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# ENERGY STATISTICS

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UNITED STATES SENATE

RUSSELL B. LONG, *Chairman*



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## CONTENTS

	Page
Preface.....	1
U.S. energy resources.....	2
Petroleum.....	2
Natural gas.....	4
Coal.....	6
World energy reserves.....	8
U.S. energy capital needs.....	10
U.S. exploration expenditures.....	12
Footage drilled in oil and gas wells.....	15
Energy consumption trends.....	16
Energy consumption by final consuming sector.....	18
Projected U.S. energy consumption.....	22
U.S. petroleum production.....	26
Domestic crude oil prices.....	28
Natural gas supply.....	30
U.S. natural gas prices.....	31
Natural gas curtailments.....	32
U.S. oil imports and prices.....	36
U.S. oil imports.....	37
Gasoline consumption.....	38
Petroleum stockpiles.....	42

### STATISTICAL MATERIAL

#### Tables and charts:

Alternative estimates of U.S. undiscovered recoverable petroleum resources (chart).....	3
Natural gas reserves, lower 48 States (table).....	4
Alternative estimates of U.S. undiscovered natural gas resources (chart).....	5
U.S. demonstrated coal reserve base, January 1974 (chart).....	7
World recoverable energy reserves (table).....	8
World proven reserves (chart).....	9
Comparison of U.S. capital requirements estimates, cumulative 1975-85 (table).....	11
Cost of new oil, total United States, years 1959-74 (table).....	13
U.S. exploration expenditures (excludes Prudhoe Bay field on North Slope of Alaska) (table).....	13
Total footage drilled in U.S. oil and gas wells (table).....	14
Total footage drilled (chart).....	15
U.S. energy consumption trends, 1850-1974 (table).....	16
U.S. energy consumption trends, 1850-1974 (chart).....	17
U.S. net energy consumption by final consuming sector, 1960-73 (table).....	18
U.S. net energy consumption, by final consuming sector, 1960-73 (chart).....	19
U.S. net energy consumption, residential and commercial sectors, 1970 (chart).....	20
U.S. net energy consumption, industrial sector, 1970 (chart).....	21

## Tables and charts—Continued

	Page
Projected U.S. gross energy consumption, 1973-90 (assuming an average price of \$7 per barrel of oil) (table).....	22
U.S. gross energy consumption, 1973-90 (chart).....	23
Projected gross energy consumption, 1973-90 (assuming an average price of \$11 per barrel of oil) (table).....	24
U.S. gross energy consumption, 1973-90 (chart).....	25
U.S. petroleum production, 1960-74 (table).....	26
U.S. petroleum production, 1960-74 (chart).....	27
Domestic crude oil prices (table).....	29
U.S. natural gas supply, 1960-74 (chart).....	30
U.S. natural gas supply, 1960-74 (table).....	30
U.S. natural gas prices (table).....	31
Selected interstate and intrastate gas statistics, 1967-73 (table).....	32
Interstate gas sales and curtailments, 1970-74 (table).....	32
Natural gas firm curtailments by State, November 1974-March 1975 (table).....	33
U.S. coal production and exports, 1960-74 (chart).....	34
U.S. coal production and exports, 1960-74 (table).....	34
U.S. coal prices (table).....	35
Total oil imports and prices (table).....	36
Petroleum import prices, by source, selected dates (table).....	36
U.S. oil imports, 1965-74 (table).....	37
Domestic gasoline consumption (table).....	38
Domestic gasoline consumption, 1975 (table).....	38
Gasoline consumption (chart).....	39
Gasoline prices in service stations (including tax) (chart).....	39
Passenger car use (table).....	40
U.S. passenger car mileage (chart).....	41
U.S. stocks required by IEA for various import levels (table).....	42
Current "emergency" storage capacity (table).....	42
Stockpile costs and GNP costs of residual vulnerability for U.S. imports of 6 million barrels per day (table).....	42
Revenue from tax on millions of Btu's of energy consumption (table).....	43
Existing and committed electrical generating capacity (chart).....	44
Existing and committed electrical generating capacity (table).....	44
U.S. energy facility production lead times (chart).....	45

### **Preface**

**This document has been prepared by the staff of the Committee on Finance to assist the Committee in its consideration of energy legislation. Its purpose is to present, in a simple and graphic form, a brief summary of current information relevant to the task of formulating national energy policy. Acknowledgments are made to the Congressional Research Service of the Library of Congress and to the Federal Energy Administration for their assistance.**

## **U.S. Energy Resources**

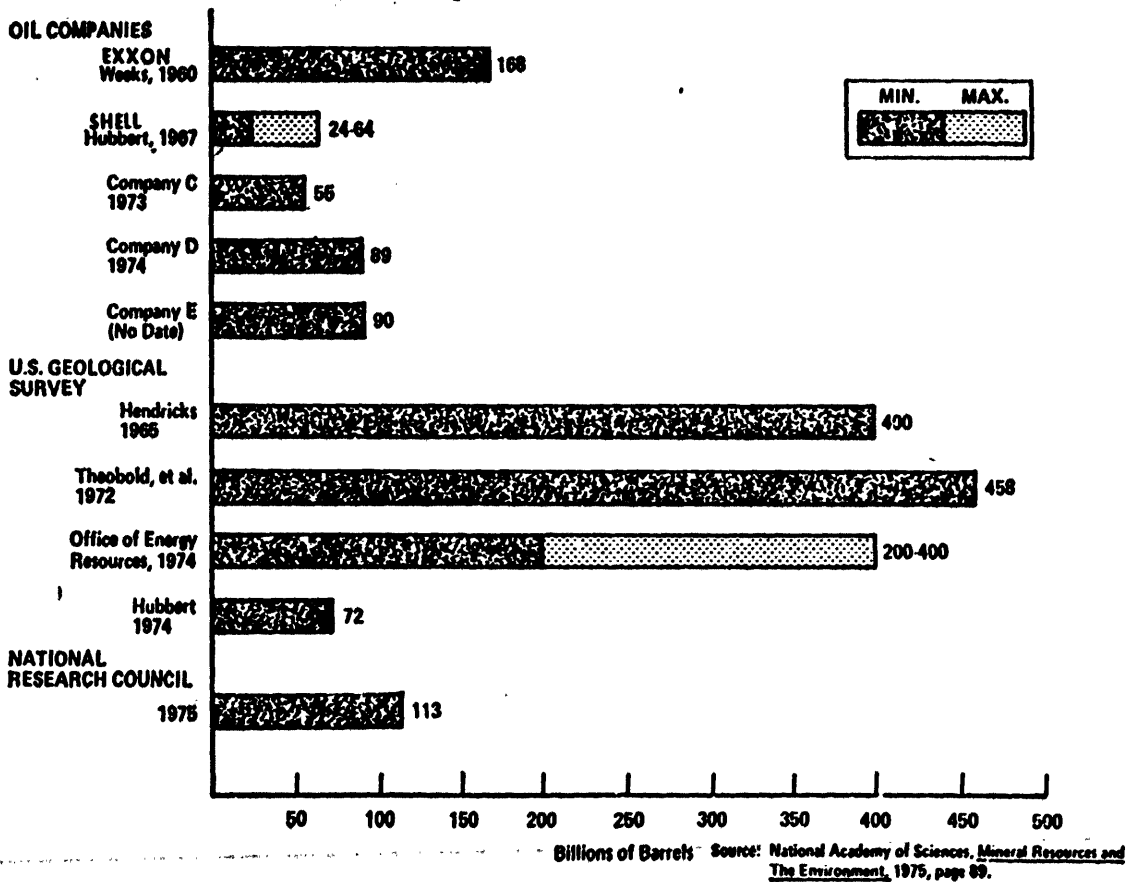
The charts on the following 5 pages illustrate the approximate sizes of U.S. fossil fuel resources. A range of estimates is presented for petroleum and natural gas; this range reflects the difficulty in estimating what is yet undiscovered. Rather than rely on any specific figures, it is well to concentrate on the conclusions that all of the estimates point to, namely that there are substantial resources of oil and gas remaining to be discovered, that frontier areas like the Outer Continental Shelf and Alaska contain a large portion of those resources, and that with increasing energy consumption, the nation will be forced to rely on more plentiful resources such as coal.

### **Petroleum**

The estimates of domestic petroleum resources range from 55 billion to 458 billion barrels. Consumption is now over 6 billion barrels annually, and over one third of this supply is imported.

These estimates of petroleum resources are based on what is currently economically recoverable from a new oil reservoir. The recovery rate is generally 30% from primary recovery techniques and an additional 10% from secondary and tertiary techniques. Many experts believe an additional 10-20% of oil in reservoirs may be recoverable in the future through new technology and greater economic incentives.

# Alternative Estimates of U.S. Undiscovered Recoverable Petroleum Resources



## Natural Gas

Estimates of domestic natural gas resources range from 374 to 2,000 trillion cubic feet. Annual consumption is now over 23 trillion cubic feet. The table below indicates that known *reserves* of natural gas have declined sharply, particularly in the interstate market.

**TABLE 1.—NATURAL GAS RESERVES, LOWER 48 STATES**

(Trillions of cubic feet)

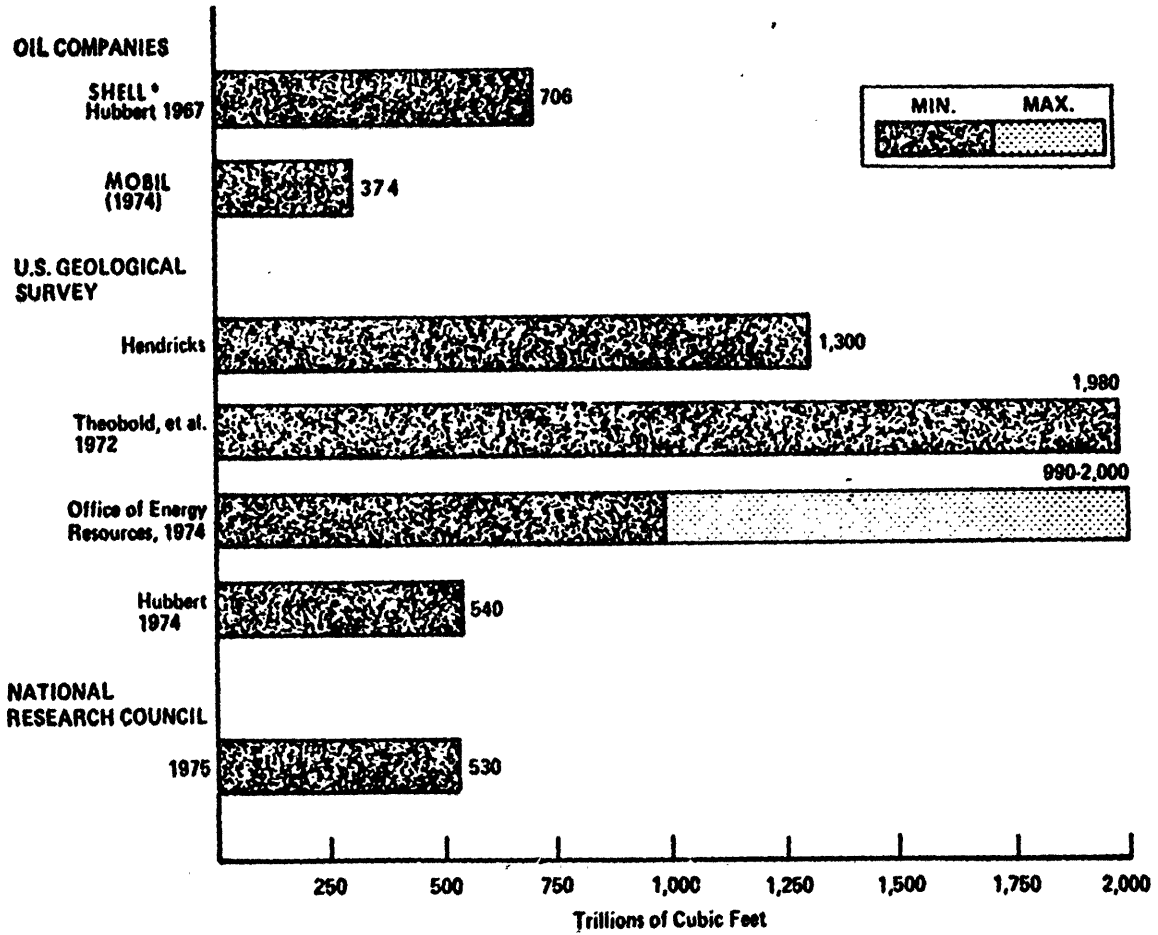
	Interstate reserves	Intrastate reserves	Total
1967.....	198	88	286
1968.....	195	84	279
1969.....	188	79	267
1970.....	173	82	254
1971.....	161	81	242
1972.....	146	83	229
1973.....	134	80	214
1974 <sup>1</sup> .....	120	85	205

<sup>1</sup> Preliminary.

Source: FPC staff study.



## Alternative Estimates of U.S. Undiscovered Natural Gas Resources



\*(excludes Alaska)

Source: National Academy of Sciences, Mineral Resources and The Environment, 1975, page 89.

## Coal

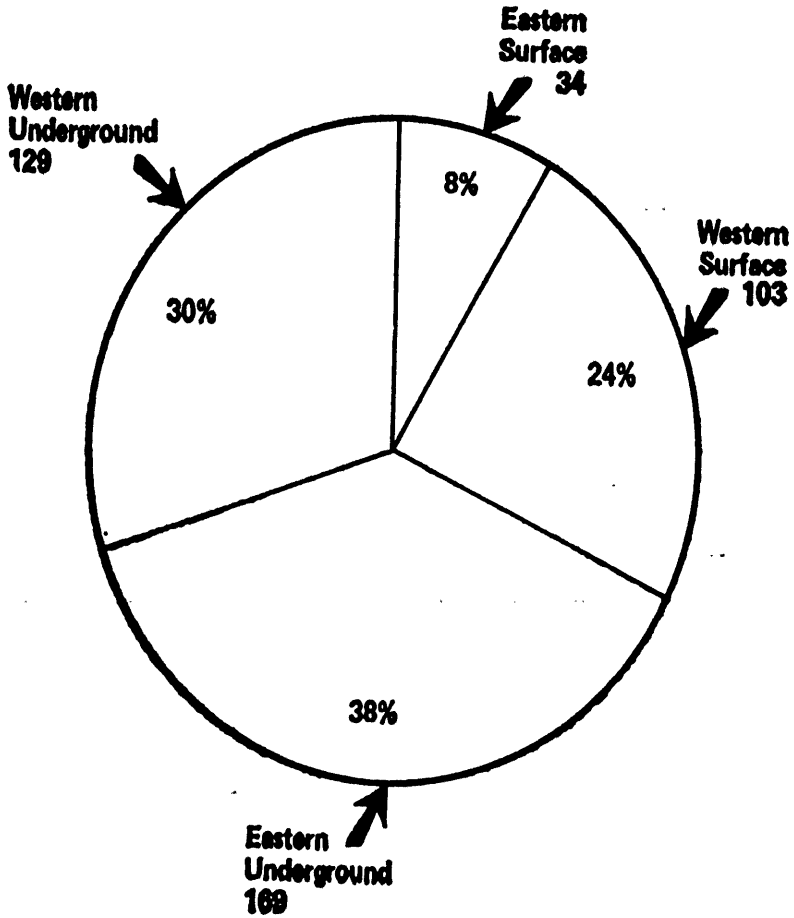
The chart on page 7 illustrates domestic coal *reserves* (i.e. known to exist). With an annual consumption of about 600 million tons, present reserves are capable of supplying several centuries of consumption. Approximately 60% of the Nation's coal reserves contain 1% or less sulfur by weight, and most of this is in the West.

Only about 50% of underground and 90% of surface mineable coal can be physically recovered by conventional mining methods. These recovery figures are less than 100% because pillars of coal must generally be left in underground mines for support, and some surface-mined coal is inaccessible because of natural and man-made surface features.

# U.S. Demonstrated Coal Reserve Base, January 1974

(Billions of Short Tons)

**TOTAL: 434**



Source: U.S. Bureau of Mines, 1974.

TABLE 2.—WORLD RECOVERABLE ENERGY RESERVES

Country	Petroleum		Natural gas		Coal	
	Reserves (billions of barrels)	Percentage of total	Reserves (trillion cubic feet)	Percentage of total	Reserves (billions of short tons)	Percentage of total
United States.....	35.3	5.0	237	9.3	434	48.2
Canada.....	9.4	1.3	52	2.0		
Mexico.....	13.6	1.9	15	.6		
Europe.....					90	10.0
United Kingdom.....	15.7	2.2	50	1.9		
Norway.....	7.3	1.0	25	1.0		
Netherlands.....			95	3.7		
Persian Gulf.....	403.9	56.4	670	26.2		
Algeria.....	7.7	1.1	229	9.0		
Libya.....	26.6	3.7				
Venezuela.....	15.0	2.1	43	1.7		
Ecuador.....	2.5	.4	5	.2		
U.S.S.R.....	83.4	11.7	912	31.8	179	19.9
P.R.C.....	25.0	3.5			150	16.7
Other.....	70.3	9.7	332	12.6	47	5.2
Total.....	715.7	100.0	2,565	100.0	900	100.0

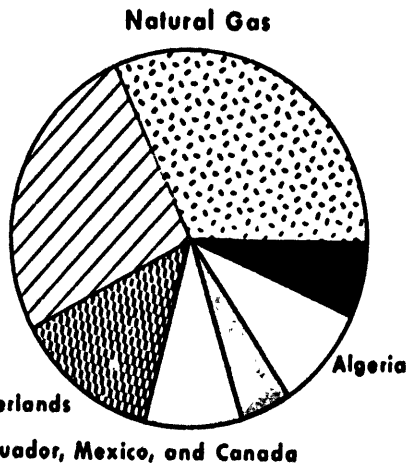
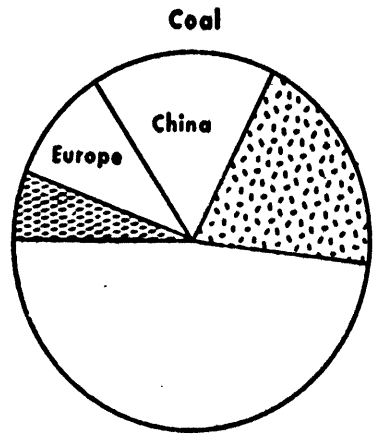
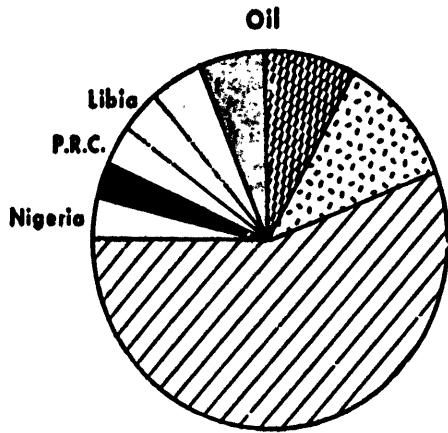
Sources: *International Economic Report of the President*, March 1975; World Energy Conference; Bureau of Mines.






### World Energy Reserves

Table 2 contains world recoverable reserves of fossil fuels. Reserves data are collected and calculated in a different way by each country; the data presented here have been adjusted for country-to-country comparability.

The table does not explain the accessibility nor the degree of development of fossil fuel reserves, but it does show the relative magnitude of deposits. Persian Gulf countries possess a predominant quantity of petroleum reserves, with relatively minor deposits in Western countries. Natural gas reserves are more evenly divided, with significant portions in the Soviet Union, Persian Gulf countries, Algeria, and the United States. A major proportion of coal reserves is located in the United States, with significant deposits in the Soviet Union, the People's Republic of China, and Europe.

# World Proven Reserves



-  U.S.
-  Persian Gulf
-  U.S.S.R.
-  Other
-  North Sea: U.K., Norway and , Netherlands
-  Western Hemisphere: Venezuela, Equador, Mexico, and Canada

### U.S. Energy Capital Needs

Table 3 on page 11 contains several estimates of the capital requirements of the U.S. energy industry for the next decade. In the past, approximately 23 percent of total U.S. business fixed investment has been made in the energy industry. If this historical percentage continues, the capital available to the industry (\$421-\$461 billion)<sup>1</sup> will fall in the range of the industry's estimated capital needs. However, with all the uncertainties in the energy sector, capital may not flow into that sector in sufficient quantities to meet our energy needs.

The Chase Manhattan Bank has estimated that the worldwide capital needs of the petroleum industry for the period 1970-85 will be \$1.2 trillion in 1970 dollars. Table 3 contains figures on the capital needs of all U.S. energy production industries for the period 1975-85 in 1973 dollars and, therefore are not directly comparable with the Chase Manhattan estimates.

<sup>1</sup> Brookings Institute and Bureau of Labor Statistics.

TABLE 3.—COMPARISON OF U.S. CAPITAL REQUIREMENTS ESTIMATES, CUMULATIVE 1975-85

[In billions of 1973 dollars]

Activity	NPC <sup>1</sup>	NAE <sup>2</sup>	ADL <sup>3</sup>	FEA accelerated supply without work in progress <sup>4</sup>	FEA accelerated supply
Oil and gas (including refining).....	133	149	122	80.3	98.4
Coal .....	8	18	6	10.6	11.9
Synthetic fuels.....	10	19	6	.6	.6
Nuclear.....	7	93	84	105.3	138.5
Fossil fuel electric power plants.....	137	53	43	50.5	60.3
Electric transmission.....	42	125	90	92.1	116.2
Transportation.....	43		43	<sup>5</sup> 25.5	<sup>5</sup> 25.5
Other <sup>6</sup> .....			8	2.2	2.2
<b>Total.....</b>	<b>380</b>	<b>457</b>	<b>396</b>	<b>367</b>	<b>454</b>

<sup>1</sup> U.S. Energy Outlook, a summary report of the National Petroleum Council, Washington, D.C., December 1972 (average of 4 supply cases).

<sup>2</sup> "U.S. Energy Prospects, An Engineering Viewpoint," National Academy of Engineering, Washington, D.C., 1974.

<sup>3</sup> Arthur D. Little estimates based upon an energy conservation scenario.

<sup>4</sup> Assumes that imported oil price is \$11 per barrel. This column is considered roughly comparable to the NPC, NAE, and ADL estimates with the exception of oil and gas capital and the inclusion of replacement capital costs for each activity. The FEA estimates for oil, gas and refining do not include lease rentals and bonus payments, hence these items must be added to obtain comparable costs. In order to make the FEA oil and gas figures comparable to the other estimates, \$107,400,000,000 should be added to the FEA oil and gas estimates. Work in progress consists of investment spending made prior to 1985 for new plant and equipment which will not come on line until after 1985.

<sup>5</sup> Does not include investments required for tanker fleets, but does include \$5,500,000,000 targeted for Trans-Alaska pipeline.

<sup>6</sup> Solar, geothermal, municipal waste treatment plants, and shale oil.

Source: Project Independence, task force report—finance, 1974.

### **U.S. Exploration Expenditures**

Tables 4 and 5 present expenditures for exploration, development and production by the oil and gas industry during recent years. The Nathan report (table 4) estimates that the cost of new oil discoveries in the United States has risen to over \$12 a barrel. The increase in the average cost of new oil production in recent years is said to be a result of deeper drilling, higher drilling costs, and smaller finds. Exploratory drilling has tended to be deeper, in less accessible areas, and in less promising formations because the easy-to-find reserves have already been developed. Drilling costs increase geometrically with the depth of the well, and development of offshore reserves is many times more expensive than onshore.



TABLE 4.—COST OF NEW OIL, TOTAL UNITED STATES, YEARS 1959-74  
[Dollar amounts in millions]

Year	Gross oil reserves (millions of barrels) (1)	Gross gas reserves (billions of cubic feet) (2)	Gross oil and gas sales (3)	Royalty expense (4)	Valorem and State taxes (5)	Operating expenses (6)	Adjusted gross income (7)	Total invested capital (8)	Intangible drilling cost (9)	Depletion allowance (10)	Depreciation (11)	Taxable income (12)	Investment tax credit (13)	Federal income taxes (14)	After tax net included (15)	Not cash flow (discounted at 15 percent) (16)	Gross oil price (dollars per barrel) (18)	Gas price (dollars per thousand cubic feet) (19)	
1959...	3,793	4,594	\$11,740	\$1,467	\$680	\$1,893	\$7,700	\$3,630	\$2,341	\$2,362	\$857	\$2,139	0	\$1,070	\$5,630	\$3,000	0	2.06	0.194
1960...	2,785	3,373	10,179	1,272	594	1,505	6,907	3,150	2,042	2,087	796	1,972	0	896	5,821	2,671	0	1.40	.210
1961...	2,773	3,358	10,025	1,253	567	1,531	6,674	3,120	2,048	2,052	791	1,873	0	836	5,739	2,618	0	1.34	.227
1962...	2,911	3,041	10,174	1,272	570	1,550	6,793	3,282	2,078	2,100	794	1,900	\$49	901	5,882	2,680	0	1.37	.233
1963...	2,118	2,583	9,721	1,215	538	1,566	6,403	3,095	2,074	2,004	718	1,687	50	753	6,650	2,555	0	4.27	.237
1964...	2,224	2,775	11,223	1,403	641	1,670	7,508	3,475	2,155	2,307	769	2,277	54	1,085	6,424	2,940	0	3.32	.231
1965...	1,886	2,705	8,098	1,137	522	1,409	5,940	2,917	1,981	1,852	693	1,414	48	650	5,282	2,365	0	3.79	.234
1966...	1,874	2,560	9,998	1,250	562	1,477	6,587	3,135	2,009	2,085	758	1,857	41	827	5,822	2,687	0	4.73	.236
1967...	2,003	2,758	10,433	1,354	634	1,478	7,367	3,446	2,268	2,273	781	2,045	55	968	6,399	2,953	0	4.99	.240
1968...	1,522	1,901	11,146	1,393	649	1,493	7,620	3,406	2,112	2,358	757	2,393	37	1,150	6,461	3,056	0	7.01	.251
1969...	1,766	2,138	13,352	1,660	770	1,667	9,247	3,590	1,891	2,323	692	4,340	6	2,170	7,077	3,487	0	7.25	.257
1970...	1,267	1,488	10,818	1,352	605	1,546	7,315	3,032	1,751	1,964	606	3,093	42	1,504	6,811	2,779	0	8.22	.273
1971...	1,303	1,764	10,105	1,263	561	1,499	6,787	2,906	1,893	1,726	696	2,467	49	1,185	5,587	2,611	0	7.36	.293
1972...	1,409	1,450	9,458	1,182	448	1,451	6,371	2,846	1,855	1,628	669	2,225	47	1,066	5,311	2,465	0	8.63	.279
1973...	1,206	1,677	16,099	2,012	762	2,137	11,187	4,632	2,739	2,813	987	4,648	69	2,255	8,932	4,300	0	12.73	.449

## EXPLANATORY NOTES

Col. 1—Oil reserves added by drilling plus expected upward revisions.  
Col. 2—Gas reserves associated with oil.  
Col. 3—Col. (1) times col. (18) plus col. (2) times col. (19).  
Col. 4—12.5 percent of col. (3).  
Col. 5—Variable tax rate times col. (3) minus col. (4). Tax rate is approximately 6 percent.  
Col. 6—Direct operating costs including field labor and supplies, maintenance, general and administrative overhead.  
Col. 7—Col. (3) minus col. (4) minus col. (5) minus col. (6).  
Col. 8—Total capital investment attributable to oil reserves added in year including leasehold costs.  
Col. 9—Portion of total capital attributable to intangible drilling costs.  
Col. 10—Includes cost and percentage depletion based on law at time of 1st year projected.  
Col. 11—Cumulative depreciation of tangible drilling costs and leasehold equipment.

Col. 12—Col. (7) minus col. (9) minus col. (10) minus col. (11).  
Col. 13—Investment tax credit is variable for each year depending on law at start of year. Zero some years.  
Col. 14—Col. (12) times 50 percent minus col. (13).  
Col. 15—Col. (7) minus col. (14) or alternatively col. (12) minus col. (14) plus col. (10) plus col. (9) plus col. (11).  
Col. 16—Col. (15) minus col. (8).  
Col. 17—Col. (16) discounted at 15 percent per annum compounded annually. Must total zero.  
Col. 18—Gross oil price at wellhead required for 15 percent discounted rate of return after Federal income taxes.  
Col. 19—Gross gas price for the purpose of calculating coproduct credits.  
Note: Figures are for total United States except Prudhoe Bay field in Alaska. All financial data expressed in constant dollars for year of initial projection. Columns may not add precisely because of computer rounding.

Source: Robert A. Nathan Associates, Inc., 1975.

The following table relates exploration and development to the price per barrel of crude oil during the years 1966-73.

TABLE 5.—UNITED STATES EXPLORATION EXPENDITURES (EXCLUDES PRUDHOE BAY FIELD ON NORTH SLOPE OF ALASKA)

Year	Exploration and development expenditures (millions of dollars) (1)	New petroleum reserves during year due to extensions and discoveries				Average gas price (FPC) (dollar per MMCF) (6)	Production costs for gas (dollar per MMCF) (7)	Net working interest gas income (millions of dollars) (8)	Exploration and development expenditures attributable to liquid reserves		Production costs (dollars per barrel) (11)	Exploration and development and production costs (dollars per barrel) (12)
		Crude oil (millions of barrels) (2)	Natural gas liquids (millions of barrels) (3)	Total (millions of barrels) (4)	Natural gas (millions of MMCF) (5)				(millions of dollars) (9)	(dollars per barrel) (10)		
1966..	4,420	1,124	260	1,384	15.282	169	50	1,546	2,874	2.08	0.72	2.81
1967..	4,640	1,061	259	1,320	15.234	171	48	1,593	3,047	2.31	.70	3.00
1968..	5,640	1,134	216	1,350	10.680	173	50	1,117	4,523	3.35	.72	4.07
1969..	4,275	862	175	1,037	9.613	175	50	1,021	3,254	3.14	.75	3.89
1970..	5,000	1,000	272	1,272	11.296	181	52	1,239	3,761	2.96	.78	3.73
1971..	4,100	717	213	930	11.054	190	55	1,268	2,832	3.04	.83	3.87
1972..	6,655	737	200	937	10.713	205	59	1,329	5,326	5.68	.83	6.54
1973..	8,290	594	177	771	10.299	225	63	1,418	6,872	8.91	.92	9.81

## COLUMN NUMBERS

- Adapted from Chase Manhattan December 1974 "Capital Investments of the World Petroleum Industry" study.
- 2, 3, and 5 From Petroleum reserve report Dec. 31, 1973 published jointly by American Petroleum Institute and others.
- Sum of cols. 2 and 3.
- From FPC News, publication of Federal Power Commission.
- Production costs for gas include direct operating, overhead, severance and ad valorem taxes. Based on American Petroleum Institute studies and certain oil company cost statistics.
- Col. 5 times 0.85 times (Col. 6 less col. 7). 0.85—the working interest portion of the gas reserves, col. 5.
- Col. 1 less col. 8.
- Col. 9 divided by col. 4.
- Same source as shown for gas in col. 7.
- Sum of cols. 10 and 11.

Source: "An Examination of Windfall Profits Tax on Oil and Gas Production," Miller and Lents, 1975.

TABLE 6.—TOTAL FOOTAGE DRILLED IN U.S. OIL AND GAS WELLS

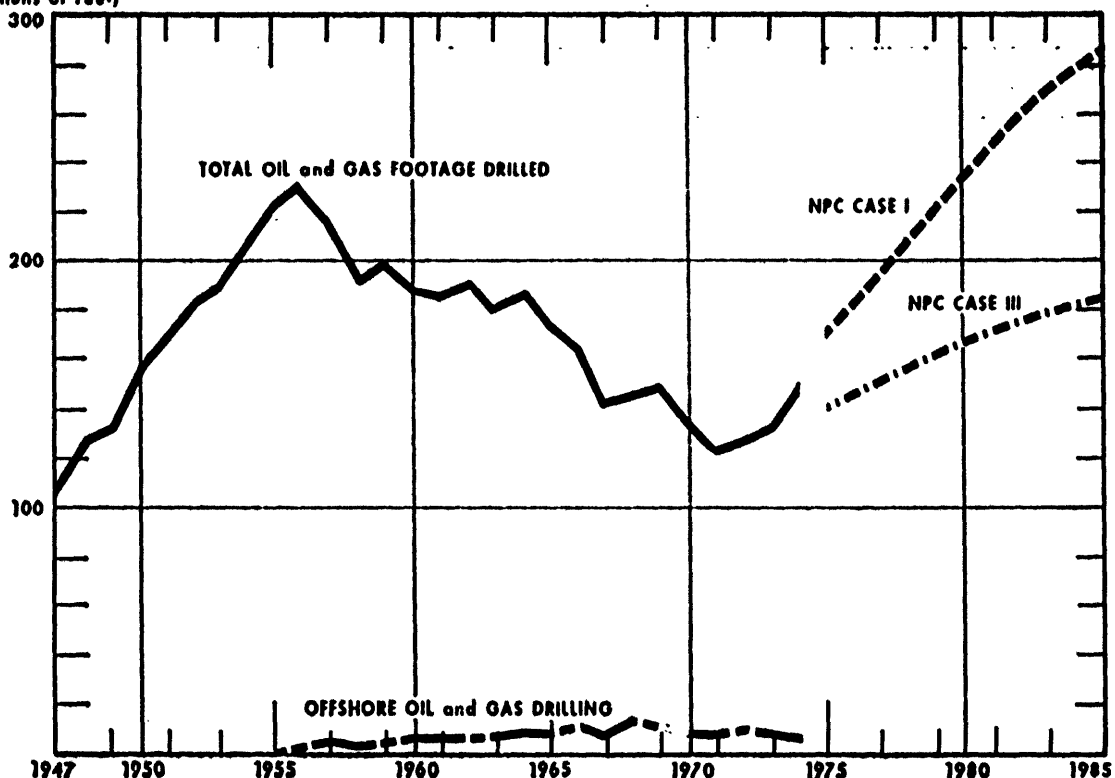
(Thousands of feet drilled)

Year	Onshore footage	Offshore footage	Total footage
1946.....	97,393		97,393
1947.....	109,358		109,358
1948.....	131,186		131,186
1949.....	135,619		135,619
1950.....	157,359		157,359
1951.....	172,145		172,145
1952.....	184,134		184,134
1953.....	194,245		194,245
1954.....	208,008		208,008
1955.....	226,181		226,181
1956.....	229,158	4,122	233,280
1957.....	210,593	6,452	217,045
1958.....	189,178	4,125	193,303
1959.....	196,428	4,264	200,692
1960.....	186,703	5,473	192,176
1961.....	183,843	5,791	189,634
1962.....	186,925	7,708	194,633
1963.....	175,021	7,628	182,649
1964.....	178,256	9,164	187,420
1965.....	165,145	9,736	174,881
1966.....	153,283	12,136	165,419
1967.....	134,112	10,610	144,722
1968.....	133,059	14,662	147,721
1969.....	140,258	11,649	151,907
1970.....	125,713	10,238	135,951
1971.....	118,085	9,007	127,092
1972.....	125,537	9,998	135,535
1973.....	126,631	9,760	136,391
1974.....	142,380	8,171	150,551
1975.....	N.A.	N.A.	N.A.
		NPC case I	NPC case III
1976.....		186,000	144,000
1977.....		201,000	149,000
1978.....		215,000	154,000
1979.....		228,000	160,000
1980.....		243,000	167,000
1981.....		256,000	172,000
1982.....		265,000	176,000
1983.....		274,000	181,000
1984.....		279,000	185,000
1985.....		284,000	189,000

## Note on Sources

The well footages from 1947 through 1971 were those reported by the National Petroleum Council's *U.S. Energy Outlook, 1971-1985*. The offshore well footages from 1956 on and the total footages for 1973 and 1974 were drawn from API's *Petroleum Facts and Figures, 1971 Edition*, and API's *Quarterly Review of Drilling Statistics Annual Summary for 1974*, respectively. The 1972 data is also that of API, published in API's *Annual Statistical Review, September, 1974*. Finally, the projections of well footage are those of the National Petroleum Council's *U.S. Energy Outlook volume on Oil and Gas Availability*. It should be noted that these projections exclude Alaskan drilling, which are included in the figures for the years 1947-1974.

Total Footage Drilled  
(Millions of Feet)



### Footage Drilled in Oil and Gas Wells

Pages 14 and 15 contain a table and chart illustrating the annual footage of oil and gas wells drilled in the United States since 1946. Four-fifths of onshore exploratory drilling in recent years has been conducted by independent oil and gas operators. The decline of drilling since 1956 coincides with the declining real price for oil (see table 12) over that period. Since 1956, approximately one-half of all independent operators have left the oil and gas business.

The projected drilling rates on table 6 are taken from a study by the National Petroleum Council on the U.S. Energy Outlook. Case I reflects optimistic assumptions of a high finding rate and a high growth in the drilling rate; Case III reflects assumptions of current low finding rates and a medium growth in the drilling rate.

TABLE 7.—U.S. ENERGY CONSUMPTION TRENDS, 1850-1974

[Millions of barrels per day of oil equivalent] <sup>1</sup>

Year	Coal	Petroleum	Natural gas	Hydro-power	Nuclear	Fuel wood	Total
1850.....	0.09					0.99	1.08
1860.....	.23					1.22	1.46
1870.....	.47					1.36	1.88
1880.....	.94	0.05				1.36	2.36
1890.....	1.93	.09	0.14			1.18	3.35
1900.....	3.21	.09	.14	0.14		.94	4.53
1910.....	5.99	.47	.23	.23		.89	7.84
1920.....	7.32	1.23	.37	.37		.75	10.06
1930.....	6.42	2.55	.94	.37		.70	11.00
1940.....	5.90	3.54	1.27	.42		.66	11.80
1950.....	6.09	6.37	2.92	.66		.56	16.62
1960.....	4.77	9.49	5.99	.80			21.06
1970.....	5.99	13.93	10.39	1.27	0.09		31.69
1971.....	5.66	14.45	10.76	1.36	.18		32.45
1972.....	5.85	15.58	10.86	1.36	.28		33.96
1973.....	6.32	16.39	10.76	1.36	.42		35.28
1974.....	6.14	15.96	10.53	1.36	.56		34.57

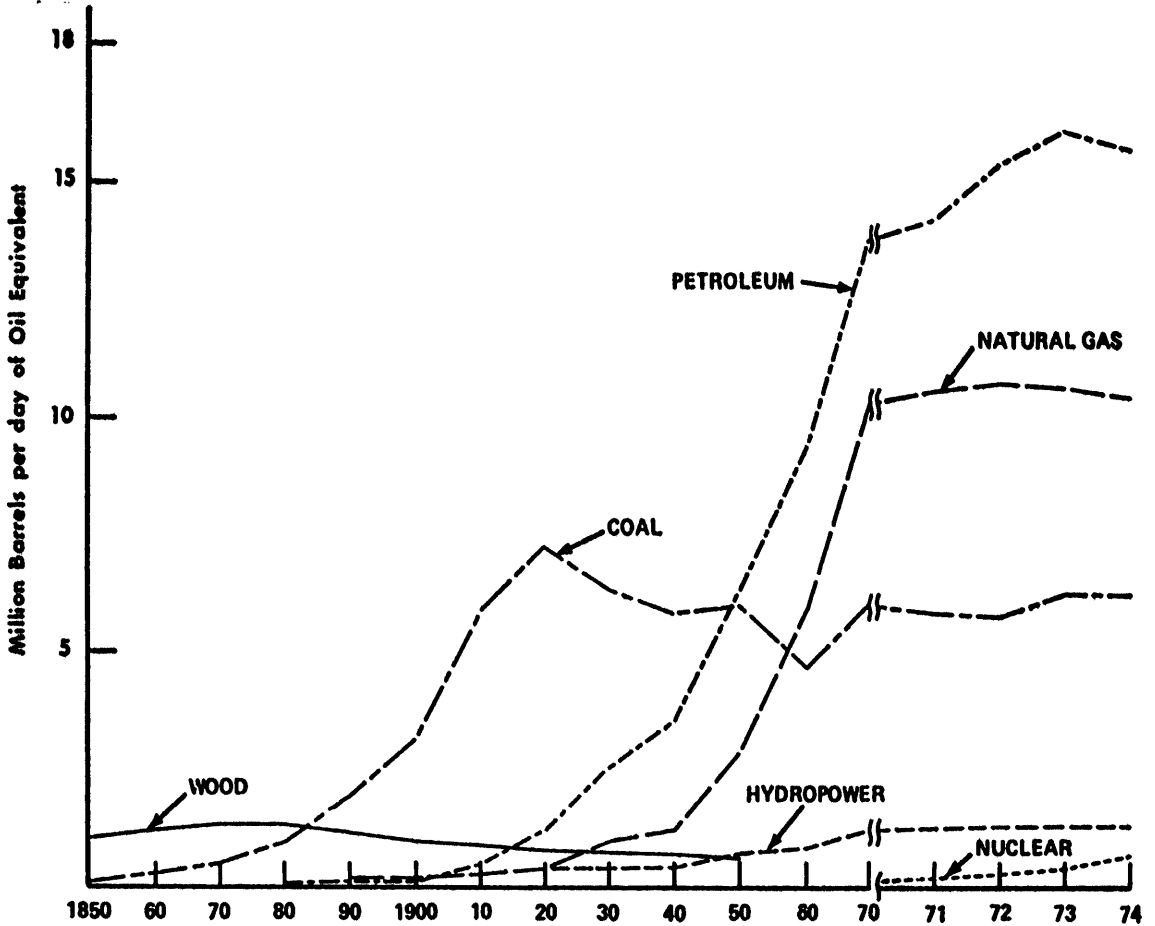
<sup>1</sup> 1,000,000 barrels per day oil=2.117 quadrillion Btu per year.

Source: Bureau of Census, U.S. Bureau of Mines.

### Energy Consumption Trends

The table above and the chart on page 17 present U.S. energy consumption patterns, by fuel, from 1850 to 1974. Until about 1930, the U.S. economy relied on a single source of fuel, first wood and later coal, but in the middle of this century spread its use to include several sources of energy. Although there are constraints on each type of energy production, this information demonstrates that there is a greater potential of choosing which fuel to use for which purpose and for switching from one fuel to another than in the past century.

## U.S. Energy Consumption Trends, 1850-1974



Source: Historical Statistics of the United States,  
Bureau of the Census; U.S. Bureau of Mines.

TABLE 8.—U.S. NET ENERGY CONSUMPTION BY FINAL CONSUMING SECTOR, 1960-73

(Million barrels per day of oil equivalent)<sup>1</sup>

Year	Household and commercial	Industrial	Transportation	Total
1960.....	5.38	7.51	5.10	18.00
1961.....	5.57	7.51	5.19	18.28
1962.....	5.85	7.88	5.38	19.13
1963.....	5.99	8.21	5.67	19.36
1964.....	6.09	8.59	5.81	20.59
1965.....	6.51	8.88	6.00	21.39
1966.....	6.84	9.35	6.33	22.53
1967.....	7.22	9.49	6.61	23.33
1968.....	7.36	10.10	7.18	24.65
1969.....	7.74	10.53	7.46	25.74
1970.....	8.03	10.67	7.79	25.50
1971.....	8.21	10.62	8.07	26.92
1972.....	8.54	11.00	8.50	28.05
1973.....	8.69	11.43	8.88	29.00

<sup>1</sup> 1,000,000 barrels per day=2.117 quadrillion Btu per year. Net energy refers to the energy used by the final consuming sectors, and does not include the losses ex-

perienced in converting primary to secondary sources.

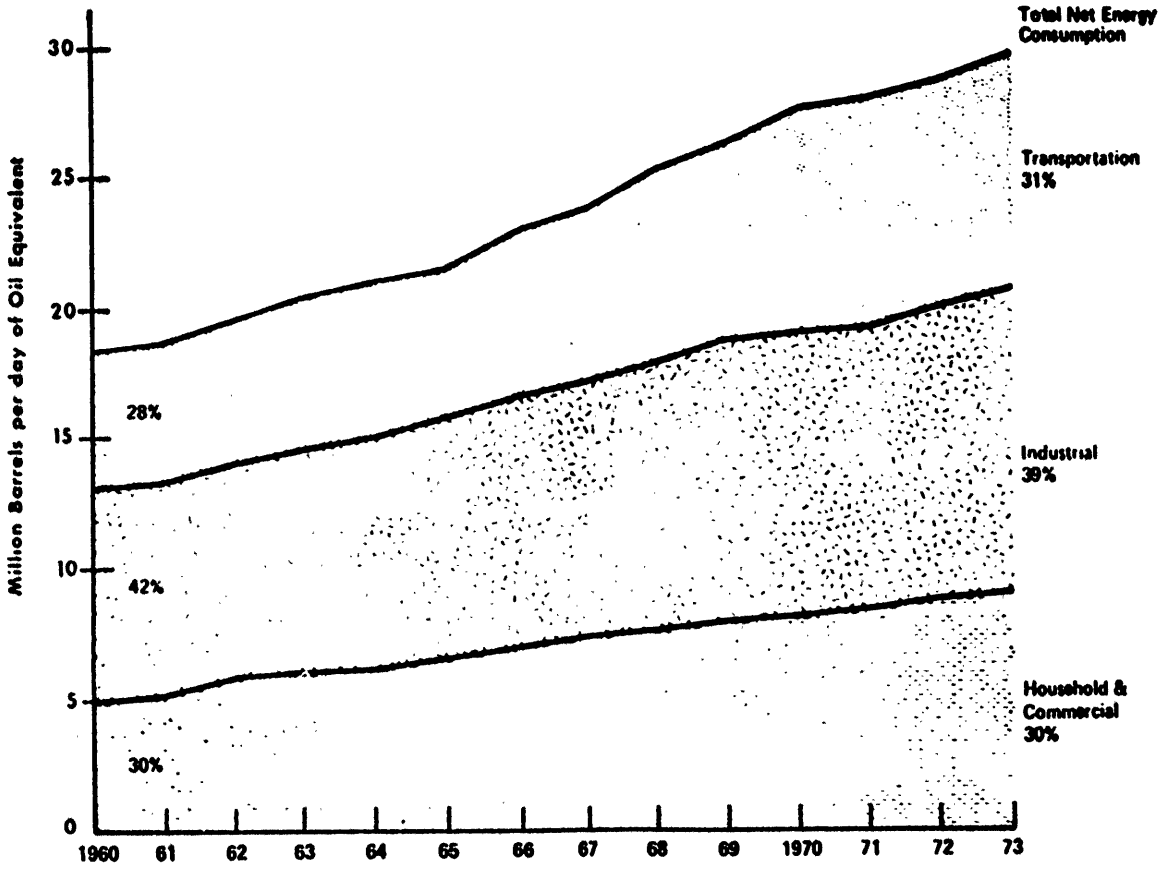
Source: U.S. Bureau of Mines.

### Energy Consumption by Final Consuming Sector

The table above indicates a steady growth in the three major areas of energy consumption—household/commercial, industrial, and transportation. The charts on pages 20 and 21 illustrate net consumption by type of end use. Figures in the pie charts do not agree with the above table because they represent net consumption, which does not reflect losses incurred in converting energy into another form (electricity, for example) before its final use.

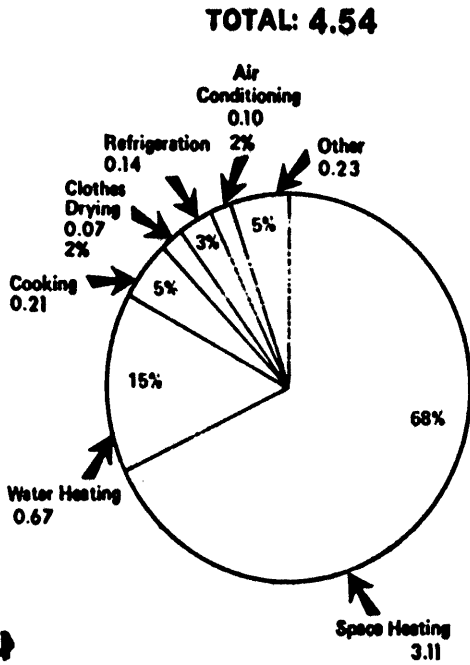
Over two-thirds of the energy used in the transportation sector is in the form of gasoline consumed by automobiles and trucks; in 1973, gasoline consumption was 6.07 million barrels per day. The balance of transportation energy consumption is by aircraft, diesel-burning trucks, and railroads.

### U.S. Net Energy Consumption, by Final Consuming Sector, 1960-73

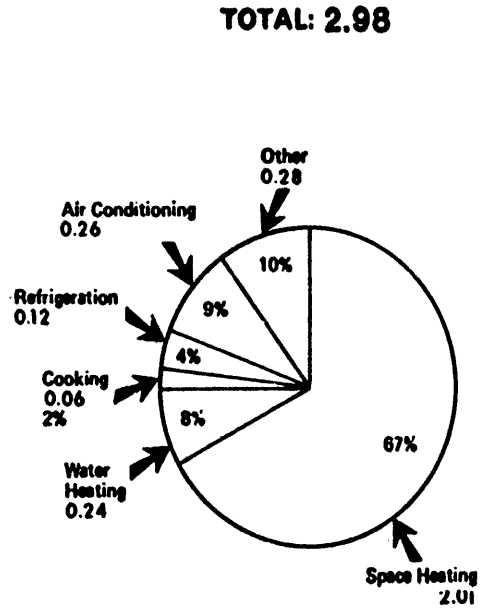


Source: U.S. Bureau of Mines, 1974.

**U.S. Net Energy Consumption, Residential and Commercial Sectors, 1970**  
 (Million Barrels per day of Oil Equivalent)



**Residential End Use**



**Commercial End Use**

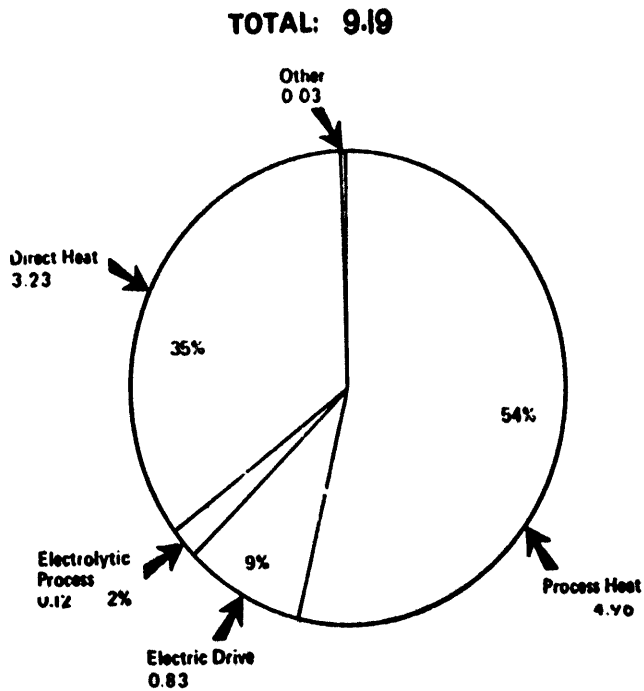
Note - Does not include nonenergy uses.

Source: U.S. Bureau of Mines, 1973.



# U.S. Net Energy Consumption, Industrial Sector, 1970

(Million Barrels per day of Oil Equivalent)



Note - Nonenergy uses not shown.

Source: U.S. Bureau of Mines, 1973

TABLE 9.—PROJECTED U.S. GROSS ENERGY CONSUMPTION, 1973-90 (ASSUMING AN AVERAGE PRICE OF \$7 PER BARREL OF OIL)

[Million barrels per day of oil equivalent]

Source	1977		1980		1985		1990		
	1973	WOC	WC	WOC	WC	WOC	WC	WOC	WC
Petroleum.....	16.39	17.85	16.86	19.65	18.13	22.62	20.12	26.07	23.19
Natural gas.....	10.76	10.20	10.00	10.81	10.34	11.28	10.62	11.81	11.14
Coal.....	6.33	7.98	7.88	8.54	7.98	9.40	7.88	10.34	8.45
Hydropower and geothermal.....	1.36	1.65	1.65	1.88	1.88	2.26	2.26	2.64	2.64
Nuclear.....	.42	1.32	1.32	2.26	2.26	5.90	5.90	10.15	10.15
<b>Total.....</b>	<b>35.28</b>	<b>39.01</b>	<b>37.78</b>	<b>43.17</b>	<b>40.62</b>	<b>51.48</b>	<b>46.81</b>	<b>61.02</b>	<b>55.59</b>
Petroleum imports (million barrels per day).....	2.92	N/A	N/A	4.58	3.82	5.85	4.62	7.51	6.14

WOC=without conservation; WC=with conservation.

Source: Project Independence Report, 1974; 1985-90 Extrapolated by Department of Interior.

### Projected U.S. Energy Consumption

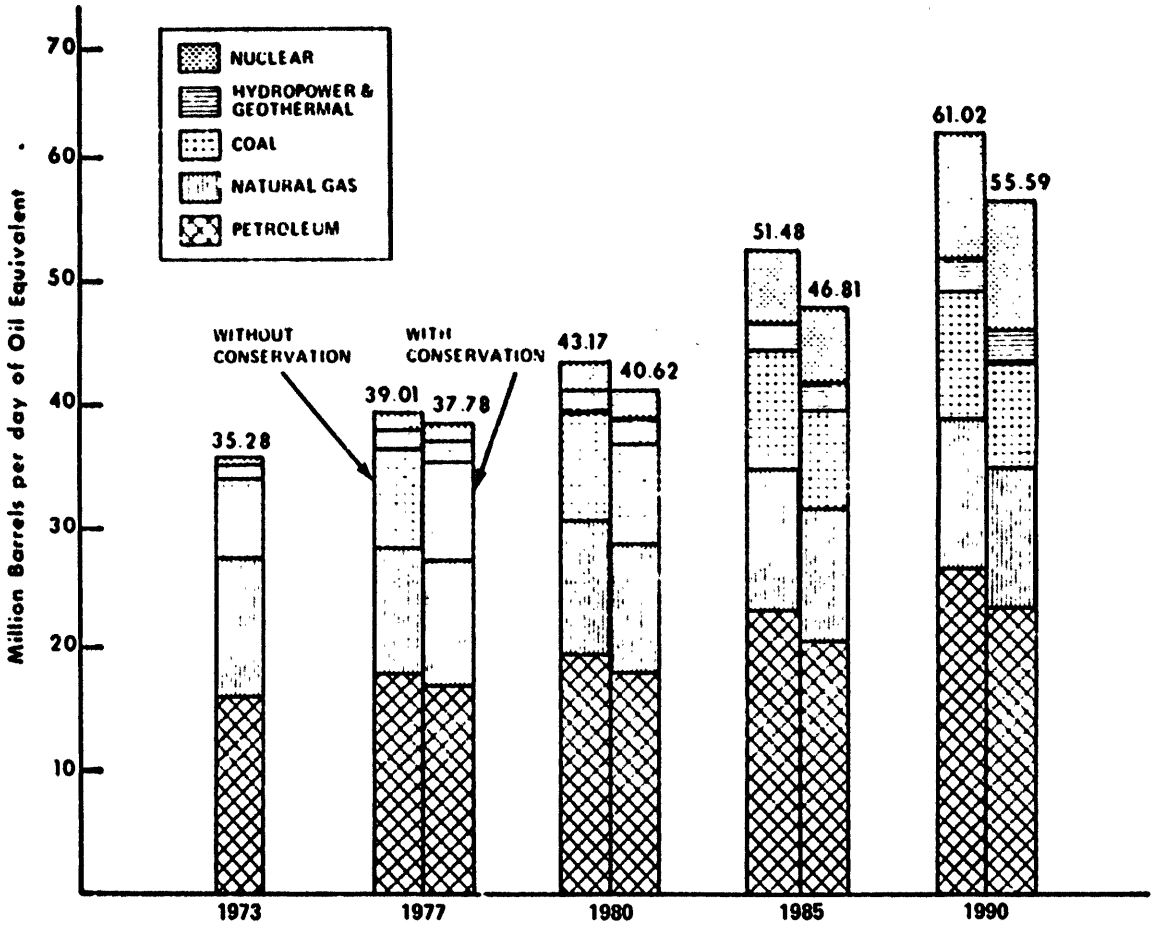
The tables on the following 3 pages contain projections of energy consumption developed by the Federal Energy Administration in its *Project Independence Report*. The "business as usual" scenario is based on an extrapolation of recent trends in energy consumption; it assumes different growth rates and prices elasticities for each fuel. The prices for oil are in 1973 dollars, with a gradual increase to those levels from present prices. The model also assumes that there will be some price increases in other fuels in response to the increase in oil prices.

The "with conservation" option in the following tables assumes enactment of fuel-saving measures, including the following: a mandatory 20 mpg auto efficiency standard, a substantial mass transit program, a federal tax credit for improving the thermal efficiency of buildings, minimum efficiency standards for new commercial structures, a research and development program for industrial energy conservation, solid waste recovery programs, prompt pass-through of escalating electricity generating costs, and alternative utility rate structures.

The main thrust of the Energy Independence report, which is corroborated by the MIT energy project, is that at higher U.S. energy prices, dependency on imports will decline. Thus, at \$11 per barrel, U.S. imports by 1980 with or without conservation, will be in the 1.5-2.2 million barrels per day range, while at \$7 prices the estimates fall between 3.8-4.6 million barrels.

# U.S. Gross Energy Consumption, 1973-90

(Business as Usual, \$7 Oil)



Source: Project Independence Report, 1974; 1985-90 extrapolated.

TABLE 10.—PROJECTED GROSS ENERGY CONSUMPTION, 1973-90 (ASSUMING AN AVERAGE PRICE OF \$11 PER BARREL OF OIL)

[Million barrels per day of oil equivalent]

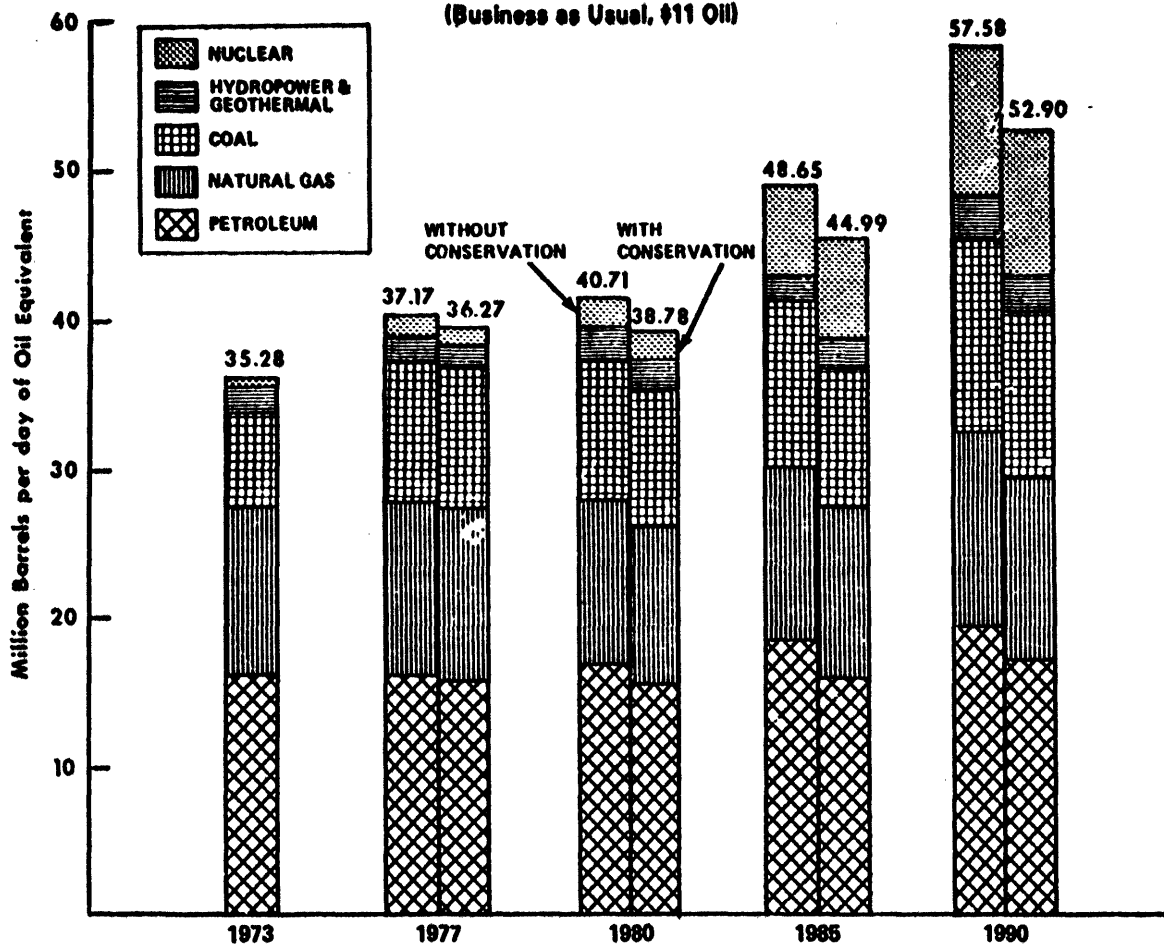
Source	1973	1977		1980		1985		1990	
		WOC	WC	WOC	WC	WOC	WC	WOC	WC
Petroleum .....	16.39	16.10	15.3	16.48	15.35	17.98	15.82	19.50	17.24
Natural gas .....	10.76	10.25	10.25	10.91	10.48	11.71	11.19	12.56	11.90
Coal .....	6.33	7.84	7.74	9.16	8.87	10.81	9.30	12.70	10.95
Hydropower and geothermal .....	1.36	1.65	1.65	1.88	1.88	2.26	2.26	2.64	2.64
Nuclear .....	.42	1.32	1.32	2.26	2.26	5.90	5.90	10.15	10.15
<b>Total .....</b>	<b>35.28</b>	<b>37.17</b>	<b>36.27</b>	<b>40.71</b>	<b>38.78</b>	<b>48.65</b>	<b>44.49</b>	<b>57.58</b>	<b>52.90</b>
<b>Petroleum imports (million barrels per day) .....</b>	<b>2.92</b>	<b>N/A</b>	<b>N/A</b>	<b>2.17</b>	<b>1.55</b>	<b>1.55</b>	<b>.56</b>	<b>1.84</b>	<b>.85</b>

WOC=without conservation; WC=with conservation.

Source: Project Independence Report, 1974; 1985-90 extrapolated by Department of Interior.

# U.S. Gross Energy Consumption, 1973-90

(Business as Usual, \$11 Oil)



Source: Project Independence Report, 1974; 1985-90 extrapolated.

**TABLE 11.—U.S. PETROLEUM PRODUCTION, 1960-74**  
 (In millions of barrels per day)

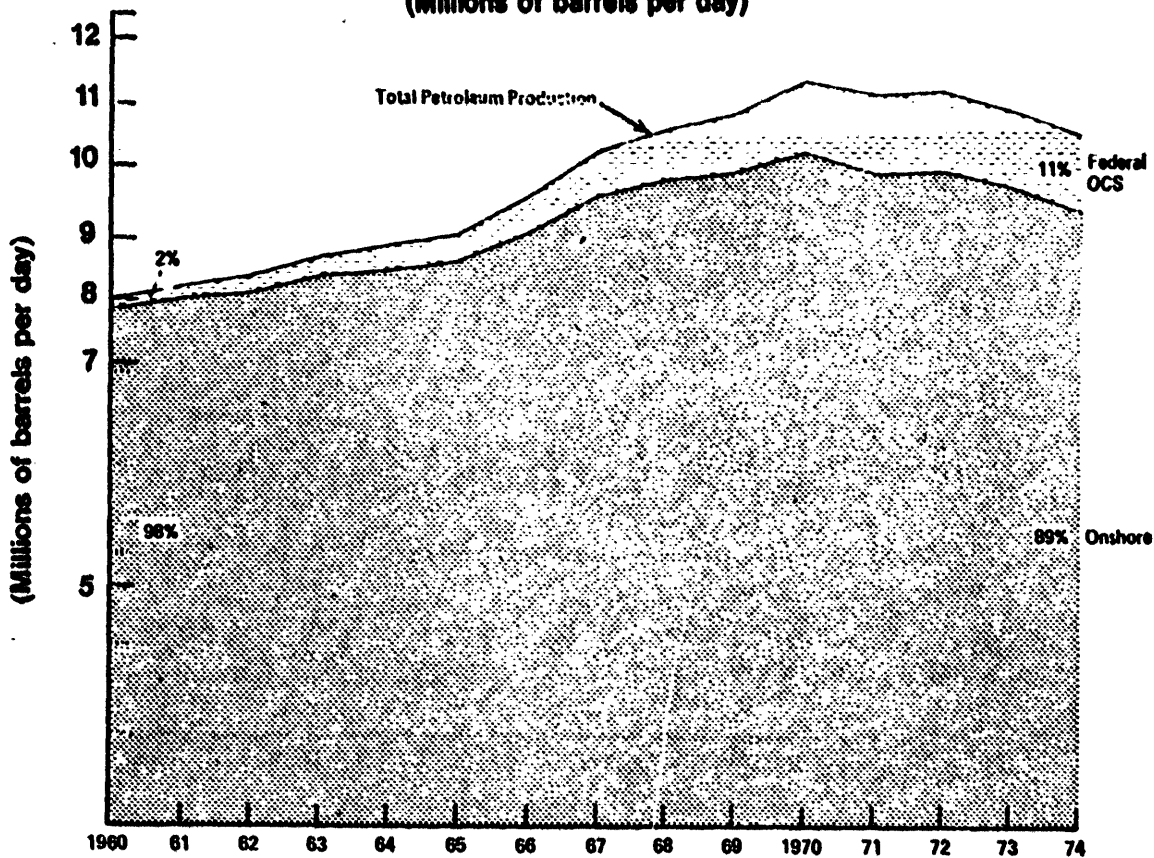
	Onshore	Federal OCS	Production total
1960.....	7.82	0.14	7.96
1961.....	7.99	.18	8.17
1962.....	8.10	.26	8.36
1963.....	8.34	.30	8.64
1964.....	8.42	.35	8.77
1965.....	8.60	.42	9.02
1966.....	9.04	.54	9.58
1967.....	9.58	.64	10.22
1968.....	9.82	.78	10.60
1969.....	9.92	.91	10.83
1970.....	10.24	1.06	11.30
1971.....	9.91	1.25	11.16
1972.....	9.95	1.24	11.19
1973.....	9.76	1.19	10.95
1974.....	9.39	1.16	10.55

Source: U.S. Geological Survey. U.S. Bureau of Mines, 1974.

### U.S. Petroleum Production

Domestic petroleum production peaked in 1970, as the production from existing reserves declined faster than new discoveries were being made. Figures for petroleum include the production of natural gas liquids, a substance that is similar to crude oil.

### U.S. Petroleum Production, 1960-74 (Millions of barrels per day)



Source: U.S. Geological Survey; U.S. Bureau of Mines, 1974.

### Domestic Crude Oil Prices

Table 12 shows average domestic wellhead prices for crude oil. Beginning in August of 1973, the Cost of Living Council established a two-tier price control system for domestic oil. Old crude production, (defined as 1972 levels of production from existing wells) remained under price controls, while the price of new oil (defined as production from new wells and production from existing wells at greater than 1972 levels of production) was allowed to rise freely. Stripper wells, those producing less than 10 barrels per day, were also exempted from price controls. Since December of 1973, the price of old oil has been held at \$5.25 per barrel. The price of new oil rose to \$11.51 per barrel in February of 1975, and represented 42 percent of domestic production for that month. The February, 1975 average price of domestically-produced crude oil was \$8.50; the average price of imported oil was \$13.04, including oil import tariff and fees.



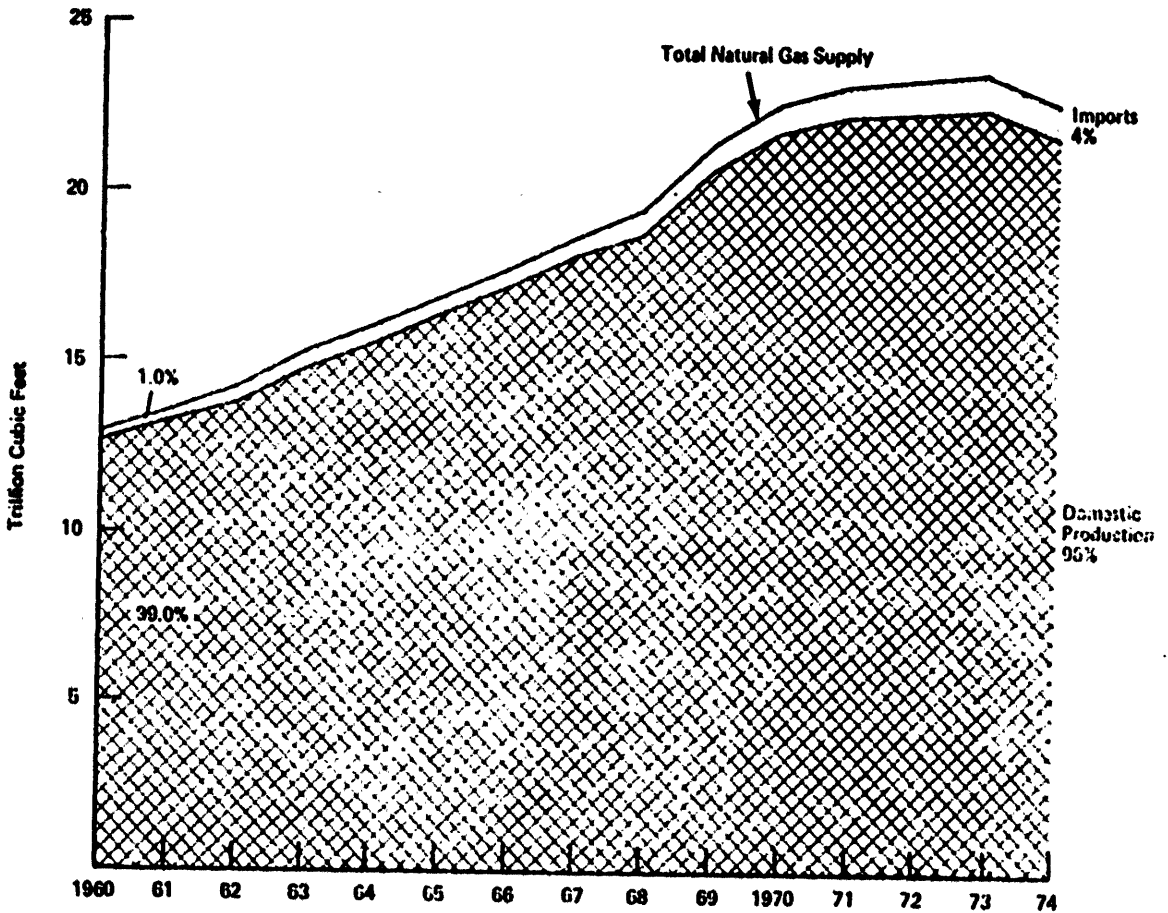
TABLE 12.—DOMESTIC CRUDE OIL PRICES

Year	Consumer Price Index 1967 equals 100	Wellhead crude oil price <sup>1</sup> (dollars per barrel)	Adjusted price (expressed in 1967 dollars per barrel according to CPI)
1960.....	88.7	\$2.88	3.25
1961.....	89.6	2.89	3.23
1962.....	90.6	2.91	3.21
1963.....	91.7	2.89	3.15
1964.....	92.7	2.88	3.11
1965.....	94.5	2.86	3.03
1966.....	97.2	2.88	2.96
1967.....	100.0	2.92	2.92
1968.....	104.2	2.94	2.82
1969.....	109.8	3.09	2.81
1970.....	116.3	3.18	2.73
1971.....	121.3	3.39	2.79
1972.....	125.3	3.39	2.71
1973.....	133.1	3.89	2.92
1974.....	147.1	6.85	4.66

<sup>1</sup> According to Independent Petroleum Association of America, average price of domestic crude oil, from 1973 to 1974, represents an average of controlled and uncontrolled crude oil prices; 1974 price is simple average of IPAA monthly quotations.

Source: Library of Congress.

## U.S. Natural Gas Supply, 1960-74



Source: U.S. Bureau of Mines, 1975;  
Project Independence Report, 1974.

TABLE 13. U.S. NATURAL GAS SUPPLY, 1960-74

[In trillion cubic feet]

	Year—				
	1960	1965	1970	1973	Estimated 1974
Domestic production <sup>1</sup> .....	12.77	16.04	21.92	22.65	21.90
Net imports.....	.14	.43	.75	.96	.86
Natural gas supply.....	12.91	16.47	22.67	23.61	22.76

<sup>1</sup> Natural gas production refers to marketed production, namely gross withdrawals less gas used for reprocessing and quantities vented and flared.

Source: Bureau of Mines, FEA.

### Natural Gas Supply

Domestic natural gas production peaked in 1973, when consumption began to outpace the addition of new reserves.

TABLE 14.—U.S. NATURAL GAS PRICES

Year	Consumer Price Index, 1967=100	Wellhead <sup>1</sup> value in \$/Mcf	Adjusted price (wellhead value expressed in 1967 \$/Mcf according to CPI)
1960.....	88.7	14.0	15.8
1961.....	89.6	15.1	16.9
1962.....	90.6	15.5	17.1
1963.....	91.7	15.8	17.2
1964.....	92.7	15.4	16.6
1965.....	94.5	15.6	16.5
1966.....	97.2	15.7	16.2
1967.....	100.0	16.0	16.0
1968.....	104.2	16.4	15.7
1969.....	109.8	16.7	15.2
1970.....	116.3	17.1	14.7
1971.....	121.3	18.2	15.0
1972.....	125.3	18.6	14.8
1973.....	133.1	21.6	16.2
1974.....	147.1	<sup>2</sup> 29.1	19.8

<sup>1</sup> According to Bureau of Mines, Wellhead Value includes inter- and intrastate gas as well as an imputed value for gas used in production.

<sup>2</sup> Estimate.

Source: Bureau of Mines.

### U.S. Natural Gas Prices

Interstate natural gas prices have been controlled for the past two decades by the Federal Power Commission (FPC). In recent years, the FPC allowed the price to rise on a regional basis, and has recently set a national ceiling price for gas newly discovered and committed to interstate markets of 51¢ per thousand cubic feet. The intrastate price closely paralleled the controlled price until 1970. However, when gas became more scarce, the uncontrolled price for intrastate gas began to rise; recent intrastate gas sales have been close to \$2 per thousand cubic feet. (One dollar per thousand cubic feet of natural gas is approximately the equivalent of six dollars per barrel of crude oil.)

TABLE 15.—SELECTED INTERSTATE AND INTRASTATE GAS STATISTICS, 1967-73

	Interstate		Intrastate	
	Reserve to production ratios (years)	Annual reserve additions (TCF)	Reserve to production ratios (years)	Annual reserve additions (TCF)
1967.....	16.8	14.8	13.8	6.3
1968.....	15.5	9.5	12.4	2.5
1969.....	14.0	6.1	10.8	2.2
1970.....	12.3	.....	10.4	11.1
1971.....	11.3	2.0	10.3	7.4
1972.....	10.2	.....	10.0	9.6
1973.....	9.8	1.1	8.9	5.4

TCF=trillion cubic feet.

Source: FPC, AGA.

### Natural Gas Curtailments

The failure of new discoveries of natural gas in fields committed to interstate markets (table 15) to match deliveries called for under long-term contracts has led to increasing curtailments. A "firm" curtailment is the failure to deliver gas under a firm contract, as opposed to "interruptible" supply, that which is contracted for, but which may be cut off at the discretion of the supplier.

National interstate sales and curtailments are shown in table 16; curtailments for the 1974-75 winter heating season are broken down by State in table 17.

TABLE 16.—INTERSTATE GAS SALES AND CURTAILMENTS, 1970-74

	Trillion cubic feet		
	Total interstate pipeline gas sales	Net interstate firm gas curtailments	Curtailments as a percent of total
1970.....	14.100	0.018	( <sup>1</sup> )
1971.....	14.200	.286	2.01
1972.....	14.200	.649	4.57
1973.....	13.700	1.131	8.25
1974.....	13.200	1.679	12.71

<sup>1</sup> Negligible.

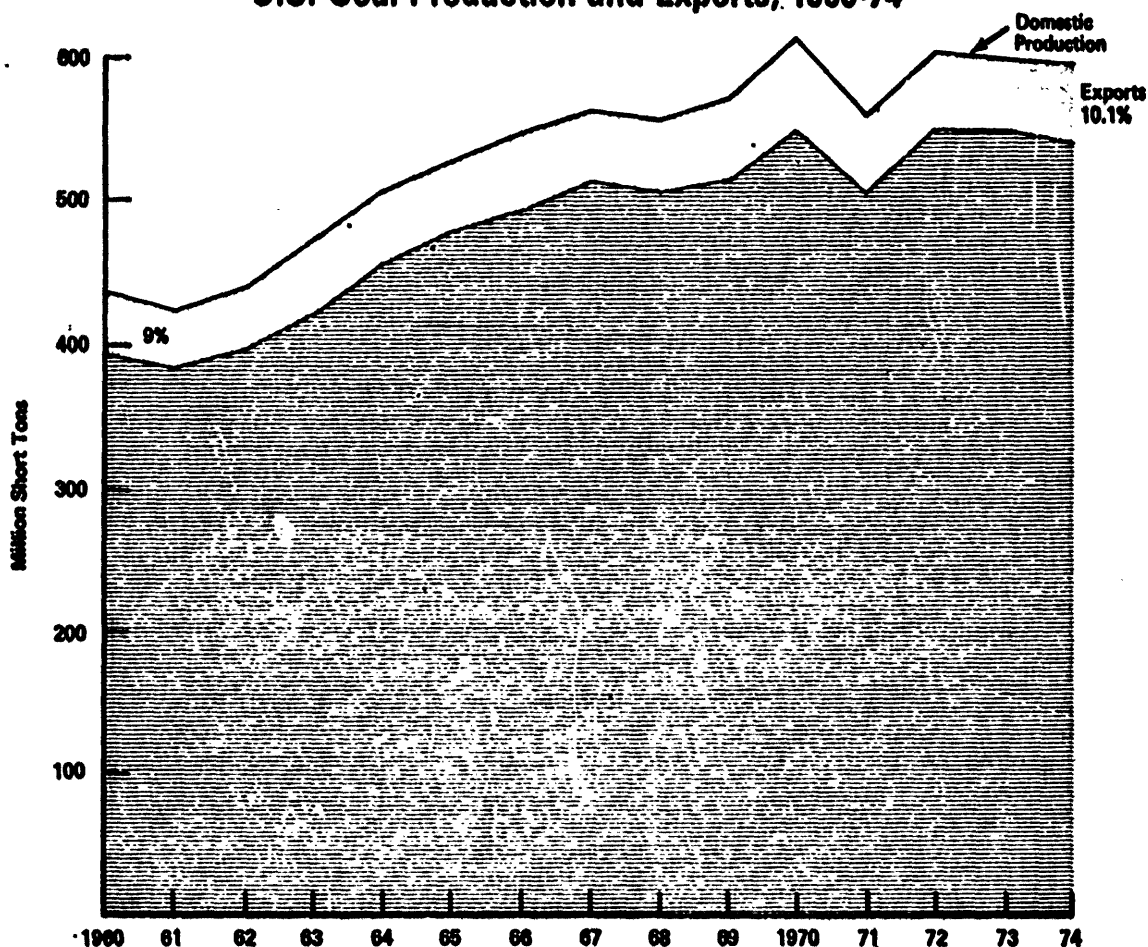
Source: FPC Gas Supply Indicators, Monthly Curtailment Report, form No. 17, and Staff Gas Supply Report.

TABLE 17.—NATURAL GAS FIRM CURTAILMENTS BY STATE, NOVEMBER 1974–MARCH 1975

[Thousands of cubic feet]

State ranking	State	Curtailments
1	Louisiana	111,115,143
2	Ohio	97,656,005
3	California	73,221,187
4	Pennsylvania	69,979,453
5	Arkansas	64,944,984
6	Mississippi	51,524,235
7	Tennessee	47,163,901
8	Kansas	45,759,515
9	New York	40,117,663
10	Indiana	39,878,687
11	Michigan	34,719,153
12	Arizona	32,623,642
13	New Jersey	31,793,146
14	Missouri	31,253,334
15	North Carolina	29,682,540
16	Alabama	24,898,853
17	Maryland	21,858,110
18	Virginia	21,364,581
19	Illinois	19,752,834
20	West Virginia	17,644,078
21	Kentucky	16,534,242
22	Oregon	12,221,306
23	Florida	11,813,321
24	Iowa	9,538,635
25	New Mexico	9,052,083
26	Idaho	8,497,952
27	Texas	8,484,523
28	Washington	7,221,307
29	Massachusetts	7,146,158
30	South Carolina	6,912,989
31	Wyoming	6,151,386
32	Georgia	5,697,293
33	Minnesota	5,171,886
34	Oklahoma	4,698,553
35	Nebraska	4,517,198
36	Connecticut	4,483,173
37	Nevada	3,924,700
38	Delaware	1,852,946
39	Rhode Island	1,715,315
40	Wisconsin	241,824
41	New Hampshire	144,081
42	South Dakota	51,097
43	Colorado	6,022
44	Alaska	0
44	District of Columbia	0
44	Hawaii	0
44	Maine	0
44	Montana	0
44	North Dakota	0
44	Utah	0
44	Vermont	0
U.S. net total		1,043,029,034

### U.S. Coal Production and Exports, 1960-74



Source: U.S. Bureau of Mines, 1974.

TABLE 18.—U.S. COAL PRODUCTION AND EXPORTS, 1960-74

[In million short tons]

Item	Year—							
	1960	1965	1969	1970	1971	1972	1973	1974
Domestic production.....	434.3	527.0	571.0	612.7	560.9	602.5	598.6	596.0
Net exports.....	37.7	52.0	57.8	72.4	57.9	57.1	53.9	60.0

Source: Bureau of Mines.

TABLE 19.—U.S. COAL PRICES

Year	Consumer Price Index, 1967=100	Coal price "as burned by utilities" in cents per million Btu <sup>1</sup>	Adjusted price (expressed in 1967 cents per million Btu according to CPI)
1961.....	89.6	25.9	28.9
1962.....	90.6	25.6	28.3
1963.....	91.7	25.0	27.3
1964.....	92.7	24.5	26.4
1965.....	94.5	24.4	25.8
1966.....	97.2	24.6	25.3
1967.....	100.0	25.2	25.2
1968.....	104.2	25.6	24.6
1969.....	109.8	26.7	24.3
1970.....	116.3	31.2	26.8
1971.....	121.3	36.3	29.9
1972.....	125.3	38.4	30.6
1973.....	133.1	40.5	30.4
1974.....	147.1	71.0	48.3

<sup>1</sup> Data from 1961-72 are Edison Electric Institute calculations from FPC data; 1973-74 are from FPC publications.

TABLE 20.—TOTAL OIL IMPORTS AND PRICES

	1971	1972	1973	1974
Quantity.....	1,376,629	1,694,529	2,296,923	2,188,760
(Millions of barrels per day).....	3.77	4.63	6.29	6.00
Average price per barrel.....	\$2.44	\$2.58	\$3.42	\$11.77
Total oil trade deficit (millions of dollars).....	\$3,360	\$4,383	\$7,861	\$25,766
Overall U.S. balance of payments, net liquidity basis (millions of dollars).....	-\$22,000	-\$13,900	-\$7,600	-\$18,100
National balance of trade <sup>1</sup> (millions of dollars).....	-\$4,800	-\$9,700	-\$2,400	-\$10,100

<sup>1</sup> Imports are c.i.f.; exports are f.o.b.  
Note: 1974 data is preliminary.

Source: Bureau of Mines, International Economic Report of the President, International Economic Indicators.

### U.S. Oil Imports and Prices

Oil imports represent a major drain on the U.S. balances of trade and payments. The largest deficits occurred between 1973 and 1974, when world oil prices quadrupled.

The table on oil prices by source, table 21, indicates that the price leaders were not the Persian Gulf embargoing countries, but rather South American and African OPEC countries. South American countries did not engage in the embargo. International oil prices have remained relatively stable since January of 1974, although a price revision is expected in the next OPEC meeting in October, 1975. U.S. refiner acquisition costs reflect the six-week delay for oil to reach U.S. shores, and are slightly more expensive than posted prices because of transportation costs.

TABLE 21.—PETROLEUM IMPORT PRICES, BY SOURCE, SELECTED DATES

[In dollars per barrel]

Posted prices	January 1972	January 1973	July 1973	Oct. 1, 1973	Oct. 16, 1973	January 1974	February 1974	July 1974	December 1974
<b>Middle East:</b>									
Iraq.....	2.45	2.56	2.92	2.98	5.06	11.67			
Kuwait.....	2.37	2.48	2.83	2.88	4.90	11.54			
Saudi Arabia.....	2.48	2.59	2.94	3.00	5.12	11.65		11.97	11.75
<b>Mediterranean:</b>									
Algeria.....						16.21		13.65	13.08
Libya.....	3.67	3.78	4.02	4.60	8.93	15.77			
<b>Non-Arab countries:</b>									
Indonesia.....	2.26	2.96		4.75		10.80		13.77	14.15
Iran.....	2.47	2.58	2.94	3.00	5.34	11.88	12.11	13.02	11.63
Venezuela.....	2.78	3.40		5.45		14.88	11.31	10.64	11.37
Ecuador.....	2.61			3.83				22.03	10.86
<b>U.S. refiner acquisition costs</b>									
Average import costs.....				4.79		9.59	12.45	12.75	12.82

<sup>1</sup> Landed cost.  
<sup>2</sup> Fob.

Source: Federal Energy Administration.



TABLE 22.—U.S. OIL IMPORTS, 1965-74

(In millions of barrels per day)

Source	Recent export policy	1965	1970	1971	1972	1973	1974
OPEC (embargo).....	OPEC countries (a) which participated in a world oil embargo in 1973-74, (b) which subsequently supported a quadrupling of world oil prices, and (c) which continue to pursue policies intended to maintain world oil prices at artificially high levels.	0.298 (12)	0.196 (6)	0.327 (8)	0.530 (11)	0.914 (15)	0.748 (12)
Algeria							
Iraq							
Kuwait							
Libya							
Qatar							
Saudi Arabia							
United Arab Emirates							
OPEC (nonembargo)	OPEC countries (a) which did not actively participate in the world oil embargo in 1973-74 and (b) which continued to export oil at substantially the same level at prevailing world prices.	1.149 (47)	1.147 (33)	1.345 (34)	1.535 (32)	2.076 (33)	2.527 (42)
Ecuador							
Gabon							
Indonesia							
Iran							
Nigeria							
Venezuela							
Non-OPEC.....	Non-OPEC countries (a) which did not actively participate in the world oil embargo of 1973-74, (b) which continued to export oil at substantially the same levels at prevailing world prices, but (c) which presently pursue oil policies which are national in character and separate from the policies of the first 2 groups.	1.021 (41)	2.076 (61)	2.254 (58)	2.676 (57)	3.266 (52)	2.813 (46)
Canada							
Bahamas							
Trinidad and Tobago							
Italy							
Netherlands							
Netherlands Antilles							
Puerto Rico							
Virgin Islands							
Others							
Total imports.....		2.468	3.419	3.926	4.741	6.256	6.088

Note: Figures in parentheses denote percentages.

Source: U.S. Bureau of Mines and Staff of the Committee on Finance.

### U.S. Oil Imports

U.S. oil imports have increased rapidly in the last five years. The percentage imported from OPEC countries has also increased over the years. A trend of growing reliance on OPEC embargoing countries was interrupted in 1974 by the oil embargo, but figures for early 1975 indicate that the historic trend of increasing reliance has resumed.

Table 22 shows that the OPEC nations which embargoed the U.S. account for about 12 percent of our total imports, down slightly since 1973 but about double their import share of 1970. Of the non-embargoing OPEC nations Iran, Nigeria and Indonesia have had the largest increases. Of the non-OPEC nations, Canada is still our largest supplier (1.067 million barrels per day in 1974) but that government has announced it will phase down its shipments of oil to this country.

TABLE 23.—DOMESTIC GASOLINE CONSUMPTION

Year	Consumption (million barrels per day)	Year	Consumption (million barrels per day)
1963.....	4.479	1969.....	5.596
1964.....	4.530	1970.....	5.839
1965.....	4.713	1971.....	6.064
1966.....	4.913	1972.....	6.374
1967.....	5.048	1973.....	6.671
1968.....	5.344	1974.....	6.542

Source: Bureau of Mines.

## Gasoline Consumption

Table 23 indicates that in the 5 years prior to 1974, the annual rate of growth in gasoline consumption averaged 4.5 percent. Total consumption was down slightly in 1974 because of both reduced availability in the early months of that year and also a rapid increase in price. Table 24 shows a general trend of lower consumption; there is usually much higher demand in the summer months.

TABLE 24.—DOMESTIC GASOLINE CONSUMPTION, 1975

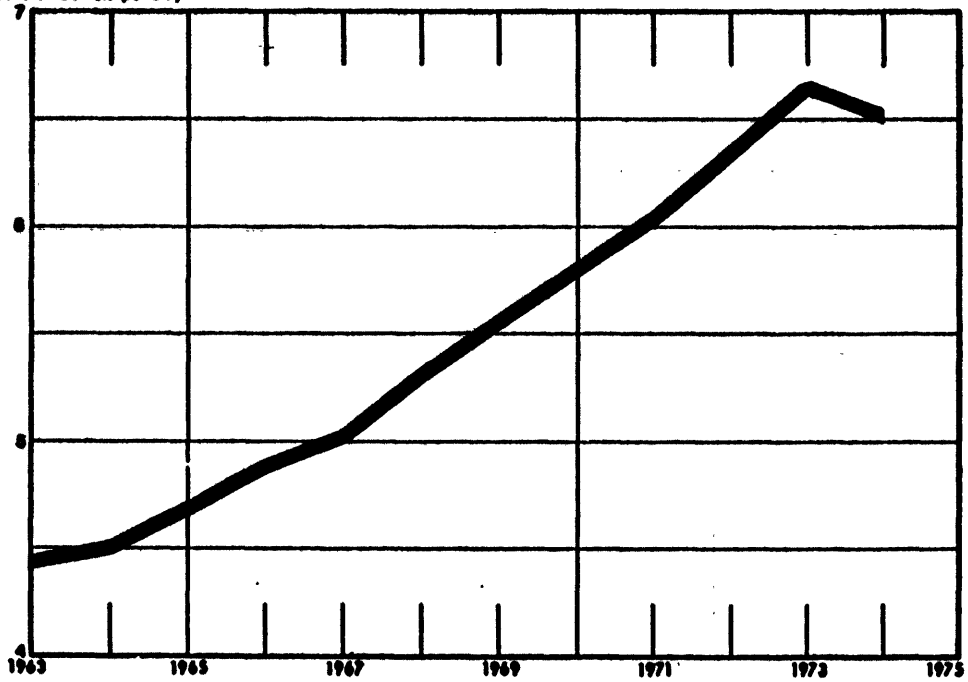
Month	Consumption (millions of barrels per day)	Month	Consumption (millions of barrels per day)
January.....	<sup>1</sup> 6.294	April.....	<sup>4</sup> 6.809
February.....	<sup>2</sup> 6.328	Average daily consumption, 1st 4 months.....	6.405
March.....	<sup>3</sup> 6.196		

<sup>1</sup> Extrapolated from actual consumption in 49 States.<sup>2</sup> Extrapolated from actual consumption in 48 States.<sup>3</sup> Extrapolated from actual consumption in 44 States.<sup>4</sup> Extrapolated from actual consumption in 27 States.

Source: Federal Highway Administration.

### Gasoline Consumption

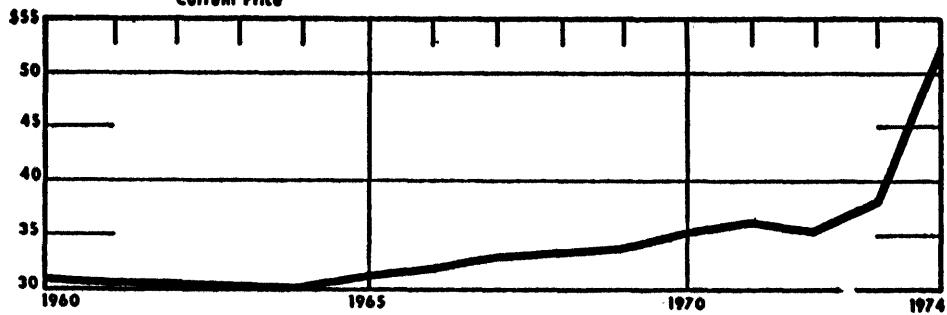
Millions of Barrels per Day



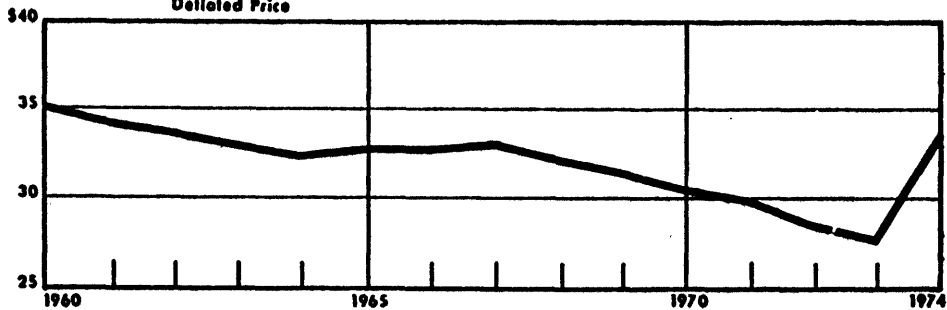
Source: Bureau of Mines

### Gasoline Prices in Service Stations (Incl. Tax)

Current Price



Deflated Price



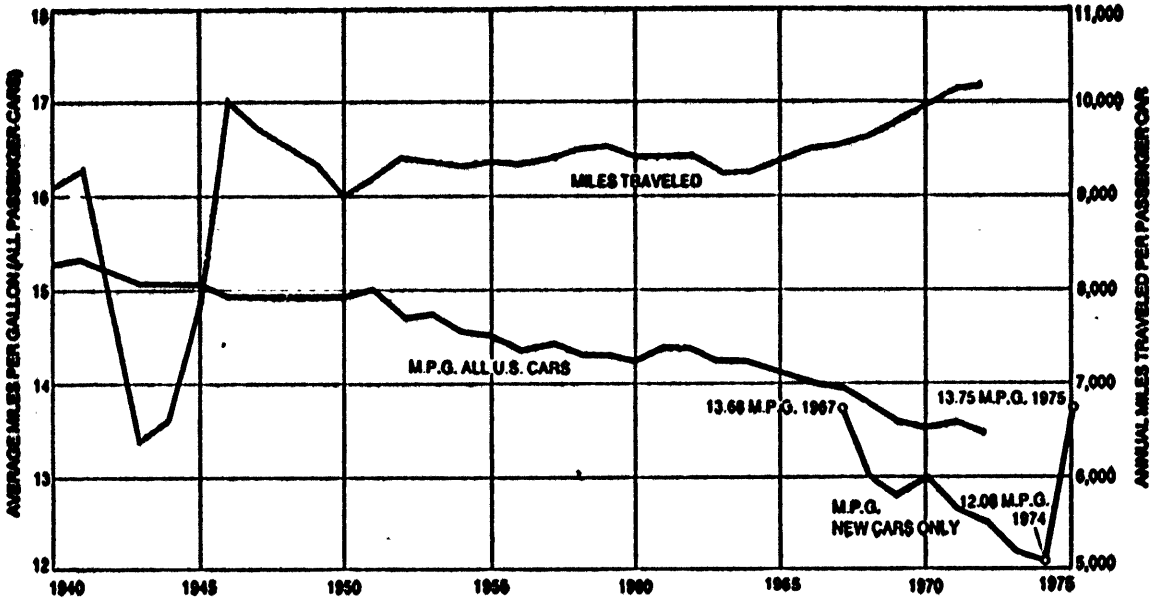
Source: Platt's Oil Gram Price Service, 1960-1973 FEA 1974  
(Calculation of deflated price: FEA)

TABLE 25.—PASSENGER CAR USE

Purpose of travel	Percentage distribution		Average trip length one-way (miles)	Average occupants per car
	Trips	Travel		
<b>Earning a living:</b>				
To and from work.....	32.3	34.1	9.4	1.4
Business related to work.....	4.4	8.0	16.1	1.6
<b>Total.....</b>	<b>36.7</b>	<b>42.1</b>	<b>10.2</b>	<b>1.4</b>
<b>Family business:</b>				
Medical and dental.....	1.7	1.6	8.4	2.1
Shopping.....	15.4	7.6	4.4	2.0
Other.....	14.1	10.3	6.5	1.9
<b>Total.....</b>	<b>31.3</b>	<b>19.6</b>	<b>5.6</b>	<b>2.0</b>
Educational, civic or religious.....	9.4	5.0	4.7	2.5
<b>Social and recreational:</b>				
Vacations.....	.1	2.6	160.0	3.4
Visit friends or relatives.....	9.1	12.2	12.0	2.2
Pleasure rides.....	1.4	3.1	20.0	2.7
Other.....	12.0	15.4	11.4	2.6
<b>Total.....</b>	<b>22.6</b>	<b>33.4</b>	<b>13.1</b>	<b>2.5</b>
<b>All purposes.....</b>	<b>100.0</b>	<b>100.0</b>	<b>8.9</b>	<b>1.9</b>

Source: U.S. Department of Transportation, Federal Highway Administration, Nationwide Personal Transportation Study (1969), Reports No. 1 and 7.

U.S. Passenger Car Mileage



Source: Scientific American, January 1975.

TABLE 26.—U.S. STOCKS REQUIRED BY IEA FOR VARIOUS IMPORT LEVELS

	Required stocks (million barrels)	Estimated 10-year costs (billions)
<b>Total U.S. Imports (MMB/D):</b>		
3.....	270	\$4.7
6.....	540	9.3
9.....	810	14.0
12.....	1,080	18.7
15.....	1,350	23.4

Source: FEA.

### Petroleum Stockpiles

As a member of the International Energy Agency, the United States agreed to maintain petroleum stocks equivalent to a ninety-day import supply. Table 26 illustrates the stocks required at various import levels and the costs of implementing such a program over a ten-year period.

TABLE 27.—CURRENT "EMERGENCY" STORAGE CAPACITY

(In millions of barrels)

Product	1972 average * total stocks	1972 average * consumption	Days usable * storage	Week of 6-6-75 total stocks	Week of 6-6-75 consumption	Days usable storage
Crude oil.....	279.4	**11.7	23.9	286.0	**12.0	23.8
Gasoline.....	216.0	6.4	33.8	201.9	6.9	29.3
Distillate.....	148.1	2.9	51.1	151.6	2.6	58.3
Residual fuel.....	56.9	2.5	22.8	56.9	2.1	27.1

\* Pre-embargo.

\*\* Crude runs to still.

Source: FEA.

Table 27 illustrates that U.S. emergency storage capacity has changed slightly since the 1973 oil embargo.

TABLE 28.—STOCKPILE COSTS AND GNP COSTS OF RESIDUAL VULNERABILITY FOR U.S. IMPORTS OF 6 MMB/D

	Size of stockpile (millions of barrels)		
	500	1,000	1,500
10-year costs of stockpile (billions).....	\$8.7	\$17.3	\$25.9
GNP cost of supply disruption with stockpile (billions)....	80.0	30.0	0
<b>Total cost.....</b>	<b>88.7</b>	<b>47.3</b>	<b>25.9</b>

Source: FEA.

Although the costs of establishing a petroleum stockpile are great, they should be compared with the potential cost to the economy of a future supply disruption. Table 28 illustrates the costs of implementing a stockpile over a ten-year period and the costs to the GNP of a one-year supply disruption of 4.8 million barrels per day with a stockpile (note that the latter declines as the size of the stockpile increases).

TABLE 29.—REVENUES FROM TAX ON MILLIONS OF BTU'S OF ENERGY CONSUMPTION

Energy source	Btu's per unit	Cost per unit at 1 cent per MM Btu	1974 annual consumption	Revenues from 1974 at 1 cent per MM Btu (millions)	Revenues from 1974 at 1 cent per MM Btu (millions)	Revenues from 1974 at 1 cent per MM Btu (millions)
Coal.....	23 MM Btu/ton (approximately).	\$0.23	551 million tons.....	\$126.7	\$253.4	\$380.1
Anthracite.....	25 MM Btu/ton.....	.25	.....	.....	.....	.....
Bituminous.....	23 MM Btu/ton.....	.23	.....	.....	.....	.....
Subbituminous.....	17 MM Btu/ton.....	.17	.....	.....	.....	.....
Lignite.....	13.5 MM Btu/ton.....	.13	.....	.....	.....	.....
Crude oil.....	5.8 MM Btu/bbl.....	.06	6.02 billion bbls.....	361.2	722.4	1,083.6
Natural gas liquids.....	4.0 MM Btu/bbl.....	.04	724 million bbls.....	28.9	57.8	86.7
Natural gas.....	1.032 MM Btu/Mcf.....	.01	19.5 trillion cubic feet..	195.0	390.0	585.0
Hydroelectricity.....	3.412 MM Btu/thousand kWh,	.03	290 billion kWh.....	9.9	19.8	29.7
Nuclear.....	3.412 MM Btu/thousand KWh,	.03	106 billion kWh.....	3.6	7.2	10.8
<b>Total.....</b>				<b>725.8</b>	<b>1,450.6</b>	<b>2,175.9</b>

Source: Library of Congress.

### Existing and Committed Electrical Generating Capacity

Electrical Generating Capacity  
(Millions of Kilowatts)

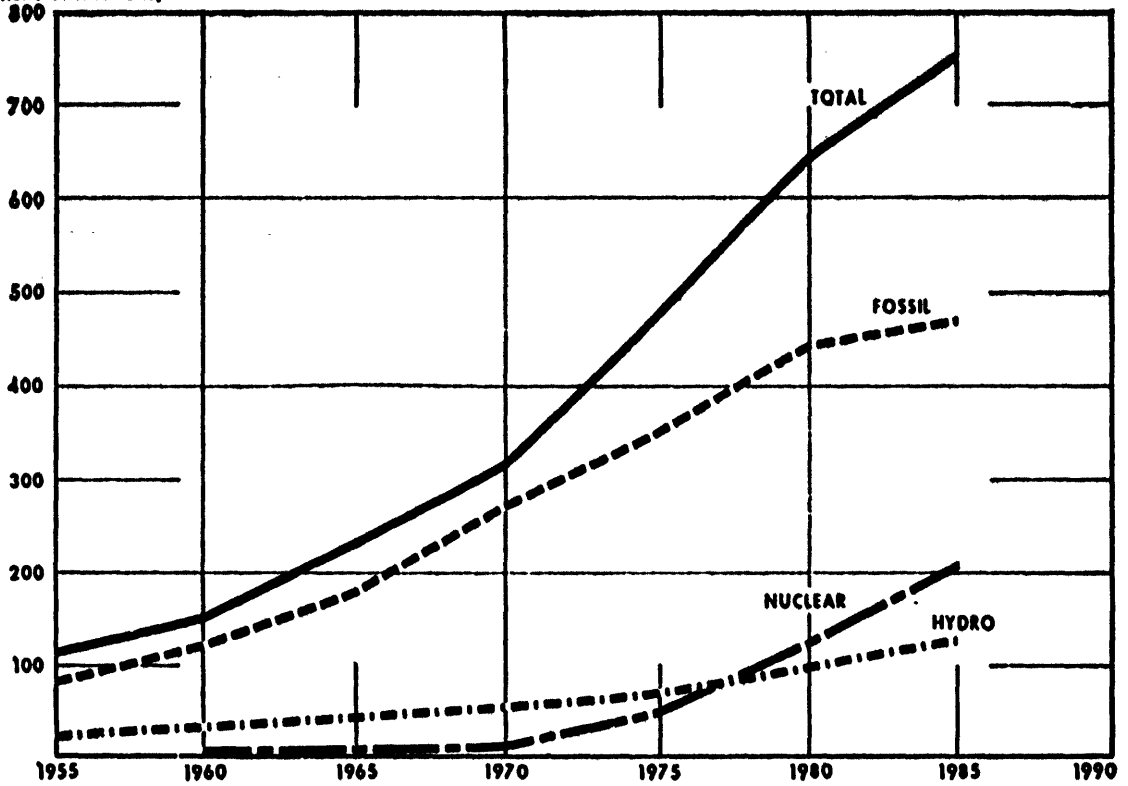


TABLE 30.—EXISTING AND COMMITTED ELECTRICAL GENERATING CAPACITY

(Millions of kilowatts)

Year	Hydro	Fossil	Nuclear	Total
1955 <sup>1</sup> .....	25	87	0	112
1960 <sup>1</sup> .....	32	132	3	167
1965 <sup>1</sup> .....	44	188	1	233
1970 <sup>1</sup> .....	55	275	6	336
1975 <sup>2</sup> .....	65	358	51	474
1980 <sup>2</sup> .....	<sup>2</sup> 83	445	121	649
1985 <sup>2</sup> .....	100	457	211	768

<sup>1</sup> Federal Energy Administration, Project Independence Report, November 1974.

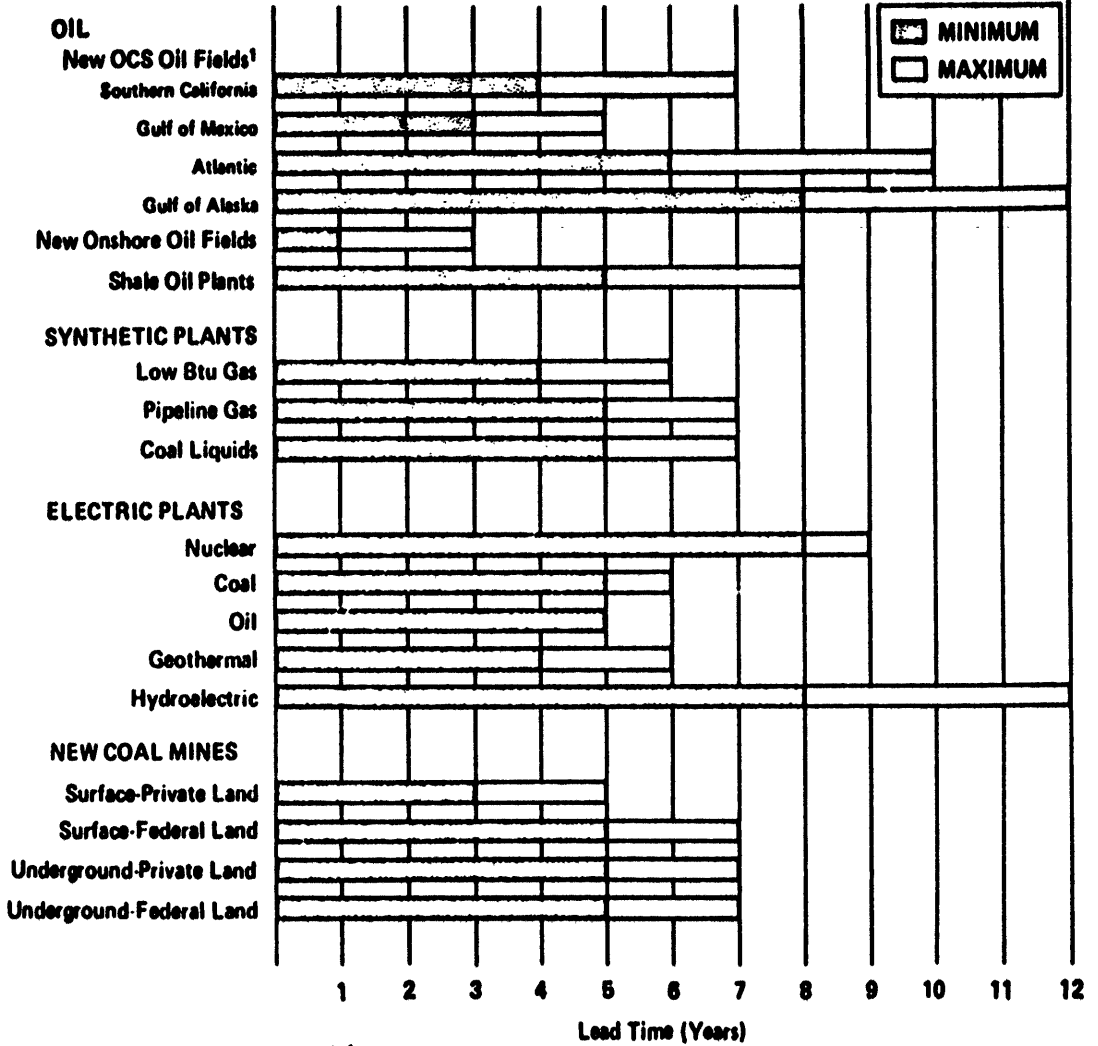
<sup>2</sup> New Capacity: A Profile of Utility Growth. Ray Schuster, Power Engineering, April 1974.

<sup>3</sup> Estimated.



# U.S. Energy Facility Production Lead Times

## TYPE OF FACILITY



<sup>1</sup>Significant production.

Source: U.S. Department of the Interior: U.S. Energy Prospects: An Engineering Viewpoint, National Academy of Engineering, 1973, page 92.

