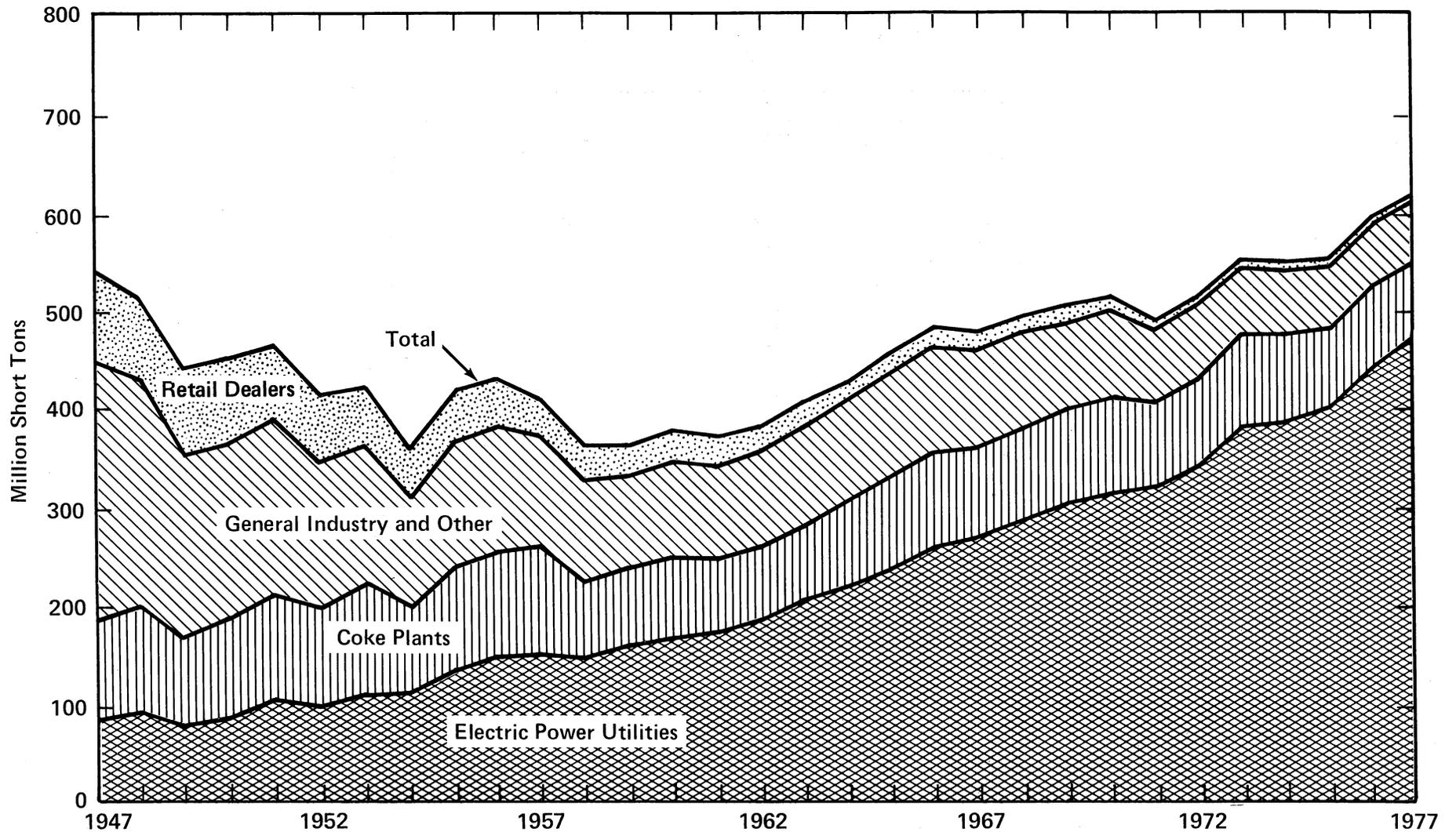
Production of Bituminous Coal and Lignite, 1947-1977
(Million Short Tons)

Year	Underground	Surface	Total
1947	491.2	139.4	630.6
1948	460.0	139.5	599.5
1949	331.8	106.0	437.9
1950	392.8	123.5	516.3
1951	415.8	117.8	533.7
1952	356.4	110.4	466.8
1953	349.6	107.7	457.3
1954	289.1	102.6	391.7
1955	343.5	121.2	464.6
1956	365.8	135.1	500.9
1957	360.6	132.1	492.7
1958	286.9	123.6	410.4
1959	283.4	128.6	412.0
1960	284.9	130.6	415.5
1961	272.8	130.2	403.0
1962	281.3	140.9	422.1
1963	302.3	156.7	458.9
1964	321.8	165.2	487.0
1965	332.7	179.4	512.1
1966	338.5	195.4	533.9
1967	349.1	203.5	552.6
1968	344.1	201.1	545.2
1969	347.1	213.4	560.5
1970	338.8	264.1	602.9
1971	275.9	276.3	552.2
1972	304.1	291.3	595.4
1973	299.4	292.4	591.7
1974	277.3	326.1	603.4
1975	292.8	355.6	648.4
1976	294.8	383.9	678.7
1977 ¹	271.6	416.9	688.5

¹ Preliminary.

Source: Bureau of Mines and Energy Information Administration.

Consumption of Bituminous Coal and Lignite by End-Use Sector



Source: Federal Power Commission, Bureau of Mines, and Energy Information Administration.

After declining in the 1950's, bituminous coal and lignite consumption began to rise again in the 1960's and reached record levels in the 1970's. Since 1959 consumption has increased at an average annual rate of 3.0 percent.

Because of fuel substitution, consumption in the other sectors has declined since 1947.

During the past 15 years, the electric power utilities is the only sector to increase coal consumption. Since 1962 consumption in this sector rose at an average annual rate of 6.2 percent.

Consumption of Bituminous Coal and Lignite by End-Use Sector, 1947-1977
(Million Short Tons)

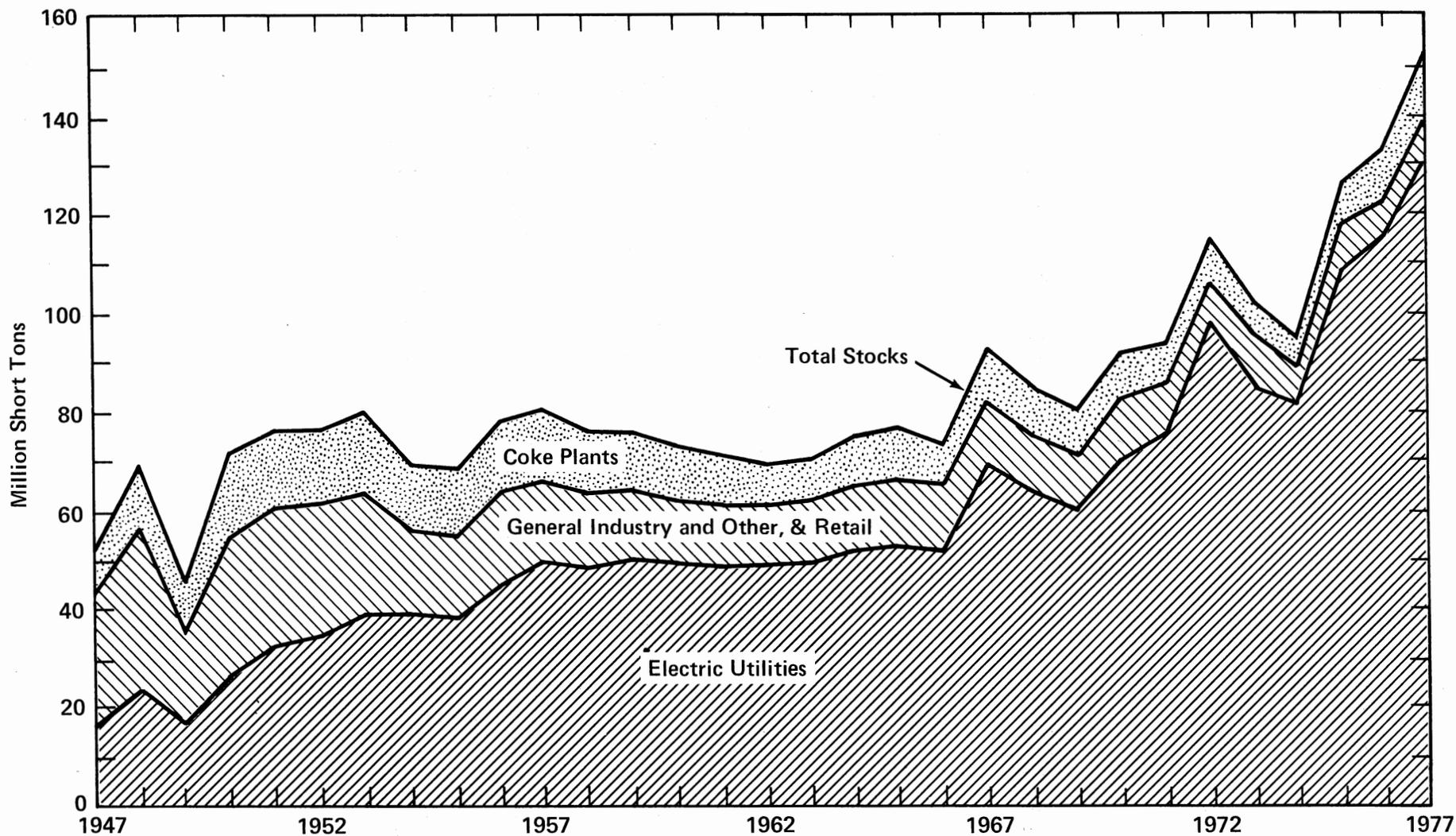
Year	Electric Utilities	Coke Plants	General Industry and Other	Retail Dealers ¹	Total
1947	86.0	104.8	258.4	96.7	545.9
1948	95.6	107.3	230.2	86.8	519.9
1949	80.6	91.2	185.3	88.4	445.5
1950	88.3	103.8	177.7	84.4	454.2
1951	101.9	113.4	179.2	74.4	468.9
1952	103.3	97.6	151.0	66.9	418.8
1953	112.3	112.9	141.7	60.0	426.8
1954	115.2	85.4	110.6	51.8	363.1
1955	140.6	107.4	122.5	53.0	423.4
1956	155.0	105.9	123.3	48.7	432.9
1957	157.4	108.0	112.5	35.7	413.7
1958	152.9	76.6	101.6	35.6	366.7
1959	165.8	79.2	92.1	29.1	366.3
1960	173.9	81.0	95.1	30.4	380.4
1961	179.6	73.9	93.2	27.7	374.4
1962	190.8	74.3	94.5	28.2	387.8
1963	209.0	77.6	99.0	23.5	409.2
1964	223.0	88.8	99.7	19.6	431.1
1965	242.7	94.8	102.6	19.0	459.2
1966	264.2	95.9	106.2	20.0	486.3
1967	271.8	92.3	99.3	17.1	480.4
1968	294.7	90.8	98.1	15.2	498.8
1969	308.5	92.9	91.2	14.7	507.3
1970	318.9	96.0	88.6	12.1	515.6
1971	326.3	82.8	74.4	11.4	494.9
1972	348.6	87.3	72.1	8.7	516.8
1973	386.9	93.6	67.3	8.2	556.0
1974	390.1	89.7	64.1	8.8	552.7
1975	403.2	83.3	62.5	7.3	556.3
1976	447.0	84.3	60.5	6.9	598.8
1977 ²	474.8	77.4	60.4	7.0	619.6

¹ Estimated.

² Preliminary.

Note: Sum of components may not equal total due to independent rounding.
Source: Federal Power Commission, Bureau of Mines, and Energy Information Administration.

Year-End Stocks of Bituminous Coal and Lignite by End-Use Sector



Source: Bureau of Mines, Federal Power Commission, and Energy Information Administration.

From 1947 to 1971 coal stocks increased gradually as the need for additional inventories became necessary to meet the growing demand for electricity. Following coal strikes in 1971 and 1974, stockpiles increased 28 percent from 1971 to 1972 and 32 percent from 1974 to 1975. Again,

in 1977, preparatory to an impending strike, stocks rose to the largest year-end totals on record. Coal stocks were 153 million short tons at year-end 1977, up from 134 million tons the previous year.

Year-End Stocks of Bituminous Coal and Lignite by End-Use Sector, 1947-1977
(Thousand Short Tons)

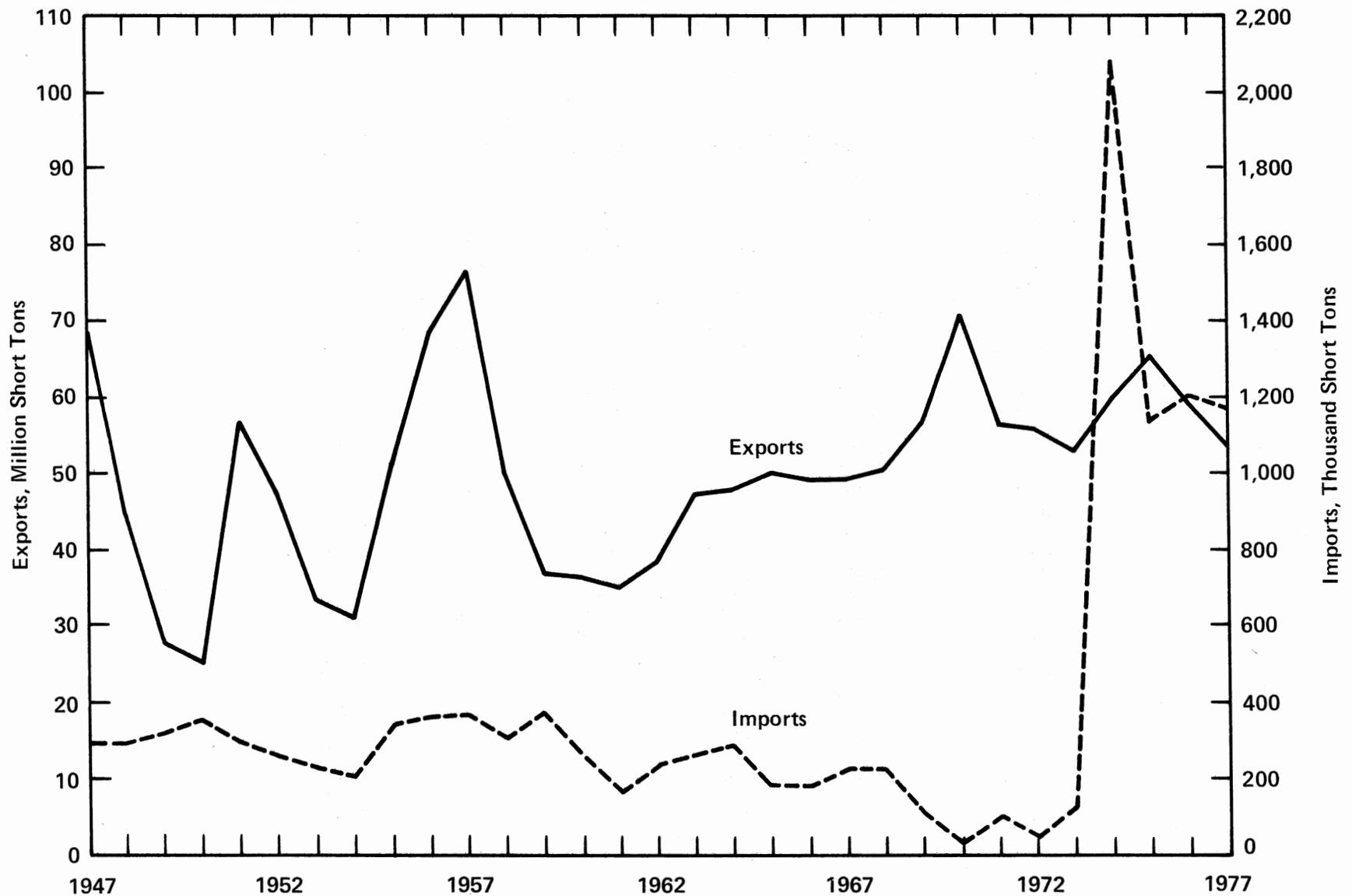
Year	Electric Utilities	Coke Plants	General Industry and Other ¹	Retail Dealers ²	Total
1947	16,788	9,148	24,188	2,037	52,161
1948	24,812	12,104	29,751	2,706	69,373
1949	17,794	9,893	16,034	1,390	45,111
1950	27,121	16,776	26,157	2,462	72,516
1951	33,398	15,270	26,218	1,750	76,636
1952	35,891	14,430	24,715	1,709	76,745
1953	39,770	16,486	22,819	1,539	80,614
1954	39,711	12,335	16,345	810	69,201
1955	38,228	13,342	15,855	998	68,423
1956	45,596	13,894	17,396	1,122	78,008
1957	50,289	14,094	15,485	911	80,779
1958	48,752	12,957	13,630	946	76,285
1959	50,107	11,495	13,570	1,030	76,202
1960	49,937	11,029	11,612	666	73,244
1961	48,609	10,393	11,890	526	71,418
1962	48,975	8,305	11,929	482	69,691
1963	49,314	8,014	12,256	499	70,083
1964	52,661	10,081	12,224	376	75,342
1965	53,437	10,506	13,097	353	77,393
1966	52,895	9,206	12,126	239	74,466
1967	69,737	10,940	12,272	179	93,128
1968	64,168	9,537	11,632	188	85,525
1969	60,597	8,962	10,739	184	80,482
1970	71,295	8,924	11,756	300	92,275
1971	76,987	7,199	9,560	275	94,021
1972	98,450	9,032	7,600	290	115,372
1973	85,512	6,875	10,345	290	103,022
1974	82,631	6,037	6,580	280	95,528
1975	109,707	8,671	8,460	277	127,115
1976	116,436	9,804	7,075	240	133,555
1977	130,951	12,721	8,425	220	152,317

¹ Includes transportation, commercial, and miscellaneous end-use sectors.

² Estimated.

Source: Bureau of Mines, Federal Power Commission, and Energy Information Administration.

Exports and Imports of Bituminous Coal and Lignite



Source: Department of Commerce.

The United States is the world's principal coal exporter; however, the level of exports have varied considerably. Increase exports during the

1950's reflect the rise in steel production abroad and the concomitant demand for metallurgical coal.

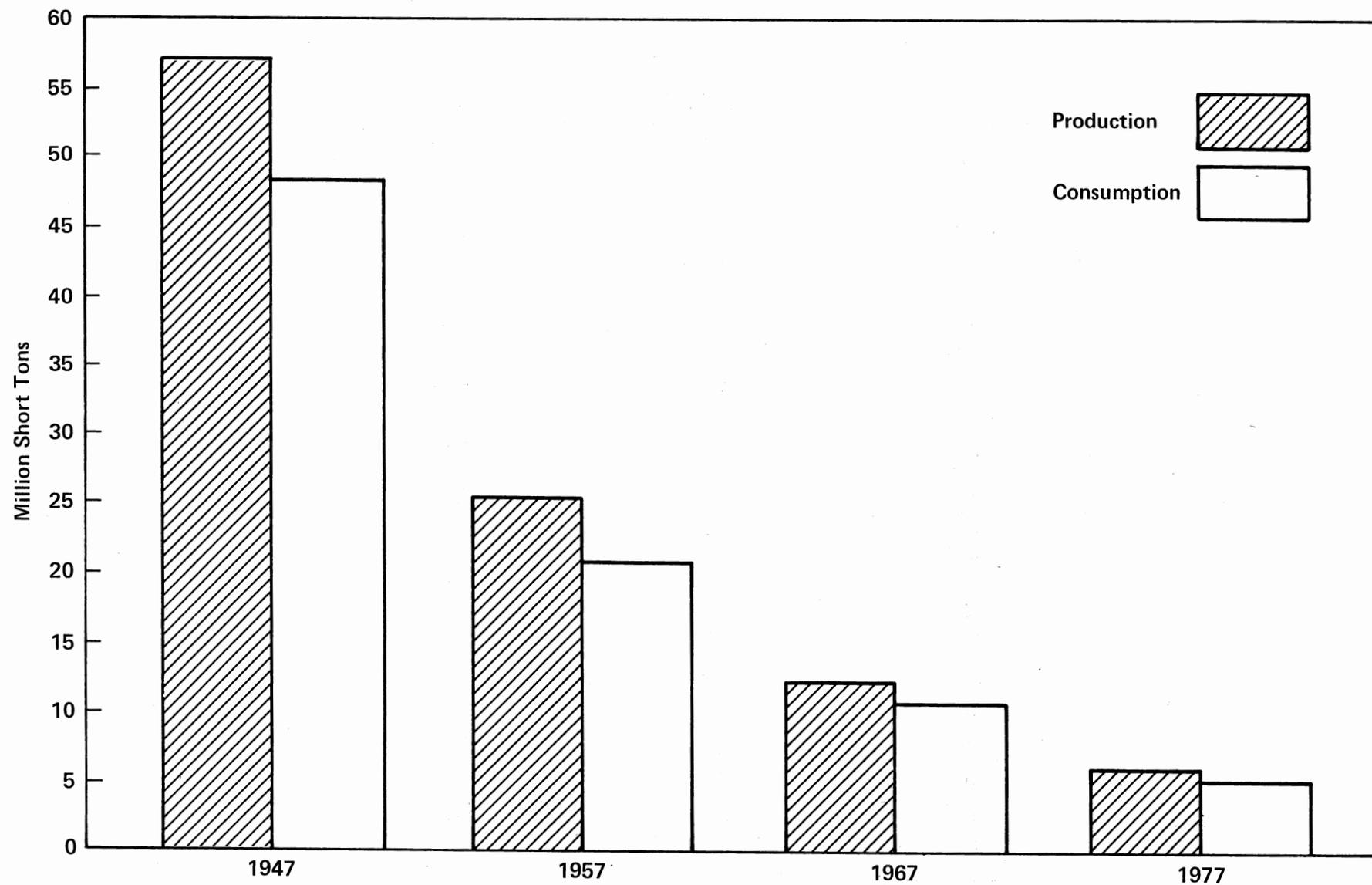
Exports and Imports of Bituminous Coal and Lignite, 1947-1977
(Thousand Short Tons)

Year	Exports	Imports
1947	68,667	290
1948	45,930	291
1949	27,842	315
1950	25,468	347
1951	56,722	297
1952	47,643	262
1953	33,760	227
1954	31,041	199
1955	51,277	337
1956	68,553	356
1957	76,446	367
1958	50,293	307
1959	37,253	375
1960	36,541	260
1961	34,970	164
1962	38,413	232
1963	47,078	267
1964	47,969	293
1965	50,181	184
1966	49,302	178
1967	49,528	227
1968	50,637	224
1969	56,234	109
1970	70,944	36
1971	56,633	111
1972	55,997	47
1973	52,870	127
1974	59,926	2,080
1975	65,669	940
1976	59,406	1,203
1977 ¹	53,687	1,181

¹ Preliminary.

Source: Department of Commerce.

Production and Consumption of Anthracite Coal



Source: Bureau of Mines and Energy Information Administration.

The high cost of mining coupled with the availability and convenience of competing fuels have effectively reduced the production and consump-

tion of anthracite coal. Between 1947 and 1977 production and consumption of anthracite coal have declined 89 percent.

Production and Consumption of Anthracite Coal, 1947-1977
(Thousand Short Tons)

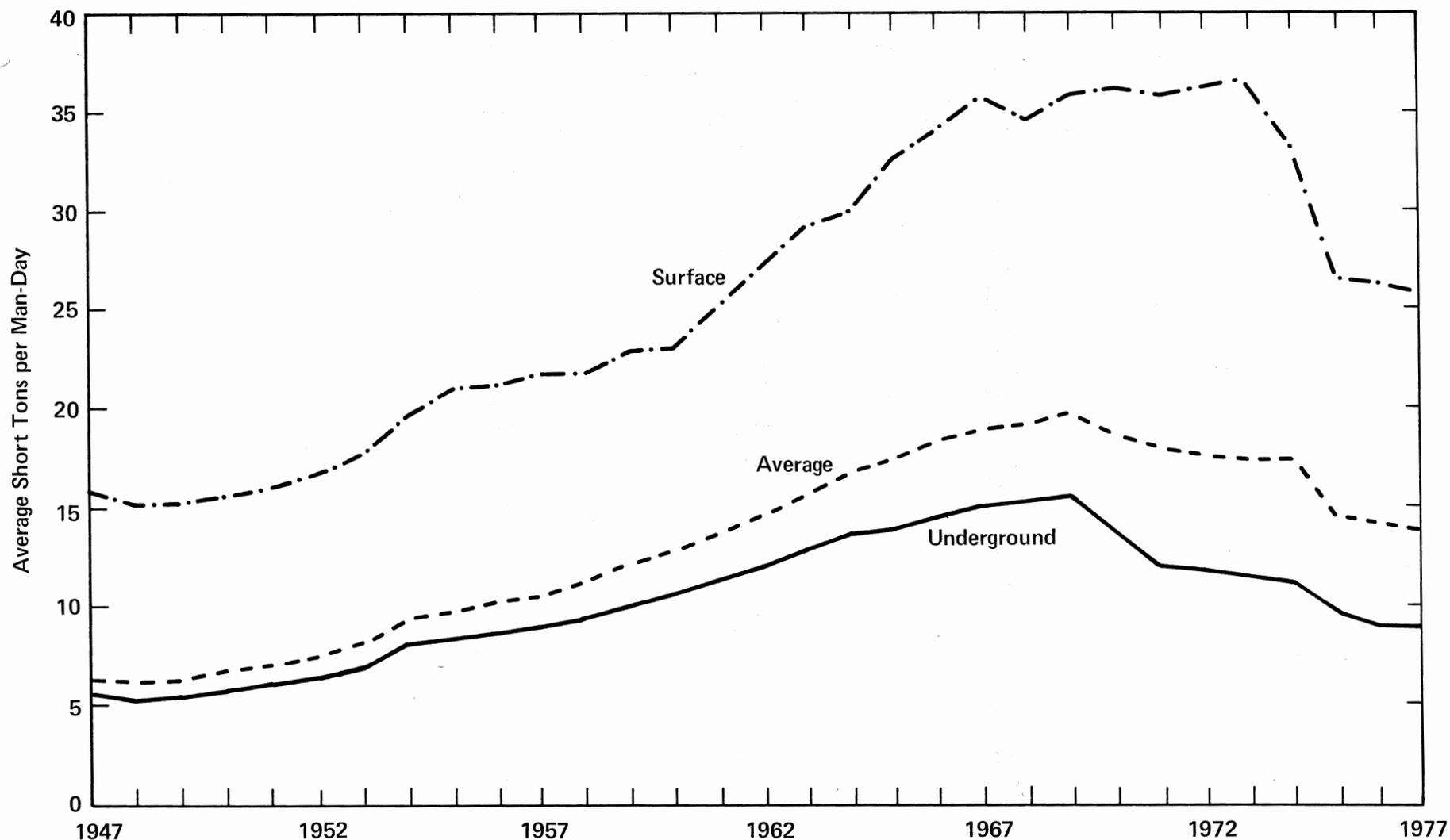
Year	Production	Consumption
1947	57,190	48,200
1948	57,140	50,200
1949	42,702	37,700
1950	44,077	39,900
1951	42,670	37,000
1952	40,583	35,300
1953	30,949	28,000
1954	29,083	26,900
1955	26,205	23,600
1956	28,900	24,000
1957	25,338	20,800
1958	21,171	19,000
1959	20,649	18,800
1960	18,817	17,600
1961	17,446	15,900
1962	16,894	14,300
1963	18,267	14,100
1964	17,184	14,400
1965	14,866	12,900
1966	12,941	11,400
1967	12,256	10,800
1968	11,461	10,160
1969	10,473	8,809
1970	9,729	8,248
1971	8,727	7,338
1972	7,106	5,915
1973	6,830	5,671
1974	6,617	5,448
1975	6,203	5,108
1976	6,228	5,040
1977 ¹	6,200	5,215

¹ Preliminary.

Note: The difference between the production and consumption of anthracite coal represents exports and stock changes.

Source: Bureau of Mines and Energy Information Administration.

Productivity in Bituminous Coal and Lignite Mining



Source: Bureau of Mines and Energy Information Administration.

Productivity in coal mining, as measured in tons per man per day, increased every year between 1948 and 1969 but has declined each year since, except in 1974 when it remained essentially unchanged.

During the first period, productivity at underground mines increased at an average annual rate of 5.3 percent. Since 1969 underground productivity has declined at an average annual rate of 6.5 percent.

During 1947-1973, productivity at surface mines increased at an average annual rate of 3.3 percent, reaching 36.67 short tons per man day. Since 1973, productivity has declined to 26.00 short tons per man day in 1977.

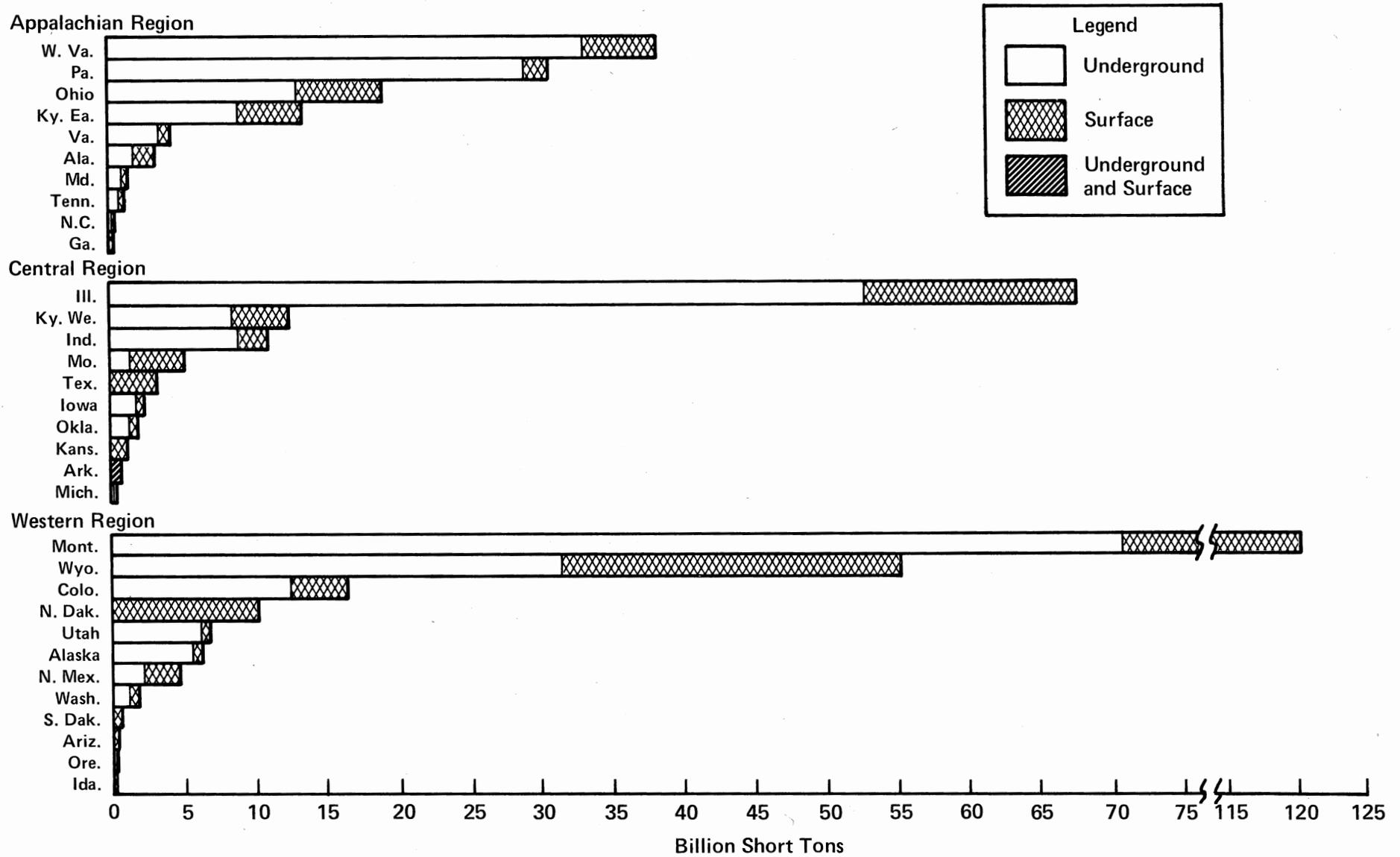
Productivity in Bituminous Coal and Lignite Mining, 1947-1977
(Average Short Tons per Man-Day)

Year	Underground	Surface	Average
1947	5.49	15.93	6.42
1948	5.31	15.28	6.26
1949	5.42	15.33	6.43
1950	5.75	15.66	6.77
1951	6.08	16.02	7.04
1952	6.37	16.81	7.47
1953	7.01	17.73	8.17
1954	7.99	19.80	9.47
1955	8.28	21.17	9.84
1956	8.62	21.37	10.28
1957	8.91	21.87	10.59
1958	9.38	21.84	11.33
1959	10.08	22.94	12.22
1960	10.64	23.31	12.83
1961	11.41	25.29	13.87
1962	11.97	27.22	14.72
1963	12.78	29.30	15.83
1964	13.74	30.05	16.84
1965	14.00	32.76	17.52
1966	14.64	34.23	18.52
1967	15.07	35.87	19.17
1968	15.40	34.64	19.37
1969	15.61	36.00	19.90
1970	13.75	36.26	18.84
1971	12.03	35.88	18.02
1972	11.91	36.33	17.74
1973	11.66	36.67	17.58
1974	11.31	33.16	17.58
1975	9.54	26.69	14.74
1976	9.10	26.40	14.46
1977 ¹	9.00	26.00	14.00

¹ Preliminary.

Source: Bureau of Mines and Energy Information Administration.

Demonstrated Coal Reserve Base, January 1, 1976



Source: Bureau of Mines

The demonstrated coal reserve base of the United States on January 1, 1976, was estimated to total 438 billion tons.

States with the largest coal reserves are Montana, Illinois, Wyoming, West Virginia, and Pennsylvania. These five States contain 71 percent of

the Nation's available coal; Montana and Wyoming, alone, have 40 percent of the total. The coalbeds of Montana and Wyoming, however, consist principally of lower rank subbituminous coals, whereas the coals of the three eastern States are principally bituminous.

Demonstrated Coal Reserve Base, January 1, 1976¹
(Billion Short Tons)

State	Anthracite		Bituminous		Subbituminous		Lignite		Underground	Total ²		Total ²
	Underground	Surface	Underground	Surface	Underground	Surface	Underground	Surface		Underground	Surface	
Alabama	—	—	1.7	0.3	—	—	—	1.1	1.7	1.4	3.1	
Alaska	—	—	0.6	0.1	4.8	0.6	—	(³)	5.4	0.7	6.2	
Arizona	—	—	—	0.3	—	—	—	—	—	0.3	0.3	
Arkansas	0.1	(³)	0.2	0.1	—	—	—	(³)	0.3	0.1	0.4	
Colorado	(³)	—	8.5	0.7	4.0	0.1	—	3.0	12.5	3.8	16.3	
Georgia	—	—	(³)	(³)	—	—	—	—	(³)	(³)	(³)	
Idaho	—	—	(³)	—	—	—	—	—	(³)	—	(³)	
Illinois	—	—	53.1	14.8	—	—	—	—	53.1	14.8	68.0	
Indiana	—	—	8.9	1.8	—	—	—	—	8.9	1.8	10.7	
Iowa	—	—	1.7	0.5	—	—	—	—	1.7	0.5	2.2	
Kansas	—	—	—	1.0	—	—	—	—	—	1.0	1.0	
Kentucky, East	—	—	9.1	4.5	—	—	—	—	9.1	4.5	13.5	
Kentucky, West	—	—	8.5	4.0	—	—	—	—	8.5	4.0	12.5	
Louisiana	—	—	—	—	—	—	—	NA	—	NA	NA	
Maryland	—	—	0.9	0.1	—	—	—	—	0.9	0.1	1.0	
Michigan	—	—	0.1	(³)	—	—	—	—	0.1	(³)	0.1	
Missouri	—	—	1.4	3.6	—	—	—	—	1.4	3.6	5.0	
Montana	—	—	1.4	—	69.6	33.8	—	15.8	71.0	49.6	120.6	
New Mexico	(³)	—	1.3	0.6	0.9	1.9	—	—	2.2	2.4	4.6	
North Carolina	—	—	(³)	(³)	—	—	—	—	(³)	(³)	(³)	
North Dakota	—	—	—	—	—	—	—	10.1	—	10.1	10.1	
Ohio	—	—	13.1	6.1	—	—	—	—	13.1	6.1	19.2	
Oklahoma	—	—	1.2	0.4	—	—	—	—	1.2	0.4	1.6	
Oregon	—	—	NA	—	(³)	(³)	—	—	(³)	(³)	(³)	
Pennsylvania	7.0	0.1	22.3	1.4	—	—	—	—	29.3	1.5	30.8	
South Dakota	—	—	—	—	—	—	—	0.4	—	0.4	0.4	
Tennessee	—	—	0.6	0.3	—	—	—	—	0.6	0.3	1.0	
Texas	—	—	—	—	—	—	—	3.2	—	3.2	3.2	
Utah	—	—	6.3	0.3	(³)	—	—	—	6.3	0.3	6.6	
Virginia	0.1	—	3.3	0.9	—	—	—	—	3.4	0.9	4.3	
Washington	—	—	0.3	—	0.8	0.5	—	(³)	1.1	0.5	1.6	
West Virginia	—	—	33.5	5.1	—	—	—	—	33.5	5.1	38.6	
Wyoming	—	—	4.0	—	27.6	23.7	—	—	31.6	23.7	55.4	
Total ²	7.2	0.2	182.0	46.9	107.7	60.7	—	33.6	297.0	141.4	438.3	

¹ Includes measured and indicated resource categories as defined by the Bureau of Mines and the U.S. Geological Survey and represents 100 percent of the coal in place.

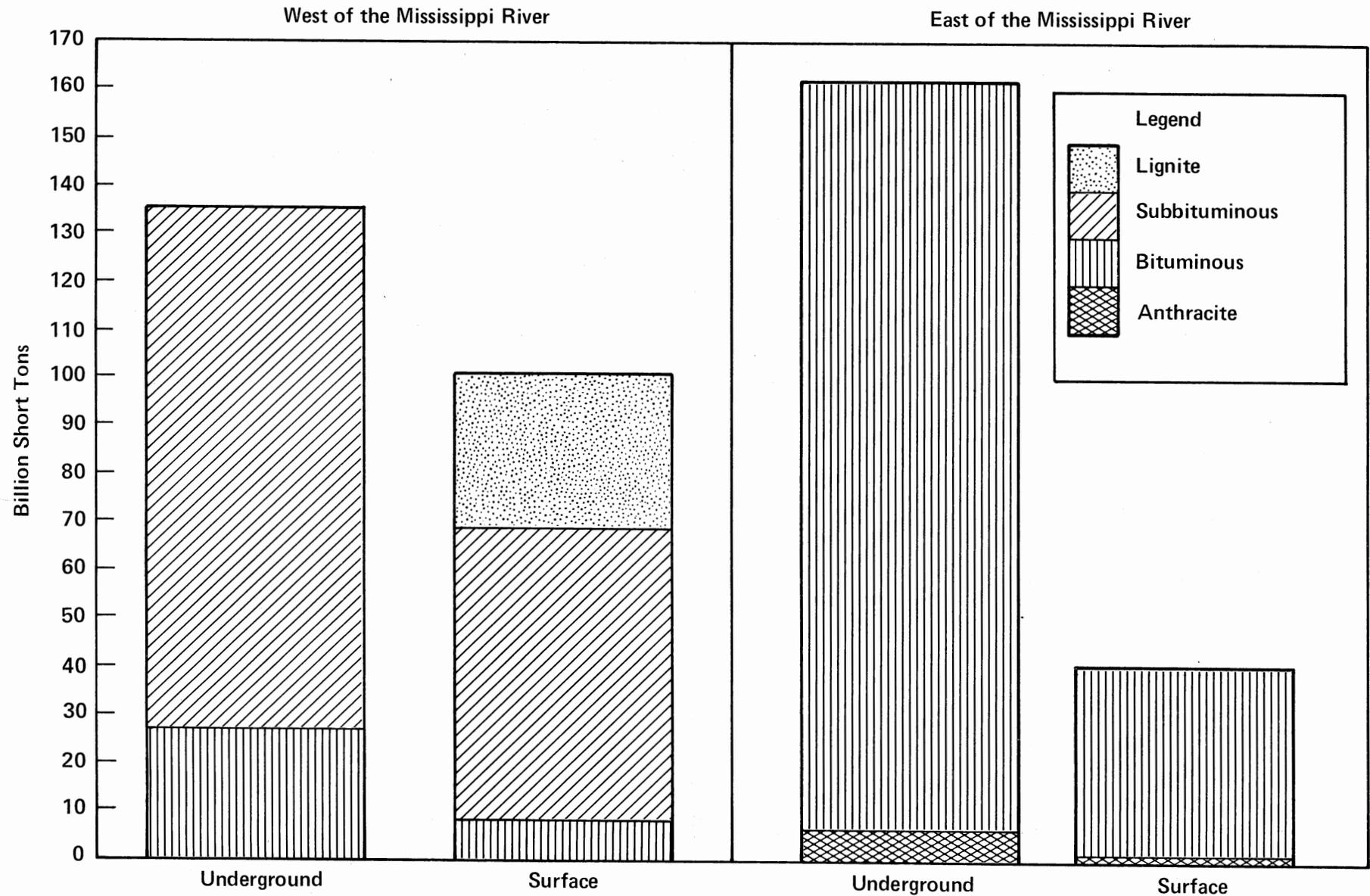
² Sum of the components may not equal total due to independent rounding.

³ Less than 0.05 billion short tons.

NA: Not available.

Source: Bureau of Mines.

Demonstrated Coal Reserve Base by Rank and Potential Method of Mining, January 1, 1976



Source: Bureau of Mines.

Approximately 52 percent of the demonstrated coal reserve base consists of bituminous coal; 38 percent is subbituminous coal; 8 percent is lignite; and 2 percent is anthracite. About 85 percent of the bituminous coal and virtually all of the anthracite occurs east of the Mississippi River, whereas most of the subbituminous coal and lignite occurs in the West.

One-third of the demonstrated reserve base, or 141 billion tons, is in beds so close to the surface, or in beds that are so thick, that underground mining is impractical. Of this quantity, nearly three-quarters is in States west of the Mississippi River. Conversely, over half of the coal that can be mined by underground methods is in States east of the Mississippi River.

Demonstrated Coal Reserve Base
by Rank and Potential Method of Mining, January 1, 1976
(Billion Short Tons)

Mining Method and Area	Anthracite	Bituminous	Sub- bituminous	Lignite	Total ¹
Underground					
East of the Mississippi River -----	7	155	0	0	162
West of the Mississippi River -----	(2)	27	108	0	135
Total underground -----	7	182	108	0	297
Surface					
East of the Mississippi River -----	(2)	39	0	1	41
West of the Mississippi River -----	(2)	8	61	33	101
Total surface -----	(2)	47	61	34	141
Grand total ¹ -----	7	229	168	34	438

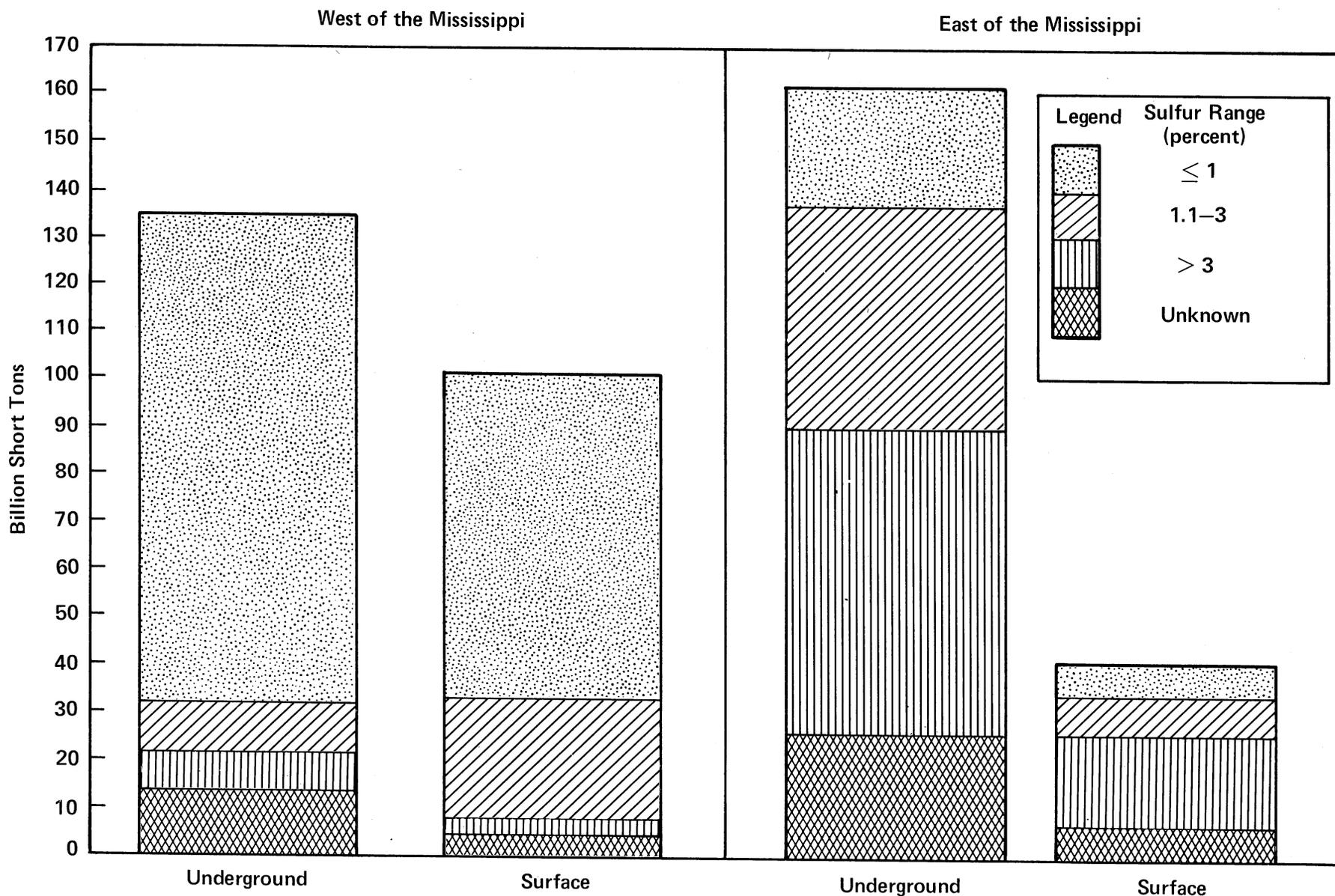
¹ Sum of components may not equal total due to independent rounding.

² Less than one-half billion tons.

Note: Includes measured and indicated categories as defined by the Bureau of Mines and U.S. Geological Survey and represents 100 percent of the coal in place. Recoverability varies between 40 and 90 percent for individual deposits. Fifty percent or more of the overall coal reserve base in the United States is estimated to be recoverable.

Source: Bureau of Mines.

Demonstrated Coal Reserve Base by Sulfur Content and Potential Method of Mining, January 1, 1976



Source: Bureau of Mines.

Approximately 46 percent of the demonstrated coal reserve base of the United States consists of coal with a sulfur content of 1 percent or less. Approximately 84 percent of this low-sulfur coal is located west of the Mississippi River.

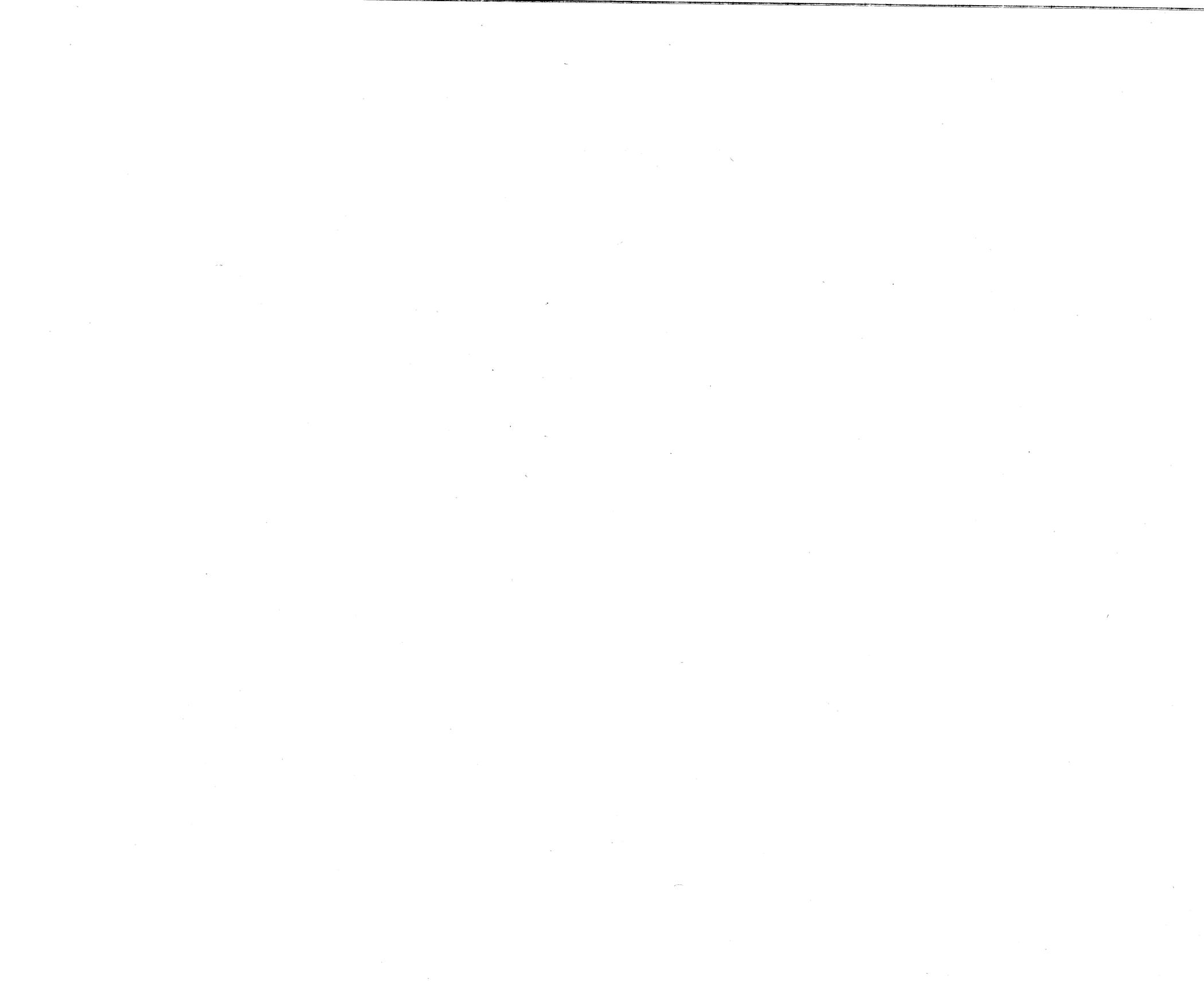
The demonstrated coal reserve base with an intermediate sulfur content (1.1 to 3 percent) comprises approximately 21 percent of the total reserve base of which approximately 40 percent is located west of the Mississippi River.

**Demonstrated Coal Reserve Base by Sulfur Content
and Potential Method of Mining, January 1, 1976
(Billion Short Tons)**

Mining Method and Area	Sulfur Range				Total
	<1%	1.1-3%	>3%	Unknown	
Underground:					
East of the Mississippi River -----	26	47	64	26	162
West of the Mississippi River -----	102	11	8	14	135
Total underground -----	126	58	73	39	297
Surface:					
East of the Mississippi River -----	7	8	19	7	41
West of the Mississippi -----	66	26	3	5	101
Total surface -----	76	34	20	11	141
Grand total -----	201	93	93	51	438

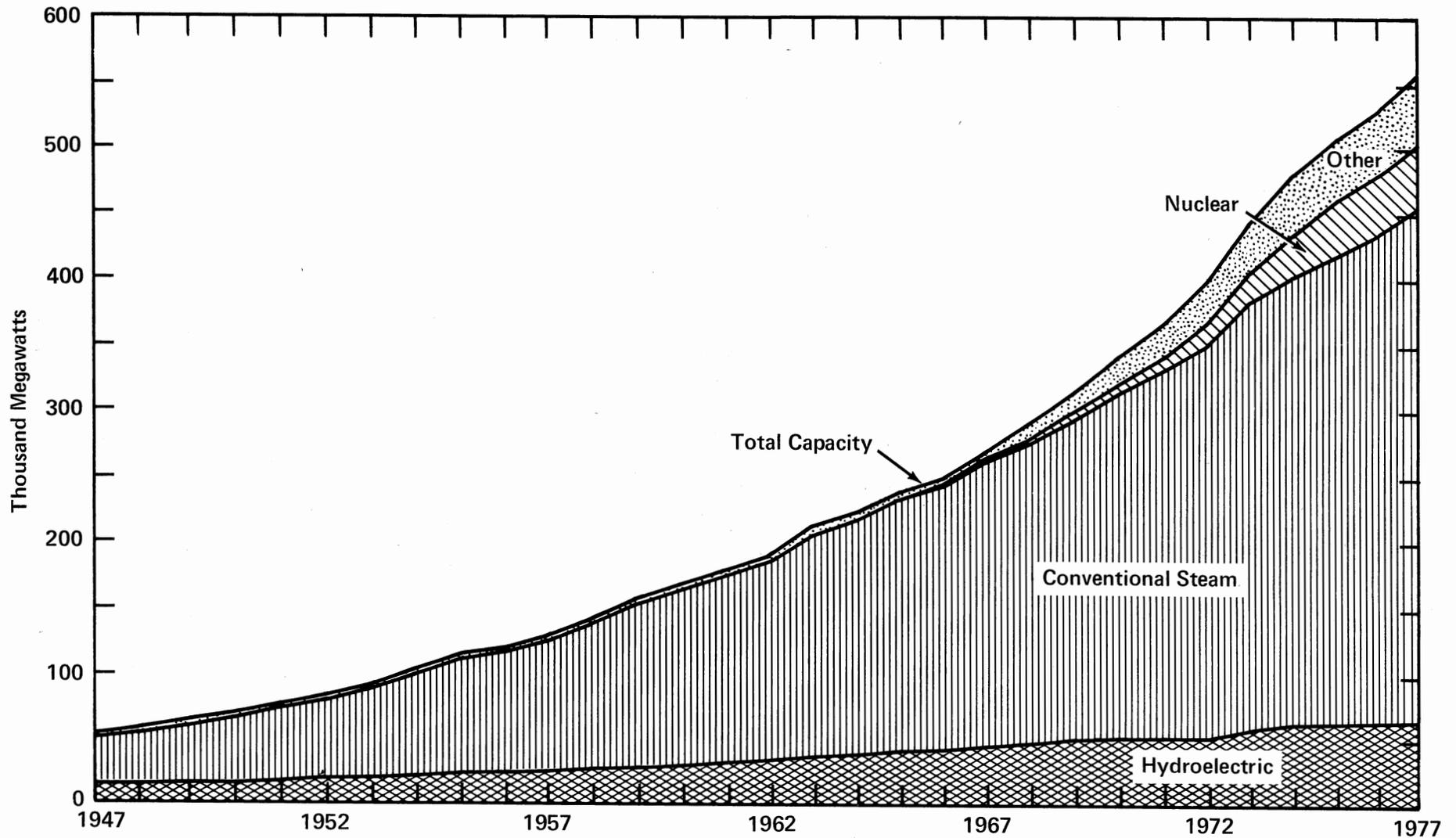
Note: As of January 1, 1976, data may not add to totals shown because of rounding. Includes measured and indicated categories as defined by the Bureau of Mines and Geological Survey, and represents 100 percent of the coal in place. Recoverability varies between 40 and 90 percent for individual deposits. Fifty percent or more of the overall coal reserve base in the United States is estimated to be recoverable.

Source: Bureau of Mines.



5
Electricity

Installed Generating Capacity of the Electric Utility Industry



Source: Federal Power Commission and Energy Information Administration.

Since 1947, installed generating capacity at electric utilities has increased each year to meet the growing demand for electricity. Steam generating capacity in 1977 accounted for 69 percent of the capacity, unchanged from that in 1947.

Nuclear capacity has shown the greatest rate of growth since 1947, when the first plant went into operation. In 1977, nuclear plants represented 9 percent of total installed capacity. Although hydroelectric capacity has increased steadily, its share of total capacity has declined from 29 percent in 1947 to 12 percent in 1977.

Installed Generating Capacity of the Electric Utility Industry, 1947-1977
(Thousand Megawatts)

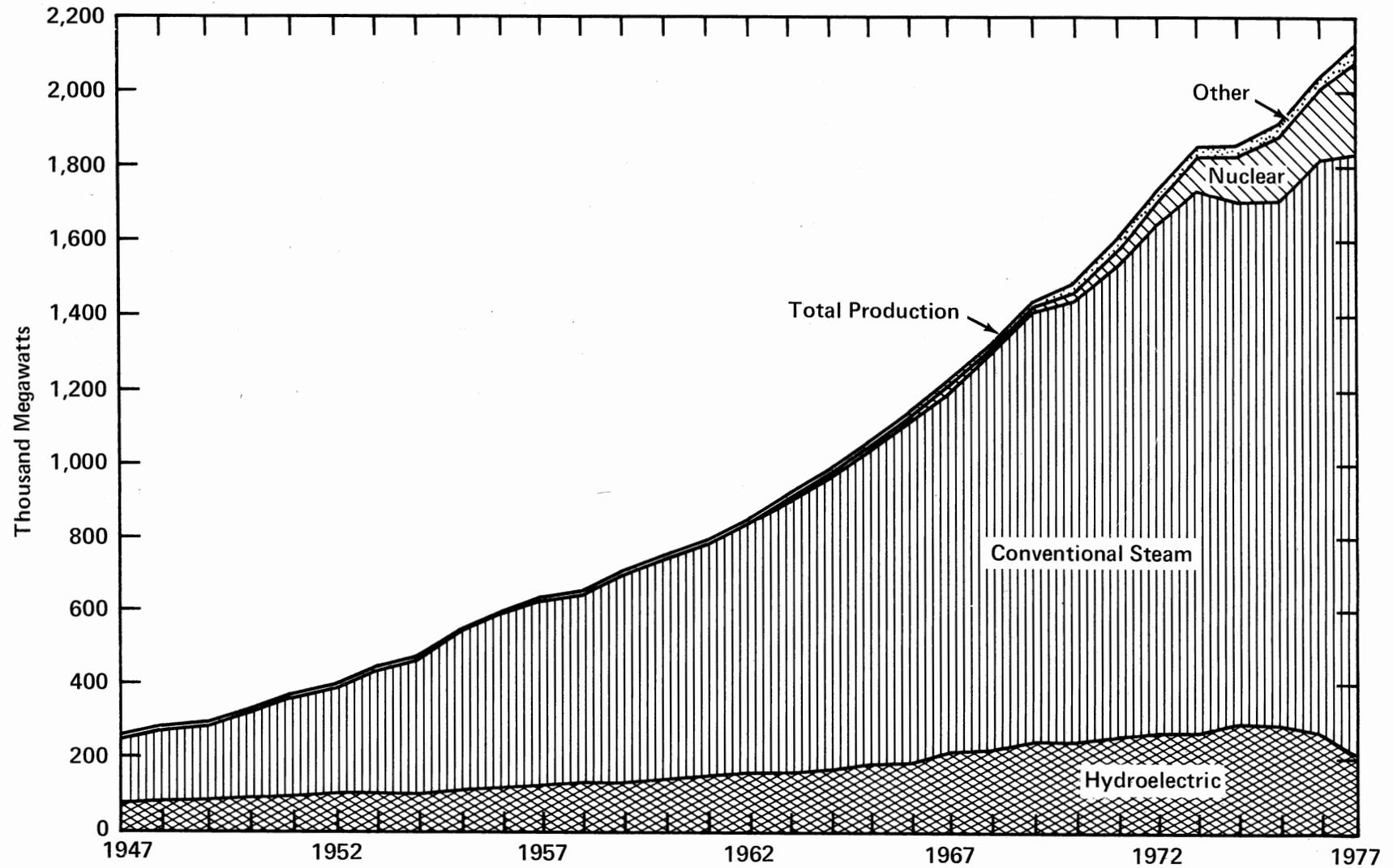
Year	Conventional Steam	Hydro- electric	Internal Combustion	Gas Turbine	Nuclear	Other	Total
1947	36.0	15.0	1.3	—	—	—	52.3
1948	39.3	15.7	1.6	—	—	—	56.6
1949	44.6	16.7	1.8	—	—	—	63.1
1950	49.3	17.7	1.9	—	—	—	68.9
1951	54.9	18.9	2.0	—	—	—	75.8
1952	59.7	20.4	2.1	—	—	—	82.2
1953	67.2	22.0	2.2	—	—	—	91.4
1954	77.1	23.2	2.3	—	—	—	102.6
1955	87.1	25.0	2.4	—	—	—	114.5
1956	92.6	25.7	2.5	—	—	—	120.8
1957	99.4	27.0	2.5	—	0.1	—	129.0
1958	110.5	29.4	2.6	—	0.1	—	142.6
1959	123.0	31.1	2.7	—	0.1	—	156.9
1960	132.5	32.4	2.8	—	0.3	—	168.0
1961	141.8	35.5	3.0	—	0.4	—	180.7
1962	150.0	37.3	3.0	—	0.7	—	191.0
1963	166.3	40.2	3.2	0.9	0.7	—	211.3
1964	175.9	42.2	3.3	0.9	0.9	—	223.2
1965	188.1	43.8	3.4	1.4	0.9	—	237.6
1966	197.4	45.0	3.5	NA	1.9	—	247.8
1967	214.4	48.1	3.8	NA	2.9	—	269.2
1968	226.9	51.2	4.0	6.2	2.8	—	291.1
1969	242.3	52.8	4.2	10.0	4.0	—	313.3
1970	260.1	55.1	4.4	15.5	6.5	—	341.6
1971	278.0	55.9	4.5	21.9	8.7	(¹)	369.0
1972	294.3	56.4	4.8	27.7	15.3	0.1	398.6
1973	320.9	62.0	5.0	33.4	21.0	0.1	442.4
1974	336.8	63.6	5.0	39.6	31.6	0.9	477.5
1975	352.5	65.9	5.1	44.1	39.8	0.9	508.3
1976	367.6	67.7	5.3	46.6	42.9	0.9	531.0
1977	384.8	68.3	5.3	47.8	49.9	0.9	557.0

¹ Less than 0.05 thousand megawatts.

NA = Not available.

Source: Federal Power Commission and Energy Information Administration.

Production of Electricity by the Electric Utility Industry



Source: Federal Power Commission and Energy Information Administration.

Steam electric generation has been the major means of generating electricity during the past 30 years. Presently, steam electric generation accounts for 76 percent of electric utility output.

Although hydroelectric generation has increased at an average annual rate of 5.2 percent since 1947, its share of total electricity generated has dwindled from 31 percent in 1947 to 10 percent in 1977. Substantial

declines in hydroelectric generation since 1975 reflect an extended drought in the Pacific Northwest.

Nuclear plants generated 12 percent of total output in 1977. Other major generation contributors, gas turbine and internal combustion units, are used primarily during periods of peak demand.

Production of Electricity by the Electric Utility Industry, 1947-1977
(Million Megawatt Hours)

Year	Conventional Steam	Hydro- electric	Internal Combustion	Gas Turbine	Nuclear	Other	Total
1947	174.5	78.4	2.8	—	—	—	255.7
1948	196.9	82.5	3.3	—	—	—	282.7
1949	197.9	89.7	3.5	—	—	—	291.1
1950	229.5	95.9	3.7	—	—	—	329.1
1951	267.3	99.8	3.7	—	—	—	370.8
1952	290.4	105.1	3.7	—	—	—	399.2
1953	333.5	105.2	3.9	—	—	—	442.6
1954	360.8	107.1	3.8	—	—	—	471.7
1955	430.1	113.0	3.9	—	—	—	547.0
1956	474.6	122.0	4.1	—	—	—	600.7
1957	497.2	130.2	4.1	—	—	—	631.5
1958	500.6	140.3	4.1	—	0.2	—	645.2
1959	567.7	137.8	4.4	—	0.2	—	710.1
1960	602.8	145.5	4.5	—	0.5	—	753.3
1961	633.9	151.8	4.6	—	1.7	—	792.0
1962	677.0	168.3	4.8	—	2.3	—	852.4
1963	742.5	165.8	5.0	0.3	3.2	—	916.8
1964	798.1	177.1	5.0	0.5	3.3	—	984.0
1965	851.9	193.9	5.1	0.7	3.7	—	1,055.3
1966	937.0	194.8	5.2	1.9	5.5	—	1,144.4
1967	977.3	221.5	4.8	3.0	7.7	—	1,214.3
1968	1,085.0	222.5	5.2	4.2	12.5	—	1,329.4
1969	1,164.3	250.2	5.6	8.2	13.9	—	1,442.2
1970	1,201.3	247.1	5.4	15.4	21.8	—	1,491.0
1971	1,279.8	266.3	6.2	22.1	38.1	0.1	1,612.6
1972	1,386.5	272.6	6.7	29.5	54.1	0.2	1,749.6
1973	1,471.0	272.3	6.6	30.1	83.3	0.2	1,863.5
1974	1,413.7	301.0	6.0	32.1	114.0	0.3	1,867.1
1975	1,416.7	300.0	5.7	22.4	172.5	0.3	1,917.6
1976	1,533.9	283.7	5.0	23.6	191.1	0.4	2,037.7
1977	1,618.8	220.4	4.7	28.9	250.9	0.4	2,124.1

Source: Federal Power Commission and Energy Information Administration.

Mineral Fuels Consumed to Produce Electricity, 1947-1977

Year	Coal ¹	Oil ²	Gas
	Million Tons	Million Barrels	Billion Cubic Feet
1947	89.5	45.3	373.1
1948	99.6	42.6	478.1
1949	84.0	66.3	550.1
1950	91.9	75.4	628.9
1951	105.8	63.9	763.9
1952	107.1	67.2	910.1
1953	115.9	82.2	1,034.3
1954	118.4	66.7	1,165.5
1955	143.8	75.3	1,153.3
1956	158.3	72.7	1,239.3
1957	160.1	79.7	1,336.1
1958	155.7	77.7	1,372.9
1959	168.4	88.3	1,628.5
1960	176.6	85.3	1,724.8
1961	182.1	85.7	1,825.1
1962	193.2	85.8	1,966.0
1963	211.3	93.3	2,144.5
1964	225.4	101.1	2,322.9
1965	244.8	115.2	2,321.1
1966	266.5	140.9	2,610.0
1967	274.2	161.3	2,746.4
1968	297.8	188.6	3,147.9
1969	310.6	251.0	3,487.6
1970	320.8	335.5	3,931.9
1971	327.9	396.5	3,976.0
1972	352.4	493.7	3,976.8
1973	389.7	560.1	3,659.4
1974	392.4	536.2	3,443.3
1975	406.0	506.1	3,157.6
1976	448.4	555.9	3,080.6
1977 ³	477.2	623.7	3,189.2

¹ Includes anthracite coal, bituminous coal, lignite, and coke.

² Includes residual fuel oil, distillate fuel oil, and crude oil.

³ Preliminary.

Note: Data in this table reflect actual consumption of fuels to produce electricity and may not equate to apparent consumption as reflected by demand or deliveries represented in other tables.

Source: Federal Power Commission and Energy Information Administration.

Year-End Coal and Oil Stocks at Electric Utilities, 1947-1977

Year	Coal ¹ Million Short Tons	Oil ² Million Barrels
1947	19.0	6.7
1948	27.3	8.1
1949	22.1	8.6
1950	31.8	10.2
1951	38.5	12.8
1952	41.5	13.7
1953	45.6	15.0
1954	46.1	15.9
1955	41.4	13.7
1956	48.8	17.3
1957	53.1	20.1
1958	51.0	20.8
1959	52.1	18.5
1960	51.7	19.6
1961	50.1	22.0
1962	50.4	23.8
1963	50.6	24.9
1964	53.9	22.8
1965	54.5	25.6
1966	53.9	27.4
1967	71.0	26.7
1968	65.5	28.7
1969	61.9	35.3
1970	72.1	38.0
1971	78.1	49.6
1972	100.0	57.7
1973	87.3	89.2
1974	83.5	112.9
1975	110.8	125.2
1976	117.5	121.7
1977 ³	133.3	144.0

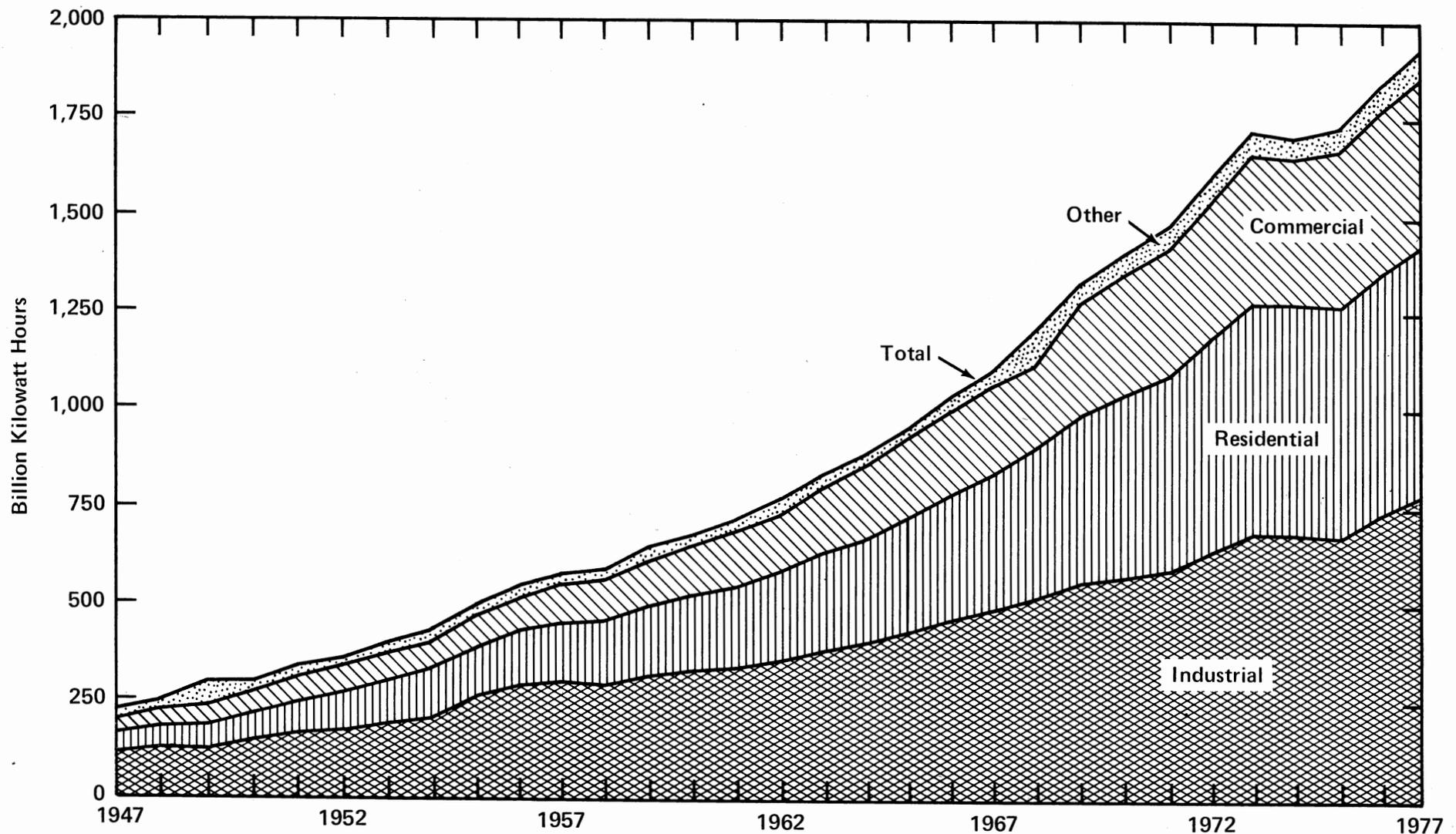
¹ Includes anthracite coal, bituminous coal, lignite, and coke.

² Includes residual fuel oil, distillate fuel oil, and crude oil.

³ Preliminary.

Source: Federal Power Commission and Energy Information Administration.

Consumption (Sales) of Electricity by End-Use Sector



Source: Federal Power Commission and Energy Information Administration.

Between 1967 and 1977 consumption (sales) of electricity increased 75 percent from 1.1 trillion kilowatt hours to 1.9 trillion kilowatt hours. The lack of growth during 1974 and 1975 reflected primarily an economic recession and energy conservation efforts. Sales to residential consumers during the 10-year period, ended 1977, increased 89 percent from 340 billion kilowatt hours to 642 billion kilowatt hours. Commercial consumption was 443 billion kilowatt hours in 1977, 89 percent

higher than the 234 billion kilowatt hours consumed in 1967. Sales to industrial consumers in 1977 totaled 774 billion kilowatt hours, an increase of 60 percent compared to 1967 sales. Other sales totaled 69 billion kilowatt hours in 1977, or 74 percent more than in 1967. Decline in industrial use of electricity during 1949, 1958, and 1974, reflect economic declines during those years.

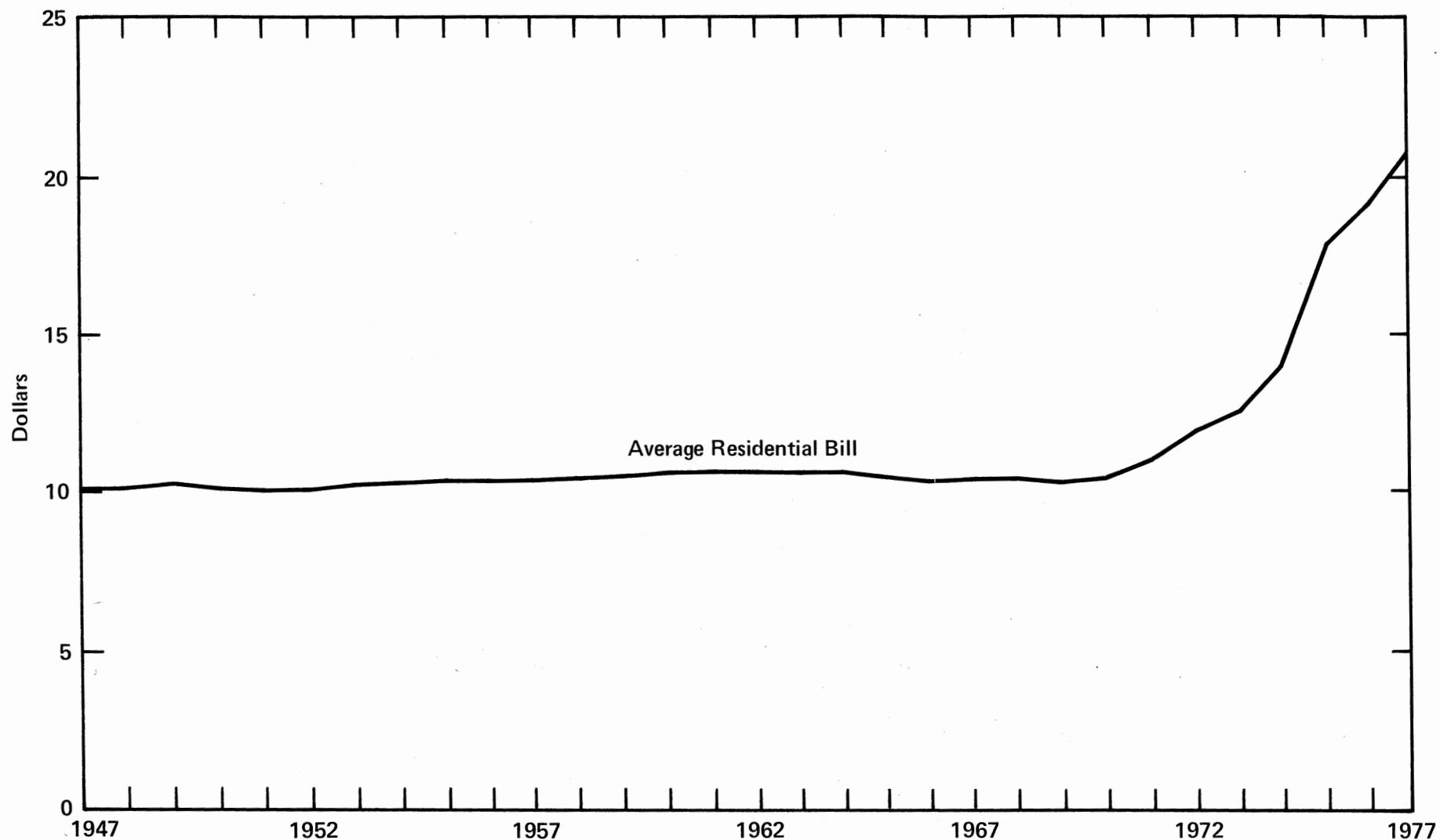
Consumption (Sales) of Electricity by End-Use Sector, 1947-1977
(Billion Kilowatt Hours)

	Residential	Commercial	Industrial	Other	Total
1947	49.4	37.2	117.0	20.1	223.7
1948	58.6	42.0	125.9	19.7	246.1
1949	66.8	45.1	122.6	20.0	254.5
1950	72.2	50.6	146.5	22.1	291.4
1951	83.1	59.8	166.2	24.2	330.3
1952	93.5	62.2	176.1	24.3	356.2
1953	104.1	67.1	198.6	26.3	396.2
1954	116.2	72.1	208.5	27.3	424.2
1955	128.4	79.4	260.0	29.0	496.7
1956	143.5	86.8	285.9	30.0	546.3
1957	156.7	94.1	294.0	31.0	575.8
1958	169.5	100.3	286.6	31.5	587.9
1959	184.5	111.7	315.1	35.5	646.9
1960	199.3	120.0	328.6	38.6	686.5
1961	213.3	140.8	332.8	33.2	720.1
1962	232.0	151.9	354.9	32.9	771.7
1963	249.8	163.7	382.7	33.8	830.1
1964	269.7	185.1	402.0	36.1	893.0
1965	291.0	200.5	428.7	33.6	953.8
1966	316.9	217.9	463.6	36.8	1,035.1
1967	340.1	234.4	485.0	39.7	1,099.2
1968	381.6	258.1	521.1	42.1	1,202.9
1969	426.7	281.9	559.4	45.9	1,313.8
1970	466.3	306.7	570.9	48.5	1,392.3
1971	499.5	329.4	589.4	51.1	1,469.5
1972	538.6	359.3	641.0	56.3	1,595.2
1973	579.2	388.3	687.0	59.3	1,712.9
1974	578.2	384.8	684.9	58.0	1,705.9
1975	584.7	401.7	675.1	68.2	1,729.6
1976 ¹	602.9	423.1	740.3	69.1	1,835.4
1977 ¹	642.0	443.4	773.8	68.9	1,928.1

¹ Preliminary.

Note: Sum of components may not equal total due to independent rounding.
Source: Federal Power Commission and Energy Information Administration.

Weighted Average Monthly Electric Bill



Source: Federal Power Commission and Energy Information Administration.

The weighted average bill for residential service varied slightly between \$10 and \$11 during 1947 through 1970. Beginning in 1971 and continuing to 1977, average bills increased at a rapid rate, especially during 1974.

This increase reflected primarily rising fuel costs and, to a smaller extent, increased costs of goods and services and increased rate structures.

Weighted Average Monthly Electric Bill—January 1, 1947–1977
(Dollars)

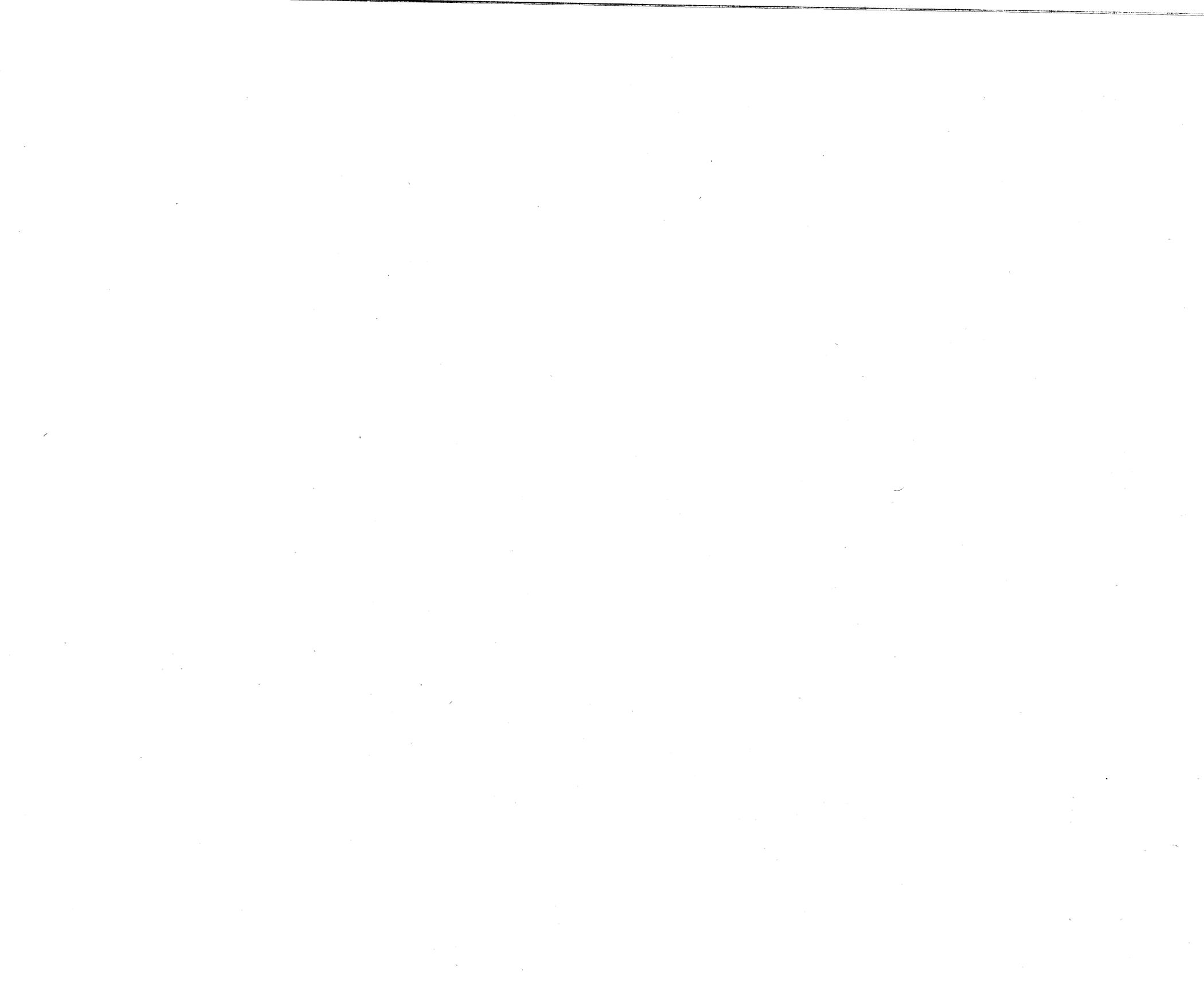
Year	Residential ¹	Commercial ²	Industrial ³
1947	10.03	159.43	2,906
1948	10.08	160.68	2,997
1949	10.22	164.95	3,105
1950	10.11	160.75	3,024
1951	10.02	158.06	3,011
1952	10.08	159.40	3,042
1953	10.20	158.03	3,154
1954	10.23	158.16	3,162
1955	10.30	159.16	3,168
1956	10.36	160.05	3,204
1957	10.39	160.71	3,235
1958	10.47	162.88	3,279
1959	10.51	163.47	3,283
1960	10.62	165.12	3,309
1961	10.64	164.11	3,337
1962	10.66	164.67	3,551
1963	10.64	164.41	3,442
1964	10.61	163.00	3,414
1965	10.41	161.01	3,423
1966	10.34	159.67	3,407
1967	10.37	160.11	3,422
1968	10.37	160.39	3,428
1969	10.32	160.85	3,436
1970	10.51	162.91	3,492
1971	11.13	171.92	3,774
1972	11.99	184.76	4,137
1973	12.56	193.67	4,402
1974	14.10	215.35	5,196
1975	17.93	268.71	6,888
1976	19.26	285.86	7,395
1977	20.86	309.99	8,224

¹ Weighted average monthly bill of residential consumers for 500 kilowatt hours.

² Weighted average monthly bill of commercial consumers who require 30 kilowatts of service for 6000 kilowatt hours.

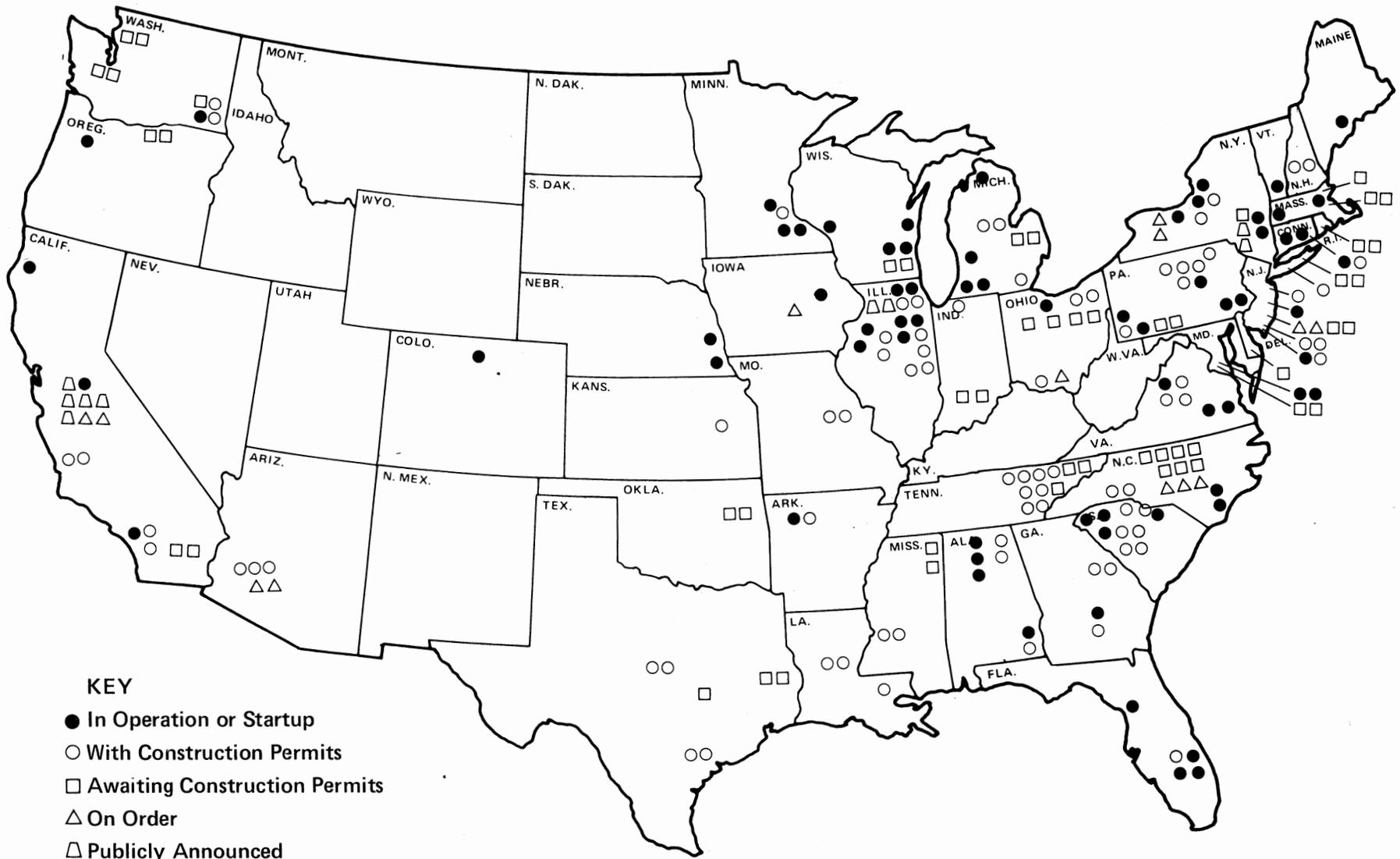
³ Weighted average monthly bill of industrial consumers who require 1000 kilowatts of service for 200,000 kilowatt hours.

Source: Federal Power Commission and Energy Information Administration.



6
Nuclear Power

Status of Nuclear Powerplants, December 31, 1977



Due to Space Limitations, Symbols do not Represent Actual Locations.

Source: Nuclear Regulatory Commission and Energy Information Administration.

Status of Nuclear Powerplants, December 31, 1977

Status	Number of Reactors				Capacity (electrical megawatts)	
	Boiling Water Reactor	Pressurized Water Reactor	Other ¹	Total	Total	Average
In operation or startup ² -----	25	40	3	68	49,000	730
(In full operation) -----	(25)	(38)	(2)	(65)	(47,000)	(720)
Construction permit granted -----	27	53	0	80	87,000	1,090
(Construction started) -----	(22)	(45)	(0)	(67)	(73,000)	(1,090)
(No construction) -----	(5)	(8)	(0)	(13)	(14,000)	(1,070)
Construction permit pending -----	11	37	4	52	58,000	1,110
(LWA ³ issued or CP ⁴ exempt) -----	(2)	(11)	(1)	(14)	(15,000)	(1,080)
Order placed for plant -----	3	10	0	13	16,000	1,190
Publicly announced -----	—	—	9	9	11,000	1,240
Total -----	66	140	16	222	221,000	1,000

¹ Includes the Government-owned Hanford N (graphite-moderated) and Shippingport (light water breeder) facilities, both in operation. Also includes 1 high temperature gas-cooled reactor in startup testing, 1 fast breeder, and 3 units in the construction permit pending stage for which a reactor type has not been announced, and 9 announced intentions to order for which a reactor type has not been chosen.

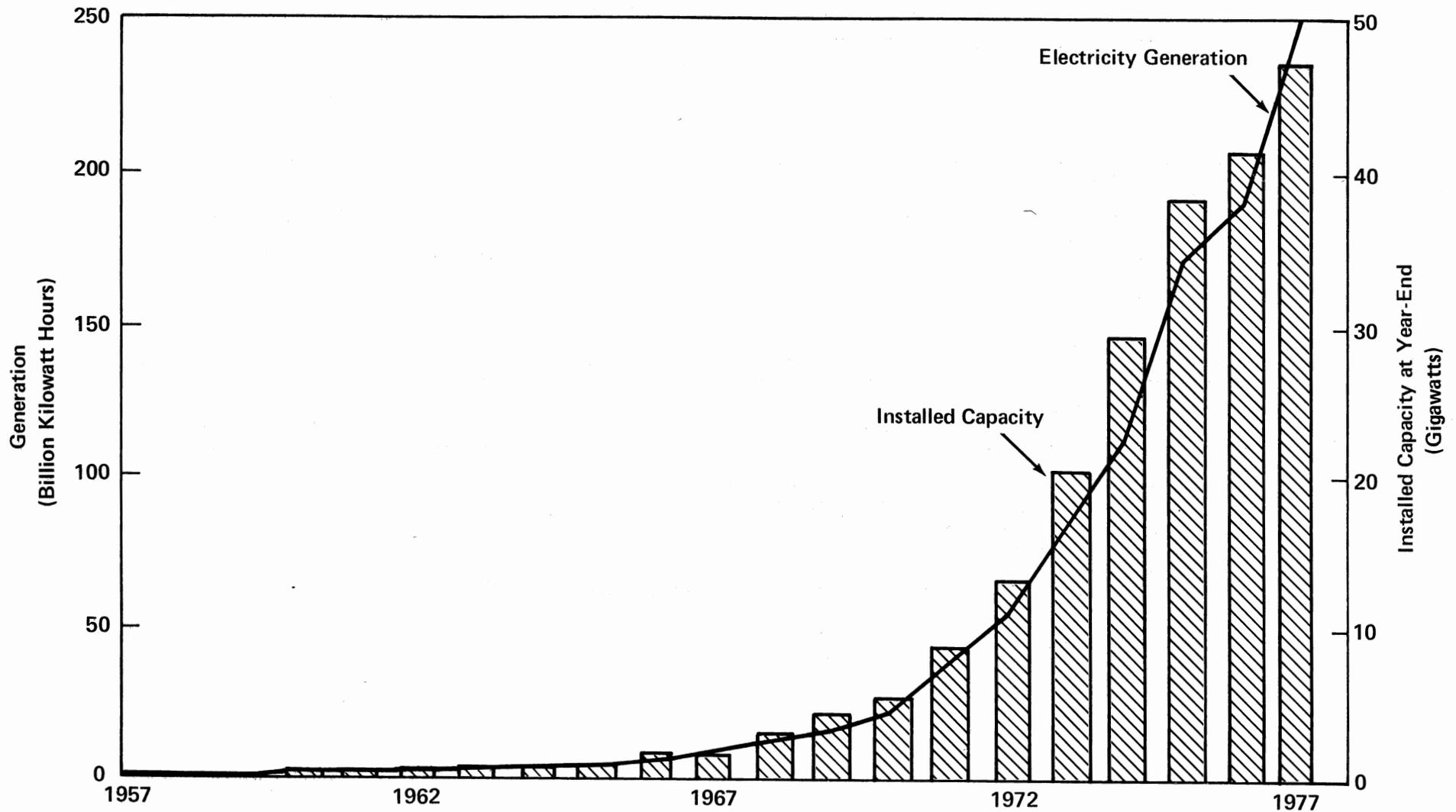
² Includes North Anna 1, licensed to load fuel in December 1977, but restricted from beginning startup testing pending the outcome of additional hearings. Does not include EBR II, operated by the National Reactor Testing Station, nor Indian Point 1, which is in an indefinite shutdown status.

³ Limited work authorizations.

⁴ Construction permit.

Source: Nuclear Regulatory Commission and Energy Information Administration.

Nuclear Power Capacity and Generation



Source: Federal Power Commission and Department of Energy.

Since the first central-station nuclear reactor began operating in 1957, nuclear power has grown to the level where it is contributing 12 percent of total electricity generation. During 1977, nuclear powerplants

generated 250 billion kilowatt hours of electricity, which was 45 and 30 percent greater, respectively, than nuclear generated electricity during the years 1975 and 1976.

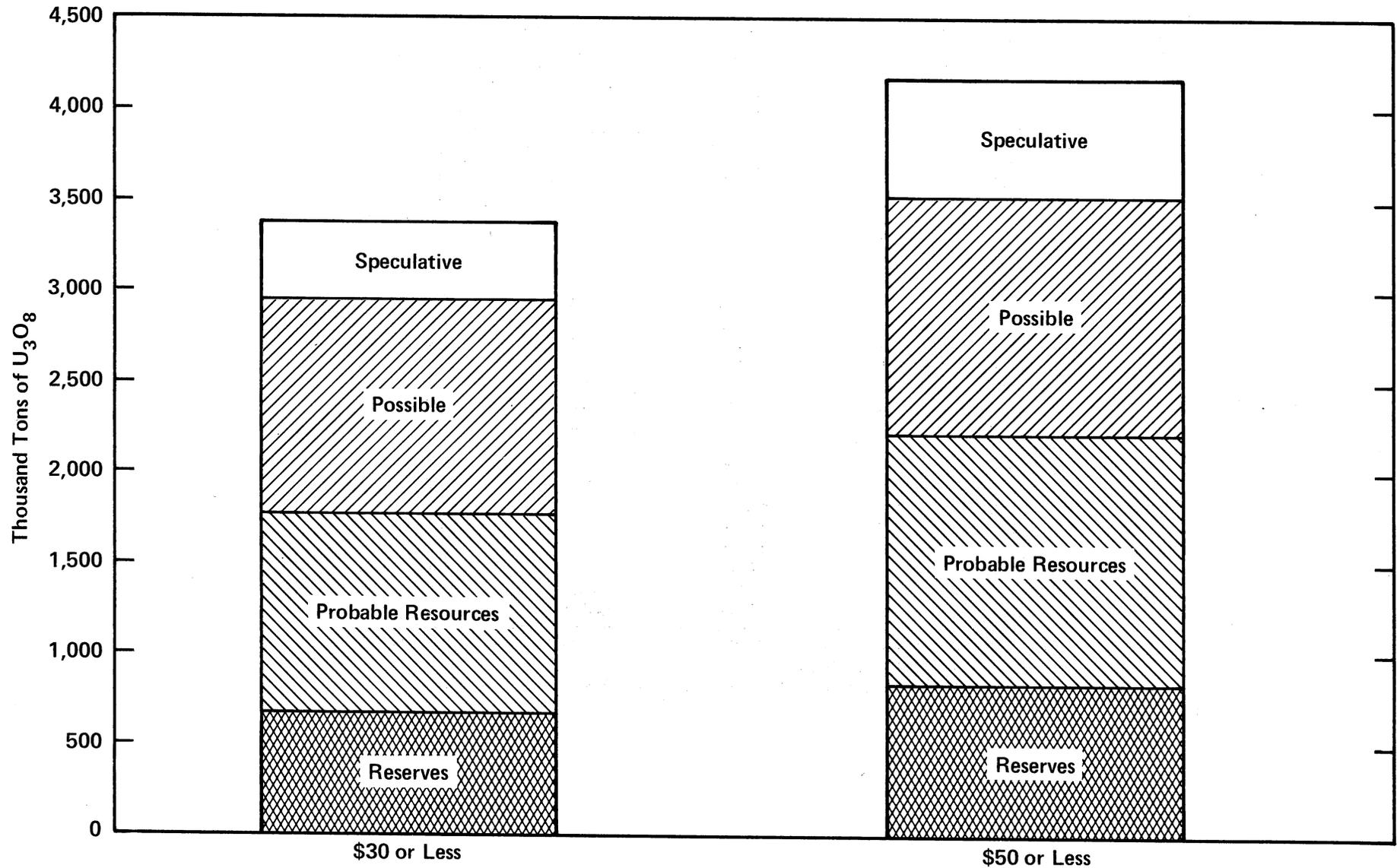
Nuclear Power Capacity and Generation, 1957-1977

Year	Year-End Operating Reactors ¹	Year-End Megawatt Capacity ¹	Electricity Generation	
			Billion Kilowatt Hours	Percent of Total U.S. Generation
1957	1	90	<0.1	<0.1
1958	1	90	0.2	<0.1
1959	1	90	0.2	<0.1
1960	2	290	0.5	0.1
1961	3	465	1.7	0.2
1962	4	730	2.3	0.3
1963	7	942	3.2	0.4
1964	9	917	3.3	0.3
1965	10	933	3.7	0.4
1966	11	1,840	5.5	0.5
1967	10	1,805	7.7	0.6
1968	10	2,792	12.5	0.9
1969	13	4,102	13.9	1.0
1970	16	5,150	21.8	1.4
1971	21	8,472	38.1	2.4
1972	26	13,028	54.1	3.1
1973	35	20,049	83.3	4.5
1974	44	29,690	114.0	6.1
1975	54	38,568	172.5	9.0
1976	57	41,129	191.1	9.4
1977	65	47,013	250.9	11.8

¹ Includes plants shutdown permanently or for extended periods, most of which were test or prototype units.

Source: Federal Power Commission and U.S. Department of Energy.

Uranium Resources



Source: Department of Energy.

As of June 1, 1977, there were 3.4 million tons of uranium reserves and potential resources available at \$30 per pound forward costs; and an additional 800,000 tons in the \$30-\$50 per pound range. The reserves and

probable resources available at \$30 per pound or less would be sufficient to fuel approximately 615 reactors of the 1,000-megawatt size range over their 30-year lifetimes, assuming no recycle of plutonium or uranium.

Uranium Resources, June 1, 1977¹
(Thousands of Tons U₃O₈)

Class	Forward Cost Category ²	
	\$30 or less ³	\$50 or less
Reserves ⁴ -----	680 (125)	840 (150)
Potential Resources -----	2,690 (490)	3,330 (605)
Probable -----	1,090 (200)	1,370 (250)
Possible -----	1,120 (205)	1,420 (260)
Speculative -----	480 (85)	540 (95)
Total -----	3,370 (615)	4,170 (755)

¹ Figures in parentheses represent the number of 1000 MWe reactors that can be supported for 30-year operating lifetimes by the amount of uranium in the associated resource category. It is assumed that each reactor consumes approximately 5,500 tons of uranium during its 30-year lifetime.

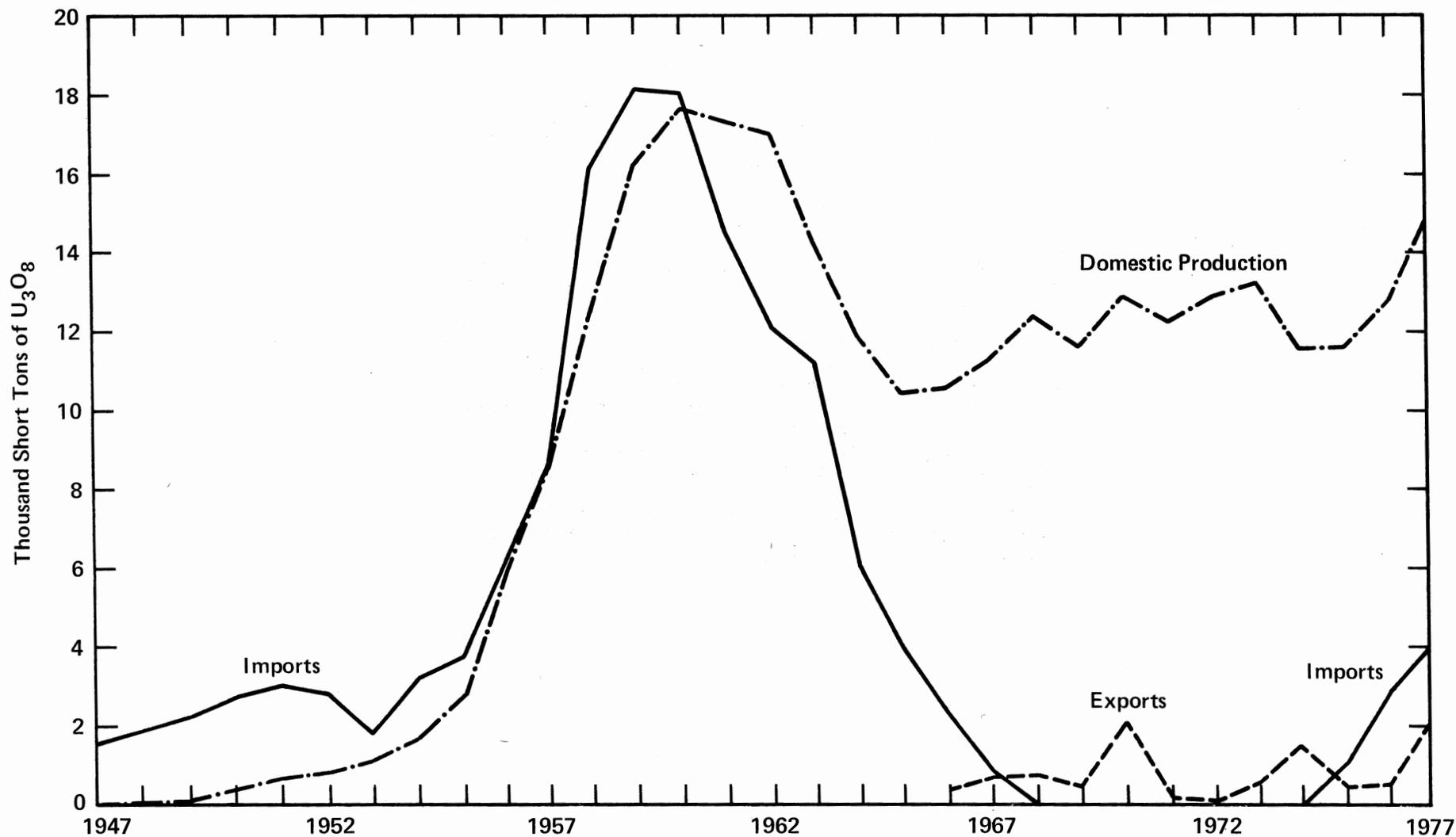
² Forward costs are those costs yet to be expended, and do not include sunk costs, taxes, profit, or amortization of existing capital equipment, and therefore, do not represent prices at which U₃O₈ will be marketed.

³ These figures differ from those in Volume II due to computational errors in Volume II.

⁴ Does not include 140,000 tons of U₃O₈ estimated to be available as a by-product of phosphate and copper production during the 1977-2000 time period.

Source: U.S. Department of Energy.

Uranium Production, Exports and Imports



Source: Department of Energy.

Before 1966, the Atomic Energy Commission purchased all domestically produced uranium. In 1966, private commercial purchasing of uranium began, and the Atomic Energy Commission initiated a 5-year phaseout of its uranium purchase program, leading to full termination in 1970.

Stockpiling of imported uranium began in 1975, preparatory to a phased lifting in 1977 of the prohibition on enriching foreign uranium for domestic use. Canada is the principal source of these imports.

Uranium Production, Exports, and Imports, 1947-1977
(Short Tons of U₃O₈)

Year	Domestic Production	Exports	Imports ¹
1947	67	—	1,580
1948	102	—	1,900
1949	177	—	2,130
1950	459	—	2,740
1951	766	—	3,050
1952	874	—	2,830
1953	1,163	—	1,910
1954	1,700	—	3,240
1955	2,784	—	3,800
1956	5,958	—	6,240
1957	8,482	—	8,570
1958	12,437	—	16,130
1959	16,239	—	18,160
1960	17,637	—	18,010
1961	17,348	—	14,500
1962	17,008	—	12,110
1963	14,217	—	11,225
1964	11,846	—	6,070
1965	10,442	—	4,000
1966	10,589	400	2,320
1967	11,253	700	890
1968	12,368	800	—
1969	11,609	500	—
1970	12,905	2,100	—
1971	12,273	200	—
1972	12,900	100	—
1973	13,235	600	—
1974	11,528	1,500	—
1975	11,600	500	1,100
1976	12,747	600	2,900
1977 ²	14,900	2,100	4,000

¹ Imported quantities for the years 1947 through 1967 are reported for fiscal years. During this period, the Atomic Energy Commission (AEC) was the sole purchaser of all imported U₃O₈.

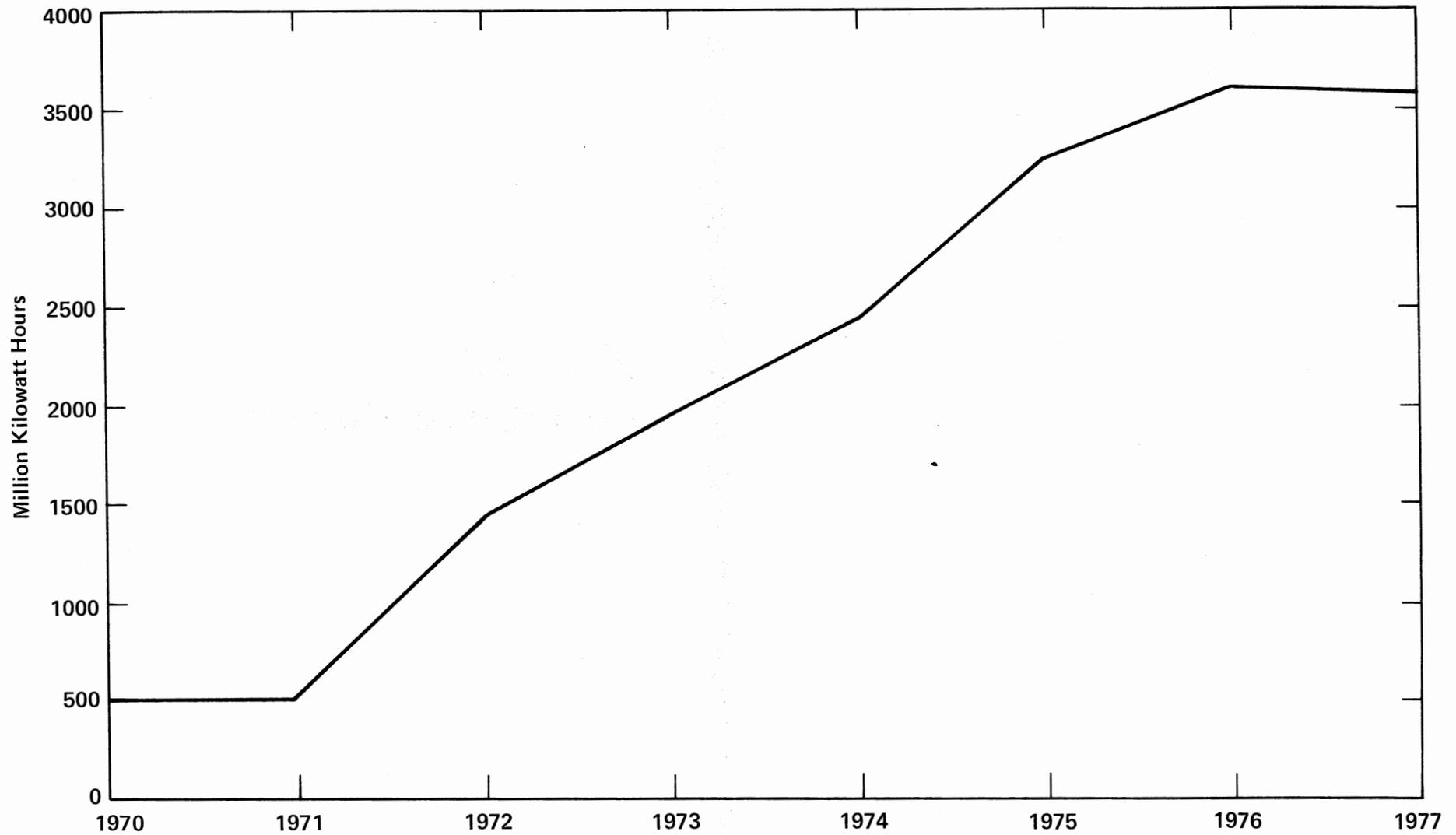
² Preliminary.

Source: Energy Research and Development Administration, Atomic Energy Commission, and U.S. Department of Energy.



7
**Solar and
Geothermal Power**

Production of Electricity from Geothermal Sources



Source: Federal Power Commission and Energy Information Administration.

Production of electricity from geothermal steam at The Geysers in California has increased steadily since their development in 1960. The Geysers, with a current capacity of more than 500 megawatts, are the

largest commercial geothermal facility in the world. Expansion activities in progress will provide over 660 megawatts of net capacity on-line by the end of 1978 and over 900 megawatts by the end of 1979.

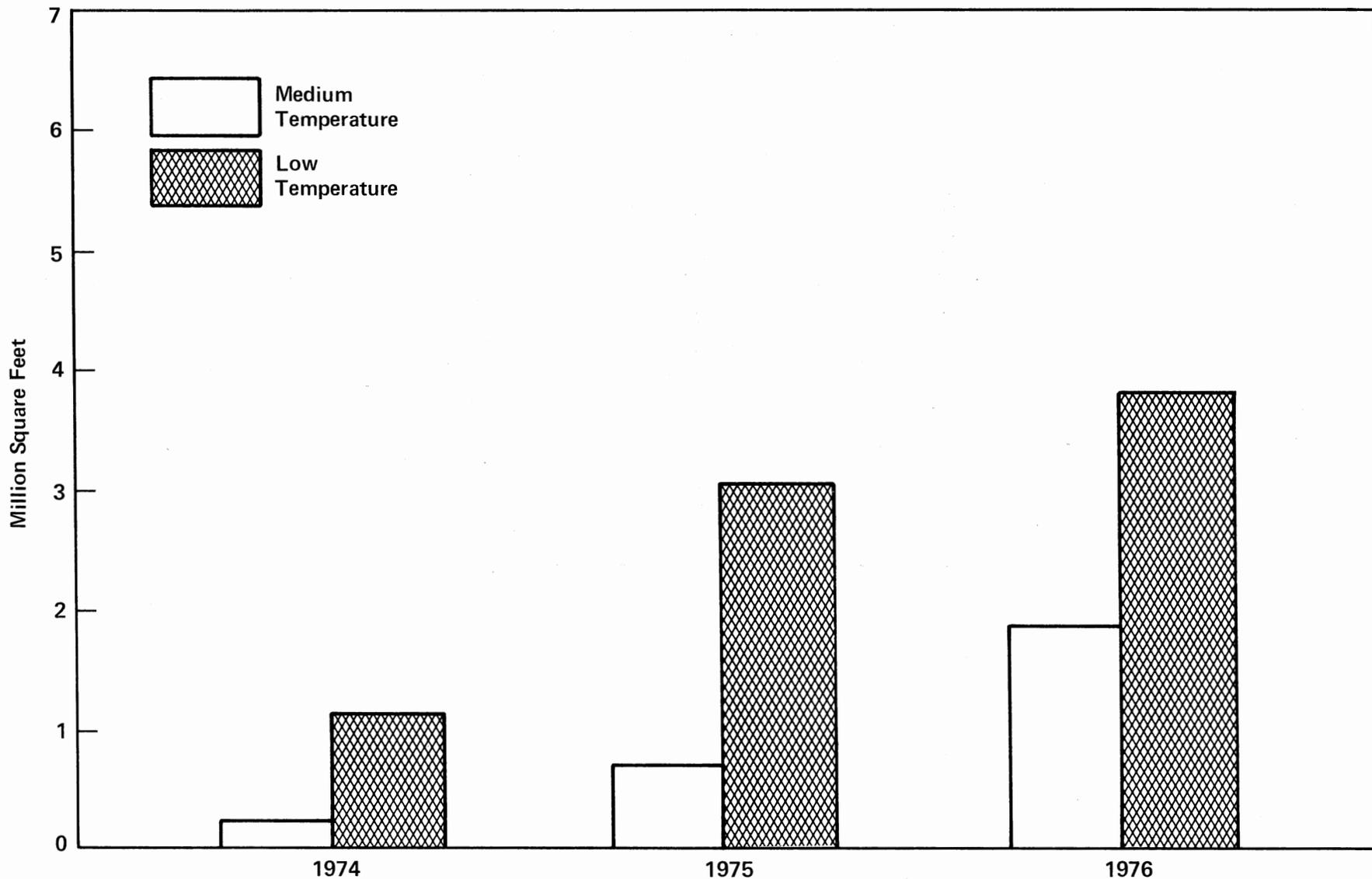
Production of Electricity from Geothermal Sources

Year	Net Capacity on Line	Net Production
	Megawatts	Million Kilowatt Hours
1960	24	NA
1961	24	NA
1962	24	NA
1963	24	NA
1964	24	NA
1965	24	NA
1966	24	NA
1967	51	NA
1968	78	NA
1969	78	NA
1970	78	525
1971	184	528
1972	290	1,453
1973	396	1,966
1974	396	2,453
1975	502	3,246
1976	502	3,615
1977	502	3,582

NA = Not available.

Source: Federal Power Commission and Energy Information Administration.

Production of Solar Collectors



Source: Federal Energy Administration and Energy Information Administration.

Production of medium-temperature solar collectors has grown 15-fold since 1974. U.S. Department of Energy estimates that residential solar

water and/or space systems were installed in approximately 20,000 homes during the first 6 months of 1977.

Production of Solar Collectors, 1974-1977

Year	Medium-Temperature Collectors		Low-Temperature Collectors	
	Number of Manufacturers	Quantity Manufactured (thousand square feet)	Number of Manufacturers	Quantity Manufactured (thousand square feet)
1974	39	136.5	6	1,137.2
1975	118	717.3	13	3,026.0
1976	203	1,924.7	15	3,875.8
1977 ¹	186	1,884.8	15	3,222.2

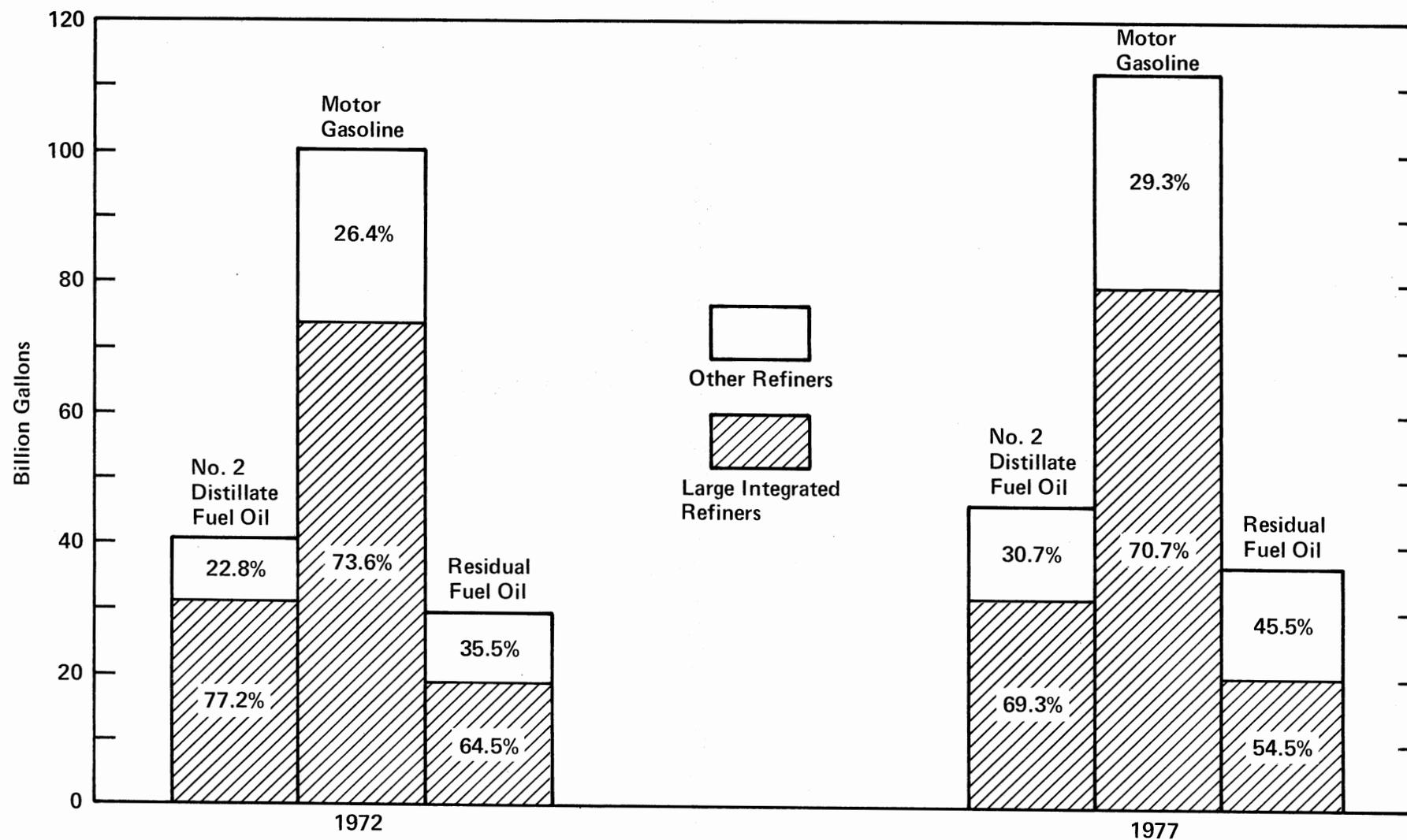
¹ January through June.

Source: Federal Energy Administration and Energy Information Administration.



8 Market Shares

Sales of Selected Refined Petroleum Products by Refiner Type



Source: Federal Energy Administration and Energy Information Administration.

The large integrated refiners distributed most of the refined petroleum products sold during the last 6 years; however, growth in motor gasoline,

No. 2 distillate fuel oil, and residual fuel oil sales, since 1972, is primarily attributable to refiners other than the large integrated refiners.

Sales of Selected Refined Petroleum Products by Refiner Type, 1972-1977¹
(Billion Gallons)

Products Refiner Groups	1972	1973	1974	1975	1976	1977
Motor Gasoline						
Large Integrated Refiners ² -----	74.0	77.6	75.5	76.6	79.1	79.6
Other Refiners -----	26.6	27.2	27.4	29.2	31.6	32.9
Total Refiner Sales -----	100.6	104.8	102.9	105.8	110.7	112.5
Aviation Gasoline						
Large Integrated Refiners ² -----	0.7	0.6	0.6	0.5	0.5	0.5
Other Refiners -----	(³)					
Total Refiner Sales -----	0.7	0.6	0.6	0.5	0.5	0.5
Jet Fuel						
Large Integrated Refiners ² -----	10.8	10.7	10.9	11.7	12.2	12.8
Other Refiners -----	1.9	2.0	2.5	2.9	2.7	3.0
Total Refiner Sales -----	12.7	12.7	13.4	14.6	14.9	15.8
No. 2 Distillate Fuel Oil						
Large Integrated Refiners ² -----	31.2	32.0	31.0	30.9	32.4	32.1
Other Refiners -----	9.2	9.4	10.2	10.2	12.5	14.2
Total Refiner Sales -----	40.4	41.4	41.2	41.1	44.9	46.3
Other Distillate Fuel Oil						
Large Integrated Refiners ² -----	5.9	6.2	5.4	3.8	4.0	4.0
Other Refiners -----	2.6	2.6	2.4	2.5	2.6	2.7
Total Refiner Sales -----	8.5	8.8	7.8	6.3	6.6	6.7
Residual Fuel Oil						
Large Integrated Refiners ² -----	19.0	20.9	18.8	16.1	19.1	20.3
Other Refiners -----	10.5	12.5	13.4	12.7	13.7	16.9
Total Refiner Sales -----	29.5	33.4	32.2	28.8	32.8	37.2

¹ Includes sales in U.S. territories.

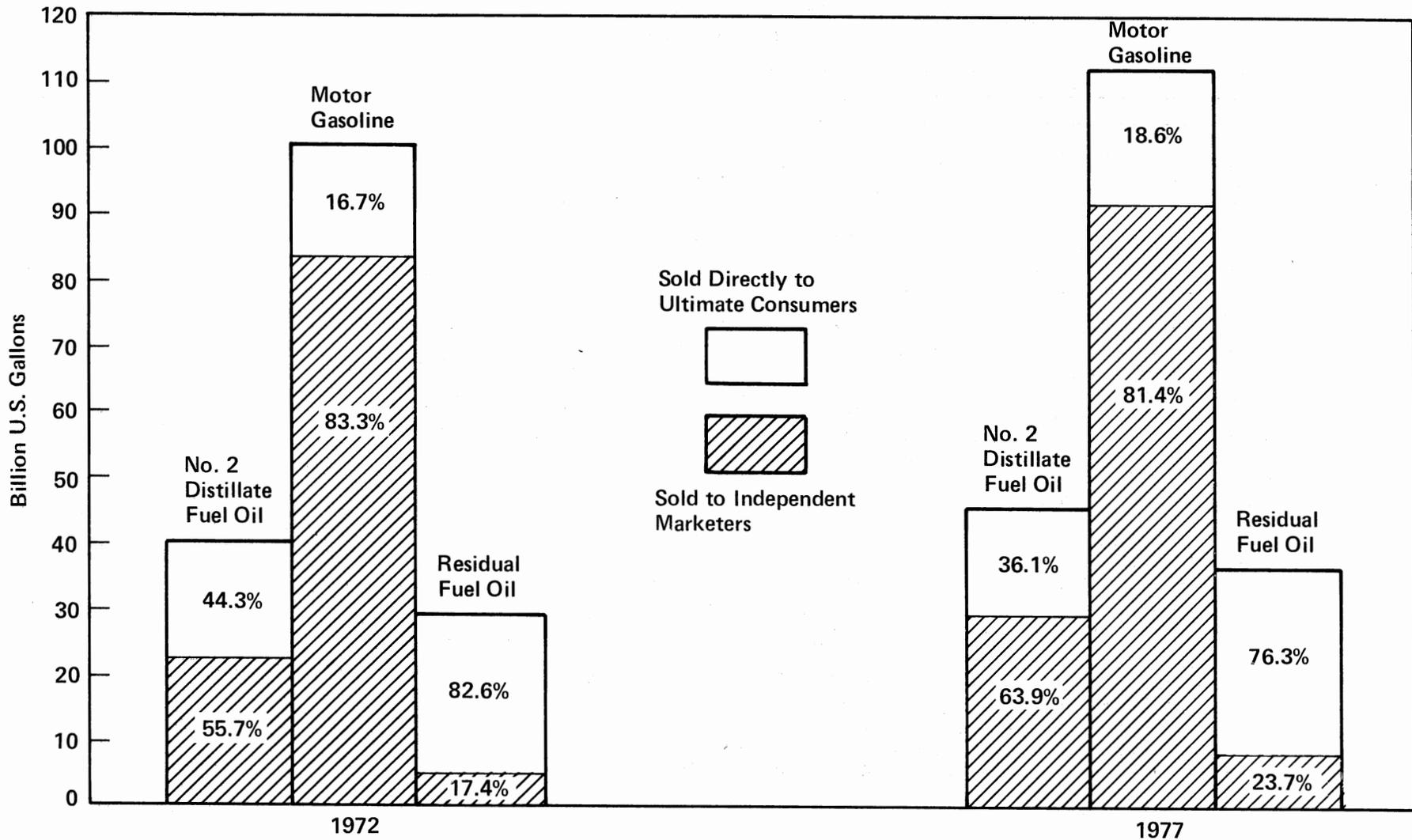
² Consists of the following refiners: Amoco, ARCO, CITGO, CONOCO, Exxon, Getty/Skelly, Gulf, Marathon, Mobil, Phillips, Shell, SOCAL, Sun, Texaco, and Union.

³ Less than 0.05 billion U.S. gallons.

Note: Totals may not agree with other tables due to independent rounding.

Source: Federal Energy Administration and Energy Information Administration.

Refiner Sales of Selected Refined Petroleum Products to Ultimate Consumers and Independent Marketers



Source: Federal Energy Administration and Energy Information Administration.

Although the refiner motor gasoline sales to independent marketers has increased about 9 percent since 1972, sales to independent marketers as a percent of total refiner sales is down about 2 percentage points.

Since 1972, refiner sales of No. 2 distillate and residual fuel oils to independent marketers are up 32 and 73 percent, respectively. The independent marketers share of total refiners sales is up about 8 percentage points for No. 2 distillate and 6 percentage points for residual fuel oil.

Refiner Sales of Selected Refined Petroleum Products to Ultimate Consumers and to Independent Marketers, 1972-1977¹
(Billion Gallons)

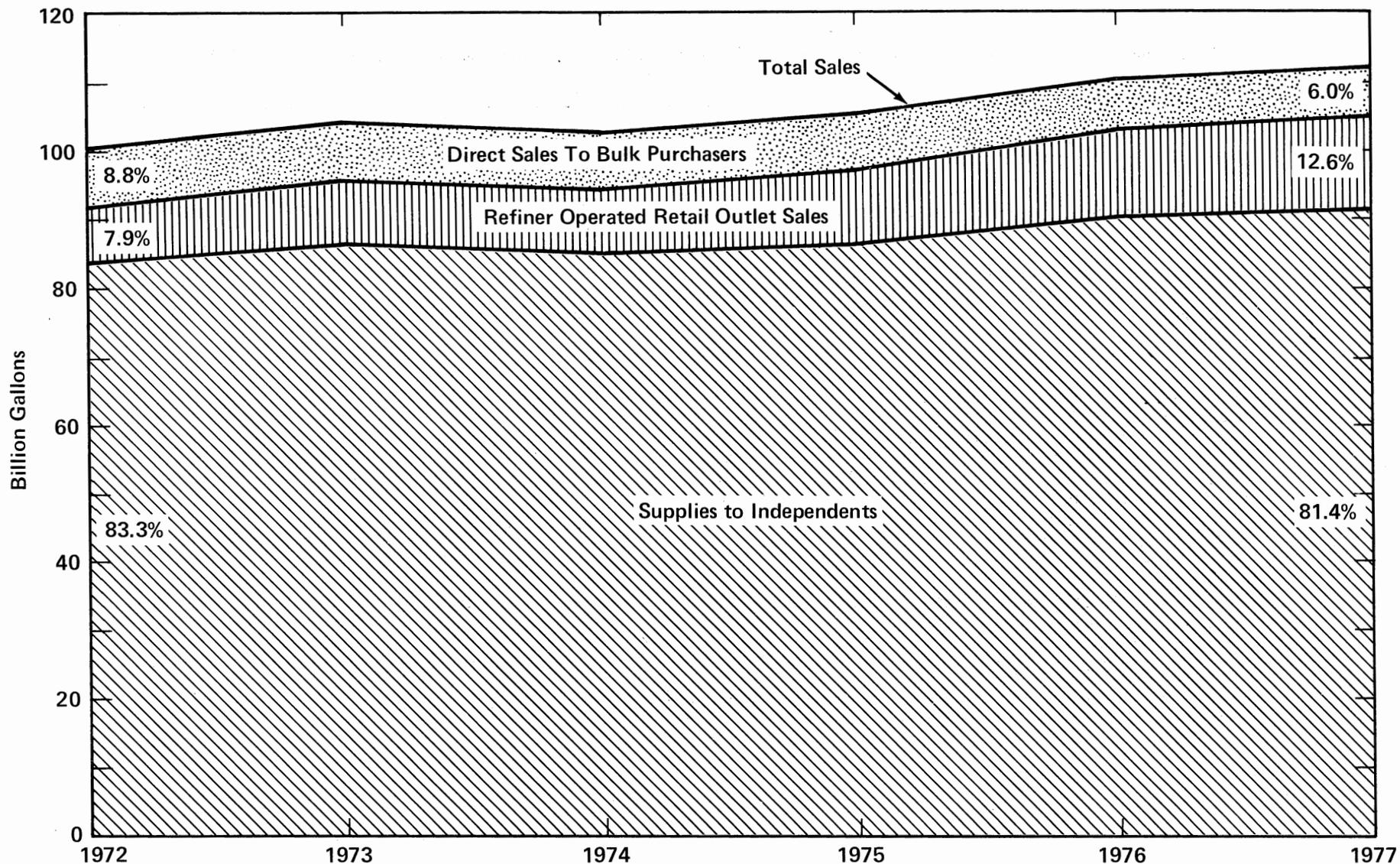
Products Sales Categories	1972	1973	1974	1975	1976	1977
Motor Gasoline						
Sold Directly To Ultimate Consumers --	16.8	17.9	17.9	19.2	20.2	21.0
Sold To Independent Marketers -----	83.8	86.9	85.0	86.6	90.5	91.5
Total Refiner Sales -----	100.6	104.8	102.9	105.8	110.7	112.5
Aviation Gasoline						
Sold Directly To Ultimate Consumers --	0.4	0.3	0.3	0.2	0.2	0.2
Sold To Independent Marketers -----	0.3	0.3	0.3	0.3	0.3	0.4
Total Refiner Sales -----	0.7	0.6	0.6	0.5	0.5	0.6
Jet Fuel						
Sold Directly To Ultimate Consumers --	12.4	12.4	13.0	14.2	14.5	15.3
Sold To Independent Marketers -----	0.3	0.3	0.4	0.4	0.5	0.5
Total Refiner Sales -----	12.7	12.7	13.4	14.6	15.0	15.8
No. 2 Distillate Fuel Oil						
Sold Directly To Ultimate Consumers --	17.9	18.2	17.5	16.5	16.4	16.7
Sold To Independent Marketers -----	22.5	23.3	23.7	24.6	28.5	29.6
Total Refiner Sales -----	40.4	41.5	41.2	41.1	44.9	46.3
Other Distillate Fuel Oil						
Sold Directly To Ultimate Consumers --	4.1	4.1	3.9	3.1	3.2	3.5
Sold To Independent Marketers -----	4.4	4.6	3.9	3.2	3.4	3.2
Total Refiner Sales -----	8.5	8.7	7.8	6.3	6.6	6.7
Residual Fuel Oil						
Sold Directly To Ultimate Consumers --	24.4	27.2	26.0	22.9	25.3	28.4
Sold To Independent Marketers -----	5.1	6.2	6.2	5.8	7.5	8.8
Total Refiner Sales -----	29.5	33.4	32.2	28.7	32.8	37.2

¹ Includes sales in U.S. territories.

Note: Totals may not agree with other tables due to independent rounding.

Source: Federal Energy Administration and Energy Information Administration.

Sales of Motor Gasoline to Marketing Categories by Refiners



Source: Federal Energy Administration and Energy Information Administration.

Sales by refiner operated retail outlets increased 80 percent during 1972-1977. Most of the increase was experienced by refiners other than the large integrated refiners. During this period, direct sales to bulk pur-

chasers declined 24 percent, and total sales to independents increased 9.3 percent.

Sales of Motor Gasoline to Marketing Categories by Refiners, 1972-1977¹
(Billion Gallons)

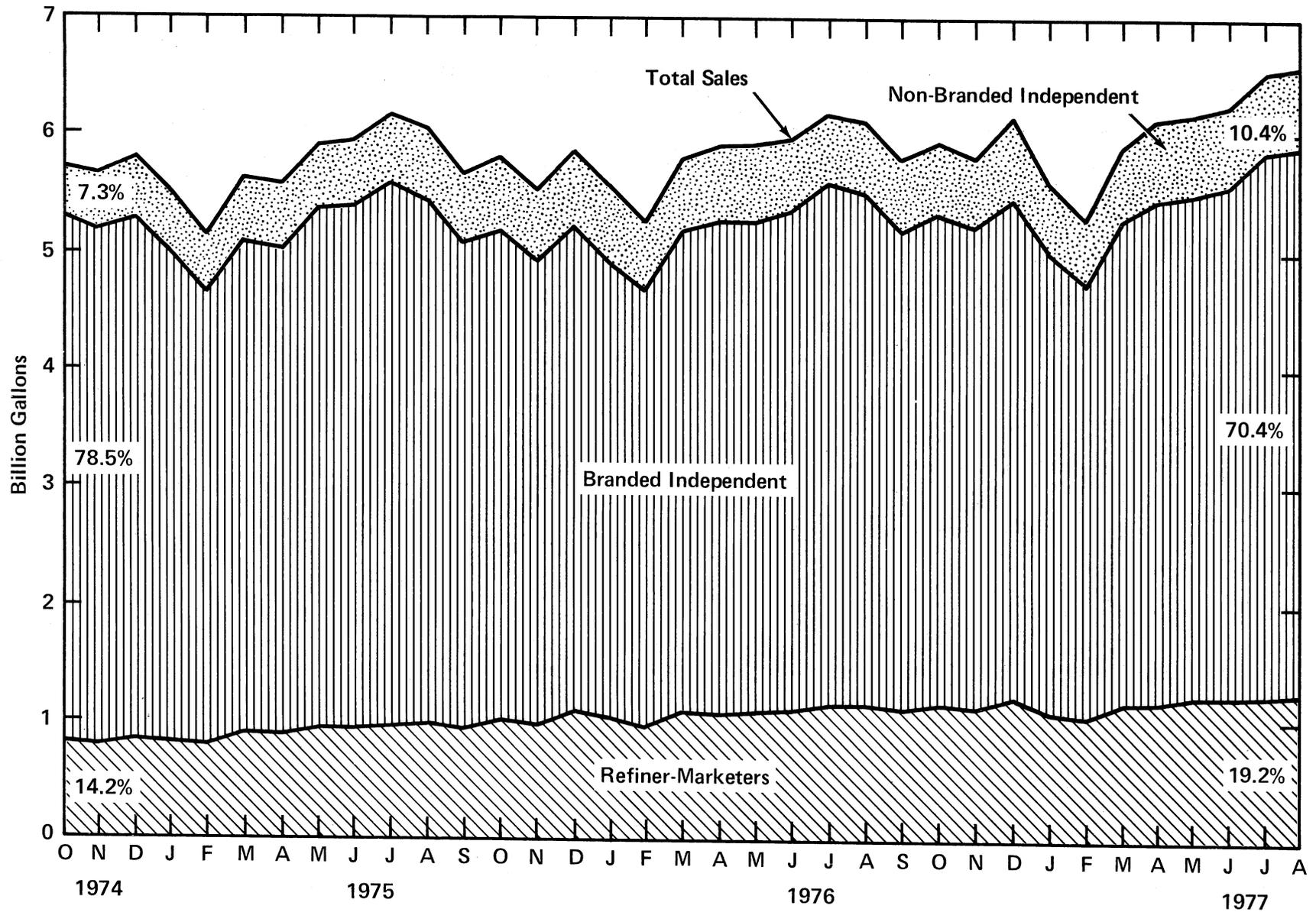
Refiner Groups						
Sales Categories	1972	1973	1974	1975	1976	1977
Large Integrated Refiners						
Direct Sales To Bulk Purchasers -----	8.3	8.2	7.9	7.6	6.7	6.2
Refiner Operated Retail Outlet Sales ---	3.4	3.9	3.8	4.5	5.5	5.8
Supplies To Independents, Total -----	62.3	65.5	63.7	64.4	66.9	67.5
Branded Product To Open Dealers ----	9.3	10.2	9.9	9.8	9.8	10.0
Branded Product To Lessee Dealers --	32.2	33.6	30.8	28.3	27.9	27.3
Branded Product To Jobbers -----	15.8	17.0	16.9	18.7	21.3	21.8
Nonbranded Product To Jobbers -----	5.0	4.7	6.1	7.6	7.9	8.4
Total -----	74.0	77.6	75.4	76.5	79.1	79.5
Other Refiners						
Direct Sales To Bulk Purchasers -----	0.6	0.6	0.6	0.5	0.5	0.6
Refiner Operated Retail Outlet Sales ---	4.5	5.2	5.5	6.6	7.5	8.4
Supplies To Independents, Total -----	21.4	21.3	21.3	22.1	23.5	23.9
Branded Product To Open Dealers ----	1.9	2.0	2.0	1.7	1.8	1.8
Branded Product To Lessee Dealers --	4.6	5.0	3.9	3.4	2.9	2.5
Branded Product To Jobbers -----	4.7	5.0	5.0	5.4	5.4	5.1
Nonbranded Product To Jobbers -----	10.2	9.3	10.4	11.6	13.4	14.5
Total -----	26.5	27.1	27.4	29.2	31.5	32.9
All Refiners						
Direct Sales To Bulk Purchasers -----	8.9	8.8	8.4	8.1	7.3	6.8
Refiner Operated Retail Outlet Sales ---	7.9	9.2	9.4	11.1	13.0	14.2
Supplies To Independents, Total -----	83.7	86.8	85.0	86.6	90.4	91.5
Branded Product To Open Dealers ----	11.1	12.2	11.9	11.5	11.6	11.8
Branded Product To Lessee Dealers --	36.8	38.5	34.7	31.7	30.8	29.9
Branded Product To Jobbers -----	20.5	22.1	21.9	24.2	26.7	26.8
Nonbranded Product To Jobbers -----	15.3	14.0	16.5	19.2	21.3	23.0
Total -----	100.5	104.8	102.8	105.8	110.7	112.5

¹ Includes sales in U.S. territories.

Note: Due to independent rounding, totals may not agree with other tables and sum of components may not add to All Refiners' total in this table.

Source: Federal Energy Administration and Energy Information Administration.

Sales of Motor Gasoline Through Service Stations by Marketer Type



Source: Federal Energy Administration and Energy Information Administration.

Branded independent marketer service station sales have declined from 78 percent of total U.S. service station sales in October 1974 to 70 percent in August 1977. Correspondingly, refiner/marketers and non-

branded independent marketers increased their share of service station sales by 5 and 3 percentage points, respectively.

Sales of Motor Gasoline through Service Stations by Marketer Type, Monthly—
October 1974 Through August 1977
(Million Gallons)

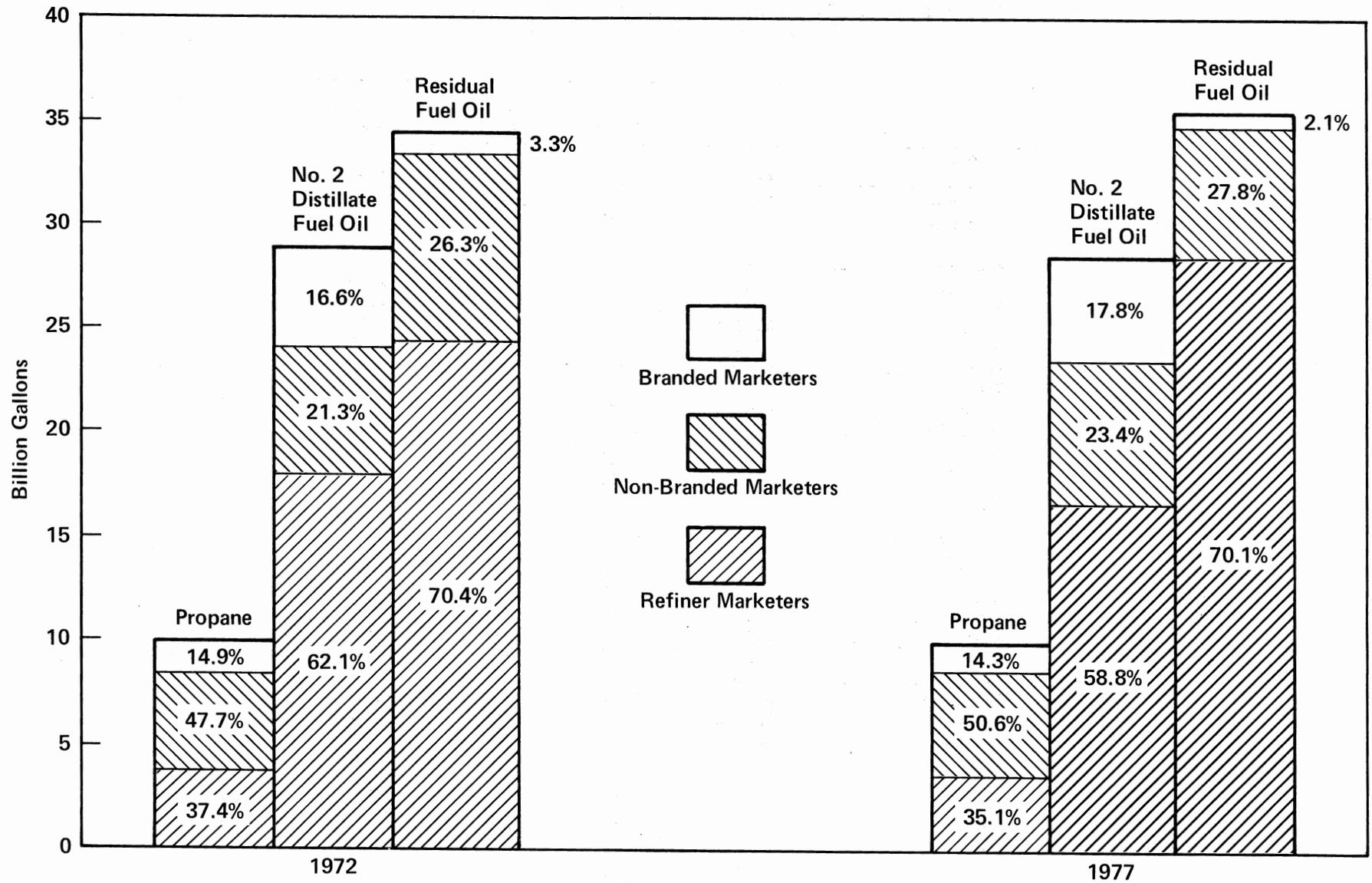
Year Month	Total	Refiners Marketers ¹	Non- branded Independent	Branded Independent
1974				
October -----	5,716	812	417	4,487
November -----	5,660	793	466	4,401
December -----	5,803	848	520	4,435
1975				
January -----	5,506	827	505	4,174
February -----	5,149	799	486	3,864
March -----	5,618	904	533	4,181
April -----	5,573	884	558	4,131
May -----	5,916	952	564	4,400
June -----	5,959	938	575	4,446
July -----	6,153	958	581	4,614
August -----	6,050	988	606	4,456
September -----	5,650	949	572	4,129
October -----	5,793	1,010	605	4,178
November -----	5,536	982	596	3,958
December -----	5,853	1,085	639	4,129
1976				
January -----	5,562	1,025	642	3,895
February -----	5,247	965	585	3,697
March -----	5,794	1,092	614	4,088
April -----	5,909	1,068	643	4,198
May -----	5,914	1,082	661	4,171
June -----	5,970	1,100	618	4,252
July -----	6,176	1,148	604	4,424
August -----	6,110	1,152	610	4,348
September -----	5,779	1,107	606	4,066
October -----	5,934	1,152	614	4,168
November -----	5,819	1,115	602	4,102
December -----	6,134	1,204	692	4,238
1977				
January -----	5,583	1,089	596	3,898
February -----	5,298	1,033	572	3,693
March -----	5,885	1,163	615	4,107
April -----	6,112	1,168	674	4,270
May -----	6,163	1,207	682	4,274
June -----	6,242	1,207	679	4,356
July -----	6,532	1,214	693	4,625
August ² -----	6,573	1,258	685	4,630

¹ Includes sales in U.S. territories.

² Preliminary.

Source: Federal Energy Administration and Energy Information Administration.

Sales of Selected Refined Petroleum Products to Ultimate Consumers by Type of Marketer



Source: Federal Energy Administration and Department of Energy.

Sales of propane to ultimate consumers in 1977 were at their highest since 1973.

Residual fuel oil sales to ultimate consumers have increased by approximately 17 percent since 1972.

In 1977, nontruckstop sales of No. 2 distillate fuel oil to ultimate consumers reached their highest level since 1973.

Sales of Selected Refined Petroleum Products to Ultimate Consumers by Type of Marketer 1972-1977¹
(Billion Gallons)

Products Class of Marketer	1972	1973	1974	1975	1976	1977
	Propane					
Refiner Marketers -----	3.7	3.7	3.4	2.9	3.1	3.5
Branded Independent Marketers -----	1.5	1.5	1.3	1.4	1.5	1.4
Nonbranded Independent Marketers -----	4.7	5.0	4.7	4.6	4.9	5.1
Total Sales to Ultimate Consumers -----	9.9	10.2	9.4	8.9	9.5	10.0
No. 2 Distillate Fuel Oil						
Refiner Marketers -----	17.9	18.2	17.5	16.5	16.3	16.7
Branded Independent Marketers -----	4.8	5.0	4.7	4.8	5.0	5.1
Nonbranded Independent Marketers -----	6.1	6.0	5.9	5.9	6.6	6.7
Total Sales to Ultimate Consumers -----	28.8	29.2	28.1	27.2	27.9	28.5
Other Distillate Fuel Oil						
Refiner Marketers -----	4.1	4.1	3.9	3.1	3.2	3.5
Branded Independent Marketers -----	0.6	0.6	0.6	0.8	0.8	0.8
Nonbranded Independent Marketers -----	0.7	0.7	0.5	0.7	0.9	0.8
Total Sales to Ultimate Consumers -----	5.4	5.4	5.0	4.6	4.9	5.1
Residual Fuel Oil						
Refiner Marketers -----	24.3	27.2	26.0	22.9	25.3	28.4
Branded Independent Marketers -----	1.1	1.1	1.0	1.1	0.8	0.8
Nonbranded Independent Marketers -----	9.1	9.5	8.7	8.4	9.4	11.3
Total Sales to Ultimate Consumers -----	34.5	37.8	35.7	32.4	35.5	40.5

¹ Includes sales in U.S. territories.

Note: Total may not agree with other tables due to independent rounding.

Source: Federal Energy Administration and Energy Information Administration.



Definitions

DEFINITIONS

Aviation Gasoline. All special grades of gasoline for use in aviation reciprocating engines. Includes aviation gasoline conforming to ASTM Specification D910, aviation gasoline, as amended, and all refinery products within the gasoline range that are to be marketed straight or in blends as aviation gasoline without further refinery processing, except mechanical blending. Also includes finished components in the gasoline range or agents that will be used for blending or compounding into aviation gasoline.

Base Gas. The total volume of natural gas in underground storage reservoirs which will maintain the required rate of delivery during an output cycle

Bituminous Coal and Lignite Consumption, Coke Plant Sector. Consumption at all plants where bituminous coal is carbonized for the manufacture of coke in slot or beehive ovens.

Bituminous Coal and Lignite Consumption, Electric Utility Sector. Consumption by privately- and publicly-owned establishments engaged in the generation and/or distribution of electric power, primarily for sale or resale. Includes Federal and State projects, cooperatives, and plants which supply power for a specific public function such as street lighting.

Bituminous Coal and Lignite Consumption, General Industry and Other Sector. Consumption at manufacturing plants, large commercial establishments, and for coking at steel plants, transportation, and miscellaneous uses.

Bituminous Coal and Lignite Consumption, Retail Dealers Sector. Sales to households and small commercial establishments.

Branded Independent Marketer. A firm that is engaged in the marketing or distribution of refined petroleum products pursuant to:

1. An agreement of contract with a refiner (or a firm that controls, is controlled by, or is under common control with such refiner) to use a trademark, trade name, service mark, or other identifying symbol or name owned by such refiner (or any such firm), or
2. An agreement or contract under which any such firm engaged in the marketing or distribution of refined petroleum products

is granted authority to occupy premises owned, leased, or in any way controlled by a refiner (or firm that controls, is controlled by, or is under common control with such refiner),

but which is not affiliated with, controlled by, or under common control with any refiner (other than by means of a supply contract, or an agreement or contract described in paragraph (1) or (2) of this definition), and which does not control such refiner.

Branded Product. A refined petroleum product sold by a refiner with the understanding that the purchaser has the right to resell the product under a trademark, trade name, service mark, or other identifying symbol or names owned by such refiner.

Coke, Petroleum. A solid residue; the final product of the condensation process in cracking. It consists probably of highly polycyclic aromatic hydrocarbons very poor in hydrogen. Calcination of petroleum coke can yield almost pure carbon or artificial graphite suitable for production of carbon or graphite electrodes, structural graphite, motor brushes, dry cells, and the like.

Crude Oil. A mixture of hydrocarbons that exists in the liquid phase in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities.

Crude Oil Imports. The volume of crude oil imported into the 50 States and the District of Columbia, including imports from U.S. territories, but excluding imports of crude oil into the Hawaiian Foreign Trade Zone.

Crude Oil Stocks. Stocks of crude oil and lease condensate held at refineries, pipeline terminals, and on leases.

Distillate Fuel Oil. The lighter fuel oils distilled off during the refining process. Included are products known as ASTM grades Nos. 1 and 2 heating oils, diesel fuels, and No. 4 fuel oil. The major uses of distillate fuel oils include heating, fuel for on- and off-highway diesel engines, and railroad diesel fuel.

Domestic Demand for Specific Refined Petroleum Products. A calculated value, computed as domestic production plus net imports (imports less exports), less the net increase in primary stocks. It, there-

fore, represents the total disappearance of a refined product from primary supplies.

Electricity Consumption, Commercial Sector. Sales of electricity to businesses with a demand generally less than 1,000 kilowatts.

Electricity Consumption, Industrial Sector. Sales of electricity to businesses with a demand generally greater than 1,000 kilowatts.

Electricity Consumption, "Other" Sector. Electricity sales to government, railways, and for street lighting, and sales not included elsewhere.

Electricity Consumption, Residential Sector. Sales of electricity for residential and household purposes.

Electricity Production. Production at electric utilities only. Does not include industrial electricity generation.

Energy Consumption, Industrial Sector. Real consumption by, apparent demand by, sales to, or deliveries to construction, manufacturing, agricultural, and mining establishments.

Energy Consumption, Residential and Commercial Sector. Real consumption by, apparent demand by, sales to, or deliveries to private households, housing units, nonmanufacturing business establishments (e.g. wholesale and retail businesses), health and educational institutions, and public buildings.

Energy Consumption, Transportation Sector. Real consumption by, apparent demand by, sales to, or deliveries to both private and public passenger and freight transportation, as well as government transportation, including military operations.

Energy Consumption, Electric Utility Sector. Real consumption by, apparent demand by, sales to, or deliveries to privately and publicly owned establishments which generate electricity primarily for sale or resale.

Exports. Shipments from the 50 States and the District of Columbia to foreign countries and U.S. possessions and territories.

Extraction Loss. The reduction in volume of wet natural gas due to the removal of some of its constituents, such as hydrocarbon products, hydrogen, helium, inorganic materials, and water vapor.

Imports. Imports (receipts) in the 50 States and the District of Columbia for consumption from foreign countries including U.S. territories and the Hawaiian Foreign Trade Zone. Excludes receipts into bonded warehouse, includes withdrawal from bonded warehouse for onshore consumption, offshore bunker use, and military use.

Indicated Resources, Coal. Coal resources for which estimates of the rank, quality, and quantity have been computed partly from sample analyses and measurements and partly from reasonable geologic projections.

Jet Fuel. Includes both naphtha-type and kerosene-type fuels meeting standards for use in aircraft turbine engines. Although most jet fuel is used in aircraft, some is used for other purposes, such as for generating electricity in gas turbines.

Jobber Prices. The price at which a petroleum jobber purchases refined products from a refiner or terminal operator.

Kerosene. A petroleum distillate in the 300 to 500 degrees Fahrenheit boiling range and generally having a flash point higher than 100 degrees Fahrenheit by ASTM Method D56, a gravity range from 40 to 46 degrees API, and a burning point in the range of 150 to 175 degrees Fahrenheit. It is a clean-burning product suitable for use as an illuminant when burned in wick lamps. Includes grades of kerosene called range oil having properties similar to No. 1 fuel oil, but with a gravity of about 43 degrees API and an end point of 625 degrees Fahrenheit. Used in space heaters, cooking stoves, and water heaters.

Large Integrated Refiner. A refiner with a total refinery capacity greater than 175,000 barrels per day which obtains less than 70 percent of its crude oil from producers who do not control, are not controlled by, and are not under common control with, such refiner. Includes Atlantic Richfield, Cities Service, Continental, Exxon, Getty/Skelly, Gulf, Marathon, Mobil, Phillips, Shell, Standard of California, Standard of Indiana, Sun, Texaco, and Union.

Lease Condensate. A natural gas liquid recovered from gas well gas in lease separators. Consists primarily of pentanes and heavier hydrocarbons.

Lessee Dealer. An independent marketer who leases the station and land and has use of tanks, pumps, signs, and the like. He typically

has a supply agreement with a refiner or a distributor and purchases products at dealer tank wagon prices. As used herein, this marketing category is limited to those lessee dealers who are supplied directly by a refiner or any affiliated or subsidiary company of a refiner.

Liquefied gases. Propane, propylene, butanes, butylene, propane-butane mixtures, and isobutane that are produced at a refinery, a natural gas processing plant, or a field facility.

Low Temperature Solar Collectors. Low-temperature collectors are used almost exclusively to heat swimming pools. They usually are made of plastic or rubber and are designed to increase the temperature of large streams of rapidly circulating water by 5 to 10 degrees Fahrenheit. Operating in the lower temperature range, of 70 to 90 degrees Fahrenheit, and in a higher ambient temperature, low-temperature collector efficiency is generally higher than that of conventional medium-temperature flat-plate collectors.

Lubricants. All lubricants containing more than 50 percent by volume of refined petroleum distillates or specially treated petroleum residuum. Includes lubricating greases, lube basestocks, and all grades of lubricating oils from spindle oil to cylinder oil and those used in greases.

Measured Resources, Coal. Coal resources for which estimates of the quality and quantity have been computed, within a margin of error of less than 20 percent, from analyses and measurements from closely spaced and geologically well known sample sites.

Medium Temperature Solar Collectors. Medium-temperature collectors typically are composed of a metal absorber plate covered by a single or double glazing of glass or plastic insulation on the sides and in the rear, all within a rigid frame. They generally operate in the 140 to 180 degrees Fahrenheit temperature range, and are used primarily for space heating and domestic water heating. Also in this category are collectors with selective absorption-emission surfaces, double glazing, greater insulation, and other special features that allow operation up to about 250 degrees Fahrenheit. These high-performance flat-plate collectors are designed to work with absorption type air conditioners.

Native Gas. The total volume of natural gas indigenous to the storage reservoir at the time the gas storage started.

Natural Gas. A mixture of hydrocarbon compounds and small quantities of various nonhydrocarbons existing in the gaseous phase or in solution with crude oil in natural underground reservoirs at reservoir conditions.

Natural Gas Consumption, Commercial Sector. Deliveries to non-manufacturing establishments including those engaged in agriculture, forestry, and fishing.

Natural Gas Consumption, Electric Utility Sector. Deliveries to electric utilities for the generation of electric power.

Natural Gas Consumption, Industrial Sector. Deliveries to establishments engaged primarily in processing unfinished materials into another form or product. Includes mining, petroleum refining, and manufacturing.

Natural Gas Consumption, Residential Sector. Deliveries to private households for heating, cooking, and other household uses.

Natural Gas Consumption, "Other" Sector. Deliveries to municipalities and public authorities for institutional heating and lighting.

Natural Gas Delivered to Consumers. Natural gas sold to consumers after the liquids have been removed. Does not include gas used for plant and pipeline fuel.

Natural Gas Liquids (Input to Refineries). Products obtained from natural gasoline plants, cycling plants, and fractionators after processing the natural gas. Included are ethane, liquefied petroleum (LP) gases (propane, butane, and propane-butane mixtures), natural gasoline, and plant condensate.

Natural Gas, Marketed Production. Gross withdrawals less gas used for repressuring and quantities vented and flared, measured before the extraction of natural gas liquids.

New Crude Oil. (1) Prior to February 1, 1976: the total number of barrels of domestic crude oil produced and sold in a specific month, less the base production control for that month and less the current cumulative deficiency. (2) Effective February 1, 1976: the total number of barrels of domestic crude oil produced and sold in a specific month, less the property's base production control level for that month and less the current cumulative deficiency since February 1, 1976.

Nonbranded Independent Marketer. A firm that is engaged in the marketing or distribution of refined petroleum products, but which (1) is not a refiner, (2) is not a firm that controls, is controlled by, is under common control with, or is affiliated with a refiner (other than by means of a supply contract), and (3) is not a branded independent marketer.

Nonbranded Product. Any refined petroleum product that is not a branded product.

Old Crude Oil. (1) Prior to February 1, 1976: the total number of barrels of crude oil produced and sold from a property in a specific month, less the total number of barrels of new crude oil for that property in that month, and less the total number of barrels of released crude oil for that property in that month. (2) Effective February 1, 1976: the total number of barrels of crude oil produced and sold from a property in a specific month, less the total number of barrels of new crude oil for that property in that month.

Open Dealer. An independent marketer who owns, or leases from a third party (who is not a refiner), the station or land of a retail outlet, and has use of tanks, pumps, signs, and the like. He typically has a supply agreement with a refiner or a distributor and purchases products at or below dealer tank wagon prices. As used herein, this marketing category is limited to those open dealers who are supplied directly by a refiner or any subsidiary or affiliated company of a refiner.

Petrochemical Feedstocks. Refined petroleum product used for processing at a petrochemical plant.

Petroleum. Crude oil (including lease condensate), refined petroleum products including natural gas liquids, and non-hydrocarbon compounds blended into finished petroleum products.

Petroleum Consumption, Electric Utility Sector. Domestic demand for all fuel oils at electric utilities.

Petroleum Consumption, Industrial Sector. Domestic demand for petroleum products for use by establishments engaged in processing unfinished materials into another form or product. Excludes industrial space heating.

Petroleum Consumption, "Other" Sector. Domestic demand for miscellaneous products and for some agricultural uses.

Petroleum Consumption, Residential and Commercial. Domestic demand for petroleum products by private households, and nonmanufacturing establishments. Includes industrial space heating and road paving.

Petroleum Consumption, Transportation Sector. Domestic demand for petroleum products for on-highway use, aircraft and vessel bunkering, and railroad use.

Petroleum Domestic Demand. Disappearance of refined petroleum products from primary supply. This is output from refineries and natural gas processing plants plus imports minus exports plus or minus changes in primary stocks. Primary stocks are those stored in facilities having a capacity of more than 50,000 barrels.

Primary Energy. For the purposes of this report, primary energy is bituminous coal, anthracite coal, lignite, net coke imports, crude oil (including lease condensate), refined petroleum products, natural gas, natural gas liquids, hydroelectric power, nuclear power, and geothermal power.

Processing Gain. The volume by which refinery output exceeds refinery input for a given period. The difference results from the processing of crude oil and other hydrocarbons into a mix of products which have less weight than the crude oil and thus a greater volume.

Property. Prior to August 16, 1976, a property was defined as the right to produce domestic crude oil, which arises from a lease or from a fee interest. This definition was interpreted to apply only to a surface lease. In August 1976, the definition of a property was changed so that a producer may treat as a separate property each separate and distinct producing reservoir subject to the same right to produce crude oil, provided that such reservoir is recognized by the appropriate governmental regulatory authority as a producing formation that is separate and distinct from, and not in communication with, any other producing formation. Although this new definition was not implemented until August 26, 1976, it was made effective retroactively to February 1, 1976. (F.R. 36171, August 26, 1976).

Proved Reserves, Crude Oil. Proved reserves of crude oil as of December 31 of any given year are the estimated quantities of all liquids statistically defined as crude oil, which geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions.

Proved Reserves, Natural Gas. Proved reserves of natural gas as of December 31 of any given year are the estimated quantities of natural gas which geological and engineering data demonstrate with reasonable certainty to be recoverable in the future from known natural oil and gas reservoirs under existing economic and operating conditions.

Proved Reserves, Natural Gas Liquids. Estimates of proved reserves of natural gas liquids on December 31 of any given year include (1) reserves of liquids which are expected to be recovered from associated and nonassociated gas produced from gas wells and processed through lease separators; and (2) reserves of liquids expected to be recovered from associated-dissolved and nonassociated gas when processed in field facilities or gas processing plants. Estimates of proved reserves of natural gas liquids are based on (1) proved reserves of natural gas on December 31, and (2) rates at which liquids can be recovered from natural gas by using processing equipment of the type currently installed or planned as of December 31.

Refined Petroleum Products. Products obtained from the processing of crude oil, unfinished oils, and natural gas liquids. Includes aviation gasoline, motor gasoline, naphtha-type jet fuel, kerosene-type jet fuel, kerosene, distillate fuel oil, residual fuel oil, ethane, liquefied petroleum gases, petrochemical feedstocks, special naphthas, lubricants, wax, coke, asphalt, oils, road oil, still gas, and miscellaneous products.

Refiner Acquisition Cost. The cost to the refiner, including transportation and fees, of crude petroleum. The composite cost is the average of domestic and imported crude costs and represents the amount of crude cost which refiners may pass on to their customers.

Refiner/Marketer. A company that owns, operates, or controls the operation of one or more refineries and markets gasoline through retail outlets.

Refiner Operated Retail Outlet. An outlet selling refined petroleum products to ultimate consumers, which is operated by salaried or commissioned personnel of a refiner and/or involves personnel services contracted by the refiner.

Residential Heating Oil. No. 2 distillate fuel oil for residential heating only.

Residual Fuel Oil. The heavier oils that remain after the distillate fuel oils and lighter hydrocarbons are boiled off in refinery operations. Included are products known as ASTM grades Nos. 5 and 6 oil, heavy diesel oil, Navy Special Fuel Oil, Bunker C oil, and acid sludge and pitch used as refinery fuels. Residual fuel oil is used for the production of electric power, for heating, and for various industrial purposes.

Rotary Rig. Machine used for drilling wells that employs a rotating tube attached to a bit for boring holes through rock.

Sales of Refined Petroleum Products. The transfer of title from the seller to a buyer for a price. It includes all sales in the United States (including U.S. territories and U.S. possessions) made by the reporting firms during the reporting month. All military sales, including those directed to post exchanges, are considered as part of direct sales to ultimate consumers. Excluded are intra-firm transfers, products consumed directly by the reporting firm, sales of bonded fuels, and all other types of sales outside of the United States. A product delivered/loaned through exchange is excluded except where the amount transferred exceeds the amount delivered and is in fact invoiced as a sale during the reporting month.

Small Refiner. A refiner whose total refining capacity does not exceed 175,000 barrels per day.

Stocks of Refined Petroleum Products. Stocks held at refineries, bulk terminals, and pipelines. They do not include stocks held in secondary storage facilities, such as those held by jobbers, dealers, independent marketers, and consumers.

Stripper Well Property. A property whose average daily production of crude oil per well (excluding condensate recovered in nonassociated production) did not exceed 10 barrels per day during any preceding consecutive 12-month period beginning after December 31, 1972.

Total Gasoline. Aviation gasoline plus motor gasoline.

Ultimate Consumer. An individual or firm that purchases refined petroleum products for its own consumption and not for resale. This category includes end users and wholesale purchaser-consumers.

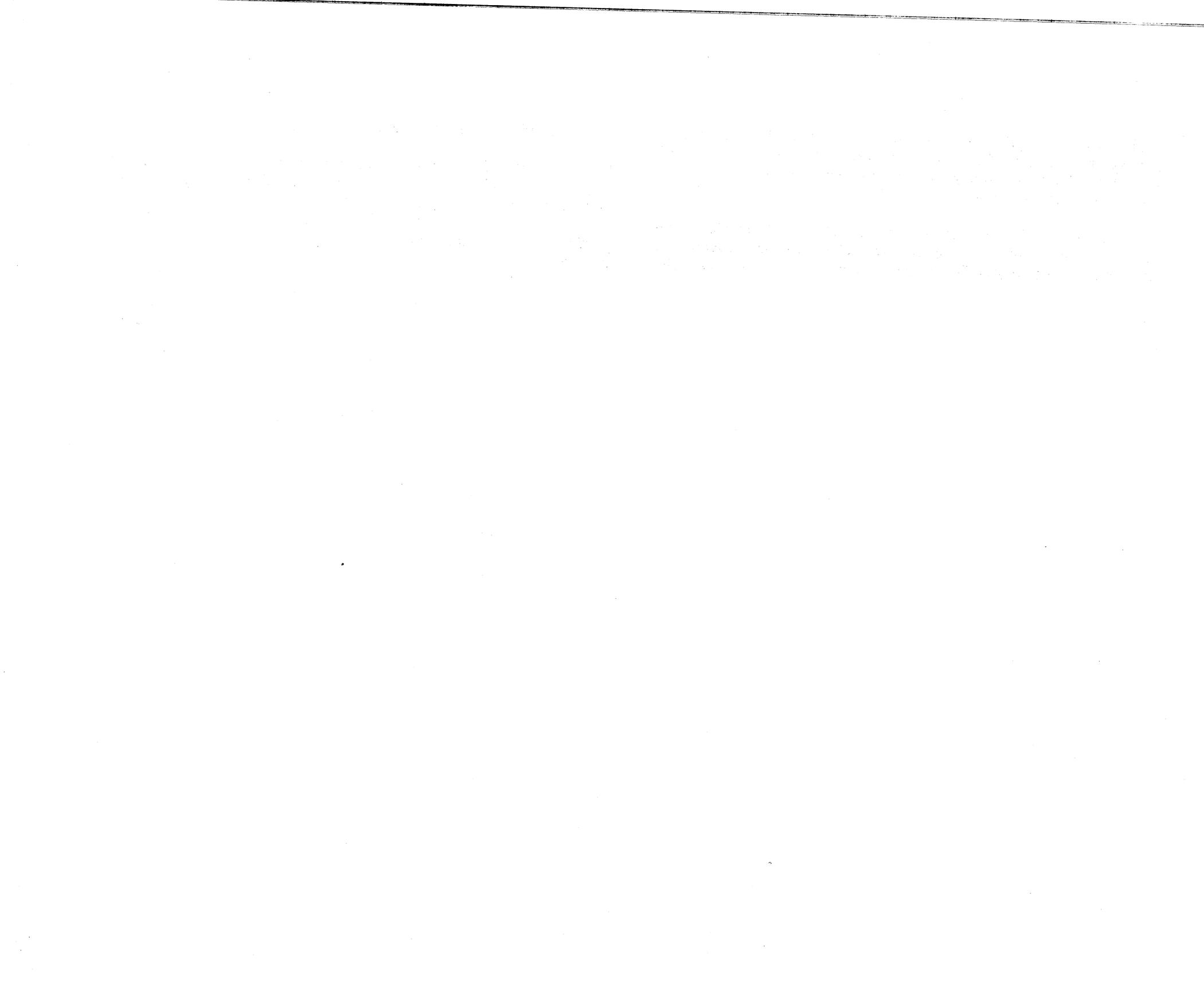
Unfinished Oils (Net). Includes all oils requiring further refinery processing, i.e., any refinery operation other than mechanical blending. Derived by subtracting changes in unfinished oil stocks from imports of unfinished oils.

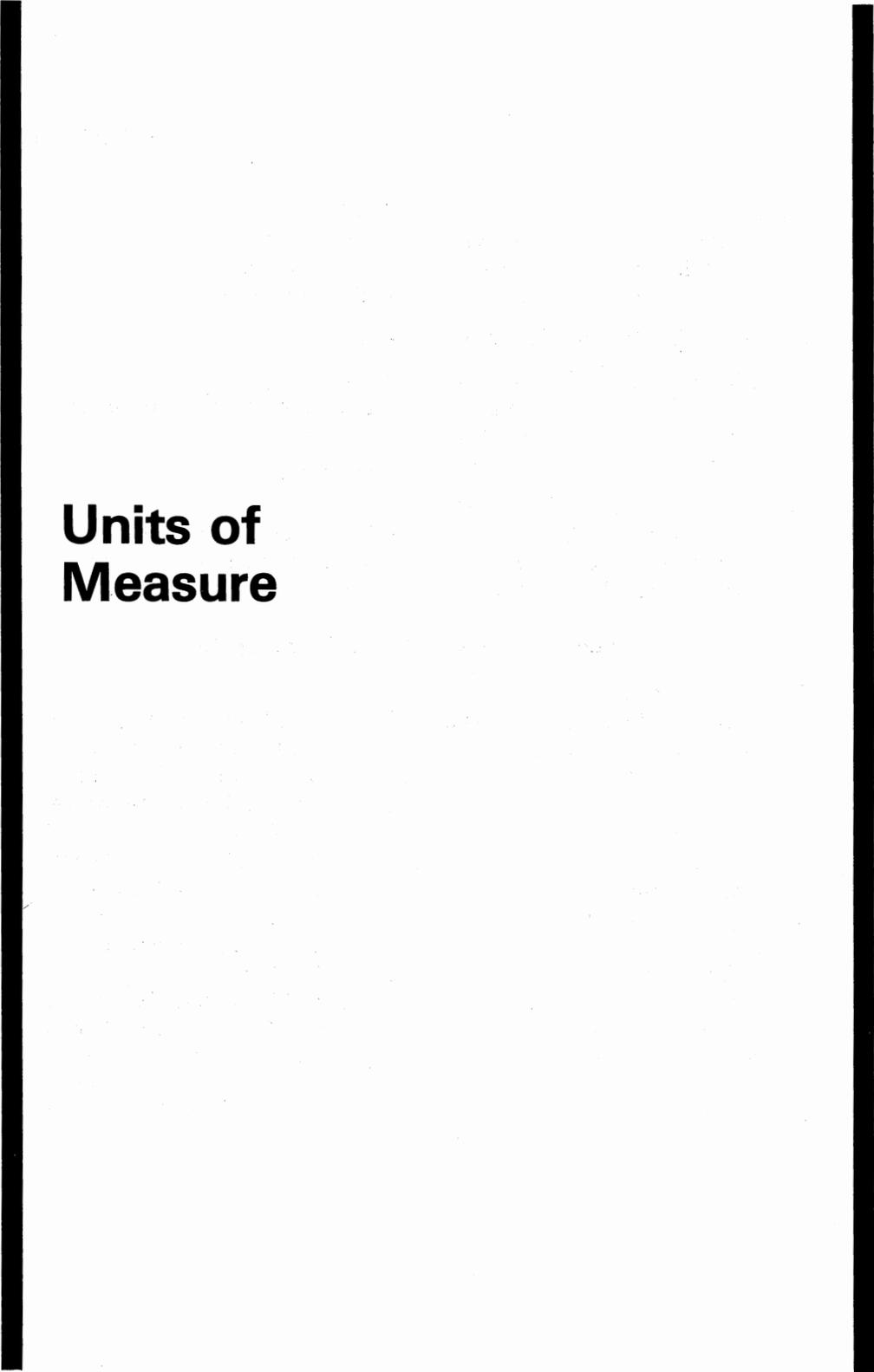
Well. A hole drilled for the purpose of finding or producing crude oil or natural gas or providing services related to the production of crude oil or natural gas. Wells are classified as oil wells, gas wells,

dry holes, stratigraphic tests, or service wells.

Wellhead Value, Natural Gas. The value in U.S. cents per thousand cubic feet of natural gas production reported by the appropriate agencies of the individual producing States.

Working Gas. The total volume of gas in a storage reservoir which is in excess of the base gas.





Units of Measure

UNITS OF MEASURE

Weight

1 short ton	contains	2,000 pounds
1 metric ton	contains	1.102 short tons
1 long ton	contains	1.120 short tons

Conversion Factors for Crude Oil (Average Gravity)

1 barrel	contains	42 gallons
1 barrel	weighs	0.136 metric tons (0.150 short tons)
1 metric ton	contains	7.33 barrels
1 short ton	contains	6.65 barrels

Conversion Factors for Uranium

1 short ton (U ₃ O ₈)	contains	0.769 metric tons of uranium
1 short ton (UF ₆)	contains	0.613 metric tons of uranium
1 metric ton (UF ₆)	contains	0.676 metric tons of uranium

Conversion Factors for Selected Energy Items

Petroleum Products

Total gasoline (includes aviation)	5.248 million Btu/barrel
Jet fuel, average	5.604 million Btu/barrel
Naphtha-type	5.355 million Btu/barrel
Kerosene-type	5.670 million Btu/barrel
Kerosene	5.670 million Btu/barrel
Distillate fuel oil	5.825 million Btu/barrel
Residual fuel oil	6.287 million Btu/barrel
Liquefied gases (refinery)	4.011 million Btu/barrel
Special naphthas	5.248 million Btu/barrel
Lubricants	6.065 million Btu/barrel
Waxes	5.537 million Btu/barrel
Petroleum coke	6.024 million Btu/barrel
Asphalt and road oil	6.636 million Btu/barrel
Still gas	6.000 million Btu/barrel
Unfinished oils	5.825 million Btu/barrel

Natural Gas Liquids

Natural gasoline	4.620 million Btu/barrel
Liquefied gases	4.011 million Btu/barrel
Ethane	3.082 million Btu/barrel
Plant condensate	5.418 million Btu/barrel

Fossil Fuel Steam Electric (1976 only)

Bituminous coal, anthracite coal, lignite, and coke	10,294 Btu/kilowatt hour
Natural gas	10,656 Btu/kilowatt hour
Residual and distillate fuel oil and crude oil	10,658 Btu/kilowatt hour

Electricity consumption 3,412 Btu/kilowatt hour

Using Btu Conversion Factors

Each Btu conversion factor is calculated from the latest year's final cumulative data. If the current year's final figures are not available, Btu conversion factor calculated from the latest final annual data is used temporarily. When later annual figures become final, a new Btu conversion factor is calculated and used, and the numbers for that year are revised to reflect the new Btu conversion factor.

Btu Conversion Factors

Year	Bituminous Coal and Lignite			Crude Petroleum Production Thousand Btu per Barrel	Petroleum Product Consumption Average Thousand Btu per Barrel	Natural Gas, (Wet) Production Btu per Cubic Feet	Natural Gas, (Dry) Consumption Btu per Cubic Feet	Hydropower Btu per Kilowatt Hours	Nuclear Power Btu per Kilowatt Hours	Geothermal Power Btu per Kilowatt Hours
	Production Million Btu per Short Ton	Consumption Million Btu per Short Ton	Anthracite Million Btu per Short Ton							
1947	26.200	26.200	25.400	5,800	5,713.00	1,120	1,035	15,600	10,660	NA
1948	26.200	26.200	25.400	5,800	5,923.50	1,118	1,035	15,738	10,660	NA
1949	26.200	26.200	25.400	5,800	5,695.50	1,120	1,035	15,033	10,660	NA
1950	26.200	26.200	25.400	5,800	5,679.30	1,119	1,035	14,030	10,660	NA
1951	26.200	26.200	25.400	5,800	5,745.60	1,114	1,035	13,641	10,660	NA
1952	26.200	26.200	25.400	5,800	5,741.00	1,115	1,035	13,361	10,660	NA
1953	26.200	26.200	25.400	5,800	5,800.00	1,116	1,036	12,889	10,660	NA
1954	26.200	26.200	25.400	5,800	5,662.34	1,115	1,035	12,180	10,660	NA
1955	25.900	25.840	25.400	5,800	5,653.00	1,120	1,035	11,699	10,660	NA
1956	25.980	25.740	25.400	5,800	5,761.00	1,116	1,035	11,456	10,660	NA
1957	25.980	25.720	25.400	5,800	5,742.50	1,113	1,035	11,365	10,660	NA
1958	25.980	25.540	25.400	5,800	5,700.00	1,110	1,035	11,085	10,660	NA
1959	25.680	25.480	25.400	5,800	5,672.50	1,109	1,035	10,970	10,660	NA
1960	25.660	25.480	25.400	5,800	5,557.00	1,107	1,035	10,760	10,660	NA
1961	25.580	25.380	25.400	5,800	5,626.00	1,108	1,037	10,650	10,660	NA
1962	25.580	25.340	25.400	5,800	5,602.50	1,107	1,037	10,558	10,660	NA
1963	25.520	25.300	25.400	5,800	5,593.00	1,103	1,035	10,482	10,660	NA
1964	25.500	25.280	25.400	5,800	5,549.00	1,102	1,035	10,462	10,660	NA
1965	25.420	25.220	25.400	5,800	5,531.00	1,101	1,032	10,453	10,660	NA
1966	25.300	25.100	25.400	5,800	5,933.83	1,103	1,032	10,415	10,660	NA
1967	25.160	24.940	25.400	5,800	5,526.20	1,105	1,032	10,432	10,660	NA
1968	25.060	24.860	25.400	5,800	5,519.00	1,115	1,032	10,398	10,660	NA
1969	24.900	24.660	25.400	5,800	5,508.10	1,103	1,031	10,447	10,660	NA
1970	24.900	24.220	25.400	5,800	5,506.00	1,102	1,031	10,494	10,660	21,690
1971	24.240	23.960	25.400	5,800	5,505.60	1,103	1,031	10,478	10,660	21,690
1972	24.050	23.750	25.400	5,800	5,503.20	1,100	1,027	10,379	10,660	21,690
1973	24.010	23.650	25.400	5,800	5,517.00	1,093	1,021	10,389	10,660	21,690
1974	23.730	23.070	25.400	5,800	5,506.10	1,097	1,024	10,442	10,660	21,690
1975	23.200	22.800	25.400	5,800	5,495.90	1,095	1,021	10,406	10,660	21,690
1976 ¹	23.150	22.750	25.400	5,800	5,495.90	1,094	1,020	10,406	10,660	21,690
1977 ¹	22.900	22.565	25.400	5,800	5,495.90	1,094	1,020	10,406	10,660	21,690

¹ Preliminary.
NA = Not applicable.

* U. S. GOVERNMENT PRINTING OFFICE : 1978 O - 270-952