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Transportation Energy Conservation Data Book

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Edition I

October 1976

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TRANSPORTATION ENERGY CONSERVATION DATA BOOK

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Energy Division

Prepared for
Data Analysis Branch
Nonhighway Transport Systems and Special Projects
Transportation Energy Conservation Division
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Abstract

This document represents the initial effort of Oak Ridge National Laboratory to develop a transportation energy conservation data book for use as a desk-top reference by the Transportation Energy Conservation Division of the Energy Research and Development Administration. It represents an assembly and display of statistics which characterize the major transportation modes and presents data on other factors which influence the transportation sector in the nation.

Statistical data on energy use in the transportation sector are presented in the form of tables, graphs, and charts. The purpose of this publication is to present a large amount of relevant data in an easily retrievable and usable format. The following topics are covered in six chapters: Characteristics of Transportation Modes; Energy Characteristics, including energy consumption by source and by sector and energy intensiveness; Conservation Alternatives; Government Impacts, including expenditures, regulations and research, development, and demonstration spending; Energy Supply, including domestic petroleum production, prices, and projections; and Transportation Demand, including population characteristics and economic determinants. A bibliography of data sources is provided at the end of each chapter, and a more general bibliography is included at the end of the book.

Foreword

The Transportation Energy Conservation (TEC) Division in the Energy Research and Development Administration (ERDA) is charged with the responsibility to perform research and development in energy economy with respect to transportation end use activities. It therefore requires information as to the current amount of energy used by the nation's transportation sector and a clear understanding how this energy is distributed among transportation modes. While this information is available from a number of sources, it is seldom consistent between sources. The problem becomes even more acute as one tries to find projections of future transportation energy use.

To reconcile the inconsistent estimates of historical, current, and future energy use, the Data Analysis Branch in TEC contracted with the Oak Ridge National Laboratory in January of 1976 to prepare a Transportation Energy Conservation Data Book. The major purpose of this data book is to draw together, under one cover, data from diverse sources, eliminating data inconsistencies, to produce a useful reference document.

Past, present, and projected data for transportation and energy are presented in this book, as well as transportation and energy conservation data. The consistency of the data set is essential to successful estimation by the TEC Division of current and future potential energy savings from transportation conservation measures. Likewise, a baseline scenario of the future that corresponds to the economic and demographic projections of other federal agencies is necessary so that impacts can be related to other major federal projections.

Although this book was developed primarily to be of assistance to members of the TEC Division, others may also be interested in the data

and the way it is presented. Therefore, this first edition of the TEC Data Book is being made available on a limited basis with a second printing to follow shortly.

Future editions will include: more information succinctly organized, data at the subnational level, TEC-generated energy conservation scenarios, and more information on the nonhighway transportation modes.

Even though only six months of effort have been expended by Oak Ridge, the volume is being released at this time so that TEC may obtain the type of early feedback essential to improving subsequent editions. Because of this, readers of this first edition are encouraged to communicate with the Data Analysis Branch in TEC concerning errors, omissions, emphases, and organization of this volume. Only through such feedback will the TEC Data Book evolve to the document that is desired.

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Nonhighway Transport Systems and
Special Projects
Transportation Energy Conservation
Division

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The authors would like to express their gratitude to Philip Patterson of TEC for his continuous support and guiding influence in the preparation of the Transportation Energy Conservation Data Book. Appreciation is expressed to Eric Hirst for his many useful comments and suggestions on the content. A special acknowledgment is expressed to M. P. Guthrie and A. C. Jordan who have provided invaluable assistance, with A. F. Fletcher, in development of the bibliographic section of this document. Finally, a special thanks to F. Ownby, B. Parker, and D. Patterson who conscientiously typed the contents of this book.

Support for this project was provided by the Division of Transportation Energy Conservation of the Energy Research and Development Administration Office of Conservation.

TRANSPORTATION ENERGY CONSERVATION DATA BOOK

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Explanation of Abbreviations Used in Figures and Tables

Document	Abbreviation
Analysis of Materials in Automobiles	D. O. T. Materials
1975 Automobile Facts and Figures	1975 Auto Facts
Benchmark Revision of National Income and Product Accounts	B. Economic Analysis
1972 Census of Transportation — Commodity Transportation Survey	1972 Transportation Survey
1963 Census of Transportation — Truck Inventory and Use Survey	Census of Transportation
1967 Census of Transportation — Truck Inventory and Use Survey	Census of Transportation
1972 Census of Transportation — Truck Inventory and Use Survey	Census of Transportation
1972 Commodity Transportation Survey	Commodity Trans. Survey
A Comparison of Mandatory and Automobile Excise Taxes	Excise Taxes
Consumer Buying Indicators	Bureau of Census
Cost of Operating an Automobile	F. H. A. Cost
Current Population Reports-Estimates of the United States and Components of Change, by Age, Color, and Sex: 1950 to 1960	Current Pop. Reports P-25
Current Population Reports-Estimates of the Population of the United States, by Age, Sex, and Race: April 1, 1960 to July 1, 1973	Current Pop. Reports P-25
Current Population Reports-Money Income in 1974 of Families and Persons in the United States	Current Pop. Reports P-60
Current Population Reports-Projections of the Population of the United States, by Age and Sex, 1975 to 2000, with Extensions of Total Population to 2025	Current Pop. Reports P-25
Current Population Reports-Series P-65, No. 33	Current Pop. Reports P-65
The Effect of Speed on Automobile Gasoline Consumption Rates	Consumption Rates

Explanation of Abbreviations Used in Figures and Tables (Cont'd)

Document	Abbreviation
Energy Conservation Potential of Urban Mass Transit	Energy Conservation
Energy Statistics — Final Report 1961-1963	Energy Statistics, 1974
Energy Statistics — Final Report 1961-1964	Energy Statistics, 1975
Energy Statistics — Final Report June-July 1973	Energy Statistics, 1973
Federal Motor Vehicle Fleet Report	Fed. Vehicle Fleet
1973 Gas Facts	1973 Gas Facts
Hearings before the Committee on Finance on the Energy Conservation and Conversion Act of 1975	Comm. on Finance
Highway Statistics	Federal Hwy. Adm.
Highway Travel Forecasts	Hwy. Forecasts
Initial Report on Oil and Gas Resources, Reserves, and Productive Capacities	Fed. Energy Adm.
Management of Defense Energy Resources — Phase II	D O D II
Marketing and Mobility	Marketing & Mobility
1975 Motor Truck Facts	1975 Motor Truck Facts
A National Plan for Energy Research, Development and Demonstration: Creating Energy Choices for the Future	ERDA-48
Press Release	Oil Pipe Lines
Project Independence Blueprint Final Task Force Report	Trans. Sector
Statistical Abstract of the United States: 1975	Stat. Abs. US. 1975
Summary of National Transportation Statistics	D. O. T., 1972
Summary of National Transportation Statistics January 1963 — December 1973	D. O. T., 1975
Survey of Current Business	Survey Current Business
A Time to Choose — America's Energy Future	Energy Policy Report
Transit Fact Book	Transit Book 1975, 1976
Transportation Energy Conservation Policies	Trans. Policies

Explanation of Abbreviations Used in Figures and Tables (Cont'd)

Document	Abbreviation
Transportation Energy Use and Conservation Potential	Trans. Potential
Transportation Facts and Trends	Trans. Facts
Twentieth Century Petroleum Statistics	Petrol. Stats.
United States Energy Through the Year 2000	U.S. Energy 2000
U.S. Transportation — A Summary Appraisal	U.S. Transportation
Yearbook of Railroad Facts	Railroad Facts 1975

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Revised	r
Preliminary	p
Not available	NA

Introduction

This document represents the initial effort of Oak Ridge National Laboratory to develop a detailed transportation energy conservation data book for the Transportation Energy Conservation (TEC) Division of the Energy Research and Development Administration. This data book is designed for day-to-day use by TEC Division personnel. It contains a display of relevant transportation statistics collected by other government agencies and trade associations as well as selected statistical series abstracted from technical articles.

The document is divided into seven chapters. These focus on (1) modal transportation characteristics, (2) energy characteristics of the transportation sector, (3) energy conservation alternatives within the transportation sector, (4) government impacts on the transportation sector, (5) the supply of energy to the transportation sector, (6) characteristics of transportation demand, and (7) energy conversion factors.

Great care has been taken to document sources of information associated with each item in the data book. Sources are noted and a bibliography for each chapter is included. It is the intent of TEC to ensure that the data book series becomes a standard for reference in the field, so an additional general bibliographic section has been included. The bibliographic section is divided into two parts. The first includes references that are particularly significant and each of these references has been annotated. The second part includes a broader presentation of references of interest to the reader. This bibliographic section will be constantly updated to include the most current and meaningful references.

Data included has been collected through a review of the past and ongoing data activities of many private and public organizations. Time series and cross-section data are presented for transportation and transportation fuel use for one or two decades prior to the oil embargo. Projections for some of this data are also presented.

Most of the information concerning new technologies, penetration scenarios, economic and social impacts, determinants of transportation supply, demand and utilization, and energy use and supply are currently unavailable. Various projects, however, that are now (or will soon be)

supported by the Division of Transportation Energy Conservation will provide some of the information needed to improve the content of this data book. For this initial activity, however, review of data from FEA, DOT, General Services Administration, Bureau of the Census, American Public Transit Association, International Taxicab Association, Motor Vehicle Manufactures Association has been conducted and selected data included. The data that are presented have been collected for Transportation Energy Conservation reference purposes and because of this the Division of Transportation Energy Conservation cannot endorse the validity of the statistics presented.

In any undertaking of this nature, omissions and inconsistencies will be revealed. In the process of organizing this first issue many inconsistencies were removed. The reader, however, should be cautioned that some errors may yet occur. Further, certain omissions in the data book do occur as a compromise with tight production schedules. In particular, non-highway detail has only been summarily included. Later versions of this document will present more of the available statistics. As more recent data on fuel consumption, production, transportation use and demand become available, TEC intends to systematically update material in this document. The reader should be aware, however, that some of the data included in this document are from one-time or infrequent studies and updates of all information will not be possible.

CHARACTERISTICS OF TRANSPORTATION MODES

Characteristics of Transportation Modes

Essential to an understanding of transportation energy consumption and conservation is an awareness of the basic characteristics of major transportation modes in the United States. This chapter provides a description of the transportation sector in general and of the individual transportation modes in specific.

Statistics in this chapter focus on utilization, capital stock, ownership and environmental impact of the major modes for both passenger travel and freight movement. Historical data are shown so that trends and present conditions can be identified and reviewed in context.

This chapter is divided into two sections. Section 1.1 is an overview that presents information for the various transportation modes: automobiles, trucks, buses, motorcycles, aircraft, ships, rail and pipelines. These data are presented for past years (generally starting in 1960) through the most recent year for which data are available (usually 1973 or 1974, and occasionally 1975). The table on page 5 succinctly shows the increase in utilization of highway vehicles and airplanes in contrast with the steadily decreasing use of local transit and passenger railroad. From 1963 to 1973 vehicle miles traveled of personal passenger vehicles increased 60 percent and the stock of these vehicles increased 60 percent also. Cargo ton-miles of all transport modes have steadily and dramatically increased over the past decade (as shown on page 7) with trucks, railroads and pipelines increasing 77 percent, 48 percent, and 122 percent, respectively, over the period 1960 through 1973.

This section also reviews statistics on the environmental impact of transportation modes. Page 27 outlines the aggregate effects of imposed automobile emission standards. For example, hydrocarbon emissions from highway vehicles declined 17 percent between 1970 and 1974.

The second portion of Chapter 1, Section 1.2, provides additional detail for highway vehicles. Additional information on rail, air, water and pipeline will be added in later versions and updates. Highway motor vehicle travel in the United States is summarily reviewed for the period 1963-1974 on page 39. Motor vehicle registrations projected through 1990 are presented on page 42 and show increases of about 43 percent between 1972 and 1990, as opposed to the 141 percent increase experienced between 1950 and 1972. Other statistics of interest such as highway vehicle accident and fatality rates (page 43), material inputs to transportation equipment products (page 44), truck use information (pages 46-48) and specific characteristics of truck stock (page 49) are included in this section in an effort to provide more detail as to the characteristics of highway vehicles whether cargo or passenger, individual transport or mass transport.

Vehicle-miles traveled, 1960-1973
(millions)

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Highway														
Personal passenger[1]	NA	NA	NA	645,371	677,613	711,594	751,740	774,203	814,030	858,858	900,992	954,155	1,003,498	1,036,455
Truck	126,409	128,582	133,289	155,569	164,271	171,436	173,905	182,456	196,651	206,680	214,670	227,037	259,735	267,147
Commercial bus	1,092[2]	1,091[2]	NA	2,841	2,892	3,019	3,008	3,024	3,031	3,007	2,943	2,885	2,750	2,548
School bus	1,481	1,550	1,610	1,642	1,724	1,763	1,884	1,870	1,937	2,030	2,100	2,212	2,359	2,412
Class I rail														
Passenger	209	198	193	189	184	172	164	150	123	107	93	53[3]	33[3]	33
Cargo	404	386	393	400	414	421	437	420	429	433	427	430[3]	451[3]	476
Local transit	2,143	NA	NA	2,022	2,016	2,008	1,984	1,997	1,989	19,967	1,883	1,846	1,756	1,835
Air, domestic														
Air carrier														
Certificated	853	833	877	926	998	1,134	1,237	1,538	1,779	2,080	2,065	2,045	2,042	2,194
Supplemental	NA	NA	NA	NA	NA	NA	NA	42	50	43	34	36	34	34
General aviation	1,769	1,858	1,965	2,049	2,181	2,562	3,336	3,440	3,700	3,926	3,207	3,143	3,571	3,729

[1]Includes motorcycles.
[2]Intercity buses only.
[3]Excludes AMTRAK operations.

Sources: U.S. Department of Transportation, Federal Highway Administration, Highway Statistics, Table VM-1, Washington, D.C., annual. U.S. Department of Transportation, Summary of National Transportation Statistics, p. 54, U.S. Government Printing Office, Washington, D.C., 1975. U.S. Department of Transportation, Summary of National Transportation Statistics, p. 42, U.S. Government Printing Office, Washington, D.C., 1972.

Passenger-miles traveled, 1960-1973
(millions)

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Highway														
Passenger	NA	NA	NA	1,419,816	1,490,749	1,554,049	1,638,657	1,686,225	1,772,525	1,869,193	1,959,857	2,066,024	2,170,095	2,237,094
Intercity bus	19,300	20,300	21,800	22,500	23,300	23,800	24,600	24,900	24,500	24,900	25,300	25,500	25,600	26,400
Class I rail														
Total	21,201	20,286	19,905	18,497	18,247	17,388	17,096	15,201	13,120	12,168	10,771	6,908	5,354	5,303
Commutation	4,197	4,132	4,406	4,101	4,199	4,128	4,193	4,281	4,383	4,546	4,592	4,427	4,120	4,064
Other than commutation	17,064	16,154	15,859	14,396	14,048	13,260	12,903	10,920	8,737	7,623	6,179	2,481	1,249r	1,238
Air, domestic														
Air carrier														
Certificated	31,099	31,617	34,298	39,016	45,046	53,226	63,085	79,522	92,112	109,541	108,451	109,804	121,820	162,224
Supplemental	NA	NA	NA	NA	NA	NA	NA	709	1,620	1,560	1,057	914	1,281	1,995
General aviation, intercity	2,300	2,300	2,700	3,400	3,700	4,400	5,700	7,000	8,200	8,800	9,100	9,300	10,000	10,700
Domestic water, intercity	2,700	2,300	2,700	2,800	3,100	3,400	3,400	3,400	3,500	3,800	4,000	4,100	4,000	4,000

Sources: U.S. Department of Transportation, Summary of National Transportation Statistics, p. 44, U.S. Government Printing Office, Washington, D.C., 1972. U.S. Department of Transportation, Summary of National Transportation Statistics, p. 56, U.S. Government Printing Office, Washington, D.C., 1975.

Cargo ton-miles, 1960-1973
(millions)

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Trucks	285,000	296,000	309,000	336,000	356,000	359,000	380,917	388,500	396,300	404,000	412,000	445,000	470,000	505,000
Class I rail[1]	572,309	563,361	592,862	621,737	658,639	697,878	738,395	719,498	744,023	767,841	764,809	739,743	776,746[r]	851,692
Air carrier														
Certificated[2]	749	867	1,155	1,099	1,294	1,670	1,985	2,310	2,590	3,295	3,010	3,151	3,403	4,759
Supplemental[3]	120	159	215	219	268	298	425	442	494	469	391	306	259	281
Water transport														
Inland waterways, including Great Lakes	220,253	209,706	223,089	234,172	250,165	262,421	280,527	281,400	291,409	302,901	318,560	316,030	338,693[r]	357,500
Total domestic system	NA	465,291	474,969	480,577	488,829	489,803	507,084	515,387	520,633	528,897	596,195	593,164	603,542	584,691
Oil pipeline	228,626	233,172	237,723	253,431	268,655	306,393	332,916	361,041	391,300	411,000	431,000	444,000	475,800[r]	507,000

[1] Prior to January 1, 1956, Class I railroads were defined as railroad operating companies (including switching roads and terminal companies) with annual operating revenues above $1,000,000. January 1, 1956, the base was raised to $3,000,000 and effective January 1, 1965, the base for Class 1 railroad was raised to $5,000,000. These differences in classification have no significant effect on the comparability of the statistics from year to year.

[2] Includes revenue ton-miles of freight, U.S. and foreign mail, and express.

[3] Includes revenue ton-miles of freight and express. Supplemental carriers are not ordinarily authorized to carry mail.

Sources: U.S. Department of Transportation, Summary of National Transportation Statistics, p. 58, U.S. Government Printing Office, Washington, D.C., 1975. U.S. Department of Transportation, Summary of National Transportation Statistics, p. 46, U.S. Government Printing Office, Washington, D.C., 1972.

Fatalities

Passenger deaths and death rates, 1965-1974

1.1.1.1.04

Year	Passenger cars & taxis		Buses		Railroad passenger trains		Scheduled domestic air transport planes	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
1965	32,500	2.40	100	0.16	12	0.07	205	0.38
1966	34,800	2.50	150	0.23	27	0.16	59	0.09
1967	34,800	2.40	120	0.18	13	0.09	226	0.29
1968	36,200	2.40	140	0.21	13	0.10	258	0.28
1969	36,800	2.30	130	0.19	9	0.07	132	0.13
1970	34,800	2.10	130	0.19	10	0.09	0	0.00
1971	34,200	1.90	130	0.19	17	0.24	174	0.15
1972	35,200	1.90	130	0.19	48	0.53	160	0.13
1973	33,700	1.80	170	0.24	6	0.07	128	0.10
1974	26,800	1.30	150	0.21	7	0.07	158	0.12

Transportation accident death rates, 1972-1974

Kind of transportation	1974			1972-1974 average death rate
	Passenger miles (billion)	Passenger deaths	Death rate per 100,000,000 passenger miles	
Passenger automobiles and taxis[1]	1,790.0	26,800	1.30	1.60
Passenger automobiles on turnpikes	*44.0*	*310*	*0.70*	*0.95*
Buses[2]	73.0	150	0.21	0.21
Intercity buses[3]	*19.2*	*12*	*0.06*	*0.13*
Railroad passenger trains	10.3	7	0.07	0.21
Scheduled air transport planes (domestic)	131.1	158	0.12	0.11

[1]Drivers of passenger automobiles are considered passengers.

[2]The American Public Transit Association reported that in 1973 participants in the Safety Award Competition — street car, trolley bus, and city bus companies — had a passenger death rate per 100,000,000 passenger miles of 0.05. As this rate covers about one-half of the transit industry and is limited to city transportation, it is only roughly comparable to the rates in the table.

[3]Class I only, representing 70 per cent of total intercity bus passenger mileage.

Source: National Safety Council, Accident Facts, p. 75, 1975 Edition, Chicago, Illinois, 1975.

1.1.1.2.01

Number of operating companies and employees, 1960-1973

	1960	1970	1973
Intercity bus			
Companies	1,150	1,000	1,000
Employees	45,000	49,600	48,000
Truck			
Companies	935	1,295	1,576
Employees	302,626	502,021	581,369
Local transit			
Companies	1,286	1,096	1,023
Employees	156,400	138,040	140,700
Class 1 rail			
Companies	NA	71	NA
Employees	780,494	566,282	520,153
Air			
Companies	NA	NA	NA
Employees	169,872	304,630	317,222
Water			
Companies	132	100	94
Employees	30,594	22,656	17,184
Oil transport			
Companies	87	99	100
Employees	21,321	15,017	14,745

Source: U.S. Department of Transportation, Summary of National Transportation Statistics, U.S. Government Printing Office, Washington, D.C., November 1972 and June 1975.

Number of vehicles, 1960-1973

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Highway														
Passenger car & taxi	61,682,304	63,417,358	66,108,282	69,055,428	71,982,740	75,251,386	78,353,000	80,414,180	83,692,699	86,861,344	89,279,864	92,799,052	96,860,000	101,762,500
Motorcycle	575,497	595,669	660,400	786,318	984,763	1,381,956	1,752,801	1,953,022	2,100,547	2,295,000	2,814,730	3,345,179	3,798,000	4,356,500
Truck	11,945,000	12,291,000	12,809,000	13,360,000	14,013,000	14,795,000	15,517,000	16,193,000	16,995,000	17,871,000	18,748,000	19,802,000	21,239,000	23,233,000
Intercity bus	20,974	20,490	n/a	21,100	21,500	20,600	21,500	21,900	22,100	22,700	23,100	23,000	22,500[r]	22,300
Class I rail														
Passenger cars & pullman	28,305	26,705	25,566	24,602	23,057	21,327	20,016	18,610	15,384	12,426	11,177	7,505	5,133[r]	4,585
Locomotives	29,080	28,815	28,639	28,449	28,300	27,816	27,886	27,687	27,376	27,033	27,086	27,189[r]	27,073	27,461
Freight cars	1,658,292	1,604,241	1,550,067	1,512,306	1,488,385	1,478,005	1,488,115	1,477,166	1,453,883	1,434,824	1,423,921	1,422,411	1,410,568	1,395,105
Local transit	65,292	64,012	63,045	62,189	61,679	61,717	62,136	62,069	61,930	61,347	61,350	60,737	60,704	60,105
Air														
Air carrier	n/a	2,216	2,173	n/a	2,124	n/a	2,319	n/a	2,638	n/a	2,690	2,720	2,674	2,600
Certified	n/a	2,034	1,958	n/a	1,894	n/a	2,082	n/a	2,406	n/a	2,569	2,536	2,518	2,467
Supplemental	n/a	182	225	n/a	210	n/a	237	n/a	232	n/a	195	184	156	133
General aviation	n/a	n/a	n/a	85,088	88,742	95,442	104,706	114,186	124,237	130,806	131,743	131,148	145,010	153,540
Water														
Nonself-propelled vessels (total)														
Dry cargo barges & scows	14,058	n/a	14,280	14,415	14,432	14,241	14,241	15,830	15,379	15,379	15,890	16,439	17,527	18,804
Tank barges	2,447	n/a	2,661	2,739	2,649	2,548	2,548	2,781	3,001	3,001	3,281	3,185	3,420	3,313
Towboats & tug	4,052	n/a	4,253	4,205	3,994	4,054	4,054	4,395	4,284	4,284	4.248	4,230	4,278	4,064

Sources: U.S. Department of Transportation, Summary of National Transportation Statistics, p. 61, U.S. Government Printing Office, Washington, D.C., 1975.
U.S. Department of Transportation, Summary of National Transportation Statistics, p. 49, U.S. Government Printing Office, Washington, D.C.,,1972.

World motor vehicle production and assemblies

1.1.1.2.03

Country	1972 Passenger cars	1972 Trucks and buses	1972 Total	1973 Passenger cars	1973 Trucks and buses	1973 Total
			Production			
Argentina	207,623	70,599	278,222	233,660	77,954	311,614
Australia	389,424	77,493	466,917	371,212	82,978	454,190
Austria	381	5,874	6,255	329	6,399	6,728
Belgium	252,832	18,621	271,453	245,933	53,024	298,957
Brazil	408,712	200,273	608,985	456,077	273,058	729,135
Canada	1,135,702	294,382	1,430,084	1,227,432	347,388	1,574,820
Czechoslovakia	154,454	28,483	182,937	165,878	31,927	197,805
France	2,992,959	335,361	3,328,320	3,202,391	393,788	3,596,179
East Germany	143,000	28,000	171,000	146,000	32,000	178,000
West Germany	3,521,540[1]	294,442	3,815,982	3,649,880[2]	299,185	3,949,065
Hungary	--	10,890	10,890	--	11,000	11,000
India	38,828	51,220	90,048	39,071	57,980	97,051
Italy	1,732,379	107,414	1,839,793	1,823,333	134,661	1,957,994
Japan	4,022,289	2,272,149	6,294,438	4,470,550	2,612,207	7,082,757
Mexico	163,005	66,761	229,766	200,147	85,366	285,513
Netherlands	87,396	12,270	99,666	94,906	12,546	107,452
Poland	91,000	65,100	156,100	115,400	75,000	190,400
Portugal	--	326	326	--	432	432
Rep. of So. Africa	164,088	--	164,088	214,302	--	214,302
Romania	29,000	42,000	71,000	37,000	58,000	95,000
Spain	600,559	94,658	695,217	706,433	115,587	822,020
Sweden	317,962	33,027	350,989	341,503	36,539	378,042
Switzerland	--	1,179	1,179	143	1,290	1,433
United Kingdom	1,921,311	408,119	2,329,430	1,747,316	416,625	2,163,941
United States	8,828,205	2,483,503	11,310,708	9,667,152	3,014,361	12,681,513
U.S.S.R.	730,000	649,000	1,379,000	917,000	685,000	1,602,000
Yugoslavia	108,029	18,383	126,412	124,993	18,833	143,826
Total	28,040,678	7,668,527	35,709,205	30,198,041	8,933,128	39,131,169
			Assemblies			
Belgium	669,121	71,282	740,403	723,331	29,402	752,733
Burma	888	1,514	2,402	882	1,932	2,814
Chile	23,452	2,864	26,316	14,105	2,999	17,104
Colombia	16,772	7,243	24,015	17,907	2,864	20,771
Denmark	11,495	1,050	12,545	13,900	3,450	17,350
Finland	10,500	3,034	13,534	15,800	1,500	17,300
Ghana	1,000	4,310	5,310	222	3,093	3,315
Ireland	58,242	10,472	68,714	50,522	5,417	55,939
Israel	3,929	4,879	8,808	3,929	4,879	8,808
Korea, South	11,390	6,360	17,750	11,390	6,360	17,750
Malaysia	23,528	7,028	30,556	24,703	6,121	30,824
Morocco	17,981	4,150	22,131	20,769	4,933	25,702
Netherlands	20,792	2,990	23,782	18,775	5,040	23,815
New Zealand	59,395	20,883	80,278	72,464	13,954	86,418
Pakistan	1,057	4,345	5,402	1,162	4,779	5,941
Peru	16,067	7,729	23,796	20,152	11,589	31,741
Philippines	9,651	11,219	20,870	11,994	9,522	21,516
Portugal	77,840	19,934	97,774	72,337	23,127	95,464
Rep. of So. Africa	18,873	169,316	188,189	15,140	112,941	128,081
Taiwan	24,871	12,898	37,769	33,147	16,547	49,694
Turkey	33,324	19,396	49,720	48,063	12,980	61,043
Switzerland	18,266	1,179	19,445	16,942	--	16,942
Venezuela	70,908	17,232	88,140	70,411	16,232	86,643
Total	1,199,342	411,307	1,607,649	1,278,047	299,661	1,577,708

[1]Includes 355,519 and [2]291,398 micro-buses.

Note: As far as possibly can be determined, production on this table refers to vehicles locally manufactured.

Source: 1975 Automobile Facts and Figures, p. 17, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975.

World motor vehicle registrations, 1973

1.1.1.2.04

Continent	Cars	Trucks and buses	Total vehicles	Population		
				Number (000)	Per car	Per vehicle
North and Central America	112,537,889	26,495,199	139,033,088	322,303	2.9	2.3
USA	101,762,477	23,658,399	125,420,876	211,210	2.1	1.7
South America	7,895,500	3,129,594	11,025,094	201,108	25.0	18.0
Asia	18,841,454	13,641,795	32,483,249	2,070,027	110.0	64.0
Oceania	5,703,068	1,327,869	7,030,937	20,078	3.5	2.9
Africa	3,400,848	1,594,078	4,994,926	346,554	101.0	69.0
Europe	85,587,559	16,372,343	101,959,902	718,707	8.4	7.0
World total	233,966,318	62,560,878	296,527,196	3,678,777	15.0	12.0

Source: 1975 Automobile Facts and Figures, p. 26-27, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975.

1.1.1.2.05

Passenger car retail sales
(in thousands)

	1968	1969	1970	1971	1972	1973	1974	1975	1976
Total car retail sales									
January	702	729	624	695	721	876	679	578	679
February	700	725	686	749	814	920	684	684	758
March	851	809	745	899	913	1,143	780	670	947
April	815	855	798	884	899	1,024	817	660	914
May	900	900	811	889	1,031	1,145	882	741	
June	872	898	922	958	1,026	1,086	812	771	
July	829	762	763	819	904	961	812	794	
August	728	654	638	725	813	838	811	684	
September	663	807	580	884	879	875	726	727	
October	980	924	754	1,050	1,069	979	757	889	
November	864	797	540	958	1,032	913	602	744	
December	750	721	536	741	848	694	508	701	
Year	9,656	9,582	8,400	10,250	10,949	11,457	8,871	8,643	
Domestic car retail sales									
January	630	645	539	586	610	736	551	463	588
February	624	662	598	637	698	775	568	536	651
March	767	722	646	756	772	964	654	524	816
April	729	754	691	737	774	863	703	518	788
May	811	795	699	748	888	972	767	603	
June	781	798	800	798	877	909	698	619	
July	737	662	641	668	769	808	691	637	
August	635	555	526	566	656	686	668	534	
September	563	709	489	756	741	754	591	591	
October	885	817	630	934	932	858	628	774	
November	785	706	436	848	891	778	506	655	
December	679	639	425	649	719	574	430	600	
Year	8,625	8,464	7,120	8,681	9,327	9,676	7,454	7,053	
Import car retail sales									
January	72	84	85	108	112	140	128	115	91
February	76	63	88	112	115	146	116	148	107
March	84	87	99	144	141	179	126	146	131
April	86	101	107	147	125	162	114	142	126
May	89	106	112	141	143	173	115	138	
June	91	100	122	160	149	177	114	152	
July	92	100	122	151	135	153	121	157	
August	94	99	112	159	157	152	143	150	
September	100	98	92	129	138	121	134	136	
October	96	107	125	116	137	122	129	115	
November	79	91	105	110	141	135	98	89	
December	72	83	110	92	128	120	79	102	
Year	1,031	1,118	1,280	1,568	1,622	1,781	1,417	1,590	

Note: Domestic includes U.S. type cars produced in the United States and Canada. Sum of months may not add to total for year, due to rounding.

Source: 1975 Automobile Facts and Figures, p. 20, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975. Figures for 1975 and 1976 taken from U.S. Department of Commerce, Bureau of Economic Analysis, Survey of Current Business, p. S-40, 55, No. 12, and 56, No. 5, U.S. Government Printing Office, Washington, D.C., December 1975 and May 1976.

Basic intercity mileage within the continental United States, 1960-1973
(Statute mileage)

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Railroads[1]	217,552	216,445	215,090	214,387	212,603	211,925	211,107	209,826	208,648	207,526	206,265	205,220[r]	203,299[r]	201,300
Oil pipelines[2]	190,944	200,543	204,064	206,876	210,807	213,764	216,745	209,478	213,555	216,453	218,617[r]	219,899[r]	221,127[r]	222,355
Natural-Gas pipelines and utility main[3]	239,500	248,600	255,100	261,600	266,400	273,000	280,000	289,100	298,900	313,000	319,200	323,000	327,300	333,400
Inland waterways[4]	25,253	25,260	25,260	25,260	25,380	25,380	25,380	25,380	25,380	25,543	25,543	25,543	25,543	25,543
Highways[5]	557,729	571,145	583,302	594,412	606,154	617,114	628,600	640,313	648,768	657,601	665,903	672,838	678,285	679,387
Airways[6]	293,003	245,620	248,270	252,325	263,348	288,275	259,083	264,165	277,554	283,861	291,231	295,301	300,126	304,260

[1]Data represent aggregate length of roadway of all line-haul railroads, excluding mileage of yard tracks or sidings. Jointly used track is counted only once.

[2]Includes gathering lines.

[3]Includes field and gathering and transmission lines only. Data not adjusted to common diameter equivalent mileage shown as of end of each year.

[4]Includes total length of all commercially navigable inland channels.

[5]Includes paved primary and secondary roads under state control.

[6]1960-1961 airway figures include low/medium frequency routes and very high frequency routes. Only very high frequency routes have been in use since 1962. Jet ranks are included from 1960. Nautical mileage has been counted to statute miles for comparability with the other modes.

Source: U.S. Department of Transportation, Summary of National Transportation Statistics, p. 60, U.S. Government Printing Office, Washington, D.C., 1975. U.S. Department of Transportation, Summary of National Transportation Statistics, p. 48, U.S. Government Printing Office, Washington, D.C., 1972. American Gas Association, Department of Statistics, 1973 Gas Facts, Arlington, Va., 1974.

Total road and street mileage classified by federal-aid and nonfederal-aid systems: 1973 1.1.1.2.07

	Traveled way interstate highway system	Federal-aid highway systems				Federal-aid primary urban type II highways	Not on federal-aid systems	Total
		Traveled way federal-aid primary highway system [1]	Federal-aid urban highway system	Traveled way federal-aid secondary highway system	Total federal-aid systems			
State primary highway system:								
Rural	32,961	208,834	458	178,231	387,523	55	22,256	409,834
Municipal 5,000 and over	6,235	26,493	2,346	7,951	36,790	972	2,823	40,585
Municipal under 5,000	1,091	13,374	20	9,172	22,566	8	1,184	23,758
Subtotal	40,337	248,701	2,824	195,354	446,879	1,035	26,263	474,177
State secondary highway system:								
Rural	64	2,617	78	69,461	72,156	184	40,711	113,051
Municipal 5,000 and over	65	782	305	2,253	3,340	863	3,833	8,036
Municipal under 5,000	4	162	--	2,010	2,172	6	2,652	4,830
Subtotal	133	3,561	383	73,724	77,668	1,053	47,196	125,917
County roads under state control:								
Rural	53	181	27	55,889	56,097	101	103,458	159,656
Municipal 5,000 and over	16	88	99	739	926	126	933	1,985
Municipal under 5,000	3	9	1	774	784	5	1,709	2,498
Subtotal	72	278	127	57,402	57,807	232	106,100	164,139
Total state highways	40,542	252,540	3,334	326,480	582,354	2,320	179,559	764,233
County roads	3	212	2,322	286,728	289,262	3,812	1,434,760	1,727,834
Town, township and other local	1	93	56	5,908	6,057	41	515,514	521,612
City streets[2]	88	1,299	9,813	22,740	33,852	27,055	488,630	549,537
Roads not overlapping state, county, or other local systems:								
State park, forest, reservation and other roads	4	321	46	34	401	4	24,578	24,983
National park, forest, and reservation roads	28	303	--	194	497	--	215,250	215,747
Toll facilities	2,082	2,122	1	3	2,126	--	811	2,937
Total existing mileage [3]	42,748	256,890	15,572	642,087	914,549	33,232	2,859,102	3,806,883

[1] Mileage of interstate system included.
[2] Municipal extensions of county, town and township roads included.
[3] Does not include mileage in Puerto Rico.

Source: U. S. Department of Transportation, Federal Highway Administration, Highway Statistics, p. 222, U.S. Government Printing Office, Washington, D.C., 1975

1.1.1.3.01

Privately owned vehicles and publicly owned vehicles, 1940-1974

Year Dec. 31	Passenger Cars	Buses[1]	Trucks[3]	Total[3]
		Privately owned vehicles		
1974[b]	104,680,000	220,000	23,930,000	128,830,000
1973	101,188,735	218,385	22,175,645	123,576,765
1972	96,451,171	204,301	20,225,504	116,880,976
1971	92,256,957	202,127	18,841,935	111,301,019
1970	88,762,304	189,085	17,814,642	106,766,031
1969	86,407,702	180,353	16,970,324	103,558,379
1968	83,175,312	174,013	16,051,602	99,400,927
1967	80,013,724	164,670	15,339,051	95,517,445
1966	77,750,764	156,698	14,721,307	92,628,769
1965	74,903,163	155,057	14,035,301	89,093,521
1964	71,663,851	151,850	13,282,556	85,098,257
1963	68,755,848	147,828	12,659,102	81,562,778
1962	65,824,939	140,301	12,120,510	78,085,750
1961	63,153,425	139,640	11,639,049	74,932,114
1960[2]	61,430,862	137,572	11,329,278	72,897,712
1955	51,960,532	142,335	9,845,873	61,948,740
1950	40,190,632	143,206	8,233,146	48,566,984
1945	25,694,926	112,253	4,831,250	30,638,429
1940	27,372,397	72,641	4,590,386	32,035,424
		Publicly[a] owned vehicles		
1974[b]	610,000	220,000	1,100,000	1,930,000
1973	573,742	207,142	1,057,227	1,838,111
1972	529,143	202,653	1,008,418	1,740,214
1971	497,104	194,948	995,128	1,687,180
1970	468,263	188,477	952,652	1,609,392
1969	444,573	183,929	921,805	1,550,307
1968	416,382	177,786	889,691	1,483,859
1967	400,456	173,250	839,798	1,413,504
1966	372,201	165,472	795,588	1,333,261
1965	348,223	159,227	759,750	1,267,200
1964	318,889	153,505	730,556	1,202,950
1963	299,580	150,036	701,323	1,150,939
1962	283,343	144,918	659,318	1,087,579
1961	263,933	140,028	622,140	1,026,101
1960[2]	251,442	134,557	584,971	970,970
1955	184,207	112,894	442,931	740,032
1950	148,455	80,446	365,816	594,717
1945	102,059	49,872	245,060	396,991
1940	93,429	28,504	295,876	417,809

[1]Incomplete. Buses are not segregated from passenger cars or trucks in earlier years. Also included are municipally owned buses engaged in public transit. Due to new method of counting buses in 1959, the bus data for earlier years are not strictly comparable.

[2]Alaska and Hawaii data included since 1959.

[3]Data excludes farm trucks registered at a nominal fee in certain states and restricted to use in the vicinity of the owners' farms. 1973 includes 34,136 such trucks.

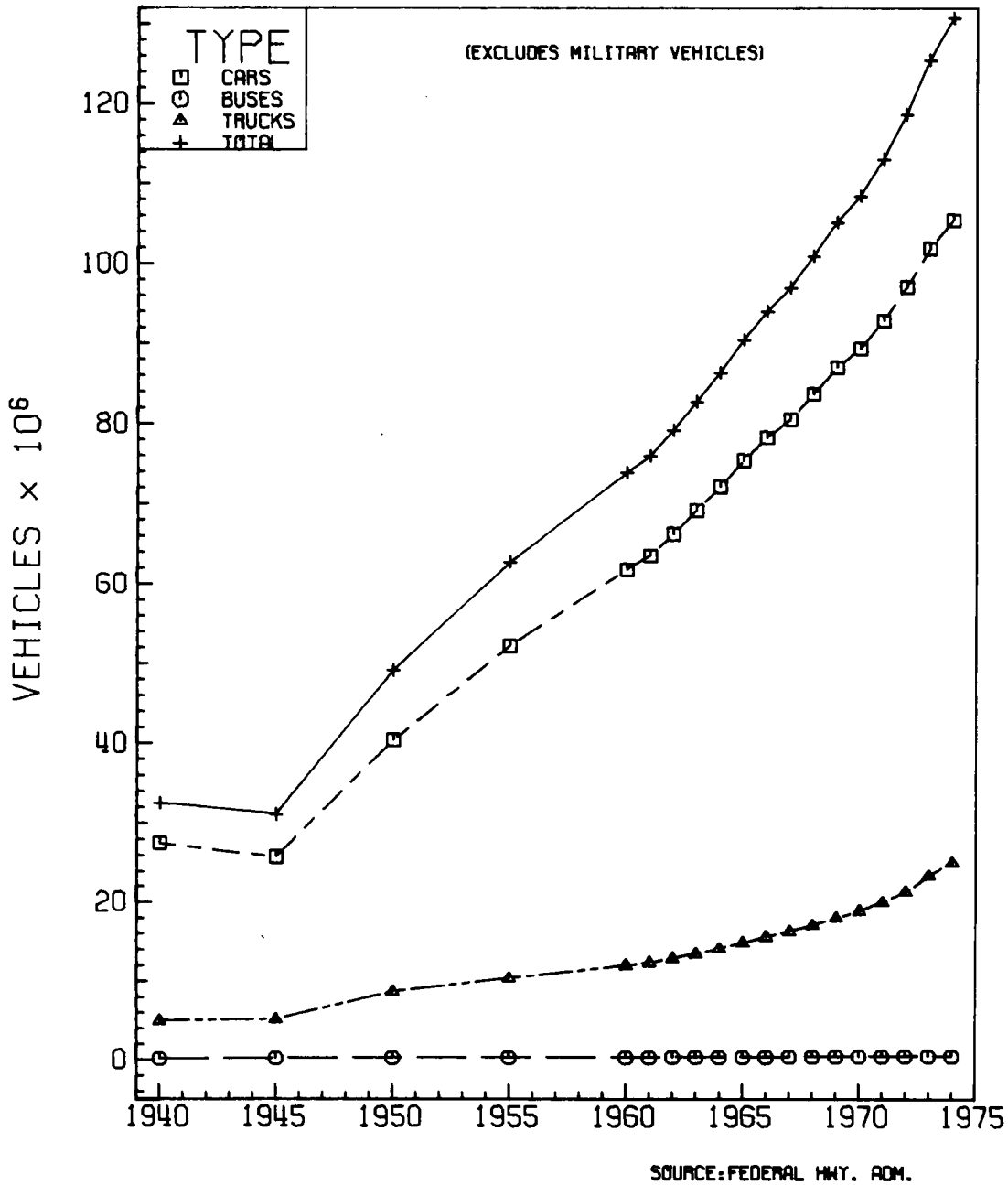
[a]Excludes military vehicles.

[b]Estimates by the Motor Vehicle Manufacturers Association of the U.S., U.S., Inc.

Source: 1975 Automobile Facts and Figures, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975, p. 24.

1.1.1.3.02

PRIVATELY AND PUBLICLY OWNED VEHICLES



1.1.1.3.03

Fleet inventory summary and selected characteristics of Federal government motor vehicles, 1974

	Sedans	Station wagons	Ambulances	Buses	Trucks	Total
Total civilian						
Agencies	60,370	7,265	412	2,408	189,019	259,474
Domestic	58,677	6,503	410	2,322	185,641	253,553
Foreign	1,693	762	2	86	3,378	5,921
Total military[1]						
Agencies	25,746	5,701	3,260	9,229	118,843	162,779
Domestic	20,204	4,722	2,489	6,420	94,556	128,391
Foreign	5,542	979	771	2,809	24,287	34,388
Total all						
Agencies	86,116	12,966	3,672	11,637	307,862	442,253
Domestic	78,881	11,225	2,899	8,742	280,197	381,944
Foreign	7,235	1,741	773	2,895	27,665	40,309
ERDA (AEC)	1,773	202	54	291	6,996	9,316

	1970	1971	1972	1973	1974
Average miles per vehicle year[2]					
Domestic	9,942	9,807	9,096	8,625	8,046
Foreign	10,714	10,711	10,528	9,959	9,278
ERDA (AEC)	9,299	9,156	9,079	8,350	7,395
Average miles per gallon of fuel[2]					
Domestic	11.2	11.0	10.7	10.6	9.5
Foreign	11.1	11.1	12.6	12.0	9.7
ERDA (AEC)	13.7	13.3	13.1	12.1	12.1
Total cost per mile[2]					
Domestic	0.12681	0.13502	0.15288	0.16066	0.17946
Foreign	0.13505	0.12968	0.15710	0.16077	0.18585
ERDA (AEC)	0.14236	0.16508	0.18851	0.24653	

[1]Does not include troop-training or tactical vehicles.

[2]Numbers calculated for agencies holding 2,000 or more reportable vehicles.

Sources: General Services Administration, Federal Motor Vehicle Fleet Report, pp. 1 and 2, Washington, D.C., March 1975; General Services Administration, Federal Motor Vehicle Fleet Report, pp. 14, 16, and 21, Washington, D.C., March 1973 and April 1974.

1.1.1.3.04

Shares of sales of domestic cars by three size classifications

	1973	1974	1975
Wheelbase size (%)			
Short (<112 inches)	32.2	37.2	43.3[1]
Medium (112-120 inches)	29.4	32.4	28.3[1]
Long (>120 inches)	38.4	30.4	28.4[1]
Market class[2] (%)			
Small	32.5	39.7	42.2
Intermediate	27.6	29.0	29.7
Standard	39.6	30.9	28.1

[1]First three quarters of 1975 only.

[2]Cars classified as small include Pinto and Vega.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Survey of Current Business, p. 5, 55, No. 11, U.S. Government Printing Office, Washington, D.C., November 1975; Automotive News Almanac, Marketing Services Inc., 1973, 1974, and 1975 issues.

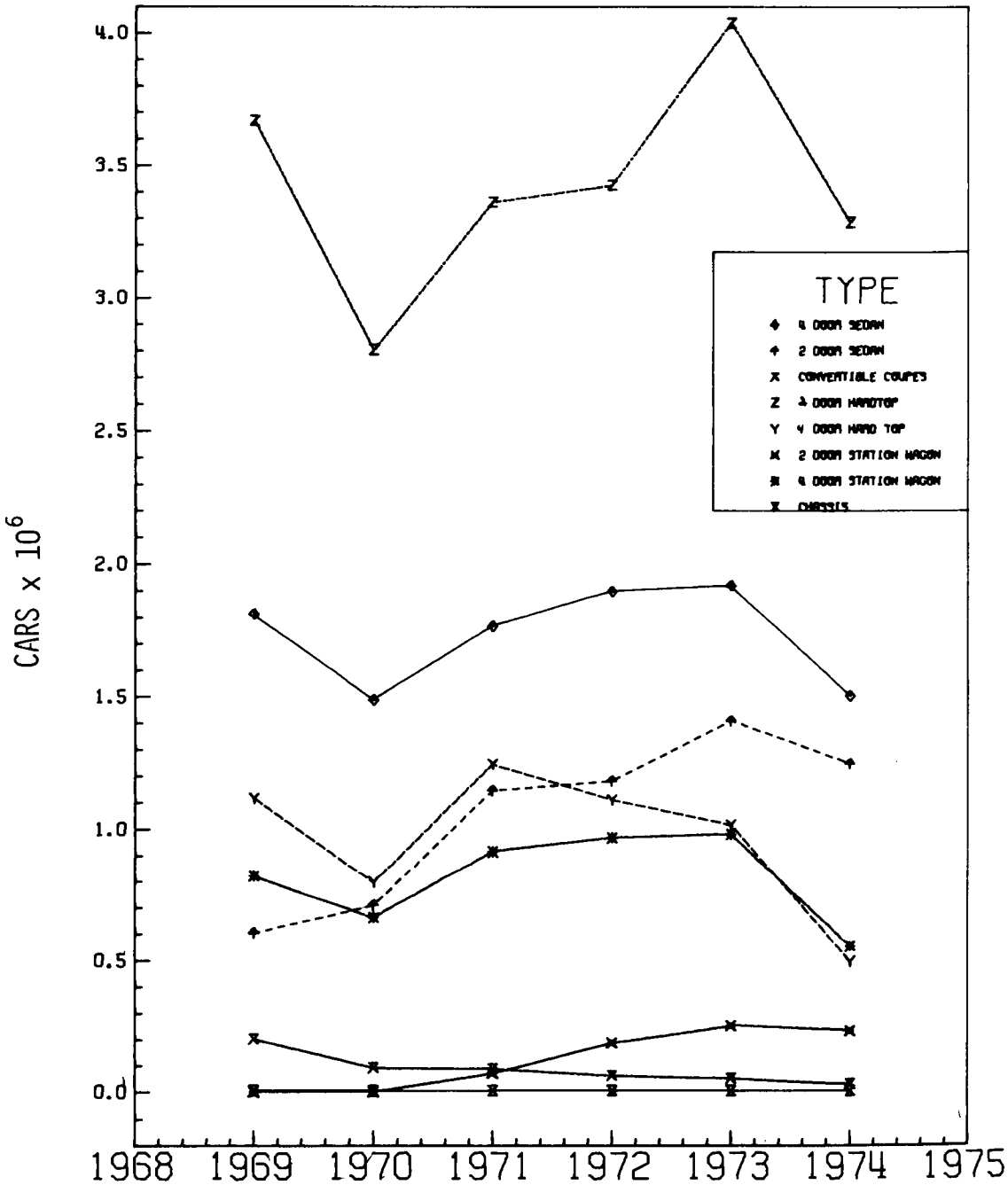
Factory sales of motor vehicles by body type, 1969-1974 1.1.1.3.05

	1969	1970	1971	1972	1973	1974
Passenger cars						
4-door sedans	1,811,218	1,486,329	1,762,520	1,893,869	1,915,302	1,500,537
2-door sedans	603,178	708,572	1,144,302	1,179,773	1,407,389	1,244,617
Convertible coupes	201,997	91,863	87,725	61,655	50,837	27,955
2-door hardtops	3,667,276	2,799,883	3,358,897	3,423,119	4,036,728	3,278,545
4-door hardtops	1,115,083	795,622	1,243,542	1,109,994	1,014,863	494,093
2-door station wagons (1)	287	786	70,525	186,684	250,548	230,714
4-door station wagons (1)	820,877	661,377	913,246	964,893	979,257	552,339
Chassis	3,799	2,385	3,835	3,951	2,723	2,456
Total	8,223,715	6,546,817	8,584,592	8,823,938	9,657,647	7,331,256
Motor truck and bus						
Pickup	1,065,123	898,814	1,130,463	1,334,402	1,711,906	1,430,214
General utility	92,871	95,156	120,660	151,331	183,775	214,766
Panel	8,280	4,809	9,651	4,226	3,281	3,275
Van	173,436	168,081	212,344	298,652	343,423	391,414
Multi-stop	54,230	47,502	72,097	77,539	88,696	42,787
Station wagon (on truck chassis)	45,659	41,898	64,330	69,186	109,718	78,399
Buses (including school bus chassis)	34,400	31,994	33,906	35,298	35,769	38,472
Platform, stake and rack	5,998	6,280	2,734	3,230	3,140	
Other body types	5,755	1,170	761	1,329	37,274	527,986
Chassis with cab	424,468	390,694	400,467	464,590	452,411	
Chassis without cab	12,959	6,042	5,733	7,024	10,295	
Total	1,923,179	1,692,440	2,053,146	2,446,807	2,979,688	2,727,313

Sources: 1975 Automobile Facts and Figures, p. 13, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975; 1975 Motor Truck Facts, p. 14, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975.

1.1.1.3.06

FACTORY SALES
BY TYPE OF VEHICLES



SOURCE: 1975 AUTO FACTS

1.1.1.3.07

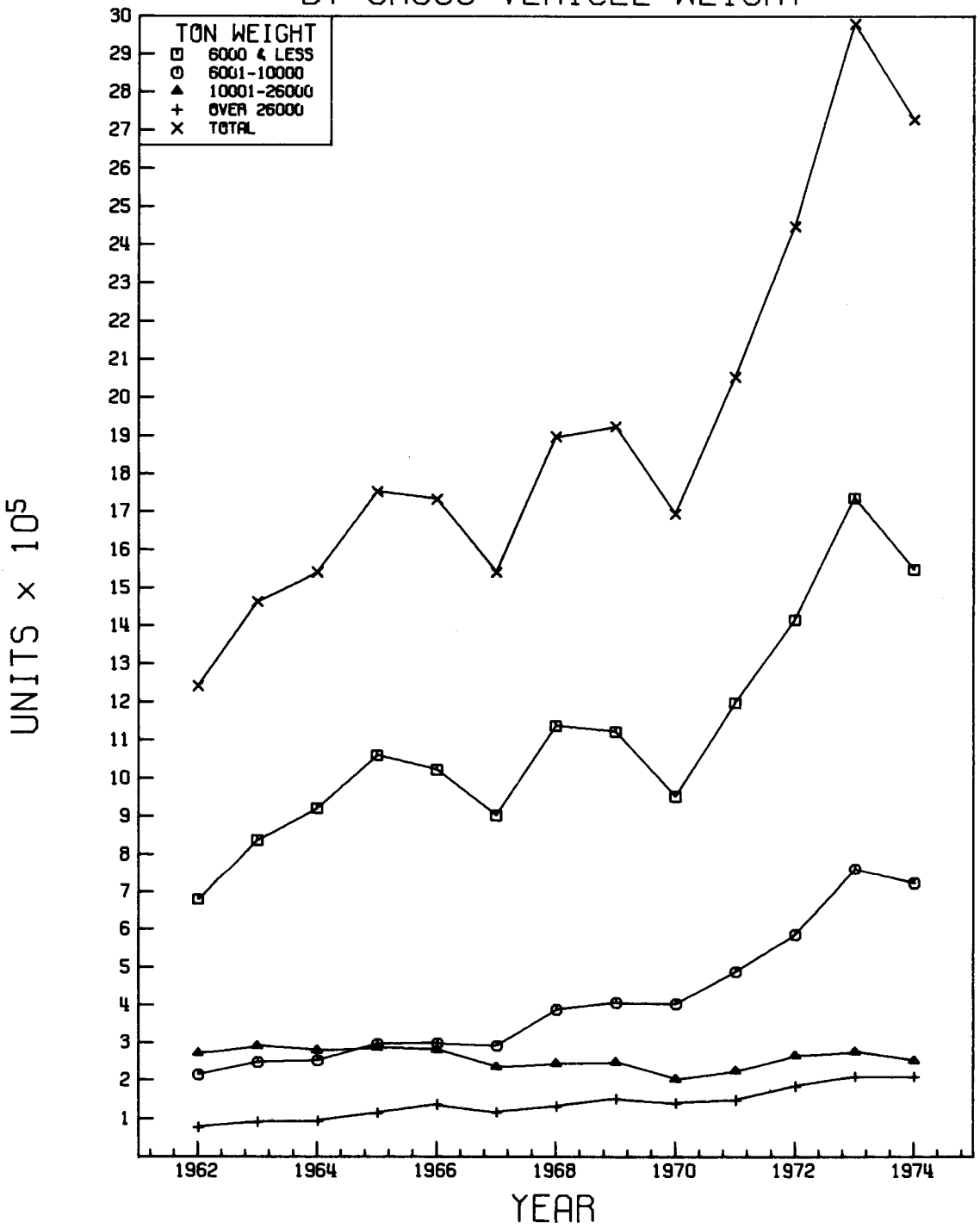
Factory sales of trucks and buses by gross vehicle weight (pounds)

	6,000 & less	6,001-10,000	10,001-14,000	14,001-16,000	16,001-19,500	19,501-26,000	26,001-33,000	Over 33,000	Total
1974	1,546,699	721,608	9,094	4,318	13,071	224,499	34,432	173,592	2,727,313
1973	1,735,645	761,481	44,724	7,477	18,941	203,300	42,200	165,920	2,979,688
1972	1,414,551	584,612	44,221	9,945	28,080	182,058	42,213	141,127	2,446,807
1971	1,196,544	486,388	17,928	14,871	58,042	132,197	36,441	110,735	2,053,146
1970	950,252	401,592	7,353	9,979	59,205	124,554	38,451	101,054	1,692,440
1969	1,121,222	405,108	7,161	13,491	78,105	147,405	33,304	117,383	1,923,179
1968	1,136,059	385,803	4,646	17,495	79,436	141,264	41,814	89,561	1,896,078
1967	899,986	289,835	5,207	16,499	88,213	123,934	37,960	77,828	1,539,462
1966	1,020,158	296,957	7,485	21,286	125,473	124,361	44,337	91,027	1,731,084
1965	1,058,211	294,178	5,020	25,751	144,449	109,625	39,968	74,603	1,751,805
1964	919,663	250,204	5,804	24,234	142,277	104,499	29,613	64,159	1,540,453
1963	836,129	246,650	5,679	28,450	145,298	109,570	32,186	58,746	1,462,708
1962	677,804	213,050	8,503	27,495	142,163	93,138	35,153	42,862	1,240,168

Source: 1975 Motor Truck Facts, p. 12, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975.

1.1.1.3.08

ANNUAL TRUCK AND BUS FACTORY SALES BY GROSS VEHICLE WEIGHT



SOURCE: 1975 MOTOR TRUCK FACTS

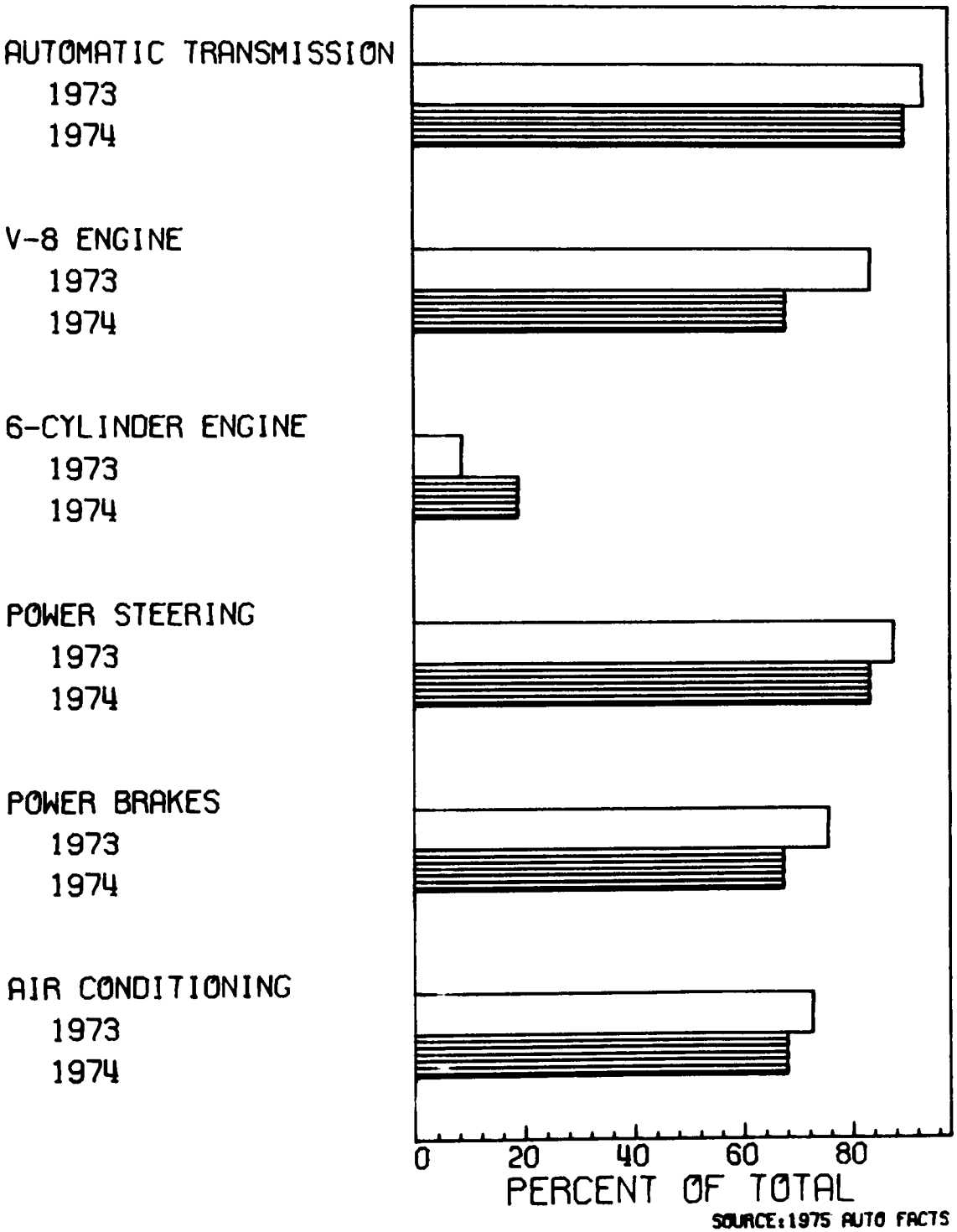
Factory installations of energy-related equipment on automobiles and trucks

	1973 model year		1974 model year	
	Units (000)	% of total	Units (000)	% of total
Automobiles				
Automatic transmission	9,583	93.4	7,568	89.8
4-speed synchromesh transmission	423	4.1	568	6.7
V-8 engine standard	5,349	52.1	4,245	50.4
V-8 optional	3,140	31.4	1,464	17.4
6-cylinder engine	885	8.6	1,594	18.9
Power steering	9,001	87.7	7,021	83.3
Power brakes, 4-wheel drum	101	1.0	203	2.4
Power brakes, 2 or 4-wheel drum	7,642	74.5	5,461	64.8
Disc brakes manual	1,153	11.2	1,619	19.2
Steel-belted radial ply tires	1,367	13.3	2,798	33.2
Air conditioning, automatic temp. control	746	7.3	672	8.0
Air conditioning, manual temp. control	6,699	65.3	5,042	59.9
Limited-slip differential	516	5.0	351	4.2
Speed regulating device	1,086	10.6	975	11.6
Dual exhausts	887	8.6	638	7.6
Trucks of 10,000 lbs. GVW and less				
Automatic transmission	1,588	62.9	1,597	66.0
Power brakes	1,604	63.5	1,632	67.5
Disc brakes	2,185	86.6	1,726	71.4
Power steering	1,550	61.4	1,662	68.7
V-8 engines, 350 CID and less	1,351	53.5	1,327	54.8
V-8 engines over 350 CID	775	30.7	719	29.7
Air conditioning	723	28.6	708	29.3

Sources: 1975 Automobile Facts and Figures, p. 19, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975; 1975 Motor Truck Facts, p. 18, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975.

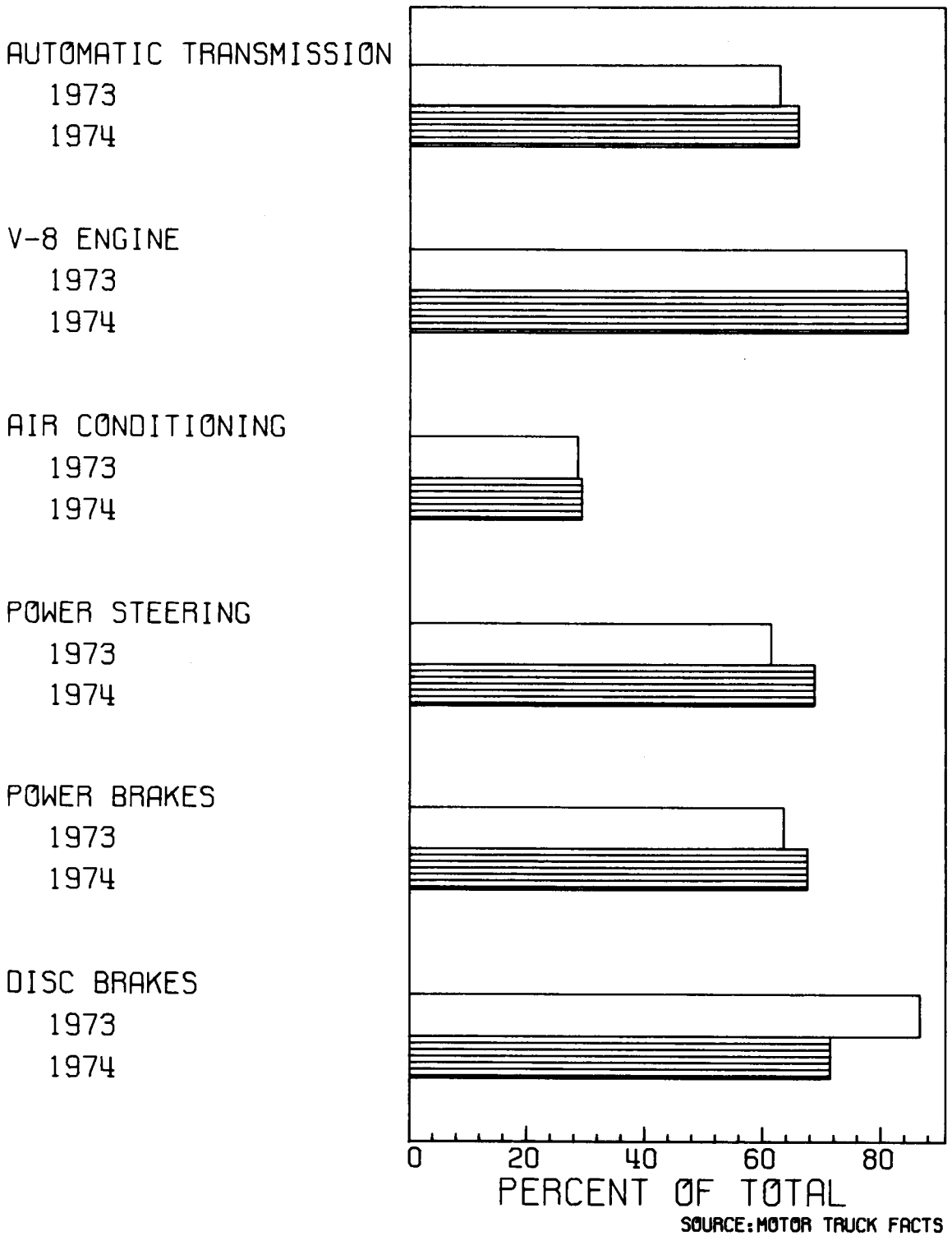
1.1.1.3.10

FACTORY INSTALLATION OF SELECTED EQUIPMENT FOR AUTOMOBILES



1.1.1.3.11

FACTORY INSTALLATION OF SELECTED EQUIPMENT FOR TRUCKS AND BUSES



SOURCE: MOTOR TRUCK FACTS

1.1.1.4.01

National emission data (10^6 ton/yr)

Source/year	Particulates	SO_x	NO_x	HC	CO
1970					
Transportation	1.2	0.7	9.3	14.7	82.3
Highway	0.8	0.3	6.9	12.9	71.6
Nonhighway	0.4	0.4	2.4	1.8	10.7
Fuel combustion	8.3	27.0	10.1	1.6	1.1
Petroleum refining	0.1	0.8	0.4	0.9	2.4
Coal refuse burning	0.1	0.1	0.0	0.1	0.3
Oil and gas production/marketing	0.0	0.0	0.0	4.3	0.0
1974					
Transportation	1.3	0.8	10.7	12.8	73.5
Highway	0.9	0.4	8.1	11.0	63.6
Nonhighway	0.4	0.4	2.6	1.8	9.9
Fuel combustion	5.9	24.3	11.0	1.7	0.9
Petroleum refining	0.1	0.9	0.4	1.0	2.6
Coal refuse burning	0.1	0.1	0.0	0.1	0.3
Oil and gas production/marketing	0.0	0.0	0.0	4.7	0.0

Source: Personal communication with James Sutherland of the National Air Data Branch, United States Environmental Protection Agency.

1.1.1.4.02

Rank ordering of surface transportation system according to A-weighted noise level

	Typical A-weighted noise levels at 50 ft[1] dB re: 20μN/m²	Estimated vehicle-miles in urban areas billions
Highway		
Medium and heavy trucks	84(88)	19
Motorcycles	82(88)	NA
Garbage trucks	82(88)	0.5
Highway buses	82(86)	0.1
Automobiles (sport, etc.)	75(86)	21
City buses	73(85)	2.2
Light trucks	72(86)	77
Automobiles (standard)	69(84)	335
Rail		
Freight and passenger trains	94	NA
Rapid transit	86	0.33
Trolley cars*	80	0.03
Trolley cars**	68	0.03
Recreational vehicles		
Off-road motorcycles	85	
Snowmobiles	85	
Inboard motorboats	80	
Outboard motorboats	80	

[1]Values inside parentheses are typical for maximum acceleration. All other values are for normal cruising speeds. Variations of 5 dB can be expected.

*Pre-WWII.

**Post-WWII.

Source: U.S. Department of Transportation, Summary of National Transportation Statistics, p. 97, U.S. Government Printing Office, Washington, D.C., June 1975.

Intercity passenger miles by mode of travel

	Automobiles[a]	Motor coaches[a]	Total motor vehicles[a]	Railways revenue passengers	Inland waterways	Airways, domestic revenue services	Total
Passenger miles by mode (in billions)							
1973	1,174.0	25.6	1,199.6	9.0	4.0	141.0	1,353.9
1972	1,129.0	25.6	1,154.6	8.7	4.0	133.0	1,300.3
1971	1,071.0	25.5	1,096.5	8.9	4.1	119.9	1,229.4
1970	1,026.0	25.3	1,051.3	10.9	4.0	118.6	1,184.8
1969	997.0	24.9	1,001.9	12.3	3.8	119.9	1,137.9
1968	936.4	24.5	960.9	13.3	3.5	101.2	1,078.9
1967	889.8	24.9	914.7	15.3	3.4	87.2	1,020.6
1966	856.4	24.6	881.0	17.3	3.4	69.4	971.0
1965	817.6	23.8	841.4	17.6	3.1	58.1	920.2
1964	706.1	19.9	726.0	21.6	2.7	34.0	784.3
Passenger miles by mode (percent)							
1973	86.70	1.90	88.60	0.70	0.30	10.40	100%
1972	86.82	1.97	88.79	0.67	0.31	10.23	100%
1971	87.12	2.07	89.19	0.72	0.33	9.75	100%
1970	86.59	2.13	88.73	0.91	0.33	10.01	100%
1969	85.85	2.18	88.04	1.08	0.33	10.53	100%
1968	86.80	2.27	89.07	1.23	0.32	9.38	100%
1967	87.18	2.44	89.62	1.50	0.33	8.54	100%
1966	88.19	2.53	90.72	1.78	0.35	7.15	100%
1965	89.33	2.48	91.81	1.83	0.32	6.04	100%
1960	90.03	2.54	92.57	2.75	0.34	4.34	100%

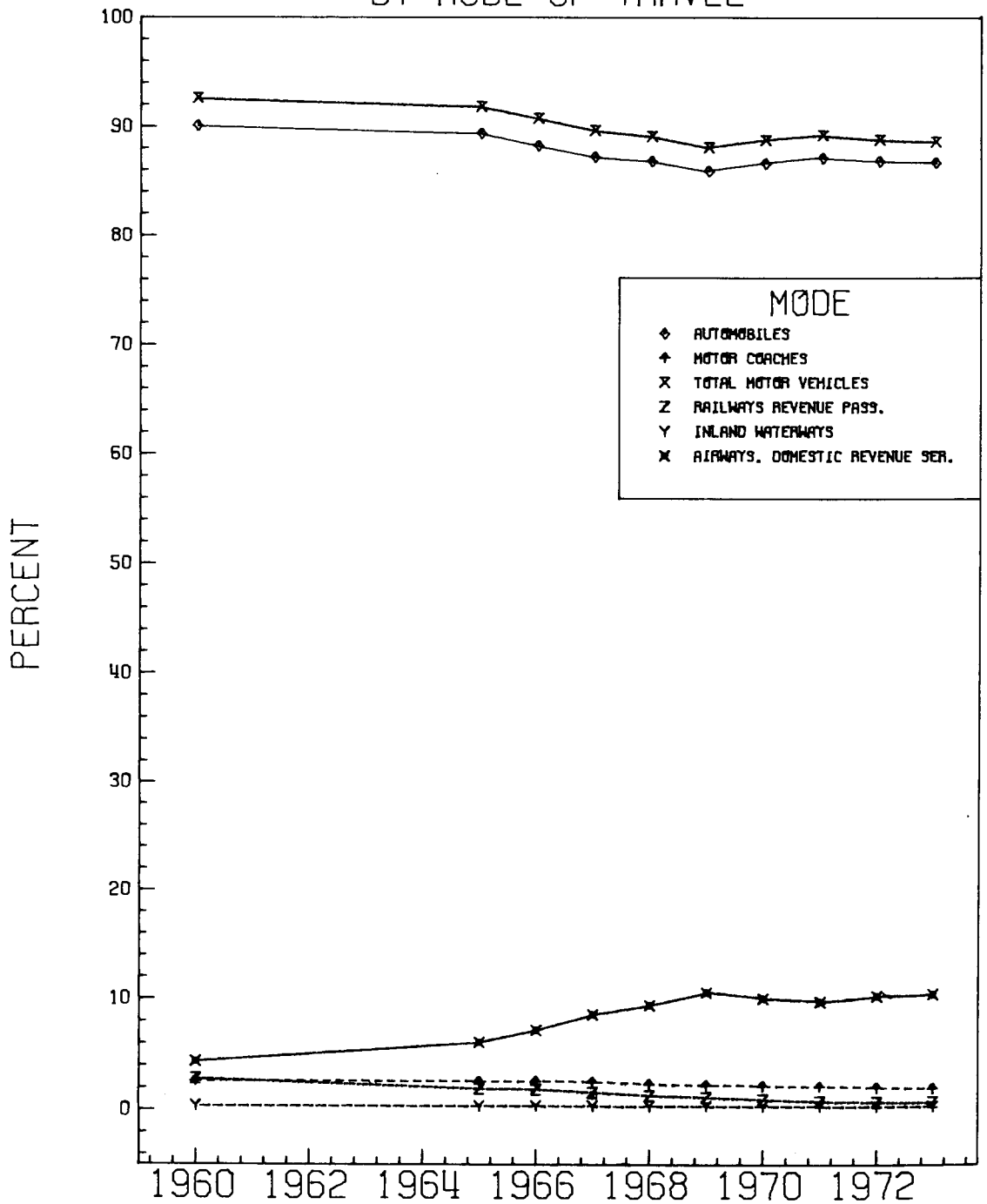
[a]Includes intra-city portions of intercity trips. Omits rural to rural trips, strictly intra-city trips with both origin and destination confined to same city, local bus or transit movement, nonrevenue school and government bus operations.

Source: 1975 Automobile Facts and Figures, p. 38, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975.

1.1.2.02

INTERCITY PASSENGER MILES

BY MODE OF TRAVEL



SOURCE: 1975 AUTO FACTS

Number and percent of person trips and person miles of travel, by mode of transportation, 1969[1]

Mode of transportation	Person Trips		Person Miles of travel	
	Number (000,000)	Percent	Number (000,000)	Percent
Automobile driver	93,137	52.49	850,000	48.26
Automobile passenger	61,000	34.38	635,689	36.10
Taxi	427	.24	1,846	.10
Truck	8,718	4.91	111,923	6.35
Total passenger cars or trucks	163,282	92.02	1,599,458	90.81
Bus, other than school bus	4,264	2.40	41,579	2.36
Elevated or subway	1,116	.63	12,119	.69
Other train	352	.20	14,479	.82
Total, mass transit other than school bus	5,732	3.23	68,177	3.87
School bus	7,732	4.36	45,811	2.60
Motorcycle	255	.15	2,231	.13
Airplane	98	.06	43,601	2.48
Other	327	.18	2,072	.12
Total, all models	177,426	100.00	1,761,350	100.00

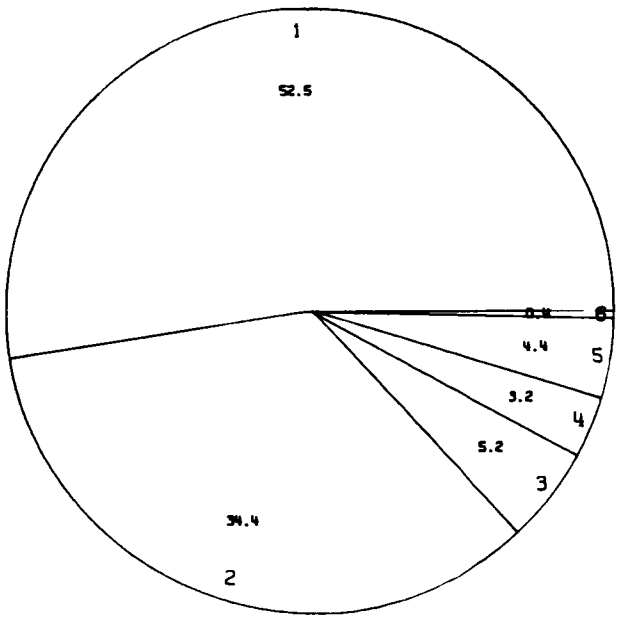
[1]This table is based on data collected for the Nationwide Personal Transportation Survey conducted in 1969-1970 by the Bureau of the Census of the Department of Commerce for the Federal Highway Administration of the Department of Transportation.

Source: 1975 Automobile Facts and Figures, p. 40, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975.

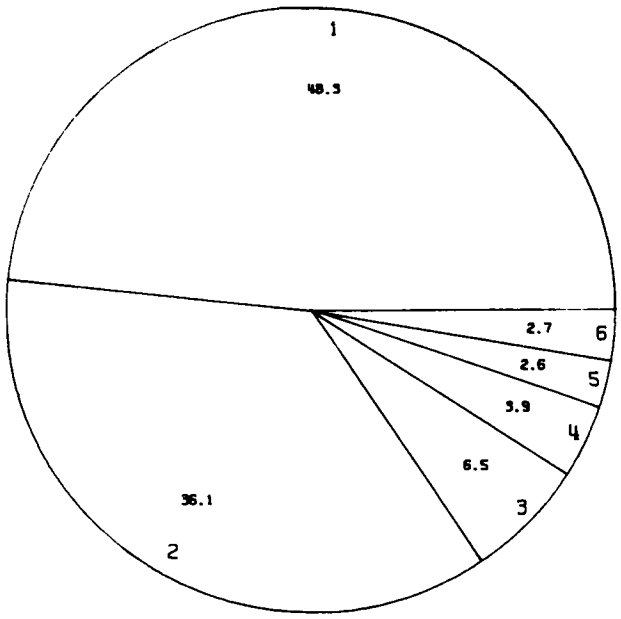
1.1.2.04

PERCENT OF PERSONAL TRANSPORTATION
DISTRIBUTION BY MODE, 1969

DATA IN MILES ÷ 10^{10}		SECTOR
9.31	85.00	1) AUTO DRIVER
6.10	63.57	2) AUTO PASSENGER
0.91	11.38	3) TAXI & TRUCK
0.57	6.82	4) MASS TRANSIT
0.77	4.58	5) SCHOOL BUS
0.07	4.79	6) AIR, MOTORCYCLE & OTHER



PERSON TRIPS



PERSON MILES

SOURCE: 1975 AUTO FACTS

1.1.3.01

Intercity freight movement by mode

	Motor trucks[a]	Railways[b]	Inland waterways[c]	Pipe lines	Domestic airways	Total
Ton-miles, in billions:						
1974**	510.0	861.0	347.0	507.0	3.600	2,228.6
1973	505.0	858.0	358.0	507.0	3.940	2,232.0
1972*	470.0	784.0	339.0	476.0	3.700	2,073.0
1971*	430.0	744.0	315.0	444.0	3.500	1,936.5
1970	412.0	768.0	319.0	431.0	3.400	1,933.4
1969	404.0	774.0	303.0	411.0	3.200	1,895.2
1968	396.3	756.8	291.4	391.3	2.900	1,838.7
1967	388.5	731.2	274.0	361.0	2.592	1,757.3
1966	380.9	750.8	280.5	332.9	2.252	1,747.4
1965	359.2	708.7	262.4	306.4	1.910	1,638.6
1964	356.3	666.2	250.2	268.7	1.504	1,542.8
1963	336.2	629.3	234.2	253.4	1.296	1,454.4
1960[d]	285.5	579.1	220.3	228.6	0.778	1,314.3
1955	223.3	631.4	216.5	203.2	0.481	1,274.9
1950	172.9	596.9	163.3	129.2	0.318	1,062.6
Ton-miles, percent by type of transport:						
1974**	22.90	38.60	15.60	22.70	0.16	100%
1973	22.60	38.50	16.00	22.70	0.18	100%
1972*	22.70	37.70	16.40	23.00	0.18	100%
1971*	22.21	38.42	16.27	22.92	0.18	100%
1970	21.30	39.72	16.49	22.29	0.17	100%
1969	21.31	40.84	15.98	21.68	0.16	100%
1968	21.55	41.16	15.85	21.28	0.16	100%
1967	22.11	41.61	15.59	20.54	0.15	100%
1966	21.80	42.97	16.05	19.05	0.13	100%
1965	21.92	43.25	16.01	18.70	0.12	100%
1964	23.09	43.18	16.21	17.41	0.10	100%
1963	23.11	43.27	16.10	17.43	0.09	100%
1960[d]	21.72	44.06	16.76	17.40	0.06	100%
1955	17.51	49.53	16.98	15.94	0.04	100%
1950	16.27	56.17	15.37	12.16	0.03	100%

*Revised.
**Estimated.

[a]Ton-miles between cities and between rural and urban areas included, whether private or for hire. Rural-to-rural movements and city deliveries are omitted.

[b]Revenue ton-miles.

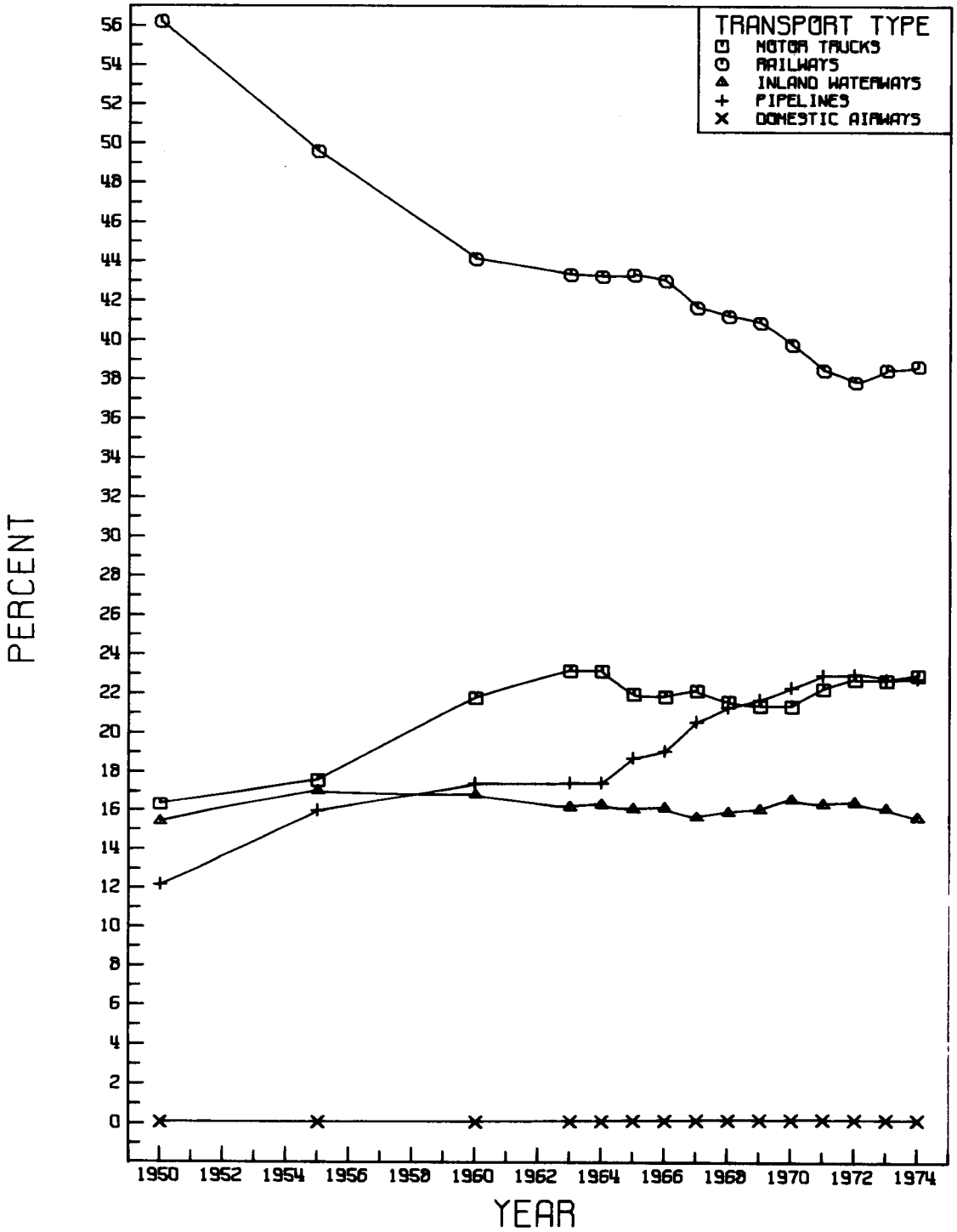
[c]Does not include coastwide and intercoastal tone-miles.

[d]1960 and later years include Alaska and Hawaii.

Source: 1975 Motor Truck Facts, p. 37, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975.

1.1.3.02

INTERCITY FREIGHT MOVEMENT



SOURCE: I.C.C.

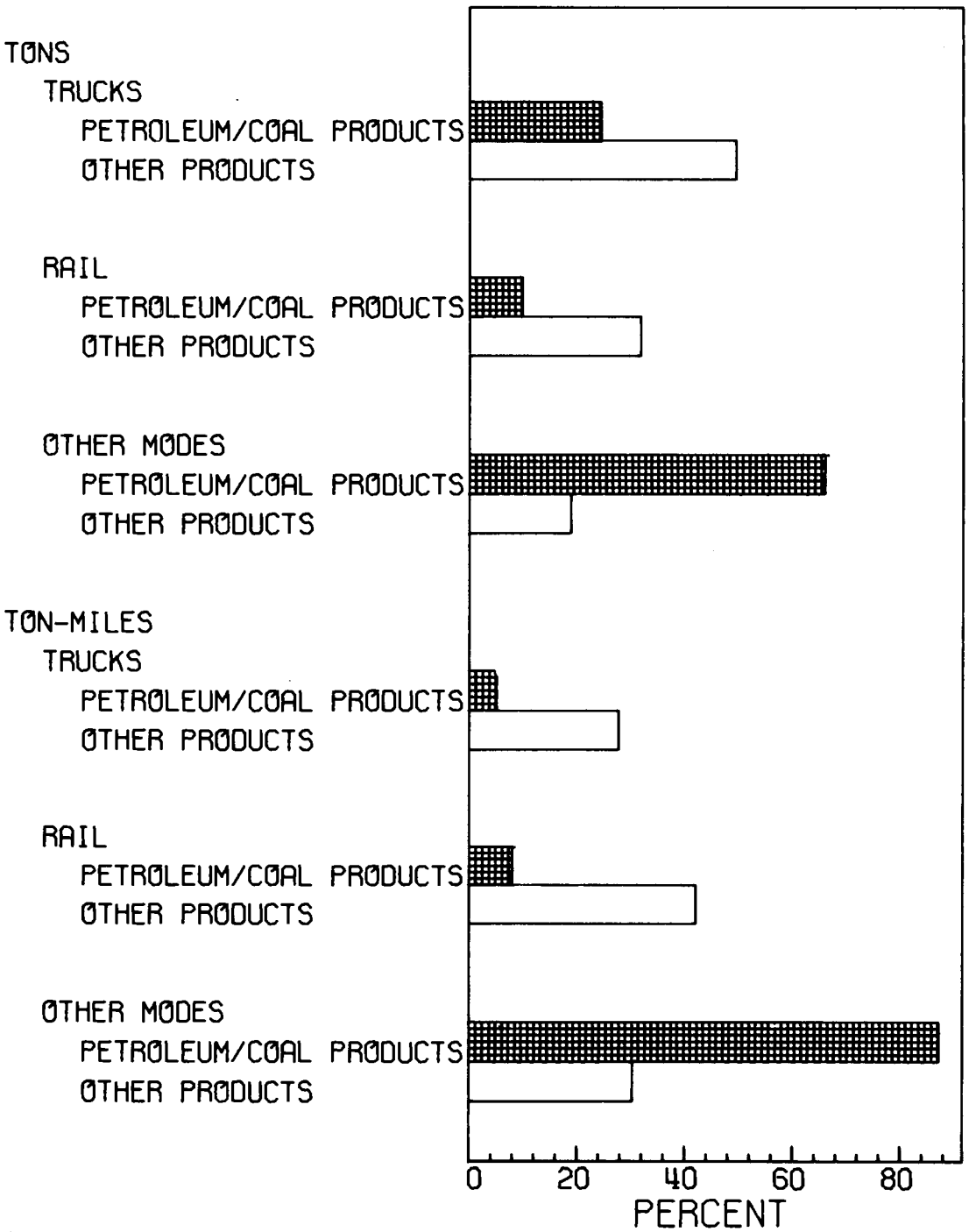
Percent distribution by mode of transportation of commodities shipped by manufacturers: 1972

Group	Tons					Tons-miles				
	Motor carrier	Private truck	Total truck	Rail	Other	Motor carrier	Private truck	Total truck	Rail	Other
Meat & dairy products	41.7%	39.1%	80.8%	18.8%	0.4%	54.3%	17.2%	71.5%	27.8%	0.6%
Canned, frozen & other food products	20.3	23.0	43.3	50.7	6.0	18.3	9.5	27.8	66.8	5.4
Candy, cookies, beverages & tobacco products	25.7	58.4	84.1	15.4	0.4	28.8	25.8	54.6	43.1	2.2
Basic textiles & leather products	61.4	27.7	89.1	9.7	1.2	61.0	21.0	82.0	16.3	1.8
Apparel & related products	69.4	15.6	85.0	8.5	6.5	67.0	9.5	76.5	13.4	10.1
Paper & allied products	28.0	17.9	45.9	51.7	2.3	18.9	5.6	24.5	73.8	1.5
Basic chemicals, plastics, synthetic rubber & fibers	30.1	12.1	42.2	48.6	9.2	21.6	4.7	26.3	63.1	10.5
Drugs, paints & other chemical products	38.6	15.7	54.3	37.8	7.9	32.0	8.4	40.4	44.3	15.2
Petroleum & coal products	16.0	8.4	24.4	9.7	65.8	3.4	1.6	5.0	7.9	87.1
Rubber & plastic products	59.1	15.2	74.3	24.4	1.2	56.8	9.3	66.1	32.1	1.8
Lumber & wood products, except furniture	16.2	36.3	52.5	45.8	1.6	7.6	10.7	18.3	76.8	4.9
Furniture & fixtures	41.4	34.7	76.1	22.0	1.9	39.9	20.5	60.4	37.1	2.5
Stone, clay & glass products	47.2	23.7	70.9	21.9	7.2	36.6	11.3	47.9	45.3	6.7
Primary iron & steel products	44.4	6.7	51.1	43.7	5.2	35.9	4.8	40.7	51.6	7.7
Primary nonferrous metal products	31.4	15.1	46.5	51.6	1.9	23.4	7.7	31.1	67.2	1.6
Fabricated metal products	55.3	25.1	80.4	17.3	2.3	60.1	13.0	73.1	23.3	3.6
Metal cans & misc. metal products	44.1	17.8	61.9	36.8	1.3	40.3	7.1	47.4	50.5	2.1
Industrial machinery, except electrical	59.4	18.9	78.3	19.6	2.0	75.7	8.9	84.6	12.3	3.0
Machinery, except electrical & industrial	53.4	17.7	71.1	26.5	2.3	49.7	8.9	58.6	37.7	3.6
Communication products & parts	64.5	12.4	76.9	13.0	10.0	59.9	5.6	65.5	18.0	16.5
Electrical products & supplies	49.3	14.1	63.4	35.0	1.3	46.0	8.4	54.4	43.2	2.6
Motor vehicles & equipment	37.3	3.0	40.3	59.3	0.4	17.4	1.0	18.4	80.9	0.8
Transportation equipment, except motor vehicles	23.9	54.8	78.7	19.5	1.8	30.3	43.1	73.4	24.0	2.7
Instruments, photo equipment, watches & clocks	63.8	10.9	74.7	20.9	4.4	53.9	5.7	59.6	34.4	6.0
Total all shipper groups	31.1%	18.3%	49.4%	31.7%	18.8%	20.9%	6.8%	27.7%	42.0%	30.3%
Total all shipper groups, except petroleum and coal production	35.7%	21.3%	57.0%	38.4%	4.5%	38.6%	9.1%	37.7%	56.9%	5.4%

Source: 1975 Motor Truck Facts, p. 34, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975.

1.1.3.04

COMMODITIES SHIPPED BY MANUFACTURERS BY MODE, 1972



SOURCE: 1972 TRANSPORTATION SURVEY

Total crude petroleum and petroleum products carried in domestic transportation and percent of total carried by each mode of transportation
(Tons of 2,000 pounds)

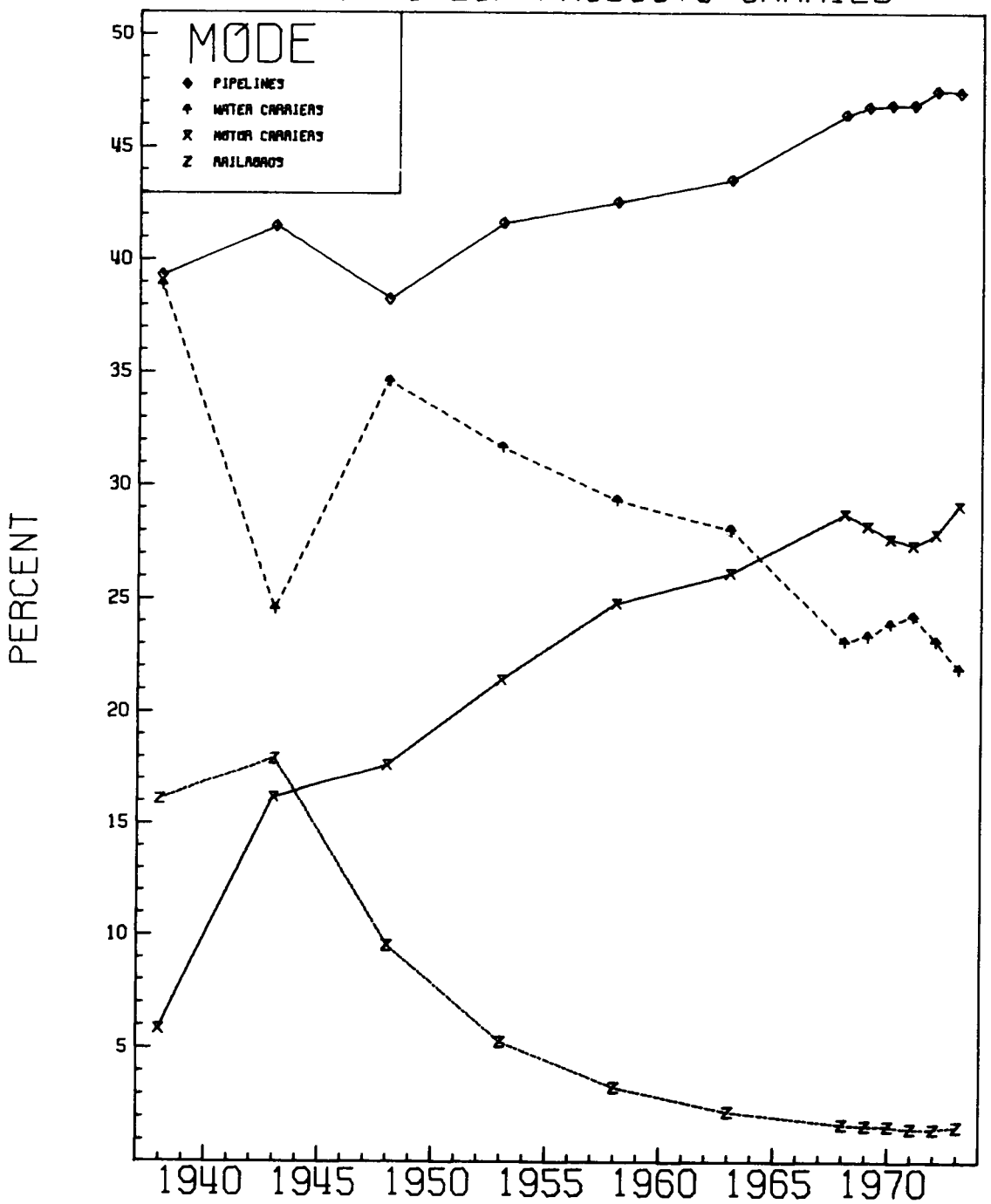
Year	Total crude and products carried	Pipelines		Water carriers		Motor carriers[1]		Railroads	
		Tons carried	Percent of total	Tons carried	Percent of total	Tons carried	Percent of total	Tons carried	Percent of total
1953	862,695,394	359,142,335	41.63	273,476,440	31.70	184,625,431	21.40	45,451,188	5.27
1958	1,017,179,215	433,027,566	42.57	298,656,025	29.36	252,024,743	24.78	33,470,881	3.29
1963	1,196,002,789	521,149,137	43.57	335,611,860	28.06	312,583,106	26.14	26,658,686	2.23
1968	1,563,397,700	726,443,900	46.47	361,002,600	23.09	449,700,000	28.76	26,251,200	1.68
1969	1,622,774,600	759,612,000	46.81	378,862,700	23.35	458,000,000	28.22	26,299,900	1.62
1970	1,685,741,800	790,241,700	46.88	402,667,900	23.88	466,100,000	27.65	26,732,200	1.59
1971	1,719,812,900	806,671,000	46.90	416,792,000	24.24	470,700,000	27.37	25,649,900	1.49
1972	1,843,449,500	876,248,100	47.53	426,603,200	23.14	513,500,000	27.86	27,098,200	1.47
1973	1,922,918,900	912,209,900	47.44	421,205,800	21.90	559,767,000	29.11	29,736,200	1.55

[1]The amounts carried by motor carriers are estimates.

Source: Association of Oil Pipe Lines, Press Release, June 2, 1975.

1.1.3.06

PERCENT DISTRIBUTION OF PETROLEUM AND PETROLEUM PRODUCTS CARRIED



SOURCE: OIL PIPELINES

Highway motor vehicle travel in the United States, 1963-1974[1]
(million vehicle miles)

Year	Passenger Vehicles							Cargo vehicles			All motor vehicles
	Personal passenger vehicles			Buses			All passenger vehicles				
	Passenger cars	Motor-cycles	All personal passenger vehicles	Commercial	School	All Buses		Single-unit trucks	Combi-nations	All trucks	
1974	995,544	22,347	1,017,891	2,610	2,450	5,060	1,022,951	211,369	55,325	266,694	1,289,645
1973	1,016,861	19,594	1,036,455	2,548	2,412	4,960	1,041,415	219,128	48,019	267,147	1,308,562
1972	986,407	17,091	1,003,498	2,750	2,359	5,109	1,008,607	213,122	46,613	259,735	1,268,342
1971	939,102	15,053	954,155	2,885	2,212	5,097	959,252	184,396	42,641	227,037	1,186,289
1970	890,844	10,148	900,992	2,943	2,100	5,043	906,035	174,443	40,227	214,670	1,120,705
1969	849,633	9,225	858,858	3,007	2,030	5,037	863,895	167,241	39,439	206,680	1,070,575
1968	805,693	8,337	814,030	3,031	1,937	4,968	818,998	158,938	37,713	196,651	1,015,649
1967	766,466	7,737	774,203	3,024	1,870	4,894	779,097	147,450	35,006	182,456	961,553
1966	744,844	6,896	751,740	3,008	1,844	4,852	756,592	140,893	33,012	173,905	930,497
1965	706,386	5,208	711,594	3,019	1,763	4,782	716,376	140,117	31,319	171,436	887,812
1964			677,613[2]	2,892	1,724	4,616	682,229	133,711	30,560	164,271	846,500
1963			645,371[2]	2,841	1,642	4,483	649,854	125,753	29,816	155,569	805,423

[1]For the 50 states and District of Columbia.

[2]Only totals are presented for 1963 and 1964 as motorcycles account for less than 1 percent of all travel.

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Statistics, Table VM-1, annual.

Number of highway motor vehicles registered in the United States by type, 1963-1974[1]
(thousands)

Year	Passenger Vehicles							Cargo vehicles			All motor vehicles
	Personal passenger vehicles			Buses			All passenger vehicles				
	Passenger cars	Motor-cycles	All personal passenger vehicles	Commercial	School	All Buses		Single-unit trucks	Combi-nations	All trucks	
1974	104,857.4	4,966.4	109,823.8	90.1	356.8	446.9	110,270.7	23,524.4	1,064.6	24,589.0	134,859.7
1973	101,762.5	4,356.5	106,119.0	89.5	336.0	425.5	106,544.5	22,205.0	1,027.9	23,232.9	129,777.4
1972	96,860	3,798	100,658	88.8	318.2	407.0	101,065	20,249	990	21,239	122,304
1971	92,799	3,345	96,144	90.3	307.3	397.6	96,542	18,828	974	19,802	116,344
1970	89,280	2,815	92,095	90.3	288.7	379.0	92,474	17,788	960	18,748	111,222
1969	86,861	2,295	89,156	90.3	274.0	364.3	89,520	16,942	929	17,871	107,391
1968	83,693	2,100	85,793	89.6	262.2	351.8	86,145	16,124	871	16,995	103,140
1967	80,414	1,953	82,367	90.0	247.9	337.9	82,705	15,363	830	16,193	98,898
1966	78,353	1,753	80,106	84.5	238.7	323.2	80,429	14,694	823	15,517	95,946
1965	75,252	1,382	76,634	85.0	229.3	314.3	76,948	14,008	787	14,795	91,743
1964			72,969[2]	82.3	223.1	305.4	73,274	13,275	738	14,013	87,287
1963			69,842[2]	82.2	215.7	297.9	70,140	12,654	706	13,860	83,500

[1]For the 50 states and District of Columbia.

[2]Only totals are presented for 1963 and 1964 as motorcycles account for less than 1 percent of all travel.

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Statistics, Table VM-1, annual.

Passenger cars in use by age

Age in years[1]	1964 Number (000)	1964 Percent Simple	1964 Percent Cum.	1969[2] Number (000)	1969[2] Percent Simple	1969[2] Percent Cum.	1973[2] Number (000)	1973[2] Percent Simple	1973[2] Percent Cum.	1974[2] Number (000)	1974[2] Percent Simple	1974[2] Percent Cum.
Under 1	5,847	8.9%	100.0%	6,467	8.2%	100.0%	7,988	8.9%	100.0%	6,433	6.9%	100.0%
1-2	7,348	11.1	91.1	8,927	11.4	91.8	10,158	11.3	91.1	11,269	12.2	93.3
2-3	6,629	10.0	80.0	8,054	10.3	80.4	8,715	9.7	79.8	10,147	11.0	81.1
3-4	5,455	8.3	70.0	8,798	11.2	70.1	8,612	9.6	70.1	8,622	9.3	70.1
4-5	6,134	9.3	61.7	8,855	11.3	58.9	8,881	9.9	60.5	8,493	9.2	60.8
5-6	5,586	8.5	52.4	7,532	9.6	47.6	8,291	9.2	50.6	8,615	9.3	51.6
6-7	3,971	6.0	43.9	6,829	8.7	38.0	7,120	7.9	41.3	7,931	8.6	42.3
7-8	5,124	7.7	37.9	5,804	7.4	29.3	7,333	8.2	33.4	6,624	7.2	33.7
8-9	4,683	7.1	30.2	4,087	5.2	21.9	6,715	7.5	25.3	6,531	7.1	26.5
9-10	4,715	7.1	23.1	3,726	4.7	16.7	4,963	5.5	17.8	5,710	6.2	19.4
10-11	2,634	4.0	16.0	2,452	3.1	12.0	3,698	4.1	12.2	3,976	4.3	13.2
11-12	2,471	3.7	12.0	1,188	1.5	8.9	2,470	2.8	8.1	2,824	3.0	8.9
12-13	1,177	1.8	8.3	1,421	1.8	7.4	1,268	1.4	5.4	1,813	2.0	5.9
13-14	1,289	2.0	6.5	1,139	1.5	5.6	967	1.1	4.0	901	1.0	5.9
14-15	1,251	1.9	4.5	1,063	1.4	4.1	548	0.6	2.9	682	0.7	2.9
15-16	631	1.0	2.6	525	0.7	2.7	274	0.3	0.3	391	0.4	2.2
16-17	1,054	1.6	1.6	1,578	2.0	2.0	1,780	2.0	2.0	1,621	1.8	1.8
Subtotal	65,999	100.0%	---	78,445	100.0%	---	89,782	100.0%	---	92,583	100.0%	---
Years not given	52	---	---	50	---	---	23	---	---	25	---	---
Total	66,051	---	---	78,495	---	---	89,805	---	---	92,608	---	---
Average age	5.97 years			5.54 years			5.74 years			5.72 years		

[1]Each class interval includes lower but not higher age.

[2]Beginning in 1966 certain vehicles previously counted as passenger cars have been counted as trucks. The 1966 change involved an estimated 700,000 vehicles.

Note: Data as of July 1 of each year.

Source: R. L. Polk & Co. Further reproduction prohibited.

1.2.1.04

Projections of motor vehicle registrations

Calendar year	Total motor vehicle registrations[1,2] Automobiles (millions)	Trucks and buses (millions)	Total (millions)
Actual			
1940	27.5	5.0	32.5
1950	40.4	8.8	49.2
1960	61.7	12.2	73.9
1965	75.2	15.1	90.3
1970	89.3	19.1	108.4
1972	96.9	21.6	118.5
Estimated			
1975	106.5	25.3	131.8
1980	117.5	28.7	146.2
1985	127.4	31.3	158.7
1990	136.3	33.5	169.8

[1]Recorded figures are shown through 1972.

[2]Estimates of Highway Statistics Division, FHWA, for 1975-1990.

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Travel Forecasts, p. 32, Washington, D.C., November 1974.

1.2.1.05

Estimated distribution of automobile registrations by vehicle size, 1973-1990

Year	Economy (subcompact) (millions)	Compact (millions)	Regular (standard) (millions)	Total (millions)
1973[1]	13.1	23.0	65.5	101.6
1975	18.1	24.9	63.5	106.5
1980	29.5	30.9	57.1	117.5
1985	50.4	40.2	36.8	127.4
1990	73.8	40.7	21.8	136.3

[1]Actual.

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Travel Forecasts, p. 34, Washington, D.C., November 1974.

Traffic fatality rates 1.2.1.06

Year	Total deaths[1]	Death rates: Per 10,000 motor vehicles	Per 100,000,000 vehicle miles	Per 100,000 Population
1974	46,200	3.40	3.61	21.9
1973	55,511	4.28	4.24	26.5
1972	56,278	4.60	4.43	27.0
1971	54,381	4.68	4.57	26.4
1970	54,633	4.92	4.88	26.8
1969	55,791	5.19	5.21	27.7
1968	54,862	5.32	5.40	27.5
1967	52,924	5.35	5.50	26.8
1966	53,041	5.53	5.70	27.1
1965	49,163	5.36	5.54	25.4
1964	47,700	5.46	5.63	25.0
1963	43,564	5.22	5.41	23.1
1962	40,804	5.12	5.32	22.0
1961	38,091	4.98	5.16	20.8
1960	38,137	5.12	5.31	21.2
1959	37,910	5.26	5.41	21.5
1958	36,981	5.37	5.56	21.3
1957	38,702	5.73	5.98	22.7
1956	39,628	6.07	6.28	23.7
1955	38,426	6.12	6.34	23.4
1954	35,586	6.07	6.33	22.1
1953	37,955	6.74	6.97	24.0
1952	37,794	7.10	7.36	24.3
1951	36,996	7.13	7.53	24.1
1950	34,763	7.07	7.59	23.0

[1]Totals may not quite equal the sum of the various types because the estimates were generally made only to the nearest 10 deaths, or to the nearest 50 deaths for certain types.

Source: National Safety Council, Accident Facts, p. 59, 1975 Edition, Chicago, Illinois, 1975.

Comparison of material inputs to transportation equipment products[1]

Input sector	Truck, bus & trailer bodies	Motor vehicles & parts	Aircraft	Aircraft engines	Aircraft equipment, NEC	Ship & boat building	Railroad equipment
Plastic products	1.5	1.0				1.4	
Rubber products	8.5	3.4					2.4
Glass	1.5	1.9				1.4	
Steel	16.0	14.4	3.4	10.9	6.9	10.4	42.8
Aluminum	7.8	1.4	4.8	2.7	7.7	3.4	4.0
Structural metal products						8.0	
Screw machine products	1.7	1.5	2.3	2.5	5.0		
Other fabricated metal products	1.2	1.3		2.7	1.7	2.0	1.6
Engines and turbines		1.5				18.2	6.7
Other metal working machinery		1.8	3.1	8.6	6.2	2.8	
Power transmission equipment						4.6	2.0
Service industry machinery		2.3					
Machine shop products	2.6	2.2	9.0	14.6	11.5		
Communications equipment			15.3				
Engine electrical equipment				2.6			
Engineering and scientific instruments			5.1				
Trucking	7.7	3.0					
Wholesale trade	4.8	5.3	4.0	3.6	3.3	6.0	4.4
Real estate			3.8	4.0	8.3	1.6	
Business services	11.1	1.0	6.9	7.1	8.3	2.4	1.7
Remainder of 185 input sectors	35.6	58.0	42.3	40.7	41.1	37.8	34.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1]All figures are the share of the total input material bill in value terms, represented by each item — no entries <1% included. The coefficients to the material bill are derived from the following equation:

$$\frac{A_{ij}}{1-VA_j-A_{ii}}$$

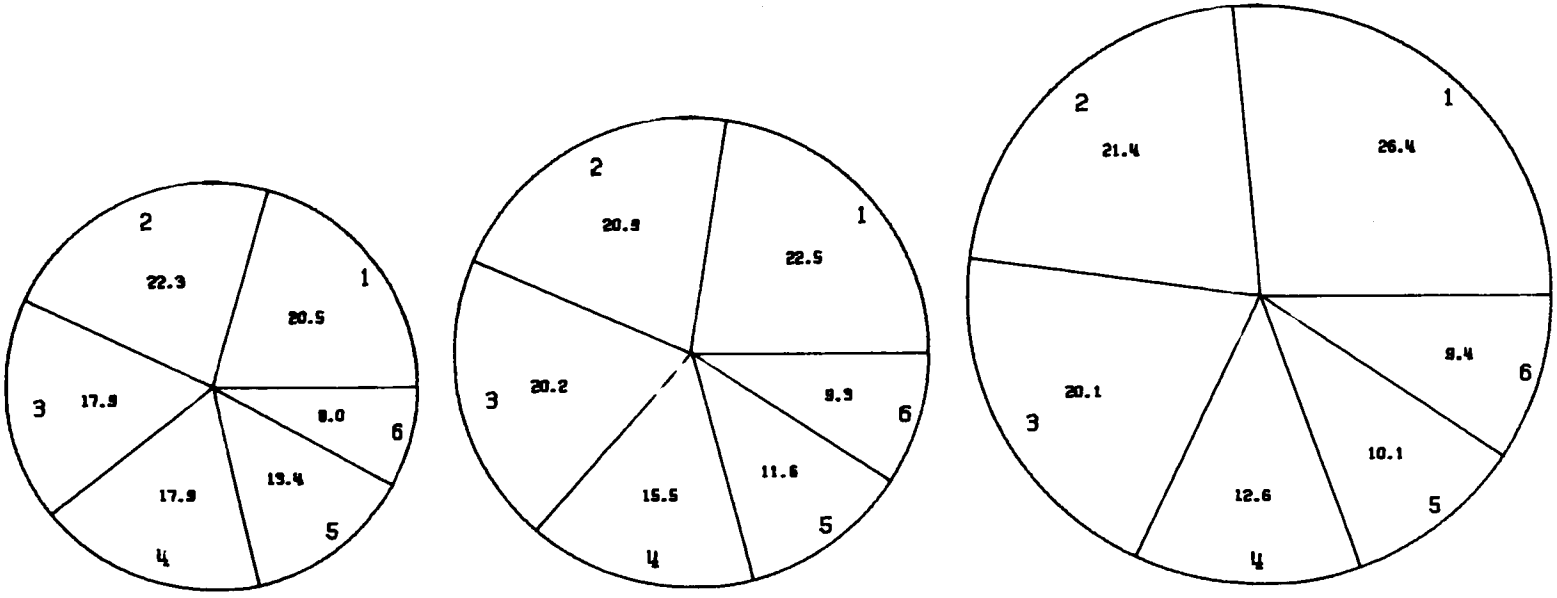
where A_{ij} represents the amount of sales on industry i to industry j per unit of j's output, VA represents value added within sector j, and A_{ii} represents the diagonal term of the input-output matrix.

Source: These numbers were generated with the economic forecasting system, INFORUM (Interindustry FORecasting System of the University of Maryland) developed by Professor Clopper Almon, Jr., at the University of Maryland. The data used is for 1972.

1.2.1.08

COST OF OPERATING A 1974 AUTOMOBILE
SUBURBAN BASED OPERATION

DATA VALUES (CENTS/MILE)			SECTOR
2.30	2.90	4.20	1. ORIGINAL VEHICLE COST DEPRECIATED
2.50	2.70	3.40	2. MAINTENANCE,ACCESSORIES,PARTS & TIRES
2.00	2.60	3.20	3. GAS & OIL (EXCLUDING TAXES)
2.00	2.00	2.00	4. GARAGE, PARKING & TOLLS
1.50	1.50	1.60	5. INSURANCE
0.90	1.20	1.50	6. STATE AND FEDERAL TAXES



SUBCOMPACT SIZED COMPACT SIZED STANDARD SIZED

SOURCE: F.H.A. COST

1.2.2.01

Comparison of relative shares of total trucks
by major use 1963, 1967, and 1972
(percent of total truck inventory for year)

	1963	1967	1972
Personal transportation	24.5	33.6	41.2
Agriculture	28.0	24.1	21.6
Forestry and lumbering	NA	1.0	1.0
Mining	NA	0.6	0.4
Construction	10.0	9.3	8.6
Manufacturing	4.6	2.4	2.3
Wholesale and retail trade	13.7	12.2	9.5
For hire	5.9	4.4	3.9
Utilities	NA	2.5	2.6
Services	8.2	5.5	7.6
All other	5.1	4.4	1.7
Total	100.0	100.0	100.0

Source: U.S. Bureau of the Census, 1972 Census of Transportation, Series TC72-T52, "Truck Inventory and Use Survey — United States Summary," Figure 3, U.S. Government Printing Office, Washington, D.C., 1973.

1.2.2.02

Percent distribution by size of truck and major use: 1972

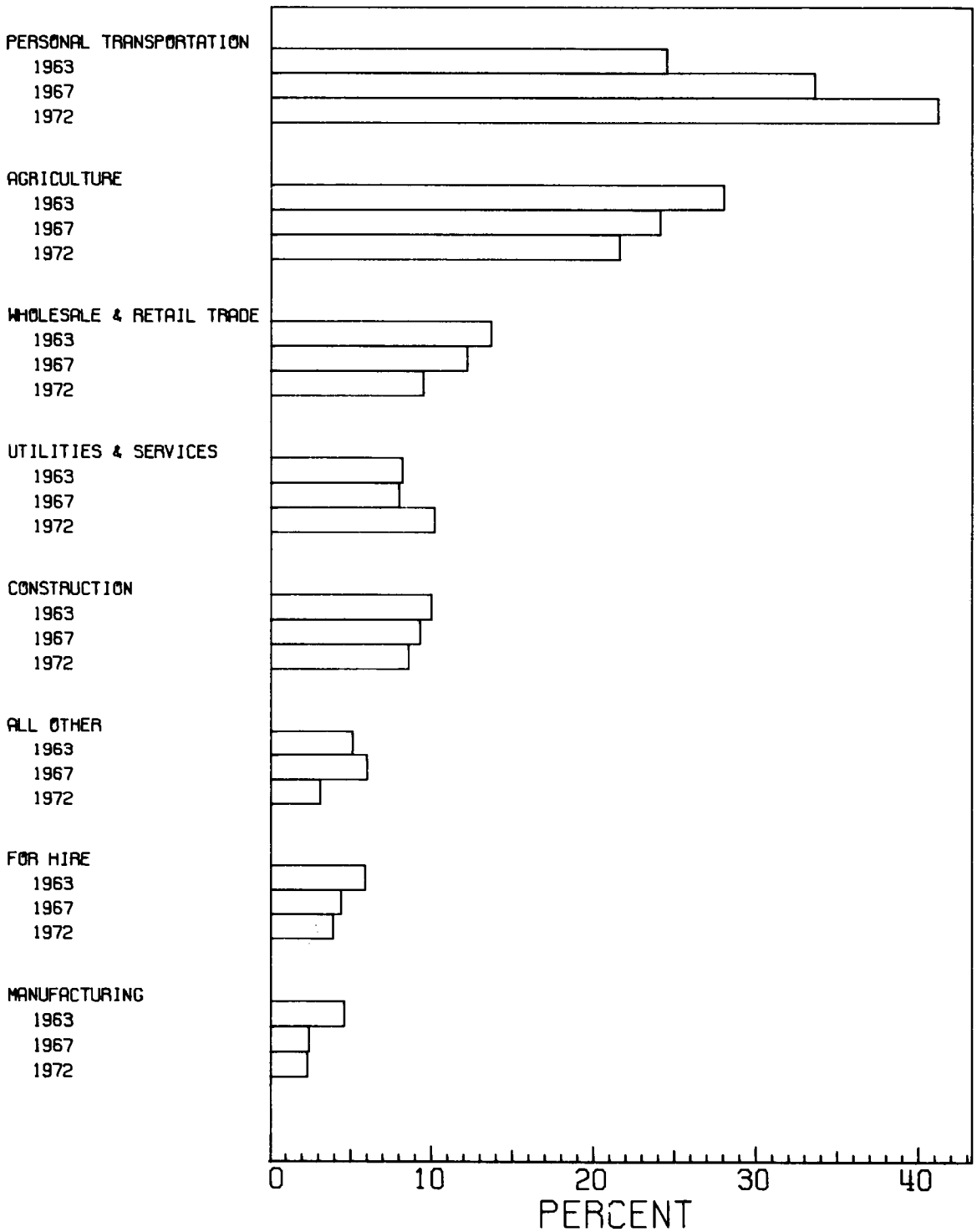
Major use	Total	Vehicle size class			
		Light[1]	Medium[2]	Light-heavy[3]	Heavy-heavy[4]
Personal transportation	41.2	53.4	11.0	2.1	1.0
Agriculture	21.6	20.1	32.1	33.2	10.3
Forestry and lumbering	1.0	.5	1.4	2.8	3.6
Mining	.4	.2	.6	.7	1.9
Construction	8.6	6.9	10.2	14.0	19.1
Manufacturing	2.3	1.3	3.3	4.4	8.5
Wholesale and retail trade	9.5	6.1	18.9	23.0	18.3
For hire	3.9	.6	6.0	7.2	30.6
Utilities	2.6	2.5	3.1	3.8	1.9
Services	7.6	7.7	10.5	6.0	2.5
All other	1.7	1.2	3.5	3.4	2.8
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Total trucks number (000)	19,745	14,598	2,822	828	1,500
Total trucks percent	100.0%	73.9%	14.3%	4.2%	7.6%

[1] 10,000 lbs G.V.W. or less.
[2] 10,001 to 20,000 lbs G.V.W.
[3] 20,001 to 26,000 lbs G.V.W.
[4] Over 26,000 lbs G.V.W.

Source: U.S. Bureau of the Census, 1972 Census of Transportation, Series TC72-T52, "Truck Inventory and Use Survey - United States Summary," Table 12, U.S. Government Printing Office, Washington, D.C., 1973.

1.2.2.03

PERCENT DISTRIBUTION OF TRUCKS BY MAJOR USE



SOURCE: CENSUS OF TRANSPORTATION

Selected characteristics of the truck stock: 1963, 1967, and 1972

Item	1963	1967	1972
Total trucks	*100.0*	*100.0*	*100.0*
Body type			
Pickup, panel, multistop, or walk-in	65.6	70.3	73.3
Platform and cattlerack	15.9	14.2	12.7
Vans	6.8	5.5	5.9
Beverage truck	(*)	.5	.5
Utility truck	(*)	1.1	1.9
Garabge and refuse collector	(*)	.2	.4
Winch or crane	-	.3	.5
Wrecker	-	.4	.6
Pole or logging	-	.3	.3
Auto transport	-	.1	.2
Dump truck	3.7	2.6	2.4
Tank truck (liquid and dry)	2.3	2.0	1.7
Concrete mixer	-	.3	.4
All other	5.7	2.2	.2
Size class			
Light	69.5	73.6	74.0
Medium	8.9	13.6	14.3
Light-heavy	10.4	5.2	4.2
Heavy-heavy	6.1	7.6	7.6
Miscellaneous sizes	5.1	-	-
Annual miles[1]			
Less than 5,000 miles	22.7	[2]56.0	23.4
5,000 to 9,999 miles	24.6		28.1
10,000 to 19,999 miles	23.9	30.7	33.5
20,000 to 29,999 miles	6.4	6.9	8.4
30,000 miles and over	6.4	6.4	7.0
Not reported	16.0	-	-
Truck fleet size			
1 truck	70.3	53.3	61.9
2 to 5 trucks	12.9	19.2	22.0
6 to 19 trucks	8.7	8.7	8.8
20 trucks	8.1	7.5	7.6
Not reported	-	11.3	-
Vehicle type[3]			
Single-unit trucks	(*)	83.4	95.4
2 axle	(*)	72.1	92.7
3 axle	(*)	11.3	2.8
Combinations	(*)	16.6	4.7
3 axle	(*)	3.3	.7
4 axles or more	(*)	13.3	4.1
Range of operations[3]			
Local	72.6	79.0	81.3
Short range	7.7	13.2	8.7
Long range	1.7	4.9	2.4
Not reported	18.0	2.9	7.6
Type of fuel[3]			
Gasoline	97.1	86.2	87.9
Diesel and LPG	2.1	10.9	4.4
Not reported	.8	2.9	7.9

Note: Percents may not add to total due to rounding. *Indicates no data was obtained. A dash (-) indicates that there were not a significant number of trucks with this characteristic to display.

[1]For the 1967 and 1972 surveys, annual miles were imputed if not reported.

[2]For the 1967 survey, data were presented for "Less than 6,000 miles" (36.2 percent) and "6,000 to 9,999 miles" (19.8 percent).

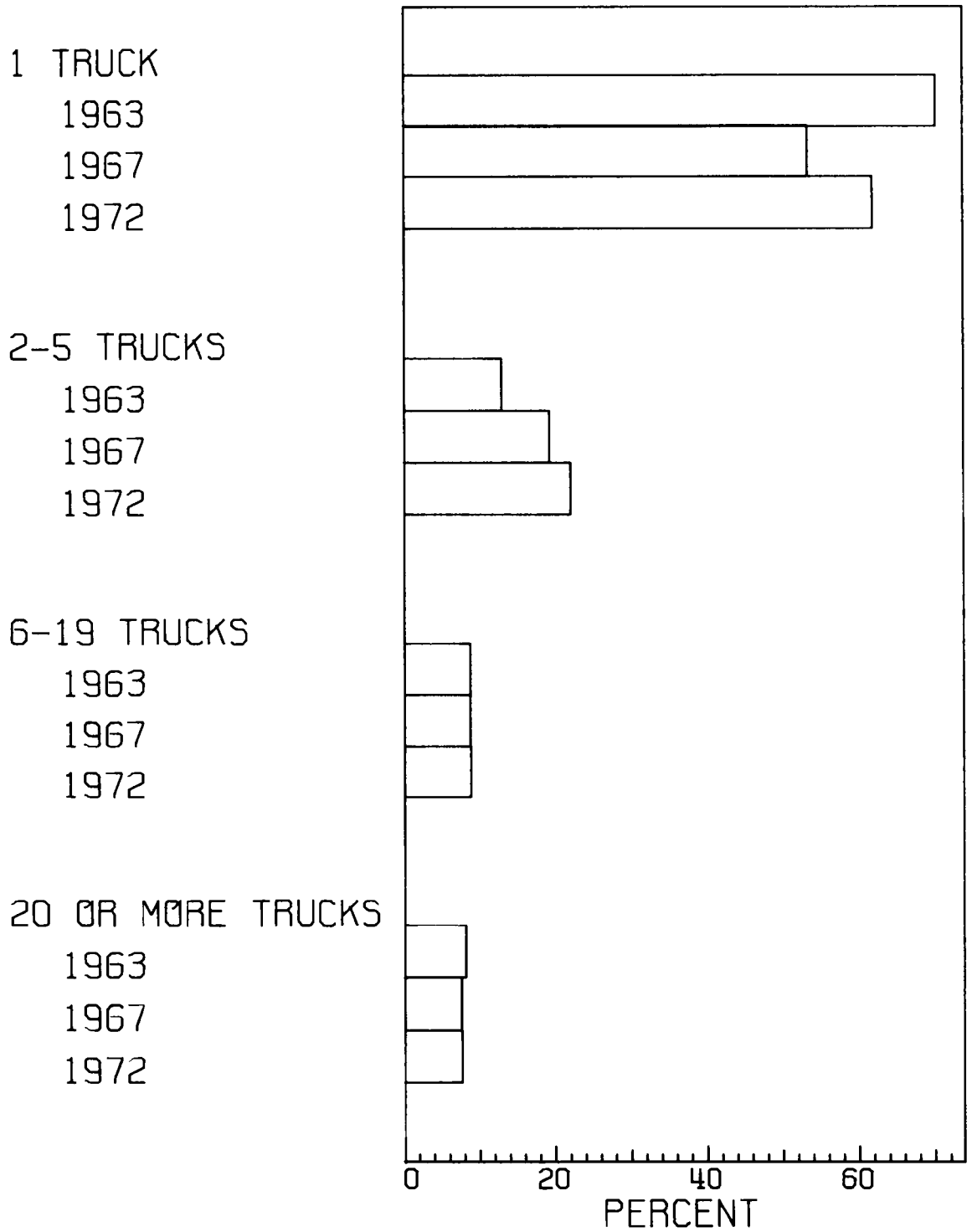
[3]Data for 1967 do not include pickups and panels.

Source: U.S. Bureau of the Census, 1972 Census of Transportation, Series TC72-T52, "Truck Inventory and Use Survey: United States Summary," Table 1, U.S. Government Printing Office, Washington, D.C., 1973.

1.2.2.05

PERCENT DISTRIBUTION OF TRUCKS

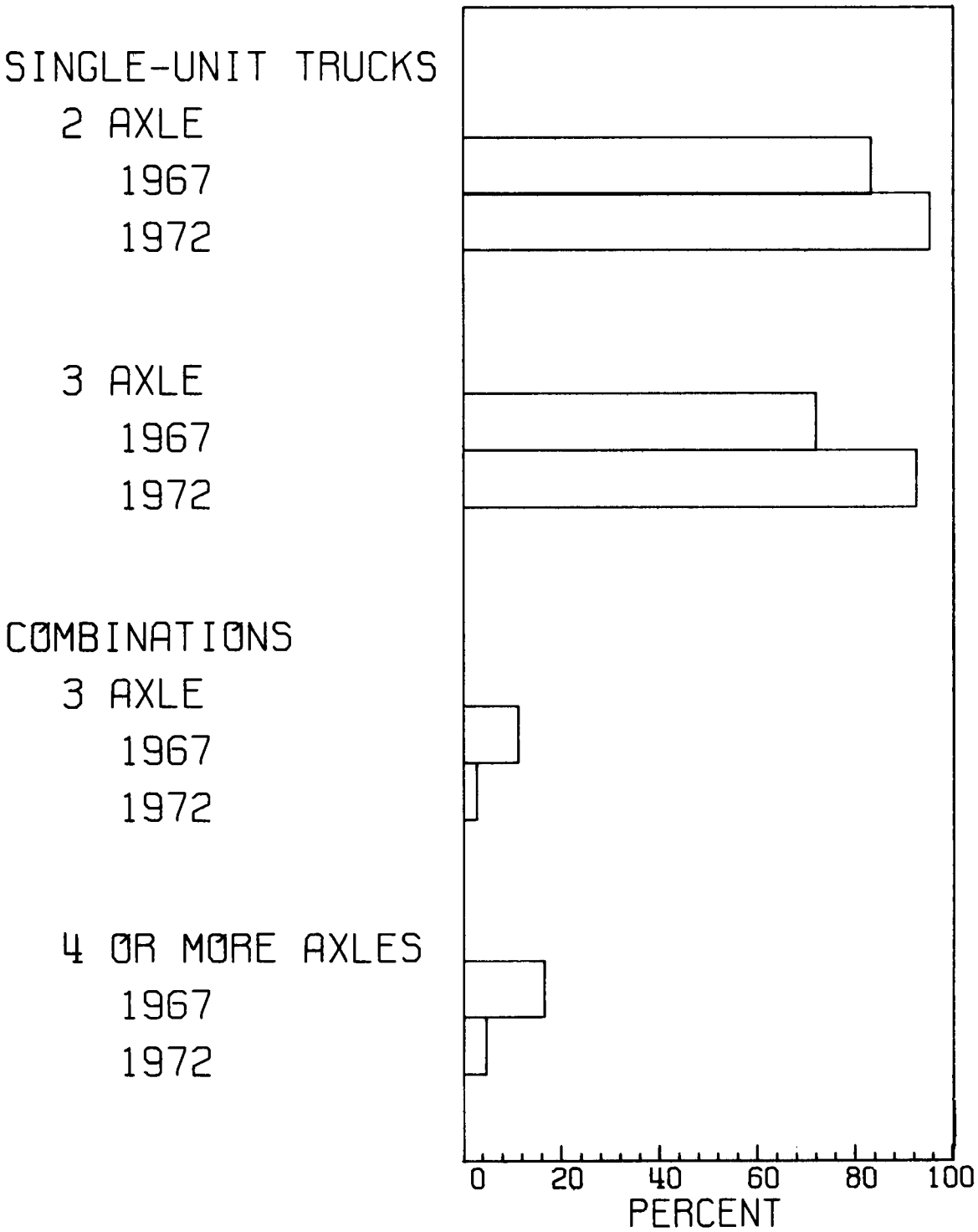
BY SIZE OF FLEETS



SOURCE: CENSUS OF TRANSPORTATION

1.2.2.06

PERCENT DISTRIBUTION OF TRUCKS BY TYPE

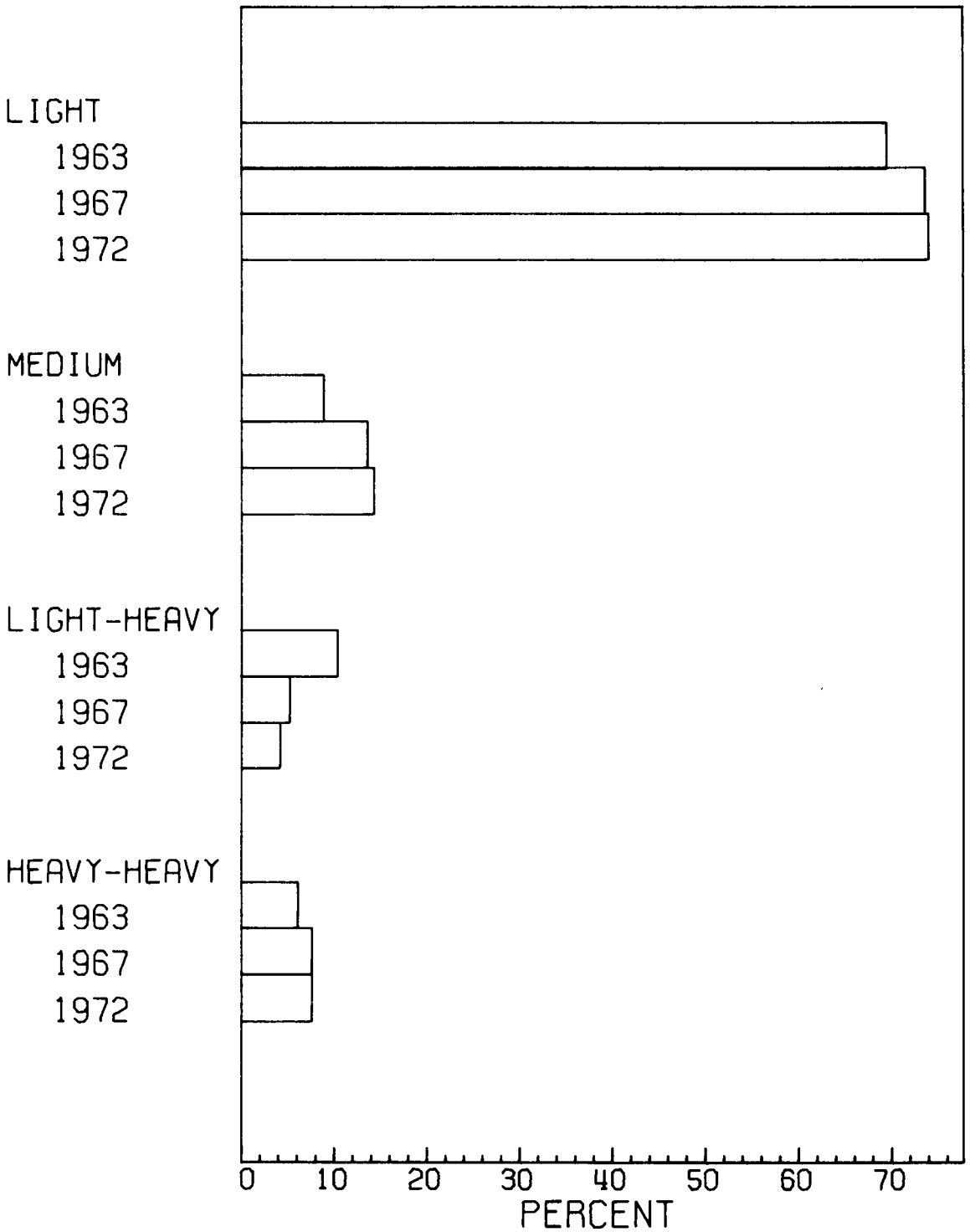


SOURCE: CENSUS OF TRANSPORTATION

1.2.2.07

PERCENT DISTRIBUTION OF TRUCKS

BY SIZE CLASS



SOURCE: CENSUS OF TRANSPORTATION

1.2.2.08

Distribution of 1973 state and federal taxes: total and for trucks

	Total dollars (millions)	% distri-bution	Paid by trucks dollars (millions)	% distri-bution
State highway user taxes				
Registration fees	$ 3,460	26.3	$1,385	30.3
Miscellaneous fees	1,100	8.4	349	7.6
Motor fuel taxes	8,352	63.5	2,613	57.2
Motor carrier taxes	231	1.8	223	4.9
Total state taxes	$13,143	100.0	$4,570	100.0
Federal highway trust fund receipts				
Motor fuel	$4,264	71.7	$1,346	53.1
Lubricating oil	61	1.0	26	1.0
Motor-vehicle use	202	3.4	199	7.9
New trucks, buses or trailers	514	8.6	509	20.1
Parts and accessories	115	1.9	113	4.5
Tires, tubes and tread rubber	794	13.3	340	13.4
Total federal taxes	$5,950	100.0	$2,533	100.0

Source: 1975 Motor Truck Facts, p. 54, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975.

1.2.3.01

Comparison of private and public mass transit systems, 1973

	Taxicabs	Bus and rail
No. of passengers	3.4 billion	6.7 billion
Passenger revenue	3.9 billion	1.7 billion
Employment level	494,000	140,700
No. of vehicles	262,043	59,590[1]
Vehicle miles traveled	13.4 billion	1.8 billion
Passenger trips	2.2 billion	NA
Communities served	3,361	1,079

[1]Transit passenger vehicles owned and leased.

Source: Transit Fact Book, American Public Transit Association, '75-'76 Edition, Washington, D.C., 1976; Taxicab Management, International Taxicab Association, Lake Forest, Illinois, 1976.

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ENERGY CHARACTERISTICS

Energy Characteristics

This chapter presents statistics on the consumption of energy and intensiveness of energy use. Although the total energy picture is considered, emphasis is centered upon petroleum consumption of the transportation sector.

As is shown in section 2.1 (page 59), energy use per capita decreased slightly more than two percent between 1974 and 1975. Total energy use in the United States decreased in 1975 to 338 million BTU per capita. Page 60 shows transportation energy consumption in 1975 and projections for three future years relative to the other major consuming sectors: household and commercial, industrial, and electrical generation. Data in this section also show the past and projected consumption of energy by energy source as well as detailing fuel consumption by mode of transportation (p. 66) and domestic petroleum consumption by use (p. 71). Projections are generally those made by Brookhaven National Laboratory and contained in the ERDA-48 document referenced in the bibliography of this chapter.

Further review of data on energy consumption presented on page 74 shows an historically consistent proportion of energy consumed by transportation relative to the United States consumption of energy of approximately 25 percent for the period 1950-1974. However, transportation comprises over half of the petroleum use by the United States (p. 59) and the automobile accounts for over one half of the transportation energy (p. 76).

Section 2.2 contains data which is focused on the intensity of energy use by various modes of transportation. Miles traveled per gallon of

equivalent fuel and average mileage per gallon for passenger modes of travel are compared on pages 79 and 86, respectively. There is also a review, on page 89, of energy intensiveness for automobiles and buses showing that due to occupancy level differences between different sized cars for intercity travel and differences in miles-per-gallon between intercity and urban driving, the following relationships exist:

	MPG	Occupancy Level	BTU/Passenger Mile
Intercity			
Subcompact	30	2.0	2083
Luxury	13	3.0	3472
Urban			
Subcompact	24	1.6	3255
Luxury	9	1.6	8681

Similar information is presented for truck, rail and aircraft. Ship and pipeline data are excluded from this issue of the data book, but will be included in later editions.

Selected United States economic, demographic, and energy indicators, 1950-1975

Year	Gross energy input[1] (quadrillion Btu)	Net energy input[2] (quadrillion Btu)	Population (millions)	Gross national product (billion $ 1972)	Gross energy per GNP (thousand Btu)	Gross energy per capita (million Btu)	Net energy per capita (million Btu)	Conversion efficiency (percent)[3]
1950	34.0	29.7	152.3	533.5	63.7	223.2	194.8	87.3
1951	36.8	32.1	154.9	576.5	63.8	237.6	206.9	87.1
1952	36.5	31.6	157.6	598.5	61.0	231.7	200.6	86.6
1953	37.6	32.6	160.2	621.8	60.5	234.7	201.1	85.7
1954	36.3	31.2	163.0	613.7	59.1	222.7	191.5	86.0
1955	39.7	34.3	165.9	654.8	60.6	239.3	206.7	86.4
1956	41.7	35.8	168.9	668.8	62.4	246.9	211.7	85.7
1957	41.7	35.6	172.0	680.9	61.2	242.2	206.9	85.4
1958	41.7	35.5	174.9	679.5	61.4	238.4	202.8	85.1
1959	43.1	36.4	177.8	720.4	59.8	242.4	205.0	84.6
1960	44.6	38.2	180.7	736.8	60.5	246.8	211.5	85.7
1961	45.3	38.7	183.8	755.3	60.0	246.5	210.6	85.8
1962	47.4	40.5	186.5	799.1	59.3	254.1	217.2	85.5
1963	49.3	42.0	189.2	830.7	59.3	260.5	222.0	85.2
1964	51.2	43.6	191.8	874.4	58.6	266.9	227.3	85.5
1965	53.3	45.3	194.3	925.9	57.6	274.3	233.1	85.0
1966	56.4	47.6	196.6	981.0	57.5	286.9	242.1	84.4
1967	58.3	49.4	198.7	1,007.7	57.9	293.4	248.6	84.7
1968	61.7	52.2	200.7	1,051.8	58.7	307.4	260.1	84.6
1969	65.0	54.4	202.7	1,078.8	60.3	320.7	268.4	83.7
1970	67.1	56.0	204.9	1,075.3	62.4	327.5	273.3	83.6
1971	68.7	57.0	207.0	1,107.5	62.0	331.9	275.4	83.0
1972	72.1	59.5	208.8	1,171.1	61.6	345.3	285.0	82.6
1973	74.7	61.3	210.3	1,233.4	60.6	355.0	291.3	82.1
1974	72.9	59.3	211.9	1,210.7	60.2	345.0	279.8	81.3
1975[e]	71.1	57.5	213.4	1,186.4	59.9	338.0	269.4	80.9

[e]Estimated.

[1]Gross energy is the total of inputs into the economy of the primary fuels (petroleum, natural gas, and coal, including imports) or their derivatives, plus the generation of hydro and nuclear power converted to equivalent energy inputs.

[2]Net energy is the sector inputs (household and commercial, transportation, and industrial), and consists of direct fuels and purchased electricity.

[3]The conversion efficiency factor is the percent of total gross energy going into the final consuming sector.

Source: News Release, April 5, 1976, Bureau of Mines, Department of the Interior.

2.1.1.02

United States total gross consumption of energy resources by major sources and consuming sectors[1]
(in trillions of Btu's)

	Coal	Petro-leum	Natural gas	Total fossil fuel	Nuclear power	Geo-hydro-solar power	Total gross energy inputs	Total four sector inputs	Utility electric consumed	Total three sector inputs
1974										
Household and commercial	309	6061	7518	13888			13888	13888	3388	17276
Industrial	4356	6153	10314	20823		37	20860	20860	2425	23285
Transportation	2	17720	685	18407			18407	18407	17	18424
Electrical generation	8540	3480	3512	15532	1202	3253	19987	19987	5830-	
Synthetics										
Total	13207	33414	22028	68650	1202	3290	73142	73142		58985
1980										
Household and commercial	156	6403	6137	12696			12696	12696	4662	17358
Industrial	4044	6769	12315	23129			23129	23129	3133	26262
Transportation	3	19413	681	20096			20096	20096	15	20111
Electrical generation	11486	3017	3614	18117	3876	3704	25696	25696	7810-	
Synthetics										
Total	15690	35601	22746	74037	3876	3704	81617	81617		63731
1985										
Household and commercial	114	8232	6440	14787			14787	14787	6432	21219
Industrial	4817	8236	14022	27075			27075	27075	3864	30939
Transportation	2	22367	811	23181			23181	23181	14	23195
Electrical generation	15381	3696	3050	21126	8665	3940	33732	33732	10311	
Synthetics	261		169	92			92			
Total	20575	41532	24154	86261	8665	3940	98866	98774		75353
1990										
Household and commercial	84	10119	6394	16597			16597	16597	8331	24928
Industrial	5803	9753	15602	31158			31158	31158	4823	35981
Transportation	2	24379	932	25313			25313	25313	14	25327
Electrical generation	19569	5731	159	25460	13279	4166	42904	42904	13168	
Synthetics	391		254	137			137			
Total	25850	49982	22833	98665	13279	4166	116109	115972		86236

[1]These figures correspond to the Project Independence Evaluation System (PIES) Reference Case with imported oil price set at $13.

Source: Federal Energy Administration, National Energy Outlook, pp. G-2, G-22, and G-24, Washington, D.C., February 1976.

2.1.2.01

United States Total Gross Consumption of Energy Resources by Major Source, 1950-2000
(Trillion Btu)

Year	Coal[1]	Natural gas	Petroleum	Total fossil fuels	Hydro-power	Nuclear power	Total gross energy inputs
1950	12,913	6,150	13,489	32,552	1,440	---	33,992
1951	13,225	7,248	14,848	35,321	1,454	---	36,775
1952	11,868	7,760	15,334	34,962	1,496	---	36,458
1953	11,893	8,136	16,098	36,147	1,439	---	37,586
1954	10,195	8,548	16,132	34,875	1,388	---	36,263
1955	11,540	9,232	17,524	38,296	1,407	---	39,703
1956	11,752	9,834	18,627	40,213	1,487	---	41,700
1957	11,168	10,416	18,570	40,154	1,551	1	41,706
1958	9,854	10,995	19,214	40,058	1,636	2	41,696
1959	9,810	11,990	19,747	41,547	1,591	2	43,140
1960	10,140	12,699	20,067	42,906	1,657	6	44,569
1961	9,906	13,228	20,487	43,621	1,680	18	45,319
1962	10,189	14,121	21,267	45,577	1,821	24	47,422
1963	10,714	14,843	21,950	47,507	1,767	34	49,308
1964	11,264	15,648	22,386	49,298	1,907	35	51,240
1965	11,908	16,098	23,241	51,247	2,058	38	53,343
1966	12,495	17,393	24,394	54,282	2,073	57	56,412
1967	12,256	18,250	25,835	55,841	2,344	80	58,265
1968	12,659	19,580	27,052	59,291	2,342	130	61,763
1969	12,733	21,020	28,421	62,174	2,659	146	64,979
1970	12,922	22,029	29,614	64,565	2,660	229	67,444
1971	12,023	22,849	30,570	65,462	2,862	404	68,728
1972	12,495	23,125	32,966	68,586	2,946	576	72,108
1973	13,294	22,712	34,851	70,857	2,998	888	74,743
1974	13,169	22,237	33,490	68,896	3,052	1,173	73,121
1985[2]	21,140	24,000	47,140	92,280	3,380	10,850	106,510
2000[2]	33,890	15,400	70,540	119,830	3,650	40,490	163,970

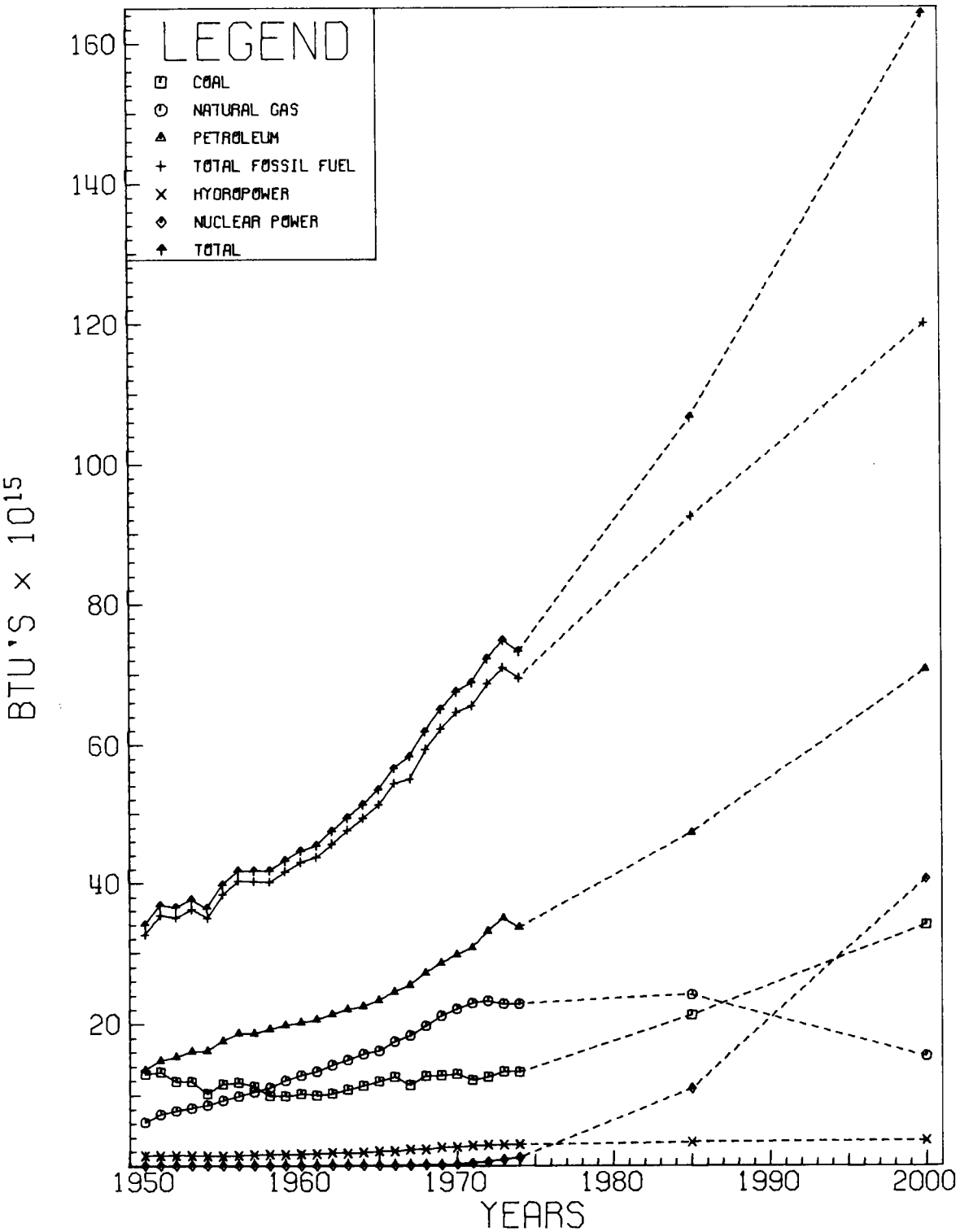
[1]Includes anthracite, bituminous, and lignite.

[2]Projections are based on ERDA's Scenario 0, "No New Initiatives," which portrays future energy demands if there were no changes in the efficiency of energy use.

Sources: U.S. Department of Transportation, Energy Statistics, p. 102, U.S. Government Printing Office, Washington, D.C., 1975. U.S. Energy Research and Development Administration, A National Plan for Energy Research, Development and Demonstration: Creating Energy Choices for the Future, p. B-6 and B-8, ERDA-48, Volume 1: The Plan, U.S. Government Printing Office, Washington, D.C., 1975.

2.1.2.02

ENERGY RESOURCE CONSUMPTION



SOURCE: ENERGY STATISTICS, 75

Petroleum[1] consumption by sector, 1950-1974
(trillion Btu)

Year	Household and commercial			Industrial			Transportation[2]	Transportation as % total	Electrical generation	Other not specified	Total input
	Fuel use	Nonfuel use	Total	Fuel use	Nonfuel use	Total					
1950	2,603	435	3,038	2,213	453	2,666	6,785	50.3	662	337	13,488
1951	2,722	480	3,202	2,509	535	3,044	7,482	50.4	499	621	14,848
1952	2,833	517	3,350	2,514	520	3,034	7,868	51.3	492	590	15,334
1953	2,869	522	2,291	2,584	560	3,144	8,158	50.7	577	829	16,099
1954	3,094	556	3,650	2,542	576	3,118	8,358	51.8	480	531	16,137
1955	3,386	615	4,001	2,754	652	3,406	9,109	52.0	512	496	17,524
1956	3,523	660	4,183	2,975	713	3,688	9,448	50.7	497	809	18,625
1957	3,432	637	4,069	2,715	763	3,478	9,649	52.0	512	862	18,570
1958	3,889	679	4,568	2,519	773	3,292	9,819	51.0	515	1,020	19,214
1959	3,997	721	4,718	2,674	915	3,589	9,923	50.3	546	971	19,747
1960	4,189	734	4,923	2,674	1,008	3,682	10,372	51.7	564	526	20,067
1961	4,275	753	5,028	2,634	1,048	3,682	10,575	51.6	577	625	20,487
1962	4,423	804	5,227	2,750	1,130	3,880	11,001	51.7	579	580	21,267
1963	4,434	824	5,258	2,739	1,255	3,994	11,506	52.4	600	592	21,950
1964	4,350	841	5,191	2,922	1,262	4,184	11,791	52.7	636	585	22,387
1965	4,744	891	5,635	2,826	1,313	4,139	12,179	52.4	744	545	23,242
1966	4,830	936	5,766	2,883	1,470	4,353	12,777	52.4	905	594	24,395
1967	5,289	917	6,206	2,820	1,612	4,432	13,408	52.9	1,013	276	25,335
1968	5,145	984	6,129	3,186	1,780	4,966	14,535	53.7	1,180	242	27,052
1969	5,260	1,009	6,269	3,220	1,951	5,171	15,125	53.2	1,628	229	28,422
1970	5,371	1,082	6,453	3,252	2,015	5,267	15,592	52.7	2,087	215	29,614
1971	5,331	1,108	6,439	3,196	1,898	5,094	16,286	53.3	2,543	207	30,570
1972	5,531	1,137	6,668	3,553	2,135	5,668	17,264	52.4	3,114	233	32,966
1973[r]	5,425	1,264	6,689	3,819	2,240	6,059	18,164	52.1	3,656	283	34,851
1974[p]	5,148	1,241	6,390	3,648	2,177	5,826	17,608	52.6	3,448	218	33,490

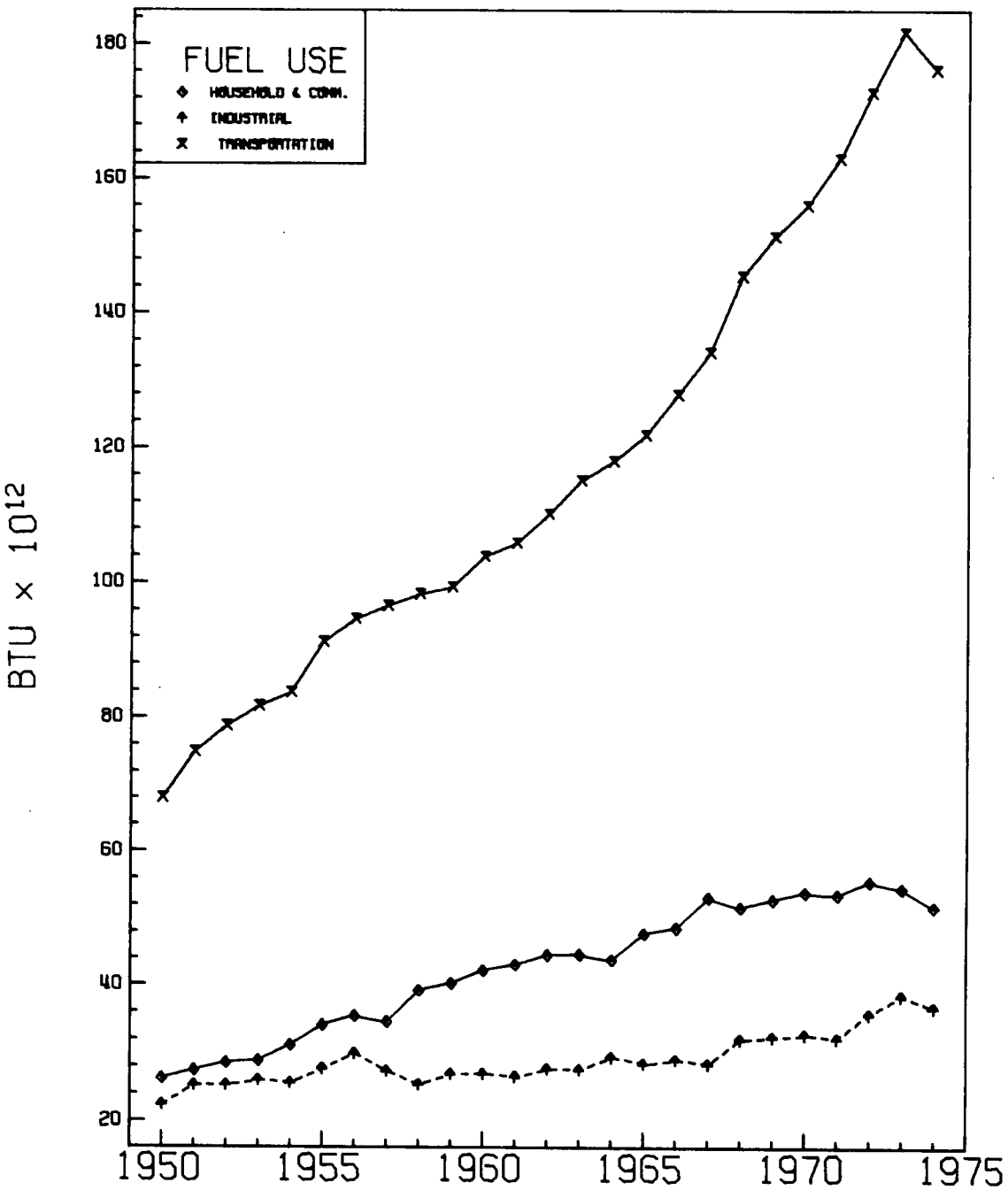
[1]Petroleum products refined and processed from crude oil, including still gas, liquefied refinery gas and natural gas liquids.

[2]Includes bunders and military transportation.

Source: U.S. Department of Transportation, Energy Statistics, p. 106, U.S. Government Printing Office, Washington, D.C., 1975.

2.1.2.1.02

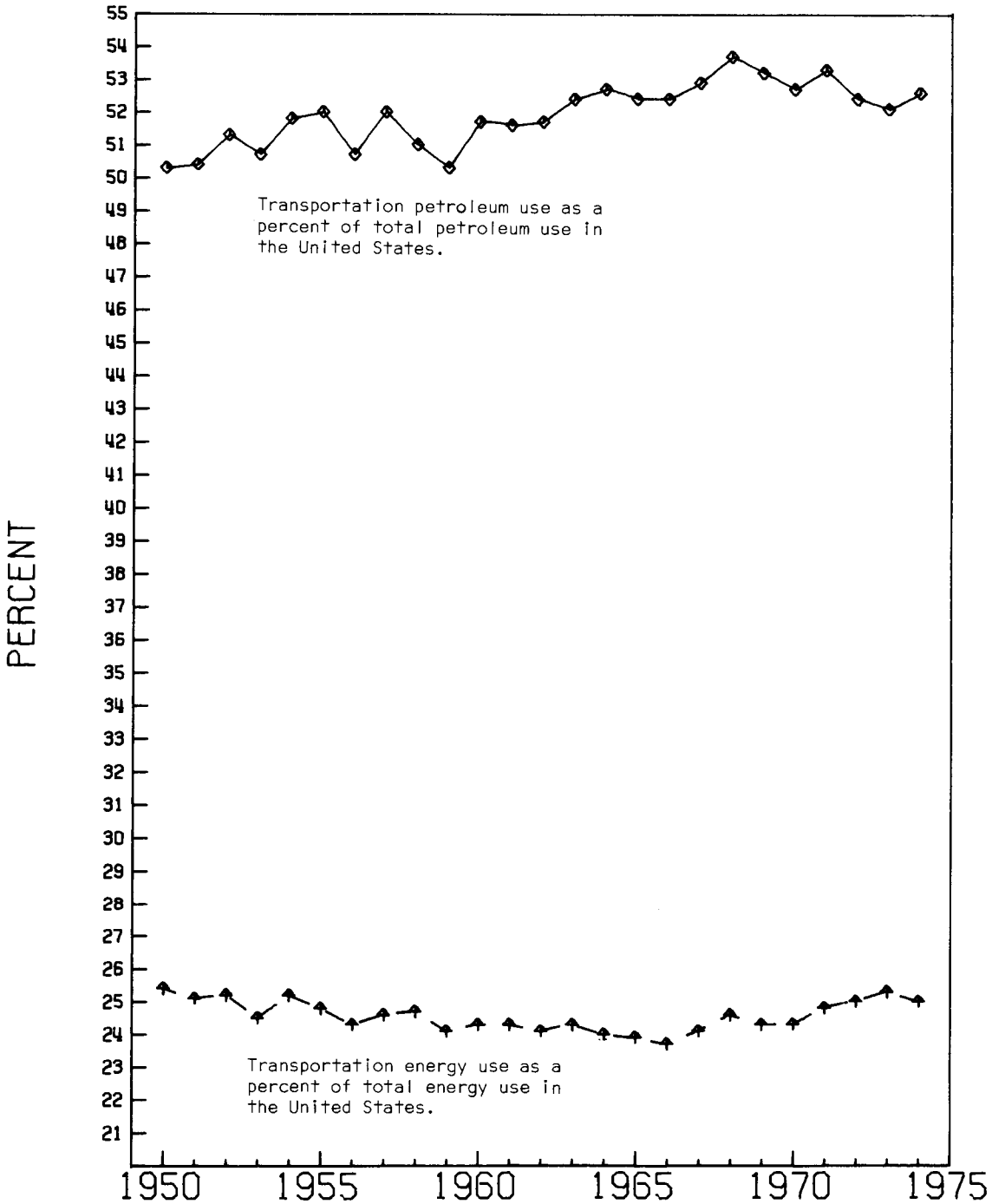
PETROLEUM CONSUMPTION
BY SECTOR



SOURCE: ENERGY STATISTICS, 1975

2.1.2.1.03

CONSUMPTION BY TRANSPORTATION



SOURCE:DEPT. OF INTERIOR

Fuel consumption by mode of transportation, 1962-1973

	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Class I railroads												
Locomotives												
Diesel oil, gals x 10^6	3,456	3,537	3,624	3,736	3,920	3,883	3,917	3,919	3,804	3,819	3,999	4,141
Fuel oil, gals x 10^6	101	90	85	77	65	47	42	33	-	-	-	-
Electricity, KWH x 10^6	1,094	1,018	931	933	922	832	750	610	578	534	605[r]	346
Coal, tons	8,256	7,332	6,831	3,695	3,235	2,310	1,669	1,137	1,238	1,191	1,400	1,202
Motor cars												
Diesel oil, gals x 10^6	7	7	7	6	6	6	5	5	8	4	3	3
Electricity, KWH x 10^6	592	591	583	576	576	580	567	538	763	756	715	901
Gasoline, gals	7,033	7,591	4,585	-	-	-	-	-	-	-	-	-
Air												
Certificated carriers												
Aviation gasoline, gals x 10^6	738	651	589	519	398	268	128	33	15	12	12	11
Jet fuel, gals x 10^6	2,808	3,291	3,830	4,650	5,670	7,523	8,891	10,113	10,085	10,140	10,302	10,671
General aviation												
Aviation gasoline, gals x 10^6	241	250	262	292	375	396	495	522	551	508	584	NA
Jet fuel, gals x 10^6	20	32	41	81	106	138	NA	168	208	226	245	NA
Highway												
Gasoline, gals x 10^6												
Passenger cars and taxis	43,771[2]	45,246[2]	47,567[2]	50,206	53,220	55,007	58,413	62,325	65,649	69,213	73,121	77,619
Motorcycles	-	-	-	69	92	103	111	123	135	301	342	392
Diesel + gasoline, gals x 10^6												
Commercial buses	610	606	622	645	637	646	655	657	644	631	561	520
School buses	227	232	242	249	259	264	277	290	300	316	320	327
Single-unit trucks[1]	NA	12,348	13,199	13,504	13,636	14,470	15,674	16,528	17,237	18,221	22,118	22,755
Combination trucks	NA	6,084	6,271	6,431	6,779	7,203	7,808	8,199	8,363	8,865	8,600	8,860
Water												
Vessels												
Residual fuel oil, gals x 10^6	3,545	3,213	3,487	3,093	3,093	3,389	3,678	3,506	3,774	3,307	3,273	3,859
Distillate fuel oil, gals x 10^6	665	636	672	652	699	734	766	793	819	880	1,013	1,125
Gasoline, gals x 10^6	NA	NA	NA	NA	485	501	533	569	598	645	687	717
Transit												
Electricity, KWH x 10^6												
Rapid Transit	2,115	2,125	2,171	2,185	2,075	2,194	2,250	2,291	2,261	2,262	2,149	2,098
Surface rail	325	255	222	218	226	180	179	173	157	153	146	140
Trolley coach	346	262	204	181	166	157	157	154	143	141	133	93
Gallons of motor fuel, gals x 10^6												
Gasoline	108	103	96	92	76	58	46	40	37	29	26	22
Diesel oil	229	235	242	248	256	270	274	274	271	257	247	273
Propane	36	36	33	33	34	33	32	32	31	27	24	15
Pipelines (Gas and oil)												
Natural gas, cu. ft. x 10^6	382,496	423,783	433,204	500,024	535,353	575,752	590,965	630,962	722,166	742,592	766,156	728,177

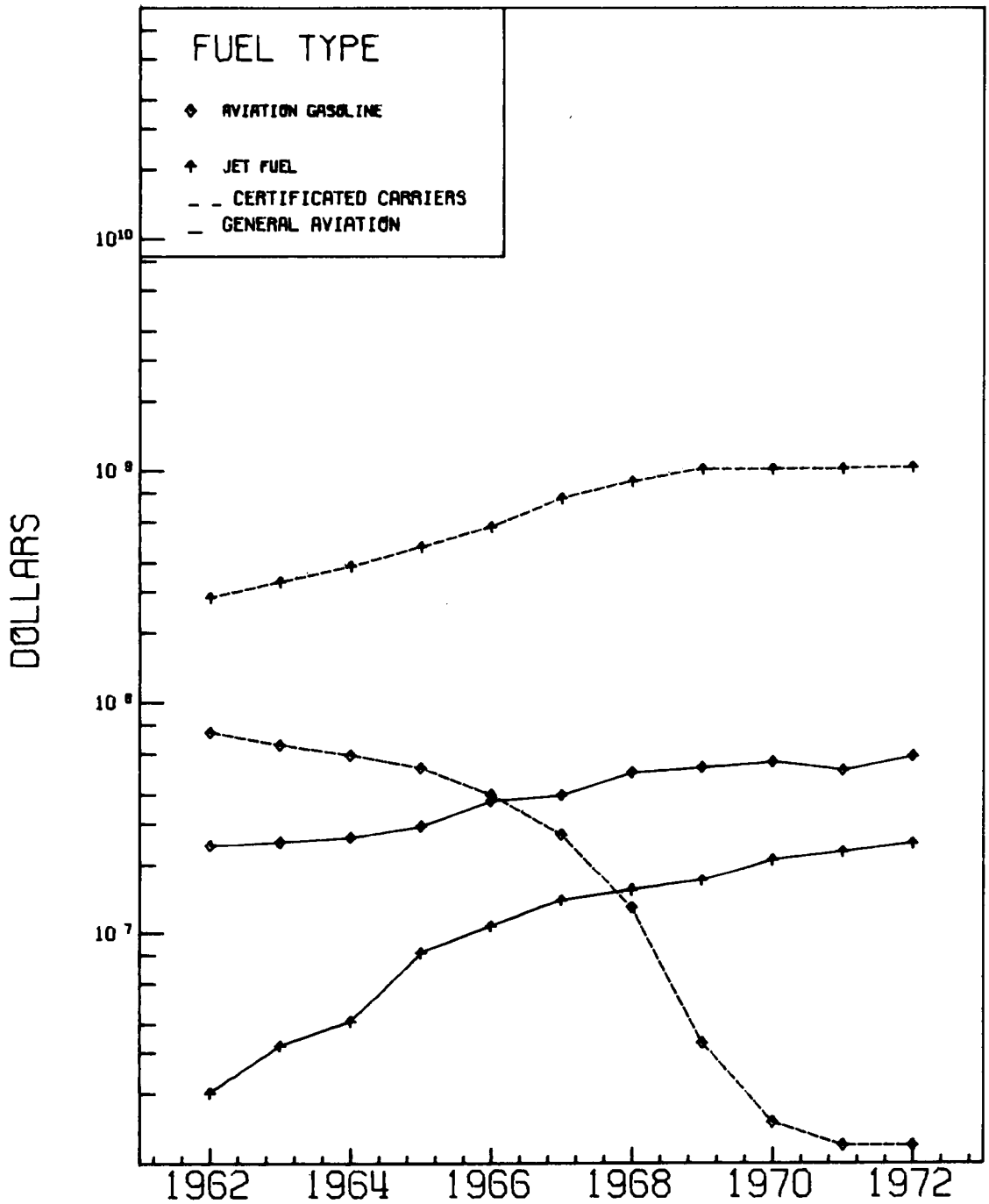
[1]Includes nonfreight truck movements.

[2]Includes motorcycles.

Sources: U.S. Department of Transportation, Energy Statistics, p. 115, U.S. Government Printing Office, Washington, D.C., 1975. U.S. Department of Transportation, Energy Statistics, p. 105, U.S. Government Printing Office, Washington, D.C., 1974.

2.1.2.1.05

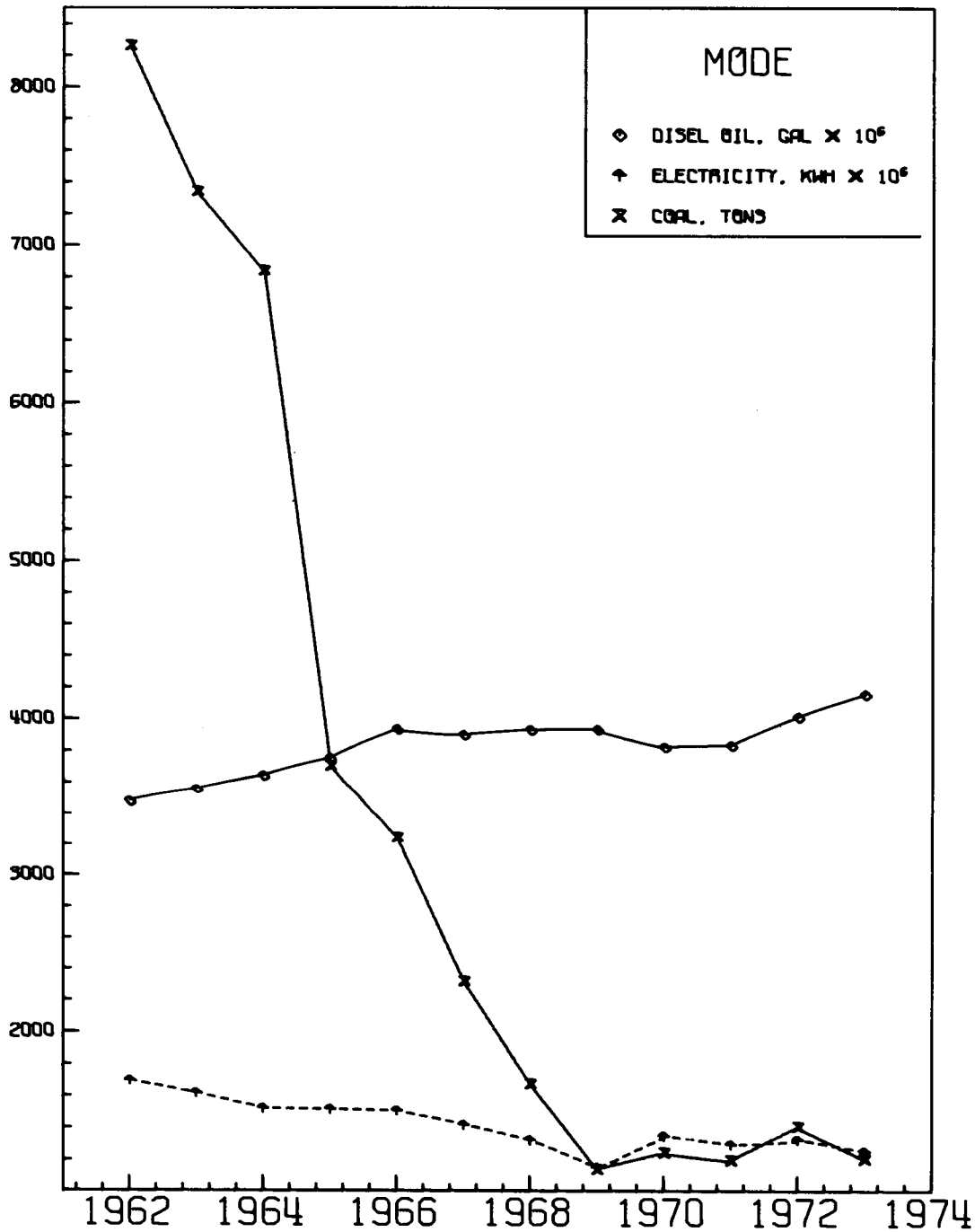
FUEL CONSUMPTION FOR AIR



SOURCE: ENERGY STATISTICS 1975, 1974

2.1.2.1.06

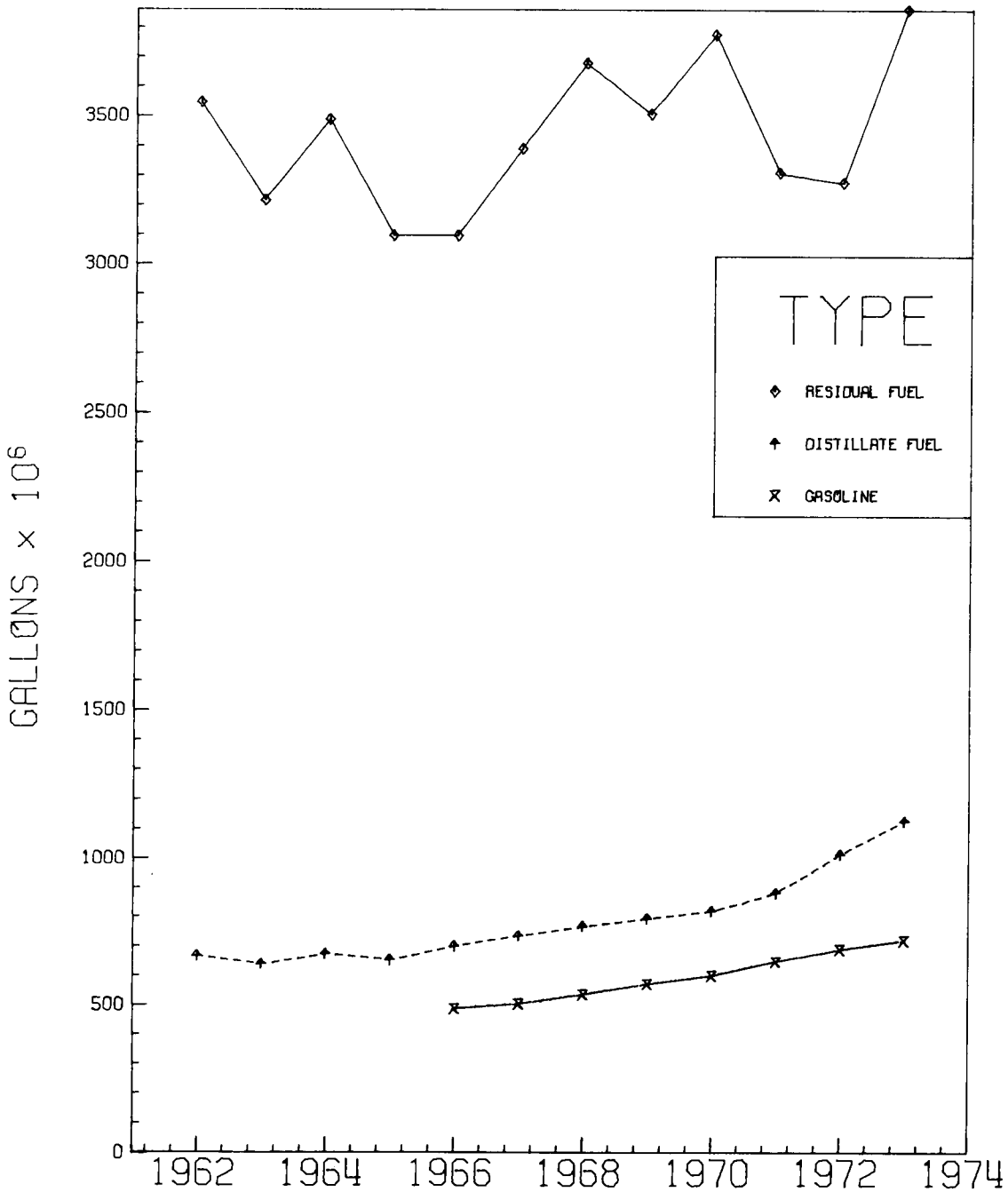
FUEL CONSUMPTION
FOR CLASS I RAILROADS



SOURCE: ENERGY STATISTICS 1975, 1974

2.1.2.1.07

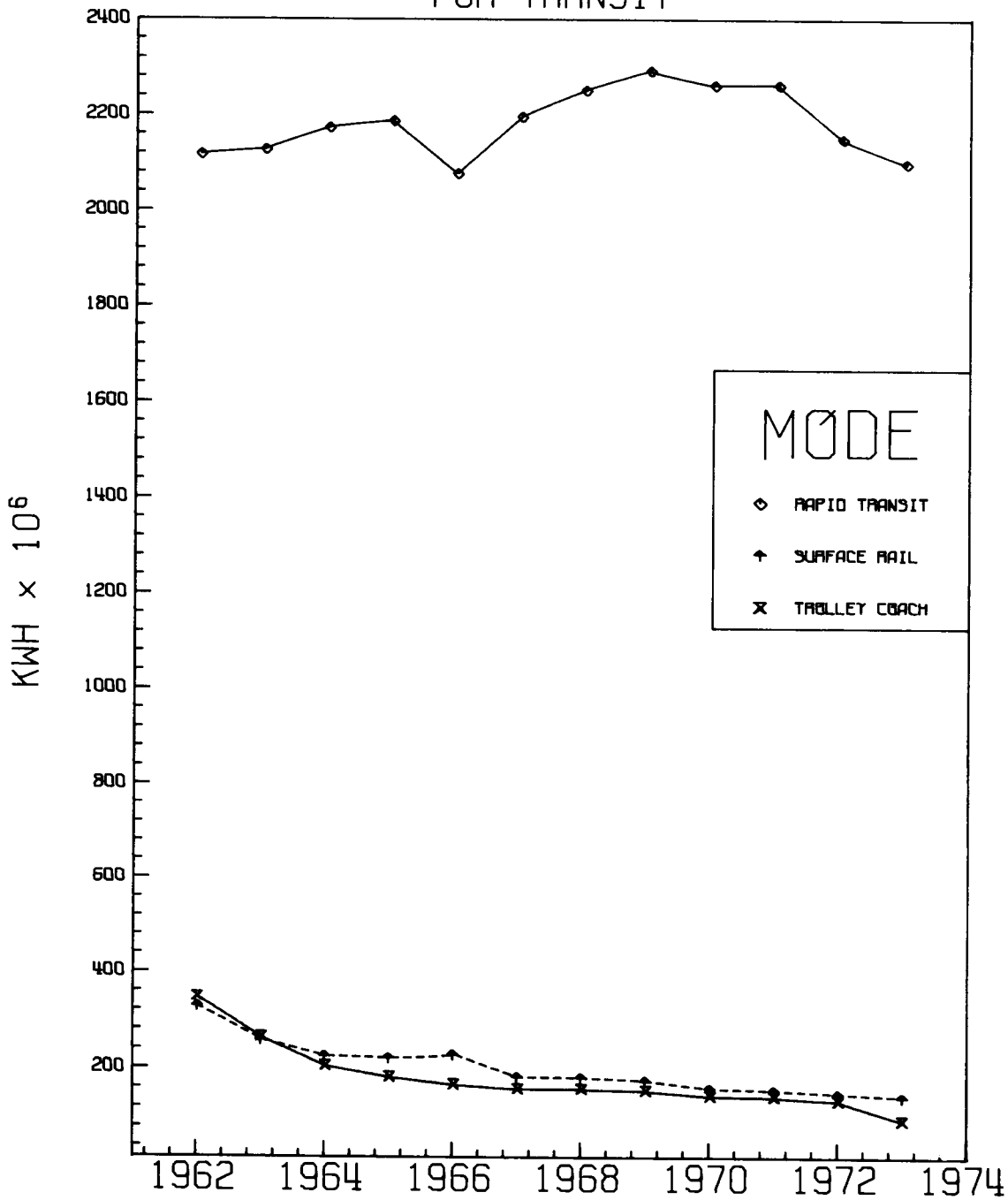
FUEL CONSUMPTION FOR WATER VESSELS



SOURCE: ENERGY STATISTICS 1975, 1974

2.1.2.1.08

FUEL CONSUMPTION FOR TRANSIT



SOURCE: ENERGY STATISTICS 1975, 1974

2.1.2.1.09

Domestic petroleum consumption, 1974

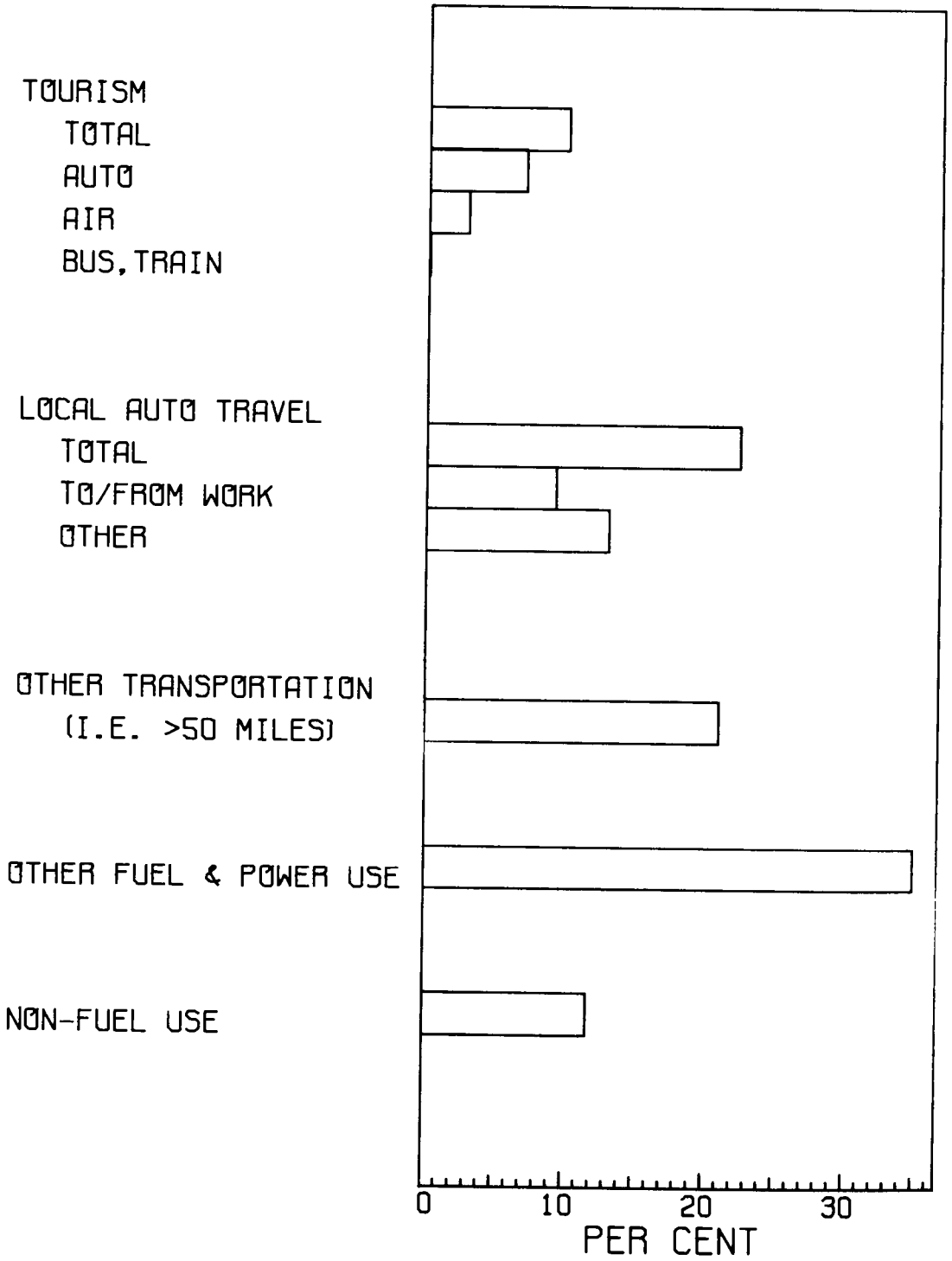
Use	Percent (%)
Tourism[1]	10.0
Auto	7.0
Air	2.9
Bus, train	0.1
Local auto travel	22.4
To/from work	9.3
Other <50 miles	13.1
Other transportation	21.0
Other fuel & power use	34.9
Non-fuel use	11.7
Total	100.0

[1]Tourism is defined as travel to places 50 miles or more away from home.

Source: Hearings on H.R.6860 — An Act to Provide a Comprehensive National Energy Conservation and Conversion Program on July 10, 11, 14, 15, 16, and 18, 1975, held by the Committee on Finance, United States Senate, Ninety-Fourth Congress, p. 946.

2.1.2.1.10

DOMESTIC PETROLEUM CONSUMPTION



SOURCE: COMM. ON FINANCE, 1975

2.1.3.01

United States total gross consumption of energy resources in standard physical units by major sources and consuming sectors[1]

	Coal million short tons	Petroleum million barrels	Natural gas billions cubic feet	Nuclear power billion kilowatt hours	Utility electricity consumed billion kilowatt hours
1974					
Household and commercial	11.42	1057.80	7341.75		992.95
Industrial	157.77	1158.10	10072.05		710.77
Transportation	0.08	3293.70	668.83		5.07
Electrical generation	389.70	559.90	3429.23	112.76	
Synthetics					
Total	558.97	6069.50	21511.86	112.76	1708.78
1980					
Household and commercial	7.09	1122.54	5946.54		1366.45
Industrial	183.50	1257.92	11933.23		918.24
Transportation	0.14	3602.52	659.48		4.32
Electrical generation	527.81	489.21	3501.75	387.60	
Synthetics					
Total	718.54	6472.18	22041.00	387.60	2289.02
1985					
Household and commercial	5.30	1451.31	6240.62		1885.22
Industrial	223.69	1531.11	13587.08		1132.43
Transportation	0.11	4150.47	785.98		4.22
Electrical generation	716.14	433.87	2955.41	866.51	
Synthetics	16.27		164.10-		
Total	961.51	7566.76	23404.99	866.51	3021.88
1990					
Household and commercial	3.92	1795.44	6195.47		2441.74
Industrial	271.68	1809.13	15117.91		1413.58
Transportation	0.10	4520.82	903.40		4.13
Electrical generation	932.02	927.89	154.06	1327.86	
Synthetics	21.13		246.16-		
Total	1228.84	9053.28	22124.68	1327.86	3859.43

[1]These figures correspond to the Project Independence Evaluation System (PIES) Reference Case with imported oil price set at $13.

Source: Federal Energy Administration, National Energy Outlook, pp. G-2, G-22, and G-24, Washington, D.C., February 1976.

Energy consumption by source: transportation sector, 1950-1974

Year	Coal[1]		Petroleum[2]			Natural gas[3]		Total fossil fuels	Utility electricity purchased		Total energy input	
	Thousand short tons	Trillion Btu	Million barrels	Trillion Btu	% of transportation sector	Million cubic feet	Trillion Btu	Trillion Btu	Billion kilowatt-hours	Trillion Btu	Trillion Btu	% of Total U.S. Energy Consumption
1950	63,783	1,701	1,248.8	6,785	78.5	125,546	130	8,616	7	24	8,640	25.4
1951	56,903	1,525	1,377.5	7,482	81.1	192,496	199	9,206	7	23	9,229	25.1
1952	40,428	1,086	1,451.3	7,868	85.6	207,207	214	9,168	6	22	9,190	25.2
1953	30,074	809	1,511.5	8,158	88.4	230,314	238	9,205	6	20	9,225	24.5
1954	19,060	516	1,551.4	8,358	91.5	230,615	239	9,113	6	18	9,131	25.2
1955	17,429	464	1,691.4	9,109	92.5	245,246	253	9,826	6	19	9,845	24.8
1956	14,187	378	1,756.2	9,448	93.1	295,972	306	10,132	5	17	10,149	24.3
1957	10,126	270	1,832.0	9,649	94.2	299,235	310	10,229	4	15	10,244	24.6
1958	5,015	133	1,825.1	9,819	95.4	312,221	323	10,275	5	16	10,291	24.7
1959	3,861	102	1,849.4	9,923	95.4	349,348	362	10,387	5	17	10,404	24.1
1960	3,294	87	1,934.1	10,372	95.7	347,075	359	10,818	5	18	10,836	24.3
1961	770	21	1,971.9	10,575	96.1	377,607	390	10,986	6	19	11,005	24.3
1962	687	18	2,051.3	11,001	96.2	382,496	396	11,415	5	18	11,433	24.1
1963	670	18	2,146.7	11,506	96.0	423,783	438	11,962	6	19	11,981	24.3
1964	711	19	2,198.9	11,791	96.0	435,570	451	12,261	6	20	12,281	24.0
1965	655	18	2,271.9	12,179	95.6	500,524	517	12,714	5	18	12,732	23.9
1966	609	16	2,382.6	12,777	95.6	535,353	552	13,345	5	16	13,361	23.7
1967	467	13	2,497.1	13,408	95.6	575,752	594	14,015	5	17	14,032	24.1
1968	417	11	2,703.8	14,535	95.8	590,965	610	15,156	5	18	15,174	24.6
1969	313	8	2,815.8	15,125	95.7	630,962	651	15,784	5	17	15,801	24.3
1970	298	8	2,902.8	15,592	95.3	722,166	745	16,345	5	16	16,361	24.3
1971	207	6	3,032.0	16,286	95.4	742,592	766	17,058	5	17	17,075	24.8
1972	163	4	3,213.0	17,264	95.5	766,156	790	18,058	5	17	18,075	25.0
1973[r]	116	3	3,348.8	18,164	96.0	728,177	743	18,910	4	15	18,925	25.3
1974[p]	80	2	3,248.3	17,608	96.3	650,000	664	18,274	5	16	18,290	25.0

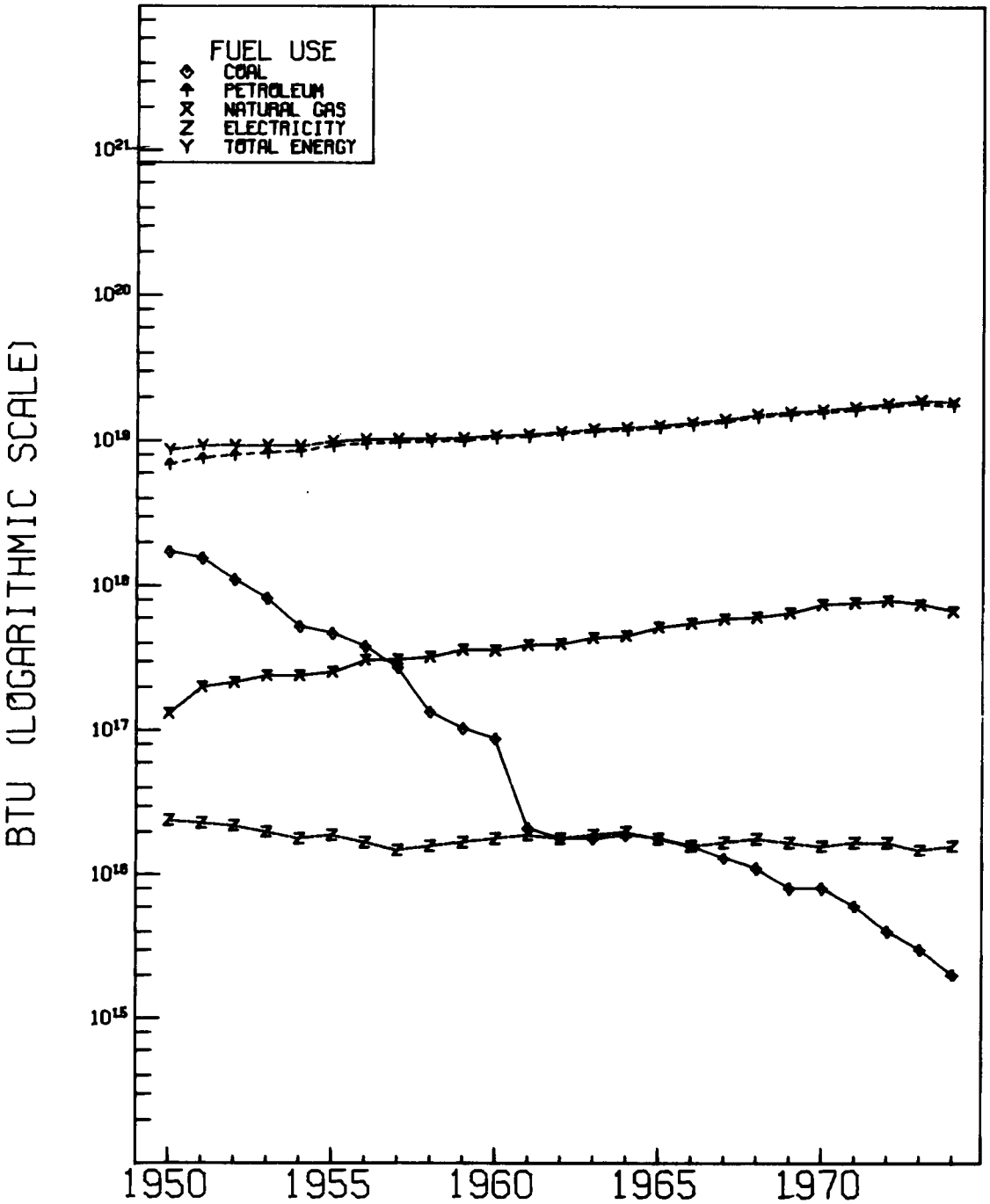
[1] Includes anthracite, bituminiuous, and lignite coals.
[2] Includes bunkers and military transportation.
[3] Consumption of natural gas by pipelines.

Source: U.S. Department of Transportation, Energy Statistics, p. 110, U.S. Government Printing Office, Washington, D.C., 1975.

2.1.3.1.02

ENERGY CONSUMPTION

TRANSPORTATION SECTOR



SOURCE: ENERGY STATISTICS, 1975

Projected transportation energy consumption by mode[1]
[Quads (Btu x 10^{15})]

	1972	Percent	1985	Percent	2000	Percent	Growth rate 1972-2000
Rail	0.615	3.6	0.73	3.1	0.99	2.9	1.7%
Ship	0.713	4.1	1.17	4.9	1.62	4.8	3.0
Air	2.201	12.7	4.70	19.7	8.63	25.5	5.0
Pipeline	0.868	5.0	1.26	5.3	1.88	5.5	2.8
Non-highway	4.397	25.4	7.86	33	13.12	38.7	4.0
Auto	9.121	52.7	10.46	44	12.84	37.9	1.2
Bus, truck	3.790	21.9	5.49	23	7.93	23.4	2.7
Highway	12.911	74.6	15.97	67	20.77	61.3	1.7
Total Trans.	17.31	100	23.83	100	33.89	100	2.4

[1]All data must be divided by conversion efficiency of 0.91 to balance ERDA-48 Extraction Data. Based on a BAU situation.

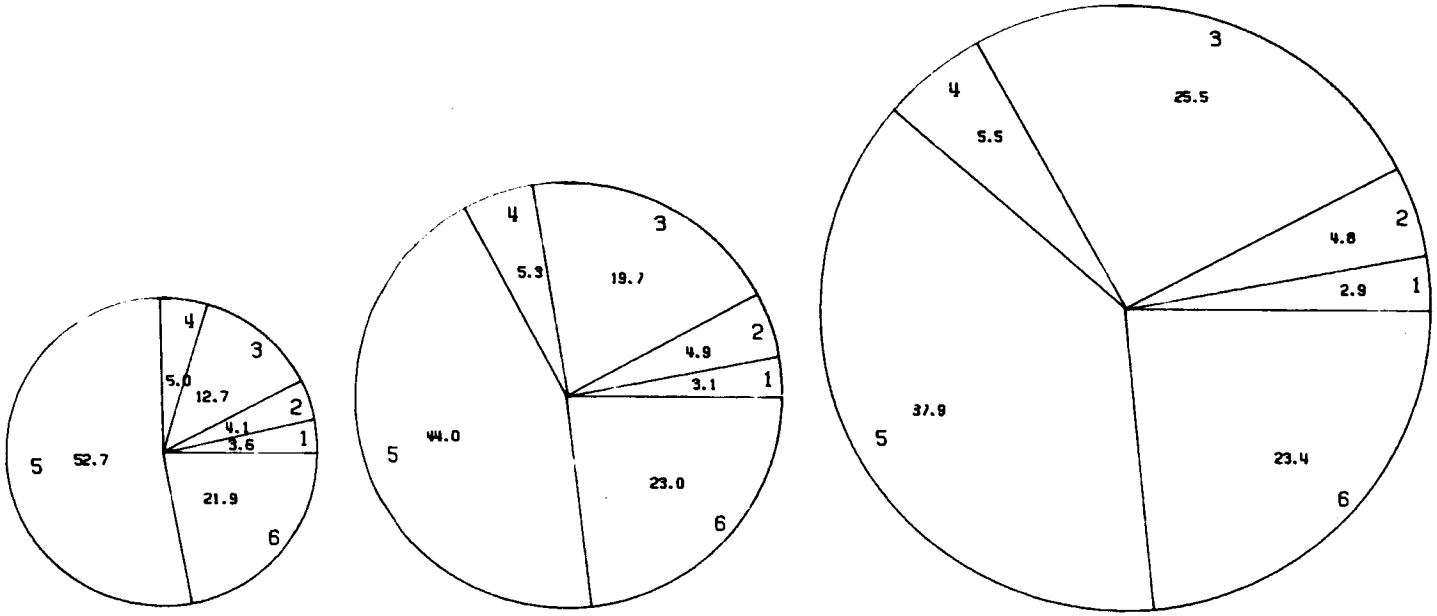
[2]Added nat. gas from DOT stats. — annual growth rate (2.8%) from Proj. Indep. ($7 barrel).

Source: Data Analysis Branch, Transportation Energy Conservation, Energy Research and Development Administration.

2.1.3.1.04

TRANSPORTATION CONSUMPTION OF ENERGY

DATA VALUES-BTU'S × 10^{15} 1972	1985	2000	SECTOR (SHOWN AS PERCENT)
0.6150	0.7300	0.9900	1. RAIL
0.7130	1.1700	1.6200	2. SHIP
2.2010	4.7000	8.6300	3. AIR
0.8680	1.2600	1.8800	4. PIPELINE
9.1210	10.4800	12.8400	5. AUTO
3.7900	5.4900	7.9300	6. BUS, TRUCK



1972 1985 2000

SOURCE: ERDA-48

2.1.3.1.05

Department of Defense energy use by transportation mode
FY 1973

			BTU x 10^{12}	% of total	% of transportation
Total	1,824			100.0	
Transportation		1,307		71.7	100.0
Aircraft			917	50.0	69.8
Ship			279	15.3	21.3
Ground			116	6.4	8.9
Other		517		28.3	

Source: U.S. Department of Defense, Management of Defense Energy Resources - Phase II, pg. 2-2, U.S. Government Printing Office, Washington, D.C., 1974.

Energy Requirements
of Passenger Transportation Modes

	Assumed Passenger Loading	Vehicle Miles Per Gallon of Fuel or Equivalent	Passenger Miles Per Gallon of Fuel or Equivalent
Heavy Rail Transit (Subway) Car Peak Load	135	4.00	540
Intercity Passenger Train	540-720	0.50	270-360
Transit Bus Peak Load	75	4.10	307
Intercity Bus	47	6.00	282
Commuter Rail Car, Diesel Powered	125	2.00	250
Heavy Rail Transit (Subway) Car Off-Peak Load	35	4.00	140
Transit Bus, Off-Peak Load	30	4.10	123
Rail Turbine Train	320	0.33	110
Standard Size Automobile Intercity, Maximum Load	6	18.00	108
Standard Size Automobile Urban, Maximum Load	6	14.40	86
Wide-Body Commercial Jet Aircraft, 1,000 Mile Flight	256-385	0.14-0.22	54-60
Twin Jet Commercial Aircraft, 500 Mile Flight	68-106	0.44-0.54	37-47
Average Commuter Automobile	1.4	13.5	19

Source: Transit Fact Book '75-'76 Edition, p. 46, American Public Transit Association, Washington, D.C., 1976.

Amount of fuel consumed by type of highway motor vehicle, 1963-1974[1]
(millions of gallons)

Year	Passenger Vehicles							Cargo vehicles			All motor vehicles
	Personal passenger vehicles			Buses			All passenger vehicles				
	Passenger cars	Motor-cycles	All personal passenger vehicles	Commercial	School	All Buses		Single-unit trucks	Combi-nations	All trucks	
1974	73,797	447	74,244	525	333	858	75,102	21,116	10,083	31,199	106,301
1973	77,619	392	78,011	520	327	847	78,858	22,755	8,860	31,615	110,473
1972	73,121	342	73,463	561	320	881	74,344	22,118	8,600	30,718	105,062
1971	69,213	301	69,514	631	316	947	70,461	18,221	8,865	27,086	97,547
1970	65,649	135	65,784	644	300	944	66,728	17,237	8,363	25,600	92,328
1969	62,325	123	62,448	657	290	947	63,395	16,528	8,199	24,727	88,122
1968	58,413	111	58,524	655	277	932	59,456	15,674	7,808	23,482	82,938
1967	55,007	103	55,110	646	264	910	56,020	14,470	7,203	21,673	77,693
1966	53,220	92	53,312	637	259	896	54,208	13,636	6,779	20,415	74,623
1965	50,206	69	50,275	645	249	894	51,169	13,504	6,431	19,935	71,104
1964			47,567[2]	622	242	864	48,431	13,199	6,271	19,470	67,901
1963			45,246[2]	606	232	838	46,084	12,348	6,084	18,432	64,516

[1]For the 50 states and District of Columbia.

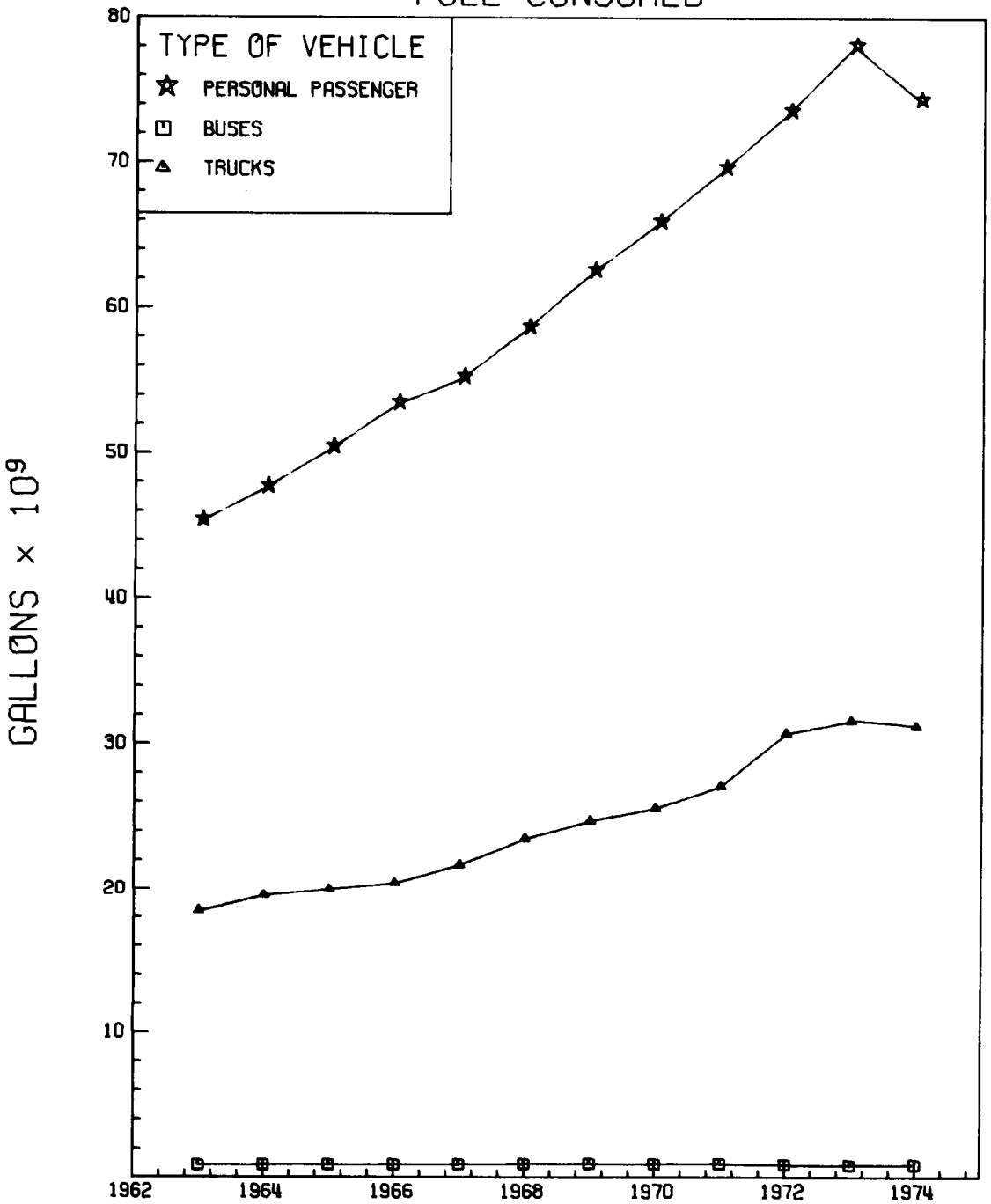
[2]Only totals are presented for 1963 and 1964 as motorcycles account for less than 1 percent of all travel.

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Statistics, Table VM-1, annual.

2.2.2.02

MOTOR VEHICLE TRAVEL

FUEL CONSUMED



SOURCE: FEDERAL HWY. ADM.

2.2.2.03

Average miles traveled by type of highway motor vehicle, 1962-1974[1]

Year	Passenger Vehicles							Cargo vehicles			All motor vehicles
	Personal passenger vehicles			Buses			All passenger vehicles				
	Passenger cars	Motor-cycles	All personal passenger vehicles	Commercial	School	All Buses		Single-unit trucks	Combi-nations	All trucks	
1974	9,494	4,500	9,268	28,968	6,867	11,322	9,277	8,985	51,968	10,846	9,563
1973	9,992	4,498	9,767	28,469	7,178	11,662	9,774	9,868	46,716	11,538	10,083
1972	10,184	4,500	9,969	30,968	7,414	12,553	9,980	10,525	47,084	12,229	10,370
1971	10,121	4,500[2]	9,926	31,949	7,198	12,819	9,938	9,794	43,779	11,465	10,198
1970	9,978	3,605	9,783	32,591	7,274	13,306	9,798	9,807	41,903	11,450	10,076
1969	9,782	4,020	9,633	33,300	7,409	13,826	9,650	9,871	42,453	11,565	9,969
1968	9,627	3,970	9,488	33,828	7,387	14,122	9,507	9,857	43,299	11,571	9,847
1967	9,531	3,962	9,399	33,600	7,543	14,484	9,420	9,598	42,176	11,268	9,723
1966	9,506	3,930	9,384	35,598	7,725	15,012	9,407	9,588	40,112	11,207	9,698
1965	9,387	3,770	9,286	35,518	7,689	15,215	9,310	10,003	39,795	11,587	9,677
1964			9,286[3]	35,140	7,727	15,115	9,311	10,072	41,409	11,723	9,398
1963			9,240[3]	34,562	7,612	15,049	9,265	9,938	42,232	11,644	9,646

[1]For the 50 states and District of Columbia.

[2]Significant differences in values for 1971 and the corresponding values for 1970 represents a change in the basic assumptions of miles per vehicle and miles per gallon, not a shift in the trend.

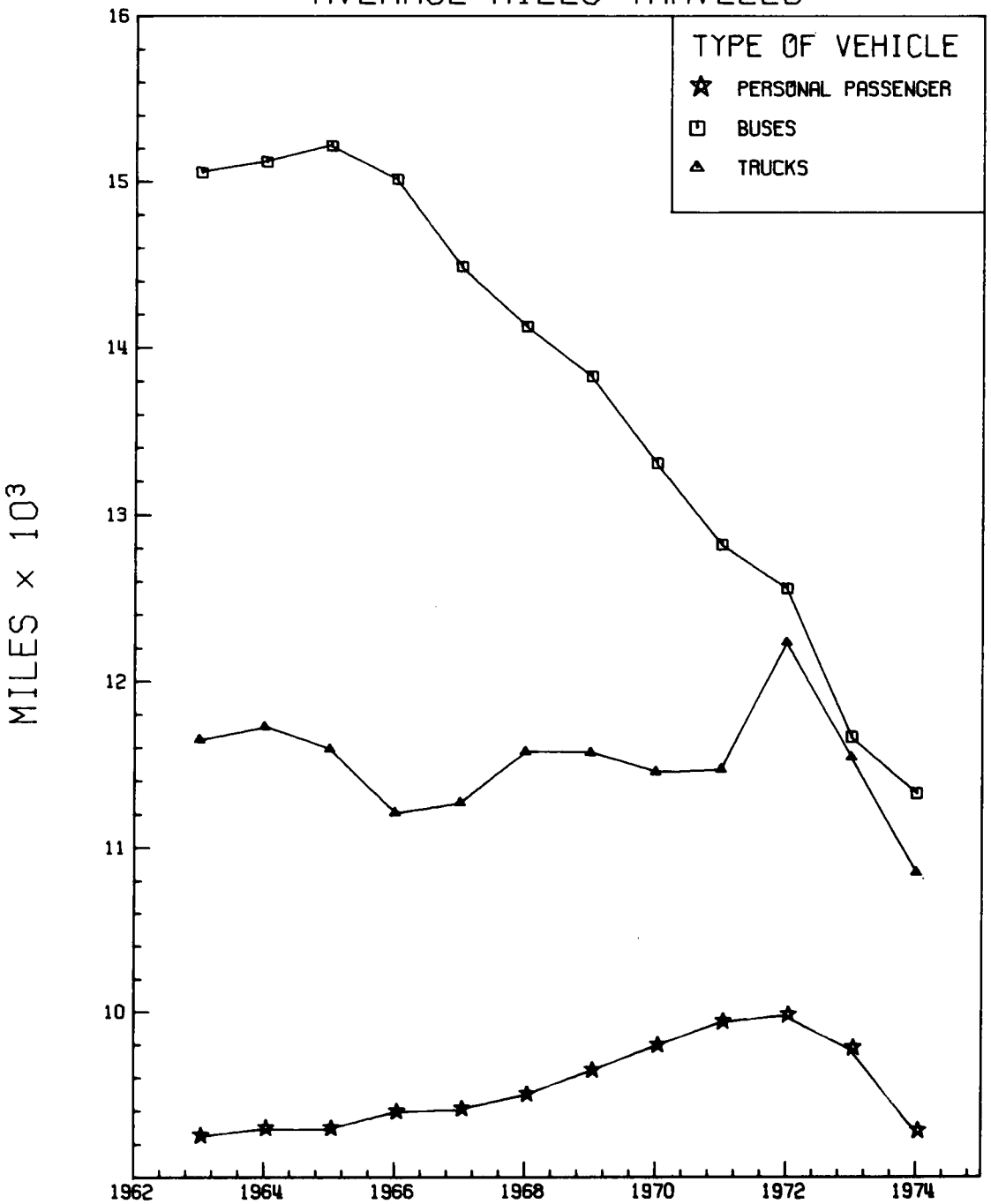
[3]Only totals are presented for 1963 and 1964 as motorcycles account for less than 1 percent of all travel.

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Statistics, Table VM-1, annual.

2.2.2.04

MOTOR VEHICLE TRAVEL

AVERAGE MILES TRAVELED



SOURCE: FEDERAL HWY. ADM.

Average gallons of fuel consumed by type of highway motor vehicle, 1963-1974[1]

Year	Passenger Vehicles							Cargo vehicles			All motor vehicles
	Personal passenger vehicles			Buses			All passenger vehicles				
	Passenger cars	Motor-cycles	All personal passenger vehicles	Commercial	School	All Buses		Single-unit trucks	Combi-nations	All trucks	
1974	704	90	676	5,827	933	1,290	681	898	9,471	1,269	788
1973	763	90	736	5,810	973	1,991	741	1,025	8,620	1,361	851
1972	755	90	730	6,318	1,006	2,165	736	1,092	8,687	1,446	859
1971	746	90[2]	723	6,988	1,028	2,382	730	968	9,102	1,368	838
1970	735	48	714	7,132	1,039	2,491	722	969	8,711	1,365	830
1969	718	54	700	7,276	1,058	2,600	708	976	8,826	1,384	821
1968	698	53	682	7,310	1,056	2,649	690	972	8,964	1,382	804
1967	684	53	669	7,178	1,065	2,693	677	942	8,678	1,338	786
1966	679	52	666	7,538	1,085	2,772	674	928	8,237	1,316	778
1965	667	50	656	7,588	1,086	2,844	665	964	8,172	1,347	775
1964			652[3]	7,558	1,085	2,829	661	994	8,497	1,389	778
1963			648[3]	7,372	1,076	2,813	657	976	8,618	1,380	773

[1]For the 50 states and District of Columbia.

[2]Significant differences in values for 1971 and the corresponding values for 1970 represents a change in the basic assumptions of miles per vehicle and miles per gallon, not a shift in the trend.

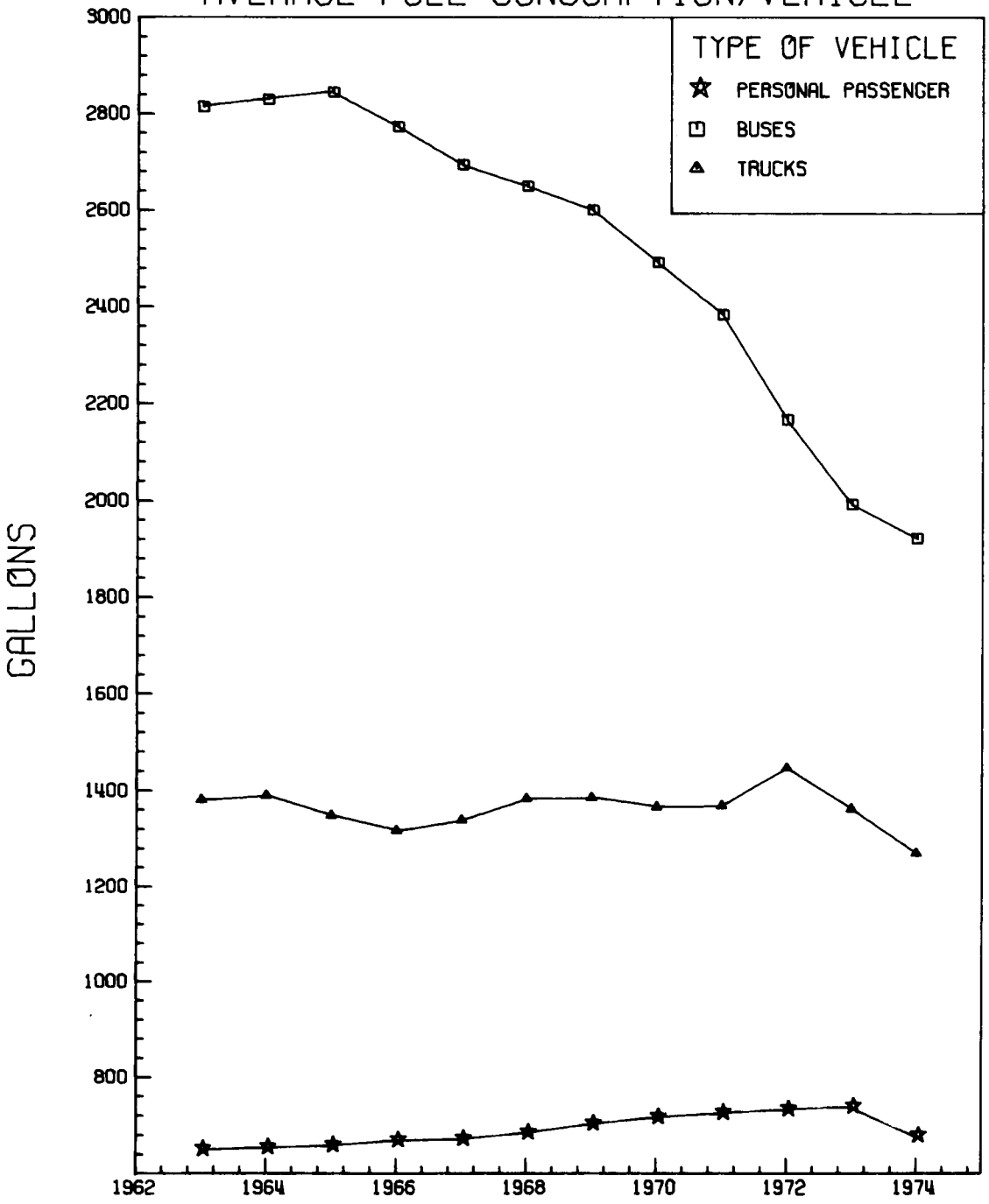
[3]Only totals are presented for 1963 and 1964 as motorcycles account for less than 1 percent of all travel.

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Statistics, Table VM-1, annual.

2.2.2.06

MOTOR VEHICLE TRAVEL

AVERAGE FUEL CONSUMPTION/VEHICLE



SOURCE: FEDERAL HWY. ADM.

2.2.2.07

Average miles traveled per gallon of fuel consumed by type of highway motor vehicle, 1963-1974[1]

Year	Passenger Vehicles							Cargo vehicles			All motor vehicles
	Personal passenger vehicles			Buses			All passenger vehicles				
	Passenger cars	Motor-cycles	All personal passenger vehicles	Commercial	School	All Buses		Single-unit trucks	Combi-nations	All trucks	
1974	13.49	50	13.71	4.97	7.32	5.90	13.62	10.01	5.49	8.55	12.13
1973	13.10	50	13.29	4.90	7.37	5.86	13.21	9.63	5.42	8.45	11.85
1972	13.49	50	13.67	4.39	7.37	5.80	13.57	9.63	5.42	8.46	12.07
1971	13.57	50[2]	13.73	4.57	7.00	5.38	13.61	10.12	4.81	8.38	12.16
1970	13.57	75	13.70	4.57	7.00	5.34	13.58	10.12	4.81	8.39	12.14
1969	13.63	75	13.75	4.58	7.00	5.32	13.63	10.12	4.81	8.36	12.15
1968	13.79	75	13.91	4.63	6.99	5.33	13.77	10.14	4.83	8.37	12.25
1967	13.93	75	14.05	4.68	7.08	5.38	13.91	10.19	4.86	8.42	12.38
1966	14.00	75	14.10	4.72	7.12	5.42	13.96	10.33	4.87	8.52	12.47
1965	14.07	75	14.15	4.68	7.08	5.35	14.00	10.38	4.87	8.60	12.49
1964			14.25[3]	4.65	7.12	5.34	14.09	10.13	4.87	8.43	12.47
1963			14.26[3]	4.69	7.08	5.35	14.10	10.18	4.90	8.44	12.48

[1]For the 50 states and District of Columbia.

[2]Significant differences in values for 1971 and the corresponding values for 1970 represents a change in the basic assumptions of miles per vehicle and miles per gallon, not a shift in the trend.

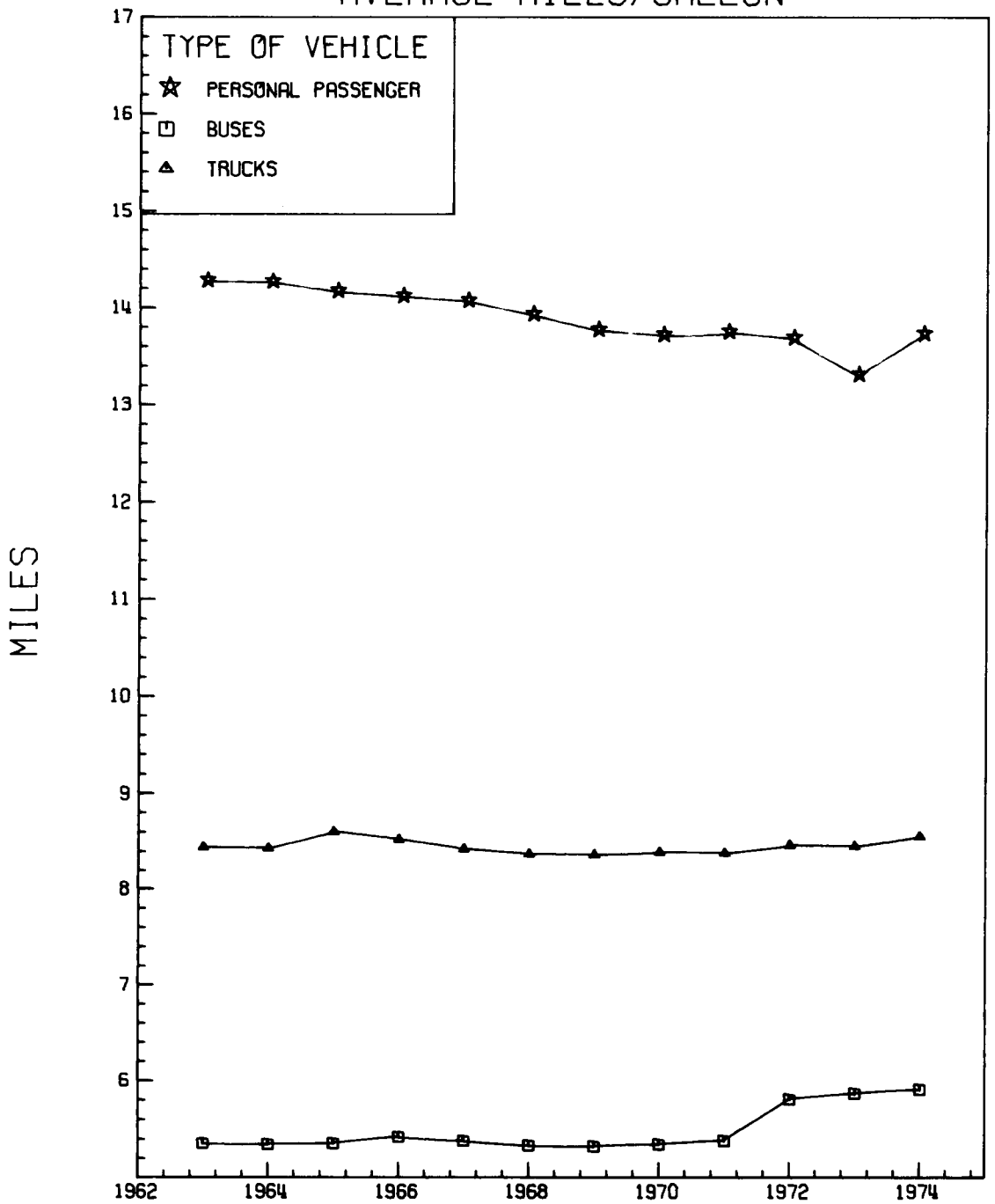
[3]Only totals are presented for 1963 and 1964 as motorcycles account for less than 1 percent of all travel.

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Statistics, Table VM-1, annual.

2.2.2.08

MOTOR VEHICLE TRAVEL

AVERAGE MILES/GALLON



SOURCE: FEDERAL HWY. ADM.

2.2.2.09

Average fuel economy for the automobile fleet and new cars
(miles per gallon)

Year	Average fleet fuel economy (calendar year basis)	New car fuel economy (model year basis)
1950	14.95	-
1951	14.99	-
1952	14.67	-
1953	14.70	-
1954	14.58	-
1955	14.53	-
1956	14.36	-
1957	14.40	13.67
1958	14.30	14.07
1959	14.30	13.85
1960	14.28	13.36
1961	14.38	13.55
1962	14.37	13.96
1963	14.26	12.62
1964	14.25	13.49
1965	14.07	12.98
1966	14.00	12.95
1967	13.93	12.86
1968	13.79	12.44
1969	13.63	12.21
1970	13.57	12.51
1971	13.57	12.21
1972	13.49	12.03
1973	13.10	11.67

Note: Motorcycle travel is included in average fleet fuel economy for 1957-64.

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Statistics, annual; U.S. Environmental Protection Agency, A Report on Fuel Economy, October 1973.

Energy intensiveness for automobiles and buses, 1974-1980

2.2.2.10

Vehicle type	Gross weight (1000 lbs.)	Trip length (statute miles)	Average trip hrs @ MPH	Fuel type[1]	Vehicle statute miles/gal	Number of seats		Specific energy, stop/start			
								Seat-miles/gallon		BTU's seat-mile	
						Available (full load)	1972 Actual aver. oper.	Available (full load)	1972 Actual aver. oper.	Available (full load)	1972 Actual aver. oper.
Urban, subcompact auto	2.0-2.4	10.0	.24/25	Gas	24.0	4.0	1.6	96	38.4	1,302	3,255
Urban, compact auto	2.5-3.4	10.0	.24/25	Gas	18.0	5.0	1.6	90	28.8	1,389	4,340
Urban, standard auto	3.5-4.4	10.0	.24/25	Gas	14.4	6.0	1.6	86.4	23.0	1,447	5,435
Urban, luxury auto	4.5-6.0	10.0	.24/25	Gas	9.0	6.0	1.6	54	14.4	2,315	8,681
Urban, bus	(18.5 empty) 20.3-3-26.0	13.0	1.25/ 10.3	Diesel	3.6-4.0	50	12	180	48	771	2,891
Intercity, bus	(28.7 empty) 45.0	100.0	1.81/55	Diesel	6.0	46	19.4	276	116.4	503	1,192
Intercity, subcompact auto	2.0-2.4	100.0	1.81/55	Gas	30.0	4.0	2.0	120	60	1,042	2,083
Intercity, compact auto	2.5-3.4	100.0	1.81/55	Gas	22.5	5.0	2.2	112.5	49.5	1,111	2,525
Intercity, standard auto	3.5-4.4	100.0	1.81/55	Gas	18.0	6.0	2.6	108	46.8	1,157	2,671
Intercity, luxury auto	4.5-6.0	100.0	1.81/55	Gas	13.0	6.0	3.0	72	36	1,736	3,472

[1]Gasoline = 125 X 10^3 BTU/gal, Diesel = 138.8 X 10^3 BTU/gal.

Source: U.S. Department of Transportation, Energy Statistics, p. 137, U.S. Government Printing Office, Washington, D.C., 1975.

2.2.2.11

Energy intensiveness for trucks, 1974-1980

Vehicle type	Cargo density lbs/ft^3	Maximum payload in tons	Trip length (statute miles)	Average trip time hrs @ MPH	Type of fuel	Vehicle statute miles/ gallon	Specific energy stop/start cycle	
							Ton-miles per gallon	BTU's/ton mile
Urban, truck	20-100	8	10	.4/25	Gas	8	64	1,953
Urban, truck	20-100	8	10	.4/25	Diesel	12	96	1,446
Urban, truck	10-30	3.1	10	.4/25	Gas	8	25	5,040
Intercity, truck	20-100	25	100	1.8/55	Diesel	5	125	1,110
Intercity, truck	15	14.3	100	1.8/55	Diesel	4.8	69	2,023

Source: U.S. Department of Transportation, Energy Statistics, p. 139, U.S. Government Printing Office, Washington, D.C., 1975.

2.2.3.01

Energy intensiveness for passenger trains, 1974-1980

Vehicle type	Gross weight (1000 lbs)	Trip length (statute miles)	Average trip time (hrs)	Fuel type	Vehicle statute miles/gal	Number of seats	Specific energy stop/start cycle	
							Seat-miles gallon	BTU's/ seat-mile
Urban train	79	0.75	0.02	Electric	57,600 BTU/mi	50-60	106	1320
Metroliner	1050	75	1.0	Electric	0.83	382	318	440
New Tokaido line	2000	140	1.4	Electric	0.4	1400	305	427
Standard diesel	1200	50	0.75	Diesel	0.66	360	240	583

Source: U.S. Department of Transportation, Energy Statistics, p. 139, U.S. Government Printing Office, Washington, D.C., 1975.

2.2.3.02

Energy intensiveness for freight trains, 1974-1980

Vehicles type	Cargo density lbs/ft^3	Maximum payload in tons	Trip length (statute miles)	Average trip time hrs @ MPH	Type of fuel	Vehicle statute miles/ gallon	Specific energy stop/start cycle	
							Ton-miles per gallon	BTU's/ton mile
Intercity, train								
Config I:	25	1000	100	2.26 @ 44	Diesel	0.14	273	550
Config II:	25	700	100	2.86 @ 35	Diesel	0.17	420	330

Source: U.S. Department of Transportation, Energy Statistics, p. 140, U.S. Government Printing Office, Washington, D.C., 1975.

Energy intensiveness for passenger aircraft, 1974-1980

Mode	Number of seats	Gross weight (1000 lbs.)	Specific trip length (S.M.)	Average trip time (Hrs.)[1]	Vehicle statute mi/gal.	Energy available seat-mi. per gal.	Stop/start BTU/avail. seat-mi. (X1000)[2]	Fuel type
Aircraft[3]								
Helicopter[4]	24-26	19	13	0.15	.58-.71	14-18	6.65-8.87	Kero
Gen avia single eng. recip.[5]	4-6	2.3-3.8	100	0.6-0.8	10.5-15.1	42-72	1.49-2.56	Avgas
Gen avia twin eng. recip.[5]	6-11	3.6-8.8	250	1.2-1.5	4.8-10.2	40-61	1.75-2.70	Avgas
Turbo prop	98	113	250	0.8	.38	37	3.32	Kero
Turbo prop	98	113	500	1.3	.47	46	2.68	Kero
Twin eng. turbo fan (NB)	68-106	77.7-116	250	0.8	.34-.44	30-38	3.22-4.15	Kero
Twin eng. turbo fan (NB)	68-106	77.7-116	500	1.3	.44-.54	37-47	2.61-3.35	Kero
Twin eng. turbo fan (NB)	68-106	77.7-116	1000	2.3	.51-.61	41-54	2.30-2.97	Kero
3 & 4 eng. turbo fan (NB)	131-200	177-150	250	0.8	.15-.22	27-30	4.06-4.62	Kero
3 & 4 eng. turbo fan (NB)	131-200	173-350	500	1.3	.21-.29	35-41	3.00-3.48	Kero
3 & 4 eng. turbo fan (NB)	131-200	173-350	1000	2.3	.26-.34	44-51	2.40-2.78	Kero
3 & 4 eng. turbo fan (WB)	256-385	426-775	250	0.8	.09-.15	33-42	2.96-3.75	Kero
3 & 4 eng. turbo fan (WB)	256-385	426-775	500	1.3	.11-.19	44-51	2.40-2.80	Kero
3 & 4 eng. turbo fan (WB)	256-385	426-775	1000	2.3	.14-.22	54-60	2.07-2.30	Kero
3 eng. turbo fan charter (WB)	400	426	250	0.8	.14	57	2.18	Kero
3 eng. turbo fan charter (WB)	400	426	500	1.3	.17	70	1.77	Kero
3 eng. turbo fan charter (WB)	400	426	1000	2.3	.20	79	1.57	Kero

[1]Commercial Transport Trip Times obtained from "Official Airline Guide," January 15, 1974, schedule times plotted versus trip distance.
[2]Kerosene at 18,400 BTU/lb. and 6.7 lb./gal.; Avgas at 18,700 BTU/lb. and 5.75 lb./gal.
[3]With the exception of helicopter and general aviation data, all other fuel consumption data obtained directly from manufacturer.
[4]From CAB "Aircraft Operating Cost and Performance Report," August 1972.
[5]Based on Manufacturer's published performance data for cruise at 75% power, block time and speed estimated at 90% of cruise speed to allow for takeoff and landing.

Source: U.S. Departmnt of Transportation, Energy Statistics, p. 138, U.S. Government Printing Office, Washington, D.C., 1975.

2.2.4.02

Energy intensiveness for freight aircraft, 1974-1980

Mode	Maximum payload (tons	Payload gross density (lb/ft)[3]	Specific trip time (s. mi.)	Average trip time (hrs)[1]	Vehicle statute mi/gal	Specific energy, stop/start cycle		Fuel type
						per gal	BTU/ton mi (X1000)[2]	
Aircraft								
Turbofan, narrow body	20.6-58.7	8.3-11.6	500	1.3	.19-.44	8.4-11.1	11.1-14.7	Kero
Turbofan, narrow body	20.6-58.7	8.3-11.6	1000	2.3	.22-.53	9.6-12.8	9.6-12.9	Kero
Turbofan, narrow body	46.8-58.7	10.9-11.6	2000	4.4	.23-.27	12.6-13.6	9.1-9.8	Kero
Turbofan, wide body	77.9-126.0	10.0	1000	2.3	.12-.23	13.7-15.0	8.2-9.0	Kero
Turbofan, wide body	77.9-126.0	10.0	2000	4.4	.13-.24	14.2-16.0	7.7-8.7	Kero

[1]Trip times assumed same as passenger schedules obtained from "Official Airline Guide," January 15, 1974, schedule times plotted against trip distance.
[2]Kerosene at 18,400 BTU/lb and 6.7 lb/gallon.
[3]All fuel consumption data obtained directly from aircraft manufacturers for all-freighter or convertible-freighter aircraft models.

Source: U.S. Department of Transportation, Energy Statistics, p. 140, U.S. Government Printing Office, Washington, D.C., 1975

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CONSERVATION ALTERNATIVES

Conservation Alternatives

This chapter summarizes key results from several projections of transportation activity and transportation energy use to the year 2000 and reviews various conservation alternatives in the transportation sector. The chapter first deals with impacts on vehicle fuel economy, according to parameters such as speed, use of auxiliary equipment, and modal shifts. The second section deals with alternative energy scenarios.

While the data presented in this chapter represent some of the best available, information more relevant to the TEC energy program will be included in future issues of this data book. The Division of Transportation Energy Conservation will prepare its own scenarios. These scenarios will provide more detail and will be closely tied to the research and programs currently carried out within the Energy Research and Development Administration.

The energy impacts of several specific transportation conservation measures are reviewed. Section 3.1 deals with the impacts of specific conservation options, based on highway vehicle tests conducted for the Federal Highway Administration (FHWA) and analyses prepared at Oak Ridge National Laboratory.

Aggregate transportation energy projections are tabulated in Section 3.2. These projections are from four major sources: the Jack Faucett Associates study for the Federal Energy Administration's Project Independence Report, the Brookhaven National Laboratory's Reference Energy System, the Ford Foundation's Energy Policy Project, and the Federal Highway Administration. All of these studies were

prepared after the 1973 Arab oil embargo; therefore they (either explicitly or implicitly) take account of the recent sharp increases in gasoline, diesel fuel, and jet fuel prices.

The estimates of 1985 transportation energy demand from these projections range from 18 to 26 QBTU (quadrillion BTU or quads). The range for the year 2000 is 17 to 38 QBTU. By comparison, transportation energy use in 1972 was 16 QBTU. Thus, these projections suggest that transportation energy use will continue to grow, although future growth rates may be much lower than historical growth rates.

Differences in energy use for a particular year among the forecasts are due to different assumptions concerning transportation mode choices, vehicle efficiencies, and passenger and freight traffic demands. The low forecasts assume slower growth in transportation demands, greater improvements in technical efficiencies, and larger shifts to less energy-intensive modes.

The FHWA projections cover the 1972-1990 period and deal with automobiles only. Their projections show a range in 1990 gasoline use of 68 to 80 billion gallons (8.5 to 10.0 QBTU). Differences in 1990 gasoline demand among the four FHWA projections are due to different assumptions concerning vehicle fuel economy (mpg), miles traveled per vehicle, and changes in average vehicle type (standard, compact, or economy cars).

Effect of speed on fuel consumption rates
(Without use of air conditioning)

Test car number and net weight (lbs.)	Miles per gallon at selected speeds					Percent increase in gasoline consumption caused by increase in speed[1]				
	30	40	50	60	70	30 to 40	40 to 50	50 to 60	60 to 70	50 to 70
1 (4,880)	17.12	17.20	16.11	14.92	13.13	-0.05	6.76	7.97	13.63	22.70
2 (3,500)	19.30	18.89	17.29	15.67	13.32	2.17	9.25	10.34	17.64	29.80
2A (3,500)	21.33	21.33	18.94	17.40	15.36	-0.01	12.64	8.85	13.28	23.31
3 (3,540)	23.67	24.59	20.46	14.83	13.42	-3.74	22.67	37.96	8.96	52.46
4 (3,975)	18.25	20.00	16.32	15.77	13.61	-8.75	22.55	3.49	15.87	19.91
5 (2,450)	31.45	35.19	33.05	30.78	22.82	-10.63	6.47	7.37	34.88	44.83
6 (3,820)	22.88	19.41	20.28	17.78	14.88	17.88	-4.29	14.06	19.49	36.29
7 (3,990)	15.61	14.89	16.98	13.67	11.08	4.84	-12.31	24.21	23.38	53.25
8[2] (2,050)	(24.79)	(27.22)	(26.80)	(24.11)	NA	-8.93	1.57	11.16	NA	NA
9 (2,290)	21.55	20.07	19.11	17.83	16.72	7.37	5.02	7.18	6.64	14.29
10 (2,400)	22.72	21.94	22.22	21.08	17.21	3.56	-0.13	5.41	22.49	29.11
11 (5,250)	18.33	19.28	15.62	14.22	12.74	-4.93	23.43	9.85	11.62	22.61
12 (4,530)	20.33	20.00	17.50	16.17	14.86	1.65	14.29	8.23	8.82	17.77
Average (Unweighted)	21.05	21.07	19.49	17.51	14.93	0.00	8.11	11.31	17.28	30.53

[1]Changes in this section marked with a minus (-) sign were decreases.

[2]Since vehicle #8 could not be operated satisfactorily at 70 miles per hour, its miles per gallon performances were omitted from the averages. They are, however, given in parentheses.

Source: U.S. Department of Transportation, Federal Highway Administration, The Effect of Speed on Automobile Gasoline Consumption Rates, p. 6, Washington, D.C., October 1973.

3.1.02

Effect of common conservation techniques on vehicle fuel efficiency

Air conditioning

Operating speed, miles per hour	Air conditioning in use (Miles per gallon)	Air conditioning not in use (Miles per (gallon)	Effect on fuel consumption caused by use of air conditioning: Reduction in miles per gallon	Effect on fuel consumption caused by use of air conditioning: Percent saving with air conditioning "off"
30	18.14	20.25	1.91	10.53
40	17.51	19.71	2.20	12.56
50	16.42	18.29	1.87	11.39
60	15.00	16.25	1.25	8.33
70	13.17	14.18	1.01	7.67

Tune ups

Operating speed, miles per hour	Miles per gallon: Before tuning (Car #2)	Miles per gallon: After tuning (Car #2A)	Improvement after tuning: Miles per gallon	Improvement after tuning: Percent
30	19.30	21.33	2.03	10.52
40	18.89	21.33	2.44	12.92
50	17.29	18.94	1.65	9.54
60	15.67	17.40	1.73	11.04
70	13.32	15.36	2.04	15.32

[1]All cars included in the averages in this table were equipped with air conditioning in good operating condition.

Source: U.S. Department of Transportation, Federal Highway Administration, The Effect of Speed on Automobile Gasoline Consumption Rates, p. 8, Washington, D.C., October 1973.

3.1.03

Energy impacts of transportation conservation measures*

Policy	Estimated energy savings (thousand barrels per day)	
	1980	1985
Increase percentage of urban travel carried by mass transit from 2.5 percent in 1973 to 5.0 percent in 1980 and 7.5 percent in 1985	52	122
Increase carpooling sufficiently to reduce work-trip auto travel by 10 percent in 1980 and 1985	69	105
Increase gasoline prices by 20 percent starting in 1975	484	700
Increase new car fuel economy from 14 mpg in 1974 to 20 mpg in 1980 and 22 mpg in 1985	568	1327

*Energy savings are calculated relative to a baseline in which auto travel is 1.2×10^{12} vehicle-miles (VM) in 1980 and 1.4×10^{12} VM in 1985, urban travel accounts for 55 percent of this total and average auto fuel economy is 14 mpg for both years and 12 mpg in urban areas. Average automobile occupancy is 2.2 PM/VM and urban occupancy is 1.6 PM/VM (PM = passenger-miles).

Source: E. Hirst, "Transportation Energy Conservation Policies," Science, 192, No. 4234 (2 April 76), p. 16.

3.1.04

Transportation energy conservation strategies

From 1970 situation	To Energy-efficient alternative	Energy savings[1] 10^{12} Btu
Passenger traffic: modal shifts		
Inter-city auto	Inter-city bus	1.8
Airplane	Inter-city bus	6.8
Urban auto	Mass transit	4.3
Passenger traffic: load factor increases[2]		
Urban auto (28%)	Urban auto (38%)	2.1
Mass transit (20%)	Mass transit (30%)	1.3
Trains (37%)	Trains (47%)	0.6
Passenger traffic: technological changes[3]		
Inter-city (auto (3400)	Inter-city auto (2300)	1.1
Urban auto (8100)	Urban auto (5400)	2.7
Airplane (8400)	Airplane (5600)	2.8
Train (2900)	Train (1900)	1.0
Freight traffic: modal shifts		
Truck	Train	2.1
Airplane	Train	41.3

[1]Energy savings are computed on the basis of a one billion passenger-mile (or ton-mile) effect, about 0.05 percent of 1970 passenger traffic (or inter-city freight traffic).

[2]Energy savings given are for a 10 percentage point increase in load factor; numbers in parentheses are load factors.

[3]Energy savings given are for a 33 percent reduction in vehicle energy intensiveness; numbers in parentheses are energy intensiveness values in Btu's per passenger-mile.

Source: E. Hirst, "Transportation Energy Use and Conservation Potential," Science and Public Affairs, XXIX, No. 9 (November 1973), p. 41.

Projecting energy demand by the transportation sector: a discussion of three methodologies[1]

Project Independence projections[2]

Three projections of transportation energy demand were made by Jack Faucett Associates for the Project Independence study on the alternatives for national energy independence. These projections, or "scenarios" are based on three different prices for crude oil. The $4 per barrel scenario estimates the demand for energy that might result if oil prices were to remain at the pre-embargo level. Projections were also made with the price of crude oil at $7 and $11 per barrel. All three projections are based on detailed analyses of past trends in energy use by the transportation sector and likely changes in the future.

The Project Independence forecasts are made with data compiled by the Federal Highway Administration, the Department of Transportation, and other government offices. Consideration is given to the efficiency with which fuel is used to transport passengers by auto, bus, rail, air and water; and freight by truck, rail, air, water, and pipeline. Changes in fuel use efficiencies are considered explicitly through detailed analyses of vehicle stocks. Future demand is estimated using projections of passenger miles to be traveled and ton miles of freight to be transported by each mode. Distinctions are made between rural (intercity) and urban (local) transportation, and by types of fuel consumed. Project Independence forecasts energy use out to the year 1990.

Reference Energy System projections[3]

The ERDA projections of energy demand were made using the "Reference Energy System" developed by the Brookhaven National Laboratory. The Reference Energy System analyzes energy flows with a link-node network approach. Energy demand by resource type is estimated by process (e.g., extraction, distribution) and end-use category (e.g., space heating and steel making). End-use demand is specified in terms of services, such as passenger miles to be traveled, square feet of floor space to be heated and cooled, tons of steel to be made, etc., and estimated according to assumed technologies. These demand and supply assumptions are developed independently of the model on the basis of engineering, demographic, and economic data. Any domestic energy supply limitations are made up by imports.

A total of six scenarios are presented in the reference cited. The first scenario, titled "No New Initiatives," attempts to portray what future energy demands would be like if there were no change in the efficiency of energy use. Projection number two assumes certain improvements in end-use efficiencies. Synthetic fuels from coal and shale are substituted for conventional fuels in the third scenario. The fourth projection assumes a shift toward increased use of electric power and the fifth projection assumes less use of nuclear power. Finally,

Projecting energy demand by the transportation sector:
a discussion of three methodologies (continued)

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scenario number six combines the more favorable aspects of the preceding five projections to portray an optimistic future of slow growth in energy consumption.

Energy Policy Project projections[4]

Three projections of energy demand were made by the Energy Policy Project: a "Historical Growth" projection, a "Technical Fix" projection, and a "Zero Energy Growth" projection. The methodology employed in each projection is similar to that of the Project Independence effort, in that a detailed analysis of future energy demand by end use was made. The Historical Growth projection estimates future energy demands on the basis of past trends in energy consumption and a high growth economy. Increased efficiencies in end-uses are assumed for the Technical Fix projection. The Zero Energy Growth projection places even more emphasis on increased efficiencies, and reflects a declining rate of growth in energy use, which slows to zero by 1990, while GNP continues to increase at respectable rates.

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[1]This discussion is taken from a paper prepared for the Data Analysis Branch in the Transportation Energy Conservation Section of the Energy Research and Development Administration. See Energy Demand by the Transportation Sector in 1985 and 2000: A Comparison of Five Studies by Ralph M. Doggett of the International Research and Technology Corporation.

[2]Project Independence Task Force Report, "Project Independence and Energy Conservation: Transportation Sectors," Federal Energy Administration, November 1974.

[3]"A National Plan for Energy Research, Development, and Demonstration: Creating Energy Choices for the Future," U.S. Energy Research and Development Administration, June 1975.

[4]A Time to Choose, Final Report by the Energy Policy Project of the Ford Foundation, 1974.

Energy demand by the transportation sector in 1985 and 2000:
a comparison of three studies

1985 PROJECTIONS			Project Independence			ERDA-48			Ford Foundation Energy Policy Project		
Line	Description	Units	$4 bbl/ oil	$7 bbl/ oil	$11 bbl/ oil	No new initi-atives	Improved effici-encies	Combina-tion of all tech-nologies	Histor-ical growth	Tech-nical fix	Zero energy growth
1.	Total energy demand	Quadrillion BTU's	118.3	109.6	102.9	105.8	95.5	96.6	116.1	91.3	88.1
2.	Transportation energy demand	Quadrillion BTU's	25.9	23.6	22.8	22.8	20.7	20.6	26.0	19.6	18.4
3.	Transportation as a % of total	%	21.9	21.5	22.2	21.6	21.7	21.3	22.4	21.5	20.9
4.	Passenger trans. energy demand	Quadrillion BTU's	18.0	16.0	15.4				15.7	10.2	9.2
5.	Freight trans. energy demand	Quadrillion BTU's	7.2	6.9	6.6				7.8	7.1	6.8
6.	Other trans. energy demand	Quadrillion BTU's	0.7	0.7	0.7				2.6	2.6	2.4
7.	Passenger as a % of total transport	%	69.5	67.8	67.5				60.2	51.3	50.0
8.	Freight as a % of t.t.	%	27.8	29.2	28.9				29.9	35.7	37.0
9.	Other as a % of t.t.	%	2.7	3.0	3.1				10.0	13.1	13.0
10.	Auto. energy demand	Quadrillion BTU's	13.2	11.7	11.4	10.5	9.8	9.8	12.5	7.5	7.0
11.	Truck energy demand	Quadrillion BTU's	6.3	5.9	5.7				5.3	5.0	5.0
12.	Bus energy demand	Quadrillion BTU's	0.1	0.1	0.1	4.9	4.4	4.4	0.2	0.2	0.5
13.	Rail energy demand	Quadrillion BTU's	0.7	0.7	0.7				1.0	1.0	1.1
14.	Air energy demand	Quadrillion BTU's	3.9	3.4	3.2	6.2	5.3	5.3	4.4	3.3	2.2
15.	Water energy demand	Quadrillion BTU's	0.8	0.8	0.8	1.2	1.2	1.2			
16.	Pipeline energy demand	Quadrillion BTU's	0.1	0.1	0.1	0.1	0.1	0.1	2.6	2.6	2.6
17.	Other energy demand	Quadrillion BTU's	0.7	0.7	0.7						
18.	Auto. as a % of total trans.	%	51.2	50.0	50.2	45.9	47.3	47.6	48.1	38.3	38.0
19.	Truck as a % of t.t.	%	24.4	25.2	25.1				20.4	25.5	27.2
20.	Bus as a % of t.t.	%	0.4	0.4	0.4	21.4	21.3	21.4	0.8	1.0	2.7
21.	Rail as a % of t.t.	%	2.7	3.0	3.1				3.8	5.1	6.0

Energy demand by the transportation sector in 1985 and 2000:
a comparison of three studies (continued)

1985 PROJECTIONS (continued)			Project Independence			ERDA-48			Ford Foundation Energy Policy Project		
Line	Description	Units	$4 bbl/ oil	$7 bbl/ oil	$11 bbl/ oil	No new initi-atives	Improved effici-encies	Combina-tion of all tech-nologies	Histor-ical growth	Tech-nical fix	Zero energy growth
22.	Air as a % of t.t.	%	15.1	14.5	14.1	27.1	25.6	25.7	16.9	16.8	12.0
23.	Water as a % of t.t.	%	3.1	3.4	3.5	5.2	5.8	5.8			
24.	Pipeline as a % of t.t.	%	0.4	0.4	0.4	0.4	0.5	0.5	10.0	13.3	14.1
25.	Other as a % of t.t.	%	2.7	3.0	3.1						
26.	Auto MPG's — Natl. Av.	MPG's	16.1	17.8	17.9	17.5	18.7	18.7	12.5	20.0	
27.	Air MPG's — passenger	MPG's	20.3	21.9	23.8	17.0	19.6	19.6			
28.	Air ton miles per gal.	MPG's				5.2	6.0	6.0			
29.	Trans. demand — residual oil	Quadrillion BTU's	0.8	0.8	0.8						
30.	Trans. demand — distillate oil	Quadrillion BTU's	2.7	2.6	2.5						
31.	Trans. demand — jet fuel	Quadrillion BTU's	4.3	3.8	3.6	22.6	20.5	20.5			
32.	Trans. demand — gasoline	Quadrillion BTU's	18.0	16.2	15.7						
33.	Trans. demand — electricity	Quadrillion BTU's	0.14	0.15	0.16	0.17	0.17	0.17			
34.	Trans. demand — other fuels	Quadrillion BTU's	0.02	0.02	0.02						
35.	Residual oil as a % of total trans.	%	3.1	3.4	3.5						
36.	Distillate oil as a % of total trans.	%	10.4	11.0	11.0						
37.	Jet fuel as a % of total trans.	%	16.6	16.1	15.8	99.3	99.2	99.2			
38.	Gasoline as a % of total trans.	%	69.3	68.7	68.9						
39.	Electricity as a % of total trans.	%	0.5	0.6	0.7	0.7	0.8	0.8			
40.	Other fuels as a % of total trans.	%	0.1	0.1	0.1						

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Energy demand by the transportation sector in 1985 and 2000:
a comparison of three studies (continued)

1985 PROJECTIONS (continued)			Project Independence			ERDA-48			Ford Foundation Energy Policy Project		
Line	Description	Units	$4 bbl/ oil	$7 bbl/ oil	$11 bbl/ oil	No new initi- atives	Improved effici- encies	Combina- tion of all tech- nologies	Histor- ical growth	Tech- nical fix	Zero energy growth
41.	Total passenger miles	Billion PMT's	3896	3837	3760				2738	2738	2618
42.	Auto passenger miles	Billion PMT's	3517	3461	3387				2159	2159	2063
43.	Bus passenger miles	Billion PMT's	72	72	72	112	112	112	97	97	194
44.	Rail passenger miles	Billion PMT's	32	32	32				19	19	35
45.	Air passenger miles	Billion PMT's	274	272	269	421	421	421	494	494	329
46.	Auto PMT's as a % of total PMT's	%	90.3	90.2	90.1				78.9	78.9	78.8
47.	Bus PMT's as a % of total PMT's	%	1.8	1.9	1.9				3.5	3.5	7.4
48.	Rail PMT's as a % of total PMT's	%	0.8	0.8	0.9				0.7	0.7	1.3
49.	Air PMT's as a % of total PMT's	%	7.0	7.1	7.2				18.0	18.0	12.6
50.	Total freight ton miles	Billion TMT's	3467	3469	3470				2266	2266	2362
51.	Truck freight ton miles	Billion TMT's	757	763	766	724	724	724	895	775	659
52.	Rail freight ton miles	Billion TMT's	1034	1034	1033				1340	1460	1460
53.	Air freight ton miles	Billion TMT's	19	14	11	30	30	30	31	31	27
54.	Water freight ton miles	Billion TMT's	869	802	737						
55.	Pipeline freight ton miles	Billion TMT's	788	856	923						
56.	Truck TMT's as a % of total TMT's	%	21.8	22.0	22.1				39.5	34.2	27.9
57.	Rail TMT's as a % of total TMT's	%	29.8	29.8	29.8				59.1	64.4	61.8
58.	Air TMT's as a % of total TMT's	%	0.5	0.4	0.3				1.4	1.4	0.9
59.	Water TMT's as a % of total TMT's	%	25.1	23.1	21.2						
60.	Pipeline TMT's as a % of total TMT's	%	22.7	24.7	26.6						
61.	GNP	Billions $ (1971)	1842	1842	1842				2064	2030	2031
62.	Total BTU/$	Thousand	64	60	56				56	45	43
63.	Trans BTU/$	Thousand	14	13	12				13	10	9

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Energy demand by the transportation sector in 1985 and 2000:
a comparison of three studies (continued)

2000 PROJECTIONS			ERDA-48			Ford Foundation Energy Policy Project			
Line	Description	Units	No new initiatives	Improved efficiencies	Combination of all technologies	Historical growth	Technical fix	Zero energy growth	Row averages
1.	Total energy demand	Quadrillion BTU's	165.5	122.5	137.0	186.7	124.0	100.0	136.6
2.	Transportation energy demand	Quadrillion BTU's	32.3	25.6	25.3	38.4	24.7	17.2	27.6
3.	Transportation as a % of total	%	19.5	20.9	18.5	20.6	19.9	17.2	20.2
4.	Passenger transportation energy demand	Quadrillion BTU's				21.7	10.5	6.7	
5.	Freight transportation energy demand	Quadrillion BTU's				13.5	11.0	7.6	
6.	Other transportation energy demand	Quadrillion BTU's				3.2	3.2	2.9	
7.	Passenger as a % of total transportation	%				56.5	42.5	40.0	
8.	Freight as a % of total transportation	%				35.2	44.5	44.2	
9.	Other as a % of total transportation	%				8.3	13.0	16.9	
10.	Automobile energy demand	Quadrillion BTU's	12.8	9.2	8.9	15.2	6.8	3.8	9.5
11.	Truck energy demand	Quadrillion BTU's				6.5	4.4	3.7	6.0
12.	Bus energy demand	Quadrillion BTU's	9.1	7.4	7.4	0.2	0.2	1.0	0.4
13.	Rail energy demand	Quadrillion BTU's				1.7	1.9	1.7	1.6
14.	Air energy demand	Quadrillion BTU's	8.6	7.3	7.3	11.6	8.2	4.1	7.3
15.	Water energy demand	Quadrillion BTU's	1.6	1.6	1.6				1.3
16.	Pipeline energy demand	Quadrillion BTU's	0.1	0.1	0.1	3.2	3.2	2.9	0.6
17.	Other energy demand	Quadrillion BTU's							1.8
18.	Automobile as a % of total	%	41.1	35.9	35.2	39.6	27.5	22.1	
19.	Truck as a % of total	%				16.9	17.8	21.5	
20.	Bus as a % of total	%	28.3	28.9	29.2	0.5	0.8	5.8	
21.	Rail as a % of total	%				4.4	7.7	9.9	
22.	Air as a % of total	%	26.7	28.5	28.9	30.2	33.2	23.8	

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Energy demand by the transportation sector in 1985 and 2000:
a comparison of three studies (continued)

2000 PROJECTIONS			ERDA-48			Ford Foundation Energy Policy Project			
Line	Description	Units	No new initiatives	Improved efficiencies	Combination of all technologies	Historical growth	Technical fix	Zero energy growth	Row averages
23.	Water as a % of total	%	5.0	6.3	6.3				
24.	Pipeline as a % of total	%	0.3	0.4	0.4	8.3	13.0	16.9	
25.	Other as a % of total	%							
26.	Auto MPG's — national average	MPG's	20.0	28.0	28.0	11.4	25.0	33.0	25.7
27.	Air passenger MPG's — national average	PMPG's	20.0	23.0	23.0				
28.	Air ton miles per gallon	TMPG's	6.8	7.8	7.8				
29.	Transportation demand — residual oil	Quadrillion BTU's							
30.	Transportation demand — distillate oil	Quadrillion BTU's	32.1	25.4	25.1				27.0
31.	Transportation demand — jet fuel	Quadrillion BTU's							
32.	Transportation demand — gasoline	Quadrillion BTU's							
33.	Transportation demand — electricity	Quadrillion BTU's	0.2	0.2	0.2				0.3
34.	Transportation demand — other fuels	Quadrillion BTU's							
35.	Residual oil as a % of total	%							
36.	Distillate oil as a % of total	%							
37.	Jet fuel as a % of total	%	99.4	99.2	99.2				
38.	Gasoline as a % of total	%							
39.	Electricity as a % of total	%	0.6	0.8	0.8				
40.	Other fuels as a % of total	%							
41.	Total passenger miles	Billion PMT's				3676	3676	3014	3805
42.	Auto passenger miles	Billion PMT's				2494	2494	2006	2931
43.	Bus passenger miles	Billion PMT's	161	161	161	39	39	333	128
44.	Rail passenger miles	Billion PMT's				33	108	157	126
45.	Air passenger miles	Billion PMT's	874	874	874	1110	1037	518	715
46.	Auto PMT's as a % of total	%				67.8	67.8	66.6	
47.	Bus PMT's as a % of total	%				1.1	1.1	11.0	

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Energy demand by the transportation sector in 1985 and 2000:
a comparison of three studies (continued)

2000 PROJECTIONS			ERDA-48			Ford Foundation Energy Policy Project			
Line	Description	Units	No new initiatives	Improved efficiencies	Combination of all technologies	Historical growth	Technical fix	Zero energy growth	Row averages
48.	Rail PMT's as a % of total	%				0.9	2.9	5.2	
49.	Air PMT's as a % of total	%				30.2	28.2	17.2	
50.	Total freight ton miles	Billion TMT's							
51.	Truck ton miles	Billion TMT's	1040	1040	1040	1121	821	698	987
52.	Rail ton miles	Billion TMT's				2340	2640	2250	2235
53.	Air ton miles	Billion TMT's	99	99	99	105	100	50	71
54.	Water ton miles	Billion TMT's							
55.	Pipeline ton miles	Billion TMT's							
56.	Truck TMT's as a % of total	%							
57.	Rail TMT's as a % of total	%							
58.	Air TMT's as a % of total	%							
59.	Water TMT's as a % of total	%							
60.	Pipeline TMT's as a % of total	%							
61.	GNP	Billion $ ('71)				3345	3219	3227	3025
62.	Total BTU/$	Thousand				56	39	31	44

Source: Ralph M. Doggett, International Reserach and Technology Corporation, Energy Demand by the Transportation Sector in 1985 and 2000: A Comparison of Five Studies, pp. 7, 8, 9, 11, and 12, prepared for Dr. Philip Patterson, Data Analysis Branch, Transportation Energy Conservation Section of the Energy Research and Development Administration, May 11, 1976.

Con't.

Modal passenger-mile fuel efficiency under three price scenarios
(passenger-miles per gallon)

	1972	1980			1985			1990		
		$4	$7	$11	$4	$7	$11	$4	$7	$11
Local										
Auto: Commuting	17.85	19.20	20.10	20.10	20.10	22.50	22.80	20.10	23.25	23.55
Business	20.23	21.76	22.78	22.78	22.78	25.50	25.84	22.78	26.35	26.69
Family	26.18	28.16	29.48	29.48	29.48	33.00	33.44	29.48	34.10	34.54
Social	29.75	32.00	33.50	33.50	33.50	37.50	38.00	33.50	38.75	39.25
Bus transit	78.56	89.50	89.50	89.50	89.50	89.50	89.50	89.50	89.50	89.50
Rail rapid transit[1]	45.23 (3.80)	48.48 (3.80)	48.48 (3.80)	48.48 (3.80)	50.05 (3.80)	50.05 (3.80)	50.05 (3.80)	51.67 (3.80)	51.67 (3.80)	51.67 (3.80)
Commuter rail[1]	36.03 (3,849)	43.17 (3,213)	43.17 (3,213)	43.17 (3,213)	44.59 (3,110)	44.59 (3,110)	44.59 (3,110)	46.57 (2,978)	46.57 (2,978)	46.57 (2,978)
Intercity										
Auto	47.58	51.22	53.30	53.30	54.34	59.54	59.80	53.82	61.88	62.14
Air	15.00	15.30	16.30	17.70	15.50	17.10	18.00	15.80	16.30	18.30
Rail[1]	36.03 (3,849)	43.17 (3,213)	43.17 (3,213)	43.17 (3,213)	44.59 (3,110)	44.59 (3,110)	44.59 (3,110)	46.57 (2,978)	46.57 (2,978)	46.57 (2,978)
Bus	117.97	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00

[1]Passenger-miles per gallon of diesel equivalent. For rail rapid transit, pmpg is calculated from PM/KWH, shown in parentheses. For rail and commuter rail, pmpg is calculated from BTU/PM, shown in parentheses. Conversion for electricity, in BTU/KWH are:

1972:	11,650
1980:	10,872
1985:	10,529
1990:	10,199

Changes in the conversion factor over time reflect estimates of improved efficiency in the heat rates of utility plants. The electricity input BTU measures (i.e., including electricity BTU conversion losses) are used to improve comparability with the energy intensiveness measures of modes which consume fuels directly.

Source: Federal Energy Administration, Project Independence Blueprint, Final Task Force Report - Project Independence and Energy Conservation: Transportation Sector, Vol. 2, p.S-20, U.S. Government Printing Office, Washington, D.C., November 1974.

Energy consumption for passenger travel under three price scenarios
(10^{12} BTU's)

Passenger modes	1972	1980			1985			1990		
		$4	$7	$11	$4	$7	$11	$4	$7	$11
Local										
Auto[1]	6,653.2	8,577.1	8,094.4	7,965.5	9,884.2	8,724.7	8,474.2	11,938.4	10,198.8	9,912.5
Bus transit	39.8	49.5	49.0	48.4	59.8	59.3	58.6	72.3	71.6	70.8
Rail rapid transit[2]	8.3	13.9	13.8	13.8	19.0	19.0	18.9	23.2	23.1	23.1
Commuter rail[2]	12.2	11.8	11.7	11.6	14.0	14.0	13.9	16.5	16.4	16.3
Subtotal, local	6,713.5	8,652.3	8,168.9	8,039.3	9,977.0	8,817.0	8,565.6	12,050.4	10,309.9	10,022.7
Intercity										
Auto	2,423.6	3,002.2	2,831.2	2,761.4	3,326.8	2,981.6	2,895.2	3,950.7	3,374.8	3,281.7
Air carrier (domestic)	1,071.3	1,781.8	1,666.1	1,517.0	2,387.2	2,144.0	2,016.3	3,119.1	2,992.4	2,623.1
Rail[2]	13.3	11.6	11.7	11.8	12.4	12.4	12.5	13.2	13.1	13.1
Bus	29.7	34.7	35.2	35.8	38.8	39.1	39.7	43.7	44.0	44.3
Subtotal, intercity	3,537.9	4,830.3	4,544.2	4,326.0	5,765.2	5,177.1	4,963.7	7,126.7	6,424.3	5,962.2
Other										
General aviation	90.3	123.4	119.6	115.8	150.7	146.4	141.5	186.8	181.6	175.7
International air	240.8	460.4	419.4	377.2	653.7	593.8	535.3	890.4	811.0	730.2
Personal use of trucks	911.0	1,161.7	1,096.3	1,076.2	1,325.4	1,174.5	1,140.7	1,594.2	1,361.9	1,323.7
Motorcycles	42.7	54.5	51.4	50.4	62.1	55.0	53.5	74.7	63.7	62.0
School and other bus	45.8	42.3	42.3	42.3	44.9	44.9	44.9	47.5	47.5	47.5
Subtotal, other	1,330.6	1,842.3	1,729.0	1,661.9	2,236.8	2,014.6	1,915.9	2,793.6	2,465.7	2,339.1
Total Passenger	11,582.0	15,324.9	14,442.1	14,027.2	17,979.0	16,008.7	15,445.2	21,970.7	19,199.9	18,324.0

[1] Includes taxis, which account for approximately 2 percent of local auto energy consumption in 1972.
[2] Electricity converted to BTU's at rate of 3412 BTU/KWH.

Source: Federal Energy Administration, Project Independence Blueprint, Final Task Force Report - Project Indenpendence and Energy Conservation: Transportation Sectors, Volume 2, p. S-21, U.S. Government Printing Office, Washington D.C., November 1974.

Energy consumption for freight transportation
under three price scenarios
(10^{12} BTU's)

Freight modes	1972	1980			1985			1990		
		$4	$7	$11	$4	$7	$11	$4	$7	$11
Domestic freight										
Railroads	556	587	588	590	650	651	652	720	720	719
Domestic water	300	373	346	319	417	387	358	466	431	396
For-hire truck local	81	107	104	101	125	121	117	147	142	138
For-hire truck intercity	587	792	761	723	910	875	835	1,045	1,004	959
Private truck local	415	584	566	549	693	672	651	817	793	768
Private truck intercity	433	527	501	474	604	573	543	691	657	622
Air - domestic	109	343	234	202	505	374	294	745	606	504
Pipelines	86	101	109	117	116	125	133	132	142	152
Subtotal, domestic freight	2,567	3,414	3,209	3,075	4,020	3,778	3,583	4,763	4,495	4,258
International freight										
Overseas water	303	403	403	403	432	432	432	478	478	478
Air - international	98	142	142	142	182	182	182	224	225	224
Subtotal, international freight	401	545	545	545	614	614	614	702	702	702
Other										
Non-freight trucking	1,375	1,971	1,911	1,852	2,350	2,280	2,209	2,808	2,724	2,640
Government trucking	126	185	179	174	223	216	209	270	262	253
Subtotal, other	1,501	2,156	2,090	2,026	2,573	2,496	2,418	3,078	2,986	2,893
Total Freight	4,469	6,115	5,844	5,646	7,207	6,888	6,615	8,543	8,183	7,853

Source: Federal Energy Administration, Project Independence Blueprint, Final Task Force Report - Project Independence and Energy Conservation: Transportation Sectors, Volume 2, p. S-37 U.S. Government Printing Office, Washington, D.C., November 1974.

3.2.3.01

Projected energy consumption by selected Reference Energy System[1] scenarios (quads)

	1985	2000	% Change 1985-2000
Scenario 0 no new initiatives			
Energy consumption	22.63	32.10	41.8
Automobile (gasoline engine)	10.48	12.84	22.5
Air transport (gas turbine)	6.22	8.63	38.7
Bus, truck, rail (I-C engine)	4.70	8.91	89.6
Ship	1.17	1.62	38.5
Pipelines	0.06	0.10	66.7
Scenario I improved efficiencies in end use			
Energy consumption	20.55	25.35	23.3
Automobile (gasoline engine)	9.81	9.17	6.5
Air transport (gas turbine)	5.28	7.33	38.8
Bus, truck, rail (I-C engines)	4.23	7.13	68.6
Ship	1.17	1.62	38.5
Pipelines	0.06	0.10	66.7
Scenario III intensive electrification			
Energy consumption	22.25	30.67	37.8
Automobile (gasoline engine)	10.38	11.55	11.3
Automobile (battery)	0.05	0.64	1180.0
Air transport (gas turbine)	6.22	8.63	38.7
Bus, truck, rail (I-C engines)	4.37	8.13	86.0
Ship	1.17	1.62	38.5
Pipelines	0.06	0.10	66.7
Scenario V combination of all technologies			
Energy consumption	20.45	24.43	19.5
Automobile (gasoline engine)	9.71	8.25	15.0
Automobile (battery)	.05	.64	1180.0
Air transport (gas turbine)	5.28	7.33	38.8
Bus, truck, rail (I-C engines)	4.23	7.13	68.6
Ship	1.17	1.62	38.5
Pipelines	0.06	0.10	66.7

[1] Projections made with the Reference Energy System model do not represent forecasts of the future. Rather they provide an indication of the relative impact of various strategies for achieving long-term national energy goals and are valuable in establishing the priorities for technological options.

Source: U.S. Energy Research and Development Administration, A National Plan for Energy Research, Development and Demonstration: Creating Energy Choices for the Future, ERDA-48, U.S. Government Printing Office, Washington, D.C., 1975.

Potential energy savings in transportation*: Zero Energy Growth vs. Technical Fix
(quadrillion Btu's)

	1985	2000	
Transportation energy use in TF scenario	21	27	
Potential savings			Conservative measures
Auto	--	1.9	Improve fuel economy to 33 mpg by 2000
	0.2	0.1	Shift urban traffic to buses: 10% by 1985; 25% by 2000
	--	0.2	Expand new communities
	--	0.3	Shift 10% of urban traffic to walkways and bikeways by 2000
Subtotal	0.2	2.5	
Air	1.2	4.5	Assume slower growth in air transport (3% per year for passenger travel and 6% per year for freight)
Trucks	--	0.8	15% reduction in freight hauling requirements by 2000
Rail	--	- 0.1	Passenger transport increases at 10% per year after 1975
		0.3	15% reduction in rail freight requirements by 2000
Total savings	1.4	8.0	
Transportation energy use in ZEG scenario	20	19	

* The transportation sector's share of energy processing losses are included in these numbers.
Source: Energy Policy Project of the Ford Foundation, A Time to Choose – America's Energy Future, p. 100, Cambridge, Massachusetts: Ballinger Publishing Co., 1974.

3.2.4.02

Potential energy savings in transportation:* Technical Fix vs. Historical Growth
(quadrillion Btu's)

	1985	2000	
Transportation energy use in HG scenario	29	43	
Potential savings			Conservative measures
Auto	5.9	9.9	Improve fuel economy to 20 mpg by 1985 and to 25 mpg by 2000
Air	1.1	2.9	Increase passenger load factor to 67% and ton load factor to 58%
	0.2	0.5	Reduce flight speeds 6%
	--	0.4	Shift short run (less than 400 miles) passenger trips to highspeed rail
	--	0.3	Shift short run (less than 400 miles) freight to truck and rail
Subtotal	1.3	4.1	
Trucks	--	1.6	Shift gasoline fueled trucks to diesel
	0.2	0.6	Shift intercity traffic to rail: 20% in 1985, 40% in 2000
Subtotal	0.2	2.2	
Total savings	7.4	16.2	
Transportation energy use in TF scenario	22	27	

* The transportation sector's share of all energy processing losses are included in these numbers.

Source: Energy Policy Project of the Ford Foundation, A Time to Choose — America's Energy Future, p. 58, Cambridge, Massachusetts: Ballinger Publishing Co., 1974.

Estimated vehicles, travel, and gasoline consumption based on Federal Highway Administration's Assumption Number 1[1]

Year and automobile size	Number automobiles	Annual miles per vehicle	Total vehicle-miles (automobiles)	Miles per gallon	Total gasoline consumption	Gallons per vehicle
	(millions)		(billions)		(billion gals)	
1972						
Standard	63.0	10,370	653.3	12.0	54.3	
Compact	22.0	10,000	220.0	16.0	13.7	
Economy	11.9	9,500	113.1	22.0	5.1	
Total	96.9	10,184	986.4	13.49	73.1	755
1980						
Standard	57.1	10,370	592.1	12.0	49.3	
Compact	30.9	10,000	309.0	16.0	19.3	
Economy	29.5	9,500	280.3	22.0	12.7	
Total	117.5	10,054	1,181.4	14.5	81.3	692
1985						
Standard	36.8	10,370	381.6	12.0	31.8	
Compact	40.2	10,000	402.0	16.0	25.1	
Economy	50.4	9,500	478.8	22.0	21.8	
Total	127.4	9,909	1,262.4	16.0	78.7	618
1990						
Standard	21.8	10,370	226.1	12.0	18.8	
Compact	40.1	10,000	407.0	16.0	25.4	
Economy	73.8	9,500	701.1	22.0	31.9	
Total	136.3	9,789	1,334.2	17.5	76.1	558
1990/1972	+40.7%	-3.9%	+35.3% (1.7% compounded annually)	+29.7%	+4.1%	

[1]The average annual vehicle-miles and miles per gallon for each vehicle size that existed in 1972 will remain constant so total vehicle-miles and total fuel consumption will be a function of those factors. The shift in car sizes is in accordance with estimates in Table 1.2.1.04.

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Travel Forecasts, p. 62, Washington, D.C., November 1974.

Estimated vehicles, travel, and gasoline consumption based on Federal Highway Administration's Assumption Number 2[1]

Year automobile size	Number automobiles	Annual miles per vehicle	Total vehicle-miles (automobiles)	Miles per gallon	Total gasoline consumption	Gallons per vehicle
	(millions)		(billions)		(billion gals)	
1972						
Standard	63.0	10,370	653.3	12.0	54.3	
Compact	22.0	10,000	220.0	16.0	13.7	
Economy	11.9	9,500	113.1	22.0	5.1	
Total	96.9	10,184	986.4	13.49	73.1	755
1980						
Standard	57.1	10,370	592.1	12.0	49.3	
Compact	30.9	10,300	318.3	16.0	19.9	
Economy	29.5	9,700	286.2	22.0	13.0	
Total	117.5	10,184	1,196.6	14.6	82.2	700
1985						
Standard	36.8	10,405	382.9	12.0	31.9	
Compact	40.2	10,400	418.1	16.0	26.1	
Economy	50.4	9,850	496.4	22.0	22.6	
Total	127.4	10,184	1,297.4	16.1	80.6	633
1990						
Standard	21.8	10,435	227.5	12.0	18.9	
Compact	40.7	10,428	424.4	16.0	26.5	
Economy	73.8	9,975	736.2	22.0	33.5	
Total	136.3	10,184	1,388.1	17.6	78.9	579
1990/1972	+40.7%	0.0%	+40.7% (1.9% compounded annually)	+30.4%	+7.9%	

[1]The average annual vehicle-miles for total automobiles will remain constant but those for individual automobile sizes may vary. The miles per gallon will remain constant at the 1972 level for each automobile size.

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Travel Forecasts, p. 63, Washington, D.C., November 1974.

Estimated vehicles, travel, and gasoline consumption based on Federal Highway Administration's Assumption Number 3[1]

Year and automobile size	Number automobiles	Annual miles per vehicle	Total vehicle-miles (automobiles)	Miles per gallon	Total gasoline consumption	Gallons per vehicle
	(millions)		(billions)		(billion gals)	
1972						
Standard	63.0	10,370	653.3	12.0	54.3	
Compact	22.0	10,000	220.0	16.0	13.7	
Economy	11.9	9,500	113.1	22.0	5.1	
Total	96.9	10,184	986.4	13.49	73.1	755
1980						
Standard	57.1	10,370	592.1	13.1	45.2	
Compact	30.9	10,300	318.3	17.0	18.2	
Economy	29.5	9,700	286.2	23.0	12.4	
Total	117.5	10,184	1,196.6	15.7	75.8	649
1985						
Standard	36.8	10,405	382.9	14.5	26.4	
Compact	40.2	10,400	418.1	17.5	23.9	
Economy	50.4	9,850	496.4	24.0	20.7	
Total	127.4	10,184	1,297.4	18.3	71.0	557
1990						
Standard	21.8	10,435	227.5	16.0	14.2	
Compact	40.7	10,428	424.4	18.0	23.6	
Economy	73.8	9,975	736.2	24.5	30.0	
Total	136.3	10,184	1,388.1	20.5	67.8	497
1990/1972	+40.7%	0.0%	+40.7% (1.9% compounded annually)	+51.7%	-7.3%	

[1]The average annual vehicle-miles per automobile will vary as stated in Assumption 2 and the miles per gallon will vary as more efficient cars in each size class are developed.

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Travel Forecasts, p. 65, Washington, D.C., November 1974.

Estimated vehicles, travel, and gasoline consumption based on Federal Highway Administration's Assumption Number 4[1]

Year and automobile size	Number automobiles	Annual miles per vehicle	Total vehicle-miles (automobiles)	Miles per gallon	Total gasoline consumption	Gallons per vehicle
	(millions)		(billions)		(billion gals)	
1972						
Standard	63.0	10,370	653.3	12.0	54.3	
Compact	22.0	10,000	220.0	16.0	13.7	
Economy	11.9	9,500	113.1	22.0	5.1	
Total	96.9	10,184	986.4	13.49	73.1	755
1980						
Standard	57.1	9,700	554.1	13.1	42.3	
Compact	30.9	10,100	312.1	17.0	18.4	
Economy	29.5	9,700	286.2	23.0	12.4	
Total	117.5	9,800	1,152.4	15.8	73.1	622
1985						
Standard	36.8	10,950	403.1	14.5	27.8	
Compact	40.2	10,600	426.1	17.5	24.3	
Economy	50.4	10,000	504.0	24.0	21.0	
Total	127.4	10,460	1,333.2	18.2	73.1	574
1990						
Standard	21.8	11,700	255.1	16.0	15.9	
Compact	40.7	11,100	451.8	18.0	25.1	
Economy	73.8	10,650	786.4	24.5	32.1	
Total	136.3	10,950	1,493.3	20.4	73.1	536
1990/1972	+40.7%	+7.5%	+51.4% (2.2% compounded annually)	+51.7%	0.0%	

[1]The total gasoline that can be made available will be that shown for 1972, the base year. Average annual vehicle-miles and miles per gallon may change as demand changes and more efficient cars are developed.

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Travel Forecasts, p. 66, Washington, D.C., November 1974.

Estimated vehicles, travel, and gasoline consumption based on Federal Highway Administration's Assumption Number 5[1,2]

Year and automobile size	Number automobiles	Annual miles per vehicle	Total vehicle-miles (automobiles)	Miles per gallon	Total gasoline consumption	Gallons per vehicle
	(millions)		(billions)		(billion gals)	
1972						
Standard	63.0	10,370	653.3	12.0	54.3	
Compact	22.0	10,000	220.0	16.0	13.7	
Economy	11.9	9,500	113.1	22.0	5.1	
Total	96.9	10,184	986.4	13.5	73.1	755
1980						
Standard	57.1	9,700	554.1	13.1	42.3	
Compact	30.9	10,100	312.1	17.0	18.4	
Economy	29.5	9,700	286.2	23.0	12.4	
Total	117.5	9,808	1,152.4	15.8	73.1	622
1985						
Standard	36.8	11,492	422.9	14.5	29.2	
Compact	40.2	11,100	446.2	17.5	25.5	
Economy	50.4	10,490	528.7	24.0	22.1	
Total	127.4	10,972	1,397.8	18.2	76.8	603
1990						
Standard	21.8	12,835	279.8	16.0	17.5	
Compact	40.7	12,194	496.3	18.0	27.6	
Economy	73.8	11,709	864.1	24.5	35.3	
Total	136.3	12,034	1,640.2	20.4	80.4	590
1990/1972	+40.7%	+18.2%	+66.3% (2.9% compounded annually)	+51.1%	+10.0%	

[1]Fuel consumption in 1985 will be 5 percent higher than 1972; and in 1990, 10 percent higher.

[2]This assumption is the same as in 4, except that the total gasoline available will be increased after 1980.

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Travel Forecasts, p. 67, Washington, D.C., November 1974.

Bibliography — Chapter 3

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GOVERNMENT IMPACTS

Government Impacts

This chapter presents information on the three major areas of government impact in transportation: taxes and expenditures; regulations; and government research, development and demonstration programs. Because of energy problems, government actions have become a focal point regarding policy formulation in areas of transportation and transportation conservation.

Taxes and expenditures associated with the transportation sector comprise the first section of the chapter. Transportation taxes as a percent of total federal taxes collected are shown on page 124. Even though federal transportation related taxes have increased approximately 400 percent since 1950, their share of total federal tax receipts has declined over the 1950-1973 period from 23 percent to 16 percent. Page 126 shows similar data for state taxes.

As detailed in Section 4.1, excise taxes, user taxes, motor vehicle registration fees and gasoline taxes encompass the sources of revenue. Federal highway trust fund receipts and disbursements account for a majority of funding of transportation facilities, based upon public transportation dollar outlays, as shown on pages 132 and 133.

Section 4.2 reviews selected transportation conservation measures mandated by the Energy Policy and Conservation Act of 1975. In future issues of this data book, a review of emission standards, safety regulations and other governmental regulations will be included in this section.

Section 4.3 outlines government research, development and demonstration programs related to transportation energy use. As shown on page 138, outlays for direct energy research and development of the

Energy Research and Development Administration are planned to double between 1975 and 1977 fiscal years. Federal transportation research planning, exclusive of ERDA efforts are planned to comprise four percent of the total U.S. Government research and development programs, as noted on page 144. The role of federal agencies in dealing with the national energy situation is shown on page 137.

Federal taxes derived from transportation

(in millions of dollars)

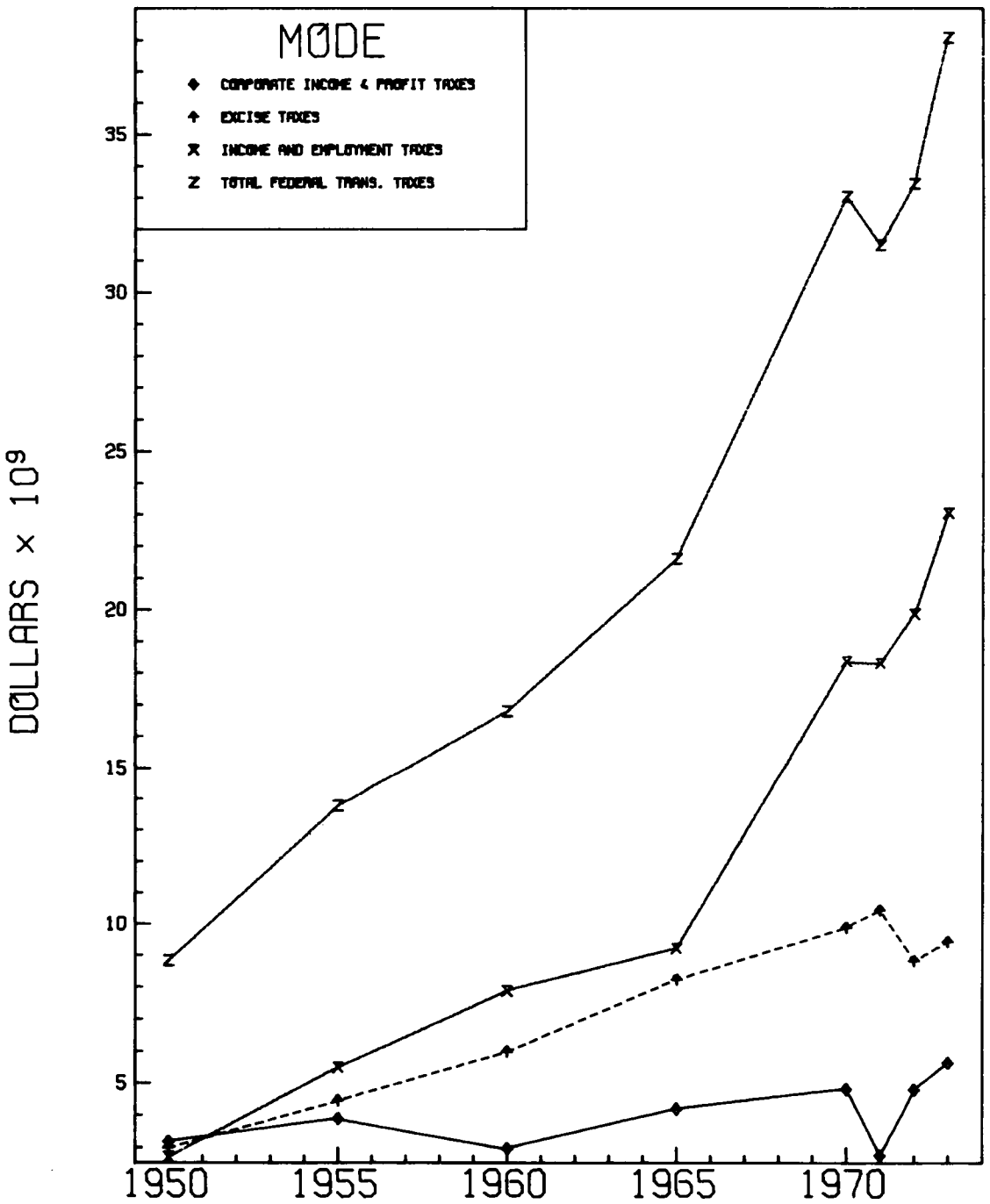
	1950	1955	1960	1965	1970	1971	1972	1973
Corporate income and profits taxes								
Transportation companies	862	809	684	779	788	563	753	980
Transport equipment mfgrs., exc. motor	162	456	322	518	629	454	449	538
Motor vehicle and equipment mfgrs.	1,799	2,434	1,729	2,591	2,927	1,328	3,026	3,438
Automotive sales and services	342	172	214	287	451	393	548	653
Total	3,165	3,871	2,949	4,175	4,795	2,738	4,776	5,609
Excise Taxes[1]								
Gasoline	568	999	2,224	2,627	3,447r	3,455r	3,674	3,906
Diesel and special motor fuels	- -	25	82	151	265	275	321	358
Use tax on large motor vehicles	- -	- -	45	103	141	152	163	202
Lubricating oil	45	43	47	48	57	53	57	61
Motor vehicles, parts, and accessories	781	1,595	1,781	2,439	2,439	2,742r	403r	629
Tires, tubes, and tread rubber	184	177	299	458	614	627	696	794
Transportation of property	340	431	2	- -	11	22	29	37
Transportation of people	229	200	261	122	337	423	556r	624
Other excise taxes*	831	962	1,235	2,280	2,546	2,685	2,904	2,801
Total	2,978	4,432	5,976	8,228	9,975r	10,434r	8,803r	9,412
Income and employment taxes*	2,673	5,453	7,856	9,199	18,343	18,287	19,837	23,035
Total federal transportation taxes	8,816	13,756	16,781	21,602	33,013r	31,459r	33,416r	38,056
Total federal taxes	38,957	66,289	91,775	114,435	195,722	191,647	209,856	237,787
Percent transportation of total	22.6%	20.8%	18.3%	18.9%	16.9%r	16.4%r	15.0%	16.0%

[1]No adjustments have been made for changes in rates or coverage.
*Paid by people employed in transportation.

Sources: Transportation Facts & Trends, Eleventh Edition, p. 27, Transportation Association of America, Washington, D.C., 1974. Transportation Facts & Trends, Quarterly Supplement - October 1975, Eleventh Edition, Transportation Association of America, Washington, D.C., 1976.

4.1.02

FEDERAL TAXES DERIVED FROM TRANSPORTATION



SOURCE: TRANS. FACTS

State taxes derived from transporation

(in millions of dollars)

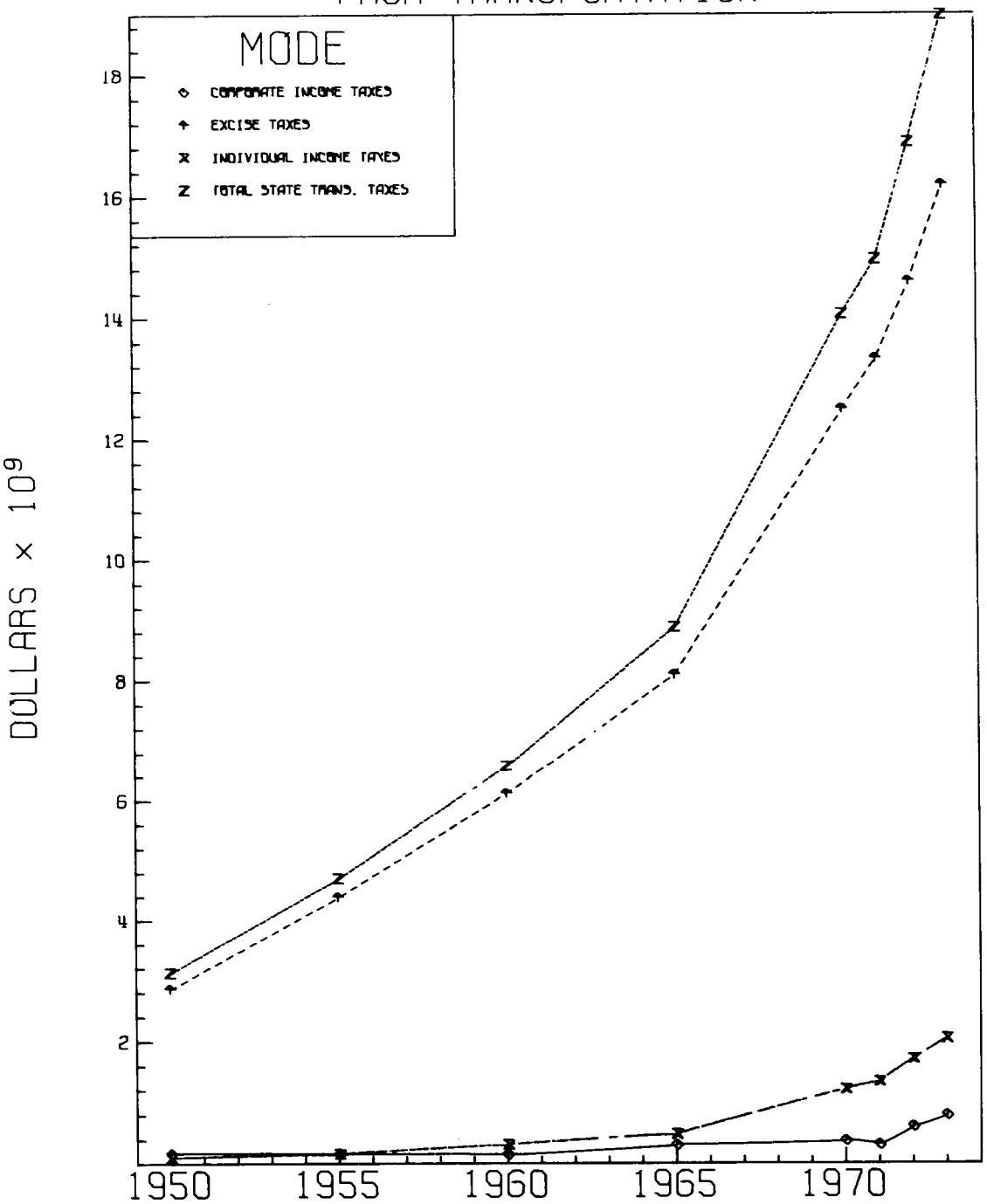
	1950	1955	1960	1965	1970	1971	1972	1973
Corporate income taxes	171	156	153	308	374	309	601	781
Excise taxes								
Motor fuels	1,544	2,353	3,335	4,300	6,283	6,628	7,216	8,058
Motor vehicle and operator licensing	755	1,184	1,468	2,021	2,955	3,174	3,340	3,636
Other state taxes*	549	847	1,307	1,762	3,239	3,509	4,024	4,471
Total	2,848	4,384	6,110	8,083	12,476	13,311	14,580	16,165
Individual income taxes*	98	158	309	475	1,194	1,320	1,689	2,026
Total state transportation taxes	3,117	4,698	6,572	8,866	14,044	14,940	16,870	18,972
Total states taxes	7,929	11,597	18,036	26,126	47,961	51,541	59,870	68,069
Percent transportation of total	39.3%	40.5%	36.4%	33.9%	29.3%	29.0%	28.2%	27.0%

*Paid by people employed in transporation.

Sources: Transporatation Facts & Trends, Eleventh Edition, p. 27, Transportation Association of America, Washington, D.C., 1974. Transportation Facts & Trends, Quarterly Supplement - October 1975, Eleventh Edition, Transportation Association of America, Washington, D.C., 1976.

4.1.04

STATE TAXES DERIVED FROM TRANSPORTATION



SOURCE: TRANS. FACTS

Average annual federal taxes per vehicle, January 1973

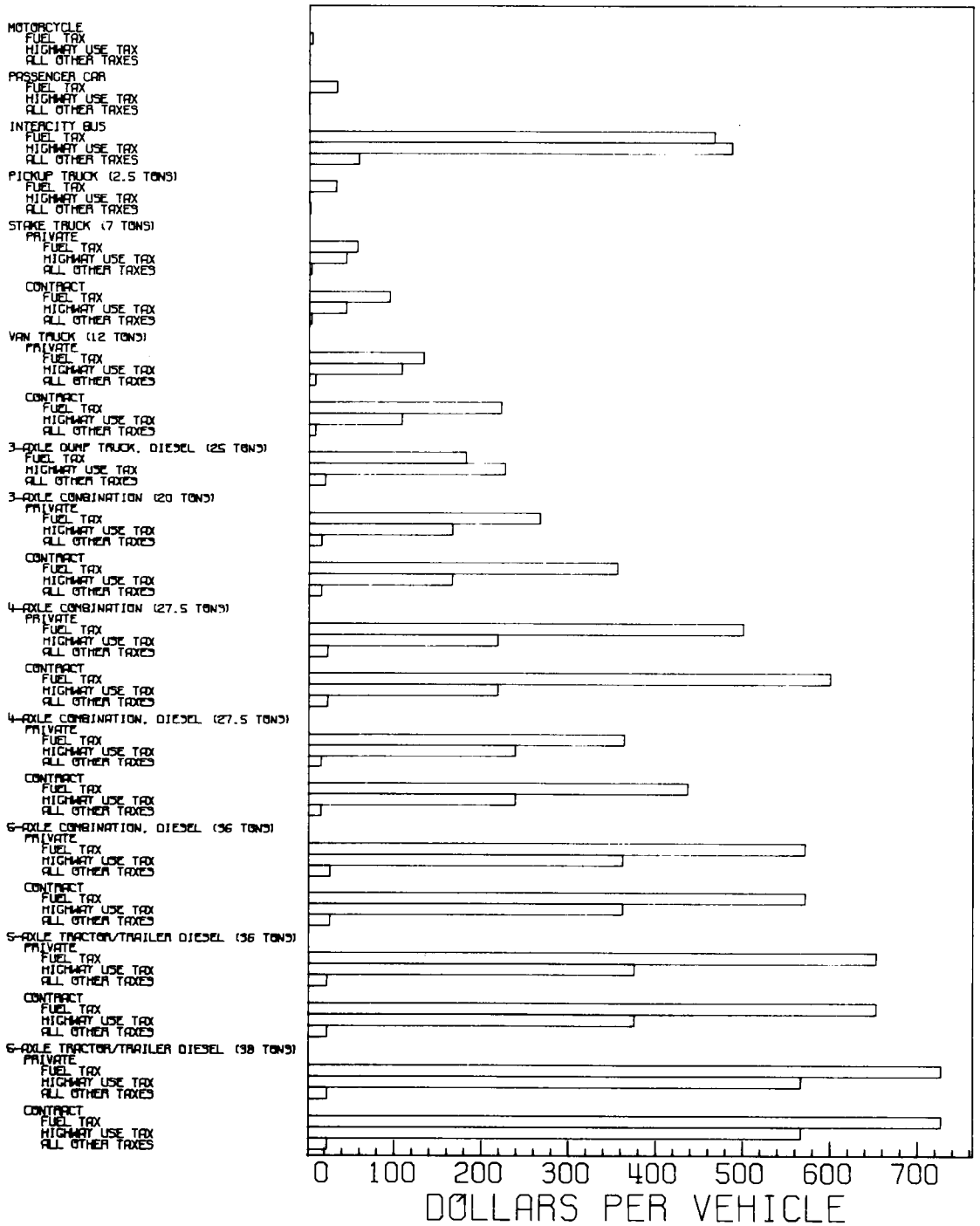
Vehicle and service	Fuel tax	Motor vehicle excise tax	Tires tubes & retread rubber	Parts and accessories	Lubricating oil	Highway use tax	Total taxes dedicated highway trust fund
Motorcycle	$ 3.60	$ --	$ 1.00	$ --	$ .05	$ --	$ 4.65
Passenger car, medium weight	32.84	--	4.55	--	.47	--	37.86
Intercity bus, common carrier	466.68	486.67	83.05	57.76	6.67	102.00	1,202.83
5,000 lbs. GVW pickup truck							
Private	31.68	--	4.00	1.52	.45	--	37.65
14,000 lbs. GVW stake truck							
Private	56.48	43.70	8.05	2.88	.80	--	111.91
Contract	94.12	43.70	13.50	2.88	1.34	--	155.54
24,000 lbs. GVW van truck							
Private	133.32	108.29	11.95	7.68	1.90	--	263.14
Contract	222.24	108.29	19.90	7.68	3.17	--	361.28
50,000 lbs. GVW, diesel, 3-axle dump truck							
Private	181.80	226.75	69.60	19.60	2.60	120.00	620.35
50,000 lbs. GVW, 3-axle combination							
Private	266.68	166.04	35.70	14.96	3.81	120.00	607.19
Contract	355.56	166.04	47.65	14.96	5.08	120.00	709.29
55,000 lbs. GVW, 4-axle combination							
Private	500.00	218.71	84.15	22.48	7.14	150.00	982.48
Contract	600.00	218.71	101.05	22.48	8.57	150.00	1,100.81
55,000 lbs. GVW, diesel, 4-axle combination							
Private	363.64	238.64	84.15	14.48	5.19	150.00	856.10
Contract	436.36	238.64	101.05	14.48	6.23	150.00	946.76
72,000 lbs. GVW, diesel, 5-axle combination							
Private	571.44	362.26	157.85	25.36	8.16	210.00	1,335.07
Contract	571.44	362.26	157.85	25.36	8.16	210.00	1,335.07
72,000 lbs. GVW, diesel, 5-axle tractor - semitrailer & full trailer							
Private	653.08	375.63	171.05	22.24	9.32	180.00	1,411.32
Contract	653.08	375.63	171.05	22.24	9.32	180.00	1,411.32
76,000 lbs. GVW, diesel, 5-axle truck & full trailer							
Private	727.28	566.35	171.05	22.24	10.39	222.00	1,719.31
Contract	727.28	566.35	171.05	22.24	10.39	222.00	1,719.31

Source: 1975 Motor Truck Facts, p. 57, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975.

4.1.06

AVERAGE ANNUAL FEDERAL TAXES

DEDICATED TO HIGHWAY TRUST FUND



SOURCE: 1975 MOTOR TRUCK FACTS

Average annual state taxes per vehicle, 1973

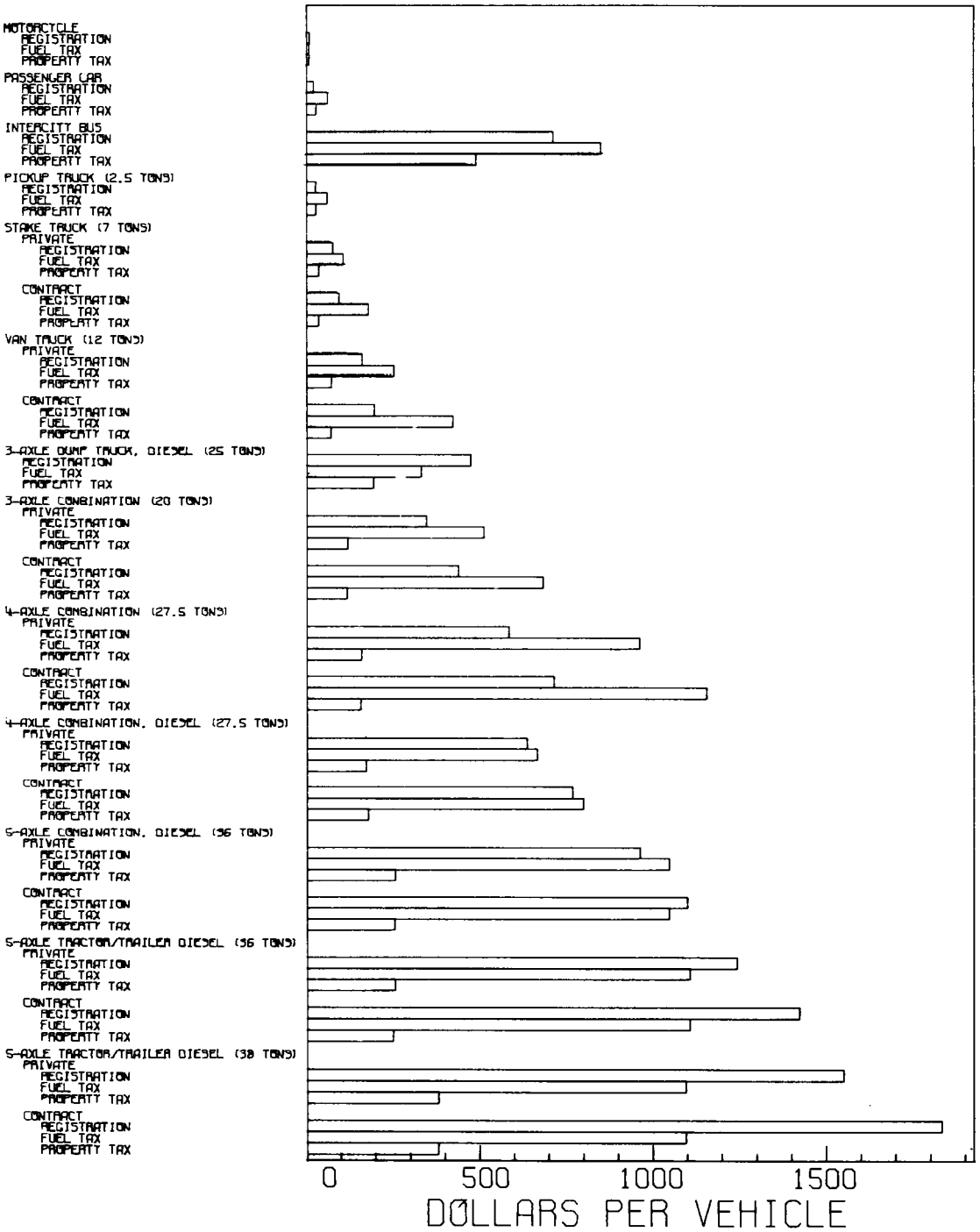
Vehicle and service	Registration fee	Motor fuel tax	Total road-user taxes	Property tax	Total
Motorcycle	$ 7.42	$ 6.86	$ 14.28	$ 7.09	$ 21.38
Passenger car, medium weight	20.04	62.46	82.50	27.86	110.36
Intercity bus, common carrier	713.96	851.01	1,564.97	490.49	2,055.45
5,000 lbs. GVW pickup truck					
Private	25.68	60.41	86.09	26.90	112.99
14,000 lbs. GVW stake truck					
Private	77.00	107.70	184.70	35.88	220.58
Contract	95.20	179.47	274.67	35.43	310.10
24,000 lbs. GVW van truck					
Private	161.86	254.22	416.08	72.52	488.60
Contract	196.71	423.78	620.49	71.69	692.19
50,000 lbs. GVW, diesel, 3-axle dump truck					
Private	475.56	332.06	807.62	195.15	1,002.77
40,000 lbs. GVW, 3-axle combination					
Private	348.31	513.75	862.06	119.18	981.24
Contract	439.80	684.98	1,124.77	118.06	1,242.83
55,000 lbs. GVW, 4-axle combination					
Private	585.47	963.24	1,548.70	159.77	1,708.47
Contract	715.99	1,155.88	1,871.87	157.99	2,029.86
55,000 lbs. GVW, diesel, 4-axle combination					
Private	637.70	666.71	1,304.40	173.53	1,477.93
Contract	769.44	799.99	1,569.43	178.36	1,747.79
72,000 lbs. GVW, diesel, 5-axle combination					
Private	964.01	1,047.64	2,011.65	256.54	2,268.19
Contract	1,099.85	1,047.64	2,147.49	254.66	2,402.15
72,000 lbs. GVW, diesel					
5-axle tractor-semitrailer & full trailer					
Private	1,243.16	1,106.30	2,349.46	255.67	2,605.13
Contract	1,423.43	1,106.30	2,529.72	250.62	2,780.34
76,000 lbs. GVW, diesel					
5-axle truck and full trailer					
Private	1,550.42	1,096.27	2,646.69	382.30	3,029.99
Contract	1,833.75	1,096.27	2,930.02	382.30	3,312.32

Source: 1975 Motor Truck Facts, p. 56, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975.

4.1.08

AVERAGE STATE TAXES: 1973

ROAD-USER AND PERSONAL PROPERTY



SOURCE: 1975 MOTOR TRUCK FACTS

Highway trust fund[3] receipts and disbursements

(in millions)

Receipts

Fiscal year	Motor fuel	Tires, tubes & tread rubber	Trucks, buses and trailers	Motor truck use	Oil	Truck & bus parts and accessories	Interest on investment	Total
1974	$4,302	$895	$614	$225	$94	$130	$415	$6,675
1973	4,159	781	380	161	80	104	247	5,912
1972	3,893	682	436[1]	151	73	87	206	5,528[1]
1971	3,934	629	693	148	52	85	184	5,725
1970	3,693	642	700	137	95	87	115	5,469
1969	3,181	609	541	129	83	94	53	4,690
1968	3,096	512	510	98	82	81	33	4,428
1967	3,124	543	525	112	68	69	14	4,455
1966	2,846	497	442	102	23	7	7	3,924
1965	2,736	430	393	99	--	--	11	3,669
1964	2,643	413	357	106	--	--	20	3,539
1963	2,462	409	311	97	--	--	14	3,293
1962	2,374	367	128	80	--	--	7	2,956
1961	2,361	275	115	47	--	--	1	2,799
1960	2,044	315	142	38	--	--	- 3	2,536
1959	1,657	276	107	34	--	--	13	2,087
1958	1,608	274	111	33	--	--	18	2,044
1957	1,326	93	34	26	--	--	3	1,482

Disbursements

Fiscal year	Receipts	Interstate highway	Other[2]	Total	Balance in the fund	Liability for unpaid obligations	Balance less liability for unpaid obligations
1974	$6,675	NA	NA	$4,576	$7,690	$8,012	$- 322
1973	5,912	$3,400	$1,411	4,811	5,591	7,703	-2,112
1972	5,528	3,468	1,222	4,690	4,490	7,918	-3,428
1971	5,725	3,456	1,229	4,685	3,652	7,512	-3,860
1970	5,469	3,289	1,089	4,378	2,612	7,535	-4,923
1969	4,690	3,149	1,002	4,151	1,521	7,124	-5,603
1968	4,428	3,207	964	4,171	982	6,617	-5,635
1967	4,455	2,976	998	3,974	725	6,556	-5,831
1966	3,924	2,978	987	3,965	244	6,748	-6,504
1965	3,670	3,016	1,010	4,026	285	6,665	-6,380
1964	3,539	2,635	1,010	3,645	641	6,669	-6,028
1963	3,293	2,109	908	3,017	747	6,149	-5,402
1962	2,956	1,914	870	2,784	471	5,239	-4,768
1961	2,799	1,719	900	2,619	299	4,989	-4,690
1960	2,536	1,861	1,079	2,940	119	4,421	-4,302
1959	2,087	1,501	1,112	2,613	523	4,751	-4,228
1958	2,044	675	836	1,511	1,049	3,855	-2,806
1957	1,482	208	758	966	516	2,421	-1,905

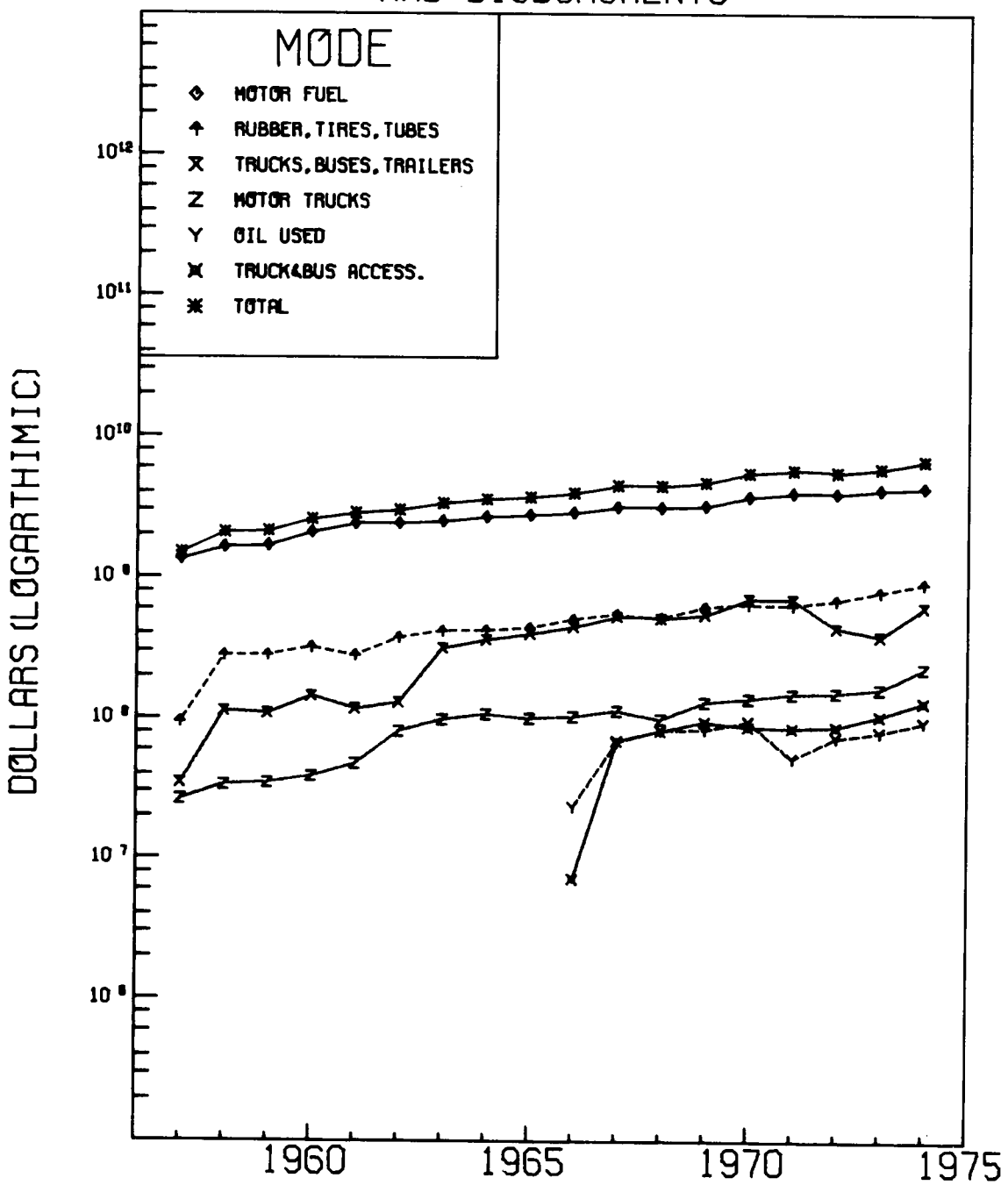
[1]The Federal excise tax on light trucks of 10,000 lbs. or less gross vehicle weight was repealed effective September 22, 1971.

[2]Includes expenditures for both primary and secondary urban and rural highways, TOPICS, emergency relief funds, bridge and dam design and construction, forest highways, public land highways, bridge replacement and highway safety research and development.

[3]See "Highway trust fund" in glossary for detailed discussion.

Source: 1975 Motor Truck Facts, p. 60, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975.

HIGHWAY TRUST FUND RECEIPTS 4.1.10
AND DISBURSMENTS



SOURCE: 1975 MOTOR TRUCK FACTS

4.1.11

Federal and state expenditures for transport facilities
(in millions of dollars)

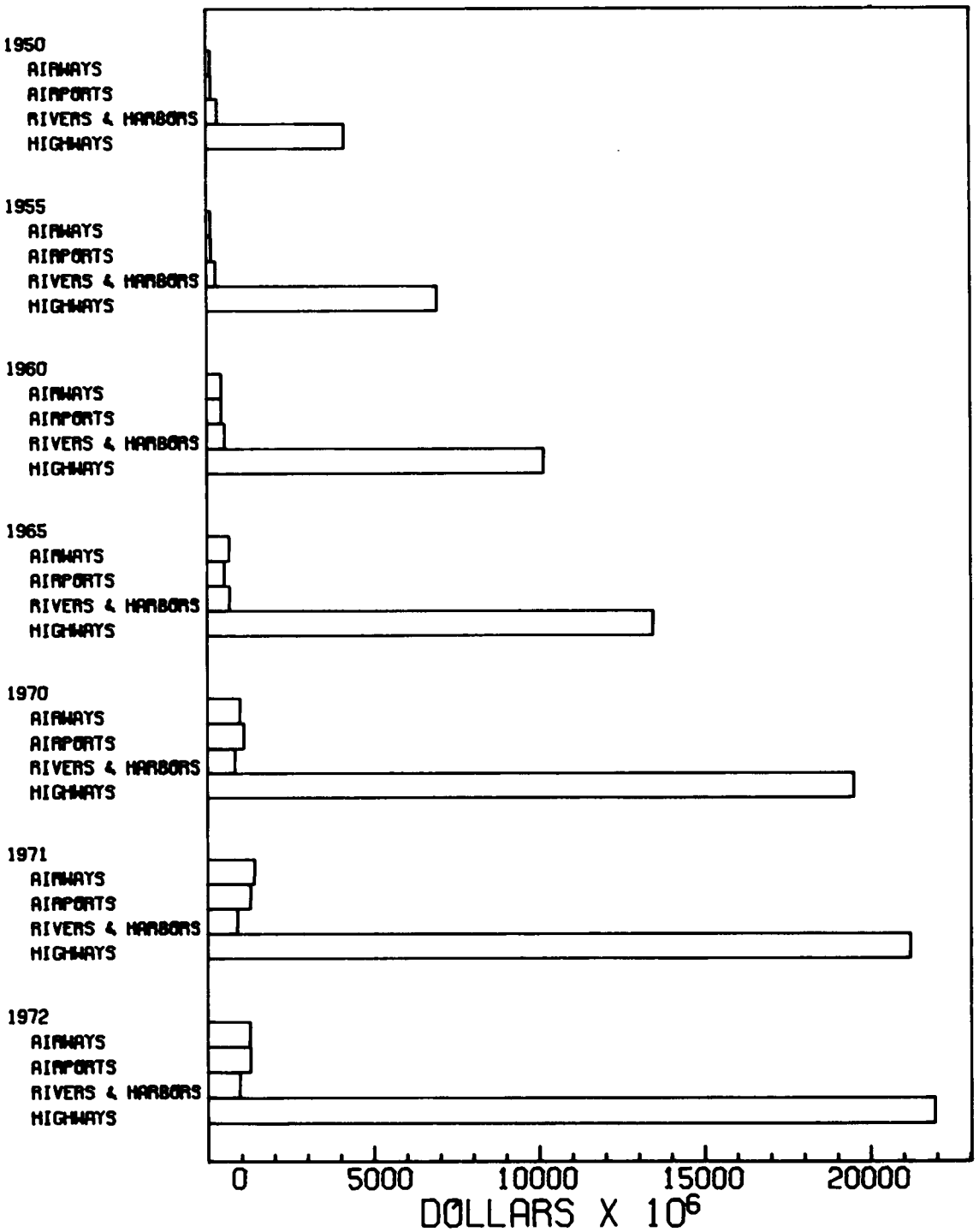
		Airways		Airports		Rivers & harbors		Highways		Grand Total
1950	Federal	115		44		189		503		
	State & local	--		101		136		3,652		
	Total		115		145		325		4,155	4,740
1955	Federal	108		14		119		784		
	State & local	--		114		154		6,157		
	Total		108		128		273		6,941	7,450
1960	Federal	429		79		287		2,753		
	State & local	--		342		237		7,407		
	Total		429		421		524		10,160	11,534
1965	Federal	652		95		391		4,137		
	State & local	--		415		276		9,319		
	Total		652		510		667		13,456	15,285
1970	Federal	965		111		376		5,181		
	State & local	--		969		444		14,321		
	Total		965		1,080		820		19,502	22,367
1971	Federal	1,398		215		385		5,646		
	State & local	--		1,061		504		15,560		
	Total		1,398		1,276		889		21,206	24,769
1972	Federal	1,261		125		425		5,424		
	State & local	--		1,156		527		16,518		
	Total		1,261		1,281		952		21,942	25,436

NOTE: AMTRAK and Urban & Hi-Speed Ground transport Federal expenditures not included above: (1965) $11.1; (1970) $117.8; (1971) $222.3; (1972) $329.6 millions.

Source: Transportation Facts & Trends, Eleventh Edition, p. 26, Transportation Association of America, Washington, D.C., 1974.

4.1.12

FEDERAL AND STATE EXPENDITURES FOR TRANSPORTATION FACILITIES



SOURCE: TRANS. FACTS

4.2.01

Selected transportation conservation measures enacted by the Energy Policy and Conservation Act, Public Law 94-163, December 22, 1975

Mandatory average fuel economy standards for passenger automobiles	Model year	Miles per gallon
	1978	18.0
	1979	19.0
	1980	20.0
	1981-1984	Determined by the Secretary of Transportation[1]
	1985	27.5[2]
Mandatory Federal government fleet average fuel economy	18.0 mpg or the average fuel economy standard described above, whichever is greater.	
Selected eligibility requirements for Federal assistance with state energy conservation plans	1) Programs to promote the availability and use of carpools, vanpools, and public transportation (except that no Federal funds provided under this part shall be used for subsidizing fares for public transportation).	
	2) A traffic law or regulation which, to the maximum extent practicable consistent with safety, permits the operator of a motor vehicle to turn such vehicle right at a red stop light after stopping.	
	3) Transportation controls which can be defined as any plan, procedure, method, or arrangement, or any system of incentives, disincentives, restrictions, and requirements, which is designed to reduce the amount of energy consumed in transportation, except for rationing of gasoline or diesel fuel.	

[1]Not later than July 1, 1977, the Secretary shall prescribe, by rule, average fuel economy standards for passenger automobiles manufactured in each of the model years 1981 through 1984. Any such standard shall apply to each manufacturer and shall be set for each such model year at a level which the Secretary determines (A) is the maximum feasible average fuel economy level, and (B) will result in steady progress toward meeting the average fuel economy standard established by or pursuant to this subsection for model year 1985.

[2]The Secretary may, by rule, amend the average fuel economy standard for model year 1985, or for any subsequent model year, to a level which he determines is the maximum feasible average fuel economy level for such model year, except that any amendment which has the effect of increasing an average fuel economy standard to a level in excess of 27.5 miles per gallon, or of decreasing any such standard to a level below 26.0 miles per gallon, shall be submitted to the Congress in accordance with section 551 of the Energy Policy and Conservation Act and shall not take effect if either House of the Congress disapproves such amendment in accordance with the procedures specified in such section.

Source: "Energy Policy and Conservation Act," Public Law 94-163, Ninety-Fourth Congress, December 22, 1975.

4.3.01

The role of federal agencies in dealing with the national energy situation

Tasks	Agencies
Recommending comprehensive national energy policy that is in balance with other national policies and priorities.	Energy Resources Council Council of Economic Advisors Council on Environmental Quality Domestic Council Water Resources Council Federal Energy Administration
Managing the expenditure of energy on related RD&D resources.	Energy Research and Development Administration Department of the Interior Environmental Protection Agency Nuclear Regulatory Commission National Science Foundation National Aeronautics and Space Administration
Involved in the regulatory aspects of environmental protection and human health and safety.	Environmental Protection Agency National Institute of Environmental Health Sciences National Institute for Occupational Safety and Health Department of Labor (Occupational Safety and Health Administration) Occupational Safety and Health Review Commission
Involved in setting standards and regulations for energy-related organizations.	Federal Energy Administration Federal Power Commission Nuclear Regulatory Commission Department of Commerce (National Bureau of Standards) Department of Transportation Federal Trade Commission Interstate Commerce Commission Federal Maritime Commission
Work with the private sector to assist the market penetration of key energy technologies.	Department of Housing and Urban Development Department of Commerce Department of the Interior Small Business Administration Department of Transportation General Services Administration
Deal with other areas that have direct energy implications.	Department of State Department of the Treasury Department of Defense Department of Health, Education and Welfare

Source: U.S. Energy Research and Development Administration, A National Plan for Energy Research, Development, and Demonstration: Creating Energy Choices for the Future, ERDA 76-1, Volume 1: The Plan, U.S. Government Printing Office, Washington, D.C., April 1976.

Federal energy Research and Development (R&D) funding (in millions)

	FY 75		FY 76[1]		FY 77	
	Authority	Outlays	Authority	Outlays	Authority	Outlays
Direct energy R&D						
ERDA	$1,317.0	$1,011.0	$1,657.0	$1,427.0	$2,435.0	$2,009.0
DOI	89.9	54.2	104.0	93.3	98.3	96.3
EPA	80.8	18.2	56.8	76.6	55.4	76.6
NRC	58.9	51.7	87.5	76.9	104.0	98.2
NASA	0.8	0.8	1.7	1.0	-0-	0.8
Subtotal	1,547.4	1,135.9	1,907.0	1,674.8	2,692.7	2,280.9
Supporting R&D						
ERDA	362.0	313.0	403.0	373.0	430.0	404.0
DOI	33.2	30.9	59.0	56.7	66.8	65.2
NPA	53.2	5.0	43.2	43.4	41.6	43.4
NRC	2.3	2.1	9.6	9.1	5.3	5.0
NSF	103.2	65.9	114.6	74.2	123.4	106.9
Subtotal	553.9	416.9	629.4	556.4	667.1	624.5
Total Federal Energy R&D	$2,101.3	$1,551.9	$2,536.4	$2,231.2	$3,359.8	$2,905.4

[1]Funds for FY 76 Transition Quarter are not included.

Source: U.S. Energy Research and Development Administration, A National Plan for Energy Research, Development and Demonstration: Creating Energy Choices for the Future, p. 10, ERDA 76-1, Volume 1: The Plan, U.S. Government Printing Office, Washington, D.C., April 1976.

4.3.03

Energy Research and Development Administration (ERDA)
Research and Development (R&D) budget
(authority and outlays in millions)

	FY 75		FY 76[1]		FY 77		FY 76 to FY 77 percent change[2]	
	Authority	Outlays	Authority	Outlays	Authority	Outlays	Authority	Outlays
Direct energy R&D								
Nuclear fuel cycle and safeguards	$ 118	$ 120	$ 173	$ 163	$ 347	$ 282	101	73
Conservation	36	21	75	55	120	91	60	64
Geothermal	28	21	31	32	100[3]	50	223	57
Fusion	183	151	250	224	392	304	57	36
Fission	567	538	602	522	823	709	37	36
Solar	42	15	115	86	160	116	39	35
Fossil	335	138	398	333	477	442	20	33
Environmental control tech.	8	7	13	12	16	15	23	24
Subtotal	1,317	1,011	1,657	1,427	2,435	2,009		
Supporting research								
Basic energy sciences	191	165	210	188	227	205	8	9
Environmental research	171	148	193	185	203	199	5	7
Subtotal	362	313	403	373	430	404		
Total ERDA energy RD&D	$1,679	$1,324	$2,060	$1,800	$2,865	$2,413		

[1]Funds for FY 76 Transition Quarter are not included.

[2]Percentage change calculated prior to rounding outlays.

[3]Includes $50 million for Geothermal Loan Guarantee Program.

Source: U.S. Energy Research and Development Administration, A National Plan for Energy Research, Development and Demonstration: Creating Energy Choices for the Future, p. 10, ERDA 76-1, Volume 1: The Plan, U.S. Government Printing Office, Washington, D.C., April 1976.

4.3.04

Estimates of Research and Development (R&D) funding of the private sector, by industry group

	Millions of dollars
Oil	660[1]
Oil equipment	50[2]
Natural gas	100[2]
Gas equipment	25[2]
Gas transmission	50[3]
Coal	6[2]
Electric utilities	150[3]
Electric utility equipment suppliers	350[4]
Total	1,391

[1]American Petroleum Institute (API) estimate. This figure includes R&D on synthetic fuels, oil shale, tar sands, coal gasification and liquefaction, and expenditures by the petroleum industry on chemicals.

[2]Oil Information Center, University of Oklahoma.

[3]Federal Power Commission.

[4]Informed Industry source. Includes expenditure on nuclear power.

Source: Energy Policy Project of the Ford Foundation, A Time to Choose America's Energy Future, p. 308, Cambridge, Massachusetts: Ballinger Co., 1974.

4.3.05

Major energy Research, Development and Demonstration (RD&D) in other nations

Country	Estimated Current Budget	Major Thrust
France	$700 million	Sixty percent of budget devoted to current and future nuclear technology. Also coal mining technology and oil and gas exploration, storage and transport.
West Germany	$450 million	Sixty-five percent devoted to nuclear and twenty-five percent to coal extraction and utilization.
United Kingdom	$350 million	Sixty percent devoted to nuclear power.
Canada	$220 million	Fifty percent devoted to derived fuels mainly in situ conversion of coal and tar sands. Thirty percent devoted to nuclear technology.
Japan	$200 million	Eighty percent devoted to the nuclear option.
USSR	Unknown	All aspects of technology believed receiving emphasis in a broadly based program.

Source: U.S. Energy Research and Development Administration, A National Plan for Energy Research, Development & Demonstration: Creating Energy Choices for the Future, p. C-2, ERDA-48, Volume 1: The Plan, U.S. Government Printing Office, Washington, D.C., 1975.

National energy technology goals[1]

4.3.06

Technology	Term of impact[2]	Direct substitution for oil and gas[3]	RD&D status	Impact in year 2000 in quads[4]
Goal I: Expand the domestic supply of economically recoverable energy producing raw materials				
Oil and gas — enhanced recovery	Mid	Yes	Pilot	13.6
Oil shale	Near	Yes	Study/Pilot	7.3
Geothermal	Mid	No	Lab/Pilot	3.1-5.6
Goal II: Increase the use of essentially inexhaustible domestic energy resources				
Solar electric	Long	No	Lab	2.1-4.2
Breeder reactors	Long	No	Pilot/Demo	3.1
Fusion	Long	No	Lab	---
Goal III: Efficiently transform fuel resources into more desirable forms				
Coal — direct utilization utility/industry	Near	Yes	Pilot/Demo	24.5
Waste materials to energy	Near	Yes	Comm	4.9
Gaseous & liquid fuels from coal	Mid	Yes	Pilot/Demo	14.0
Fuels from biomass	Long	Yes	Lab	1.4
Goal IV: Increase the efficiency and reliability of the processes used in the energy conversion and delivery systems				
Nuclear converter reactors	Near	No	Demo/Comm	28.0
Electric conversion efficiency	Mid	No	Lab	2.6
Energy storage	Mid	No	Lab	---
Electric power transmission and distribution	Long	No	Lab	1.4
Goal V: Transform consumption patterns to improve energy utilization				
Solar heat and cooling	Mid	Yes	Pilot/Demo	5.9
Waste heat utilization	Mid	Yes	Study/Demo	4.9
Electric transport	Long	Yes	Study/Lab	1.3
Hydrogen in energy systems	Long	Yes	Study	---
Goal VI: Increase end-use efficiency				
Transportation efficiency	Near	Yes	Study/Lab	9.0
Industrial energy efficiency	Near	Yes	Study/Comm	8.0
Conservation in buildings and consumer products	Near	Yes	Study/Comm	7.1

[1]The last column of this table presents data from ERDA-48. It represents the maximum impact of the technology in any scenario measured in terms of additional oil which would have to be marketed if the technology were not implemented. Basis for the calculation is explained in Appendix B of ERDA-48. These data are being reexamined, and changes will be made when analysis is completed. In a number of cases, revised projections of the impacts will be lower.

[2]Near — now through 1985; mid — 1985 through 2000; long — post-2000.

[3]Assumes no change in end-use device.

[4]Maximum impact of this technology in any scenario measured in terms of additional oil which would have to be marketed if the technology were not implemented.

Source: U.S. Energy Research and Development Administration, A National Plan for Energy Research Development and Demonstration: Creating Energy Choices for the Future, p. VI-2, ERDA-48, U.S. Government Printing Office, Washington, D.C., 1975; U.S. Energy Research and Development Administration, A National Plan for Energy Research Development and Demonstration: Creating Energy Choices for the Future, p. 25, ERDA-76-1, U.S. Government Printing Office, Washington, D.C., April 1976.

Proposed national ranking of Research, Development and Demonstration (RD&D) technologies[1]

Highest priority demand	
Near-term conservation (efficiency) technologies	* Conservation in buildings and consumer products * Industrial energy efficiency * TRANSPORTATION EFFICIENCY * Waste materials to energy
Highest priority supply	
Near-term major energy systems	* Coal-direct utilization in utility/industry * Nuclear-converter reactors * Oil and gas enhanced recovery
New sources of liquids and gases for the mid term	* Gaseous and liquid fuels from coal * Oil shale
"Inexhaustible" sources for the long term	* Breeder reactors * Fusion * Solar electric
Other important technologies	
Under-used (limited application) mid-term technologies	* Geothermal * Solar heating and cooling * Waste utilization
Technologies supporting intensive electrification	* Electric conversion efficiency * Electric power transmission and distribution * Electric transport * Energy storage
Technologies being explored for the long term	* Fuels from biomass * Hydrogen in energy systems

Source: U.S. Energy Research and Development Administration, A National Plan for Energy Research, Development and Demonstration: Creating Energy Choices for the Future, p. 30, ERDA 76-1, Volume 1: The Plan, U.S. Government Printing Office, Washington, D.C., April 1976.

4.3.08

U.S. government transportation research, planning, and Research and Development (R&D) outlays*
(millions of dollars)

	Fiscal years						
	1960	1965	1970	1972	1973	1974 est.	1975 est.
General							
Dept. of Transportation (commerce)	- -	2.0	8.1	31.6	29.1r	32.7r	46.5
Dept. of Agriculture	- -	5.9	9.0	10.9	9.9r	10.7	11.1
Total	- -	7.9	17.1	42.5	39.0r	43.4r	57.6
Air							
FAA - aviation	52.8	48.9	53.9	85.8r	91.6r	96.3r	96.9
Supersonic transport[1]	- -	47.9	160.5	62.1	1.2r	4.4r	3.0
NASA - aircraft technical	39.0	65.6	187.3	227.7	252.1r	295.8r	315.7
AEC - aircraft propulsion reactors	62.8	- -	- -	- -	- -	- -	- -
Total	154.6	162.4	401.7	375.6r	344.9r	396.5r	415.6
Highway							
FHA - highways	- -	7.1	16.0	19.1	17.3r	29.5r	0.5
Safety	29.5	- -	14.0	26.6	20.9r	27.5r	23.9
Research/planning grants	- -	61.2	78.3	80.0	67.0	100.0r	100.0
Total	29.5	68.3	108.3	125.7	105.2r	157.0r	124.4
Rail							
FRA - high-speed surface trans. program	- -	- -	16.0	27.1	30.7r	20.8r	34.3
General research	- -	- -	0.4	13.0	8.2r	9.0r	17.6
Total	- -	- -	16.4	40.1	38.9r	29.8r	51.9
Urban mass transport							
HUD-DOT	- -	1.0	7.6	56.8	85.1r	80.2r	86.6
Water							
Maritime administration	11.2	9.3	12.7	27.4r	29.6r	28.9r	32.2
Coast guard	- -	- -	10.1	17.5	14.6r	17.7r	21.0
AEC - merchant ship reactors	7.5	2.0	- -	- -	- -	- -	- -
Total	18.7	11.3	22.8	44.9r	44.2r	46.6r	53.2
Total transportation R&D	202.8	250.9	573.9	685.0r	657.3r	753.5r	789.3
Total U.S. government research and R&D	7,774	14,889	15,632	16,630	17,408r	18,479r	19,643
Transport percent of total	2.6%	1.7%	3.7%	4.1%r	3.8%r	4.1%r	4.0%

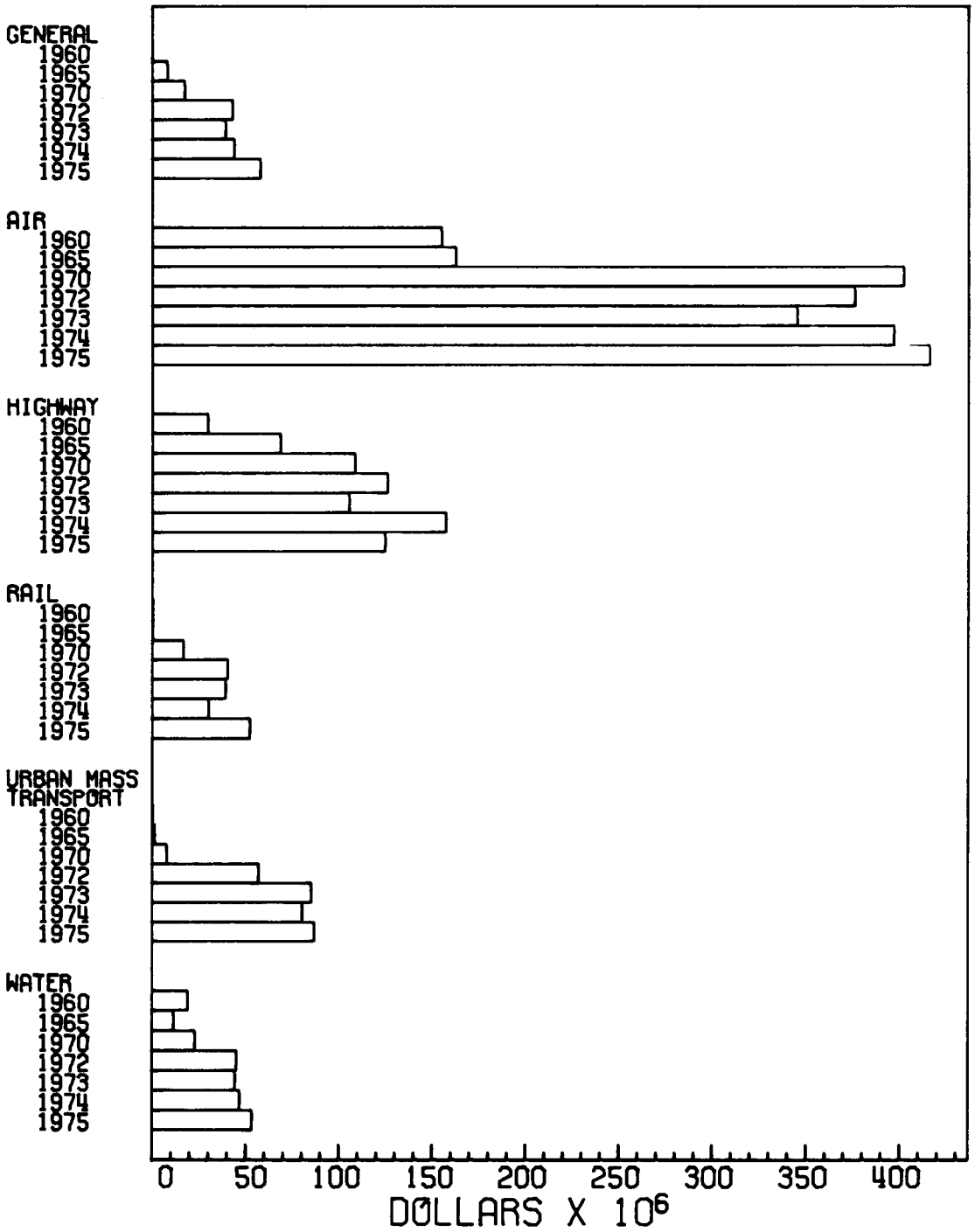
*In terms of financial obligations as reported in "The Budget of the U.S. Government"
[1]Program discontinued by Congress in early 1971.

Source: Transportation Facts & Trends, Eleventh Edition, p. 25, Transportation Association of America, Washington, D.C., 1974.

4.3.09

TRANSPORTATION PLANNING AND R&D OUTLAYS

U. S. GOVERNMENT



SOURCE: TRANS. FACTS

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ENERGY SUPPLY

Energy Supply

This chapter contains five sections dealing with petroleum supply. Section 5.1 is an overview that shows U.S. petroleum production and imports for the 1950-1974 period. An important feature of this summary (page 149) is the increasing role played by crude petroleum imports.

Section 5.2 deals with United States and world production of petroleum, United States reserves, and the product mix of United States petroleum refineries for the 1950-1974 period. For example, page 157 shows that motor fuel has had a relatively stable share (43-46 percent) of total refined products and an increasing share of petroleum has gone to jet fuel (0 to 7 percent).

Section 5.3 shows information on petroleum imports and refined petroleum products to the United States by country of origin. The table on imports by country in 1974 (pages 161 and 162) shows the U.S. to be most dependent on Canada, Nigeria, Iran and Saudi Arabia, in order of importance.

Section 5.4 shows price information over time for domestic crude petroleum by exporting countries, as well as gasoline prices. For example, page 165 shows that the real fuel cost per mile declined over the 1950-1973 period, but rose sharply in 1974.

Section 5.5 provides some projections of United States capacity to produce petroleum products and offers a comparison of estimates of when United States petroleum resources will be exhausted. For example, page 169 shows that the most pessimistic estimate has the United States

running out of petroleum in 1998 while the most optimistic estimate extends the depletion date to 2025.

UNITED STATES TOTAL PRODUCTION, IMPORTS, AND ANNUAL NEW SUPPLY
(THOUSANDS OF BARRELS)

Year	Total Domestic Crude Oil Production (1)	Crude Oil Imports	Refined Products Imports (2)	Total New Supply (3)	Daily Average of New Supply	Percent Crude Imports to Domestic Production
1950	1,973,574	177,714	132,547	2,283,835	6,257	9.0
1951	2,247,711	179,073	129,121	2,555,905	7,002	8.0
1952	2,289,836	209,591	138,916	2,638,343	7,209	9.2
1953	2,357,082	236,455	141,044	2,734,581	7,492	10.0
1954	2,314,988	239,479	144,476	2,698,943	7,394	10.3
1955	2,484,428	285,421	170,143	2,939,992	8,055	11.5
1956	2,617,283	341,833	183,758	3,142,874	8,578	13.1
1957	2,616,901	373,255	201,344	3,191,490	8,744	14.3
1958	2,448,987	348,007	272,582	3,069,576	8,410	14.2
1959	2,574,590	352,344	297,239	3,224,173	8,833	13.7
1960	2,574,933	371,575	292,536	3,239,044	8,850	14.4
1961	2,621,758	381,548	318,118	3,321,424	9,100	14.6
1962	2,676,189	411,039	348,754	3,435,982	9,414	15.4
1963	2,752,723	412,660	364,922	3,530,305	9,672	15.0
1964	2,786,822	438,643	388,093	3,613,558	9,873	15.7
1965	2,848,514	452,040	448,732	3,749,286	10,272	15.9
1966	3,027,763	447,120	492,042	3,966,925	10,868	14.8
1967	3,215,742	411,649	514,342	4,141,733	11,347	12.8
1968	3,329,042	472,323	567,046	4,368,411	11,935	14.2
1969	3,371,751	514,114	641,437	4,527,302	12,404	15.2
1970	3,517,450	483,293	764,769	4,765,512	13,056	13.7
1971	3,453,914	613,417	819,463	4,886,794	13,388	17.8
1972	3,455,368	811,135	924,179	5,190,682	14,182	23.5
1973	3,360,903	1,183,996	1,099,497	5,644,396	15,464	35.2
1974	3,199,328	1,269,155	953,024	5,421,507	14,853	39.7

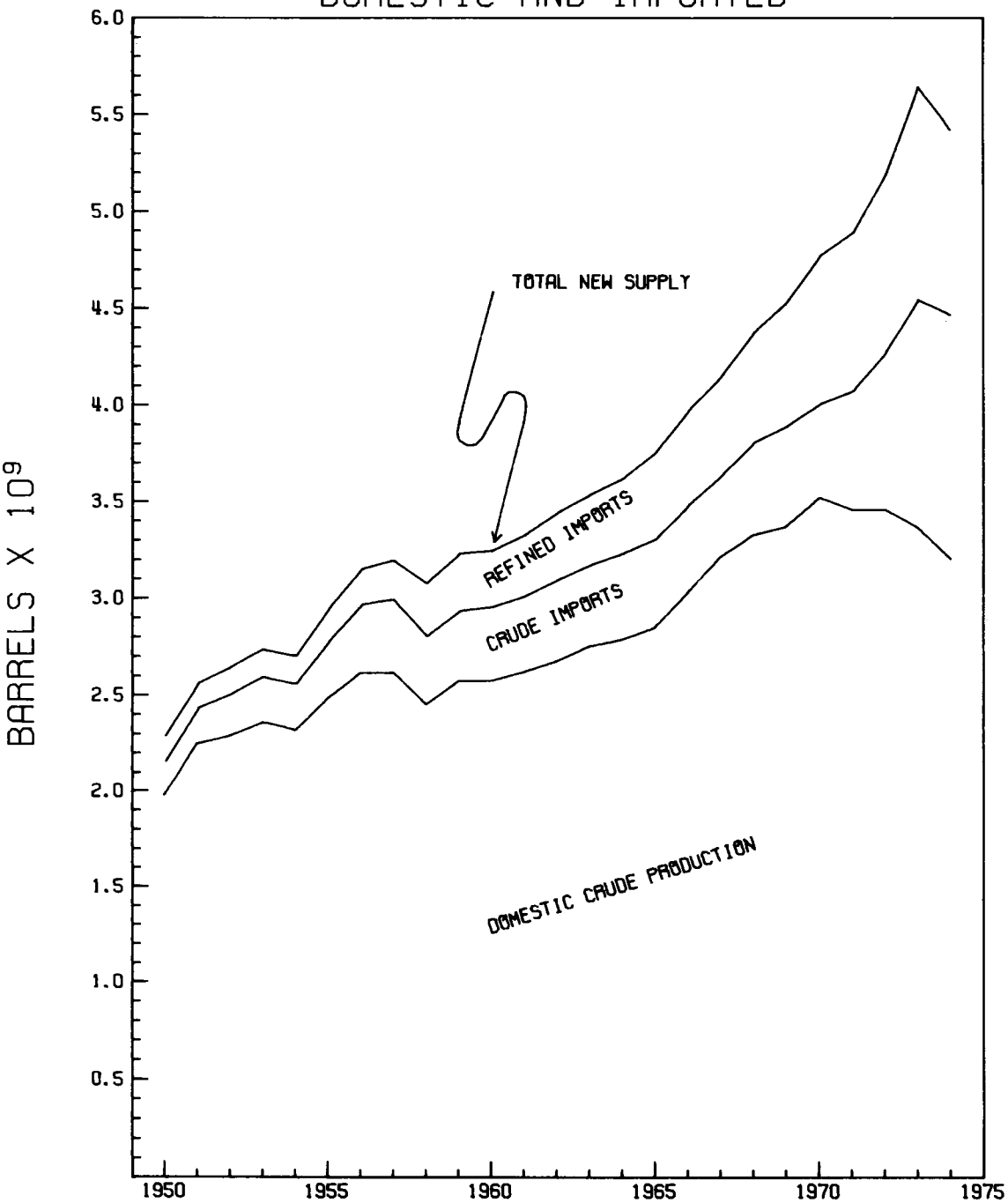
(1) Includes field condensate.
(2) Includes plant condensate and unfinished oils.
(3) Excludes natural gasoline and benzol.

Source: Twentieth Century Petroleum Statistics, Thirty-first Edition, p. 58, DeGolyer and MacNaughton, Dallas, Texas, 1975.

5.1.02

UNITED STATES OIL SUPPLY

DOMESTIC AND IMPORTED

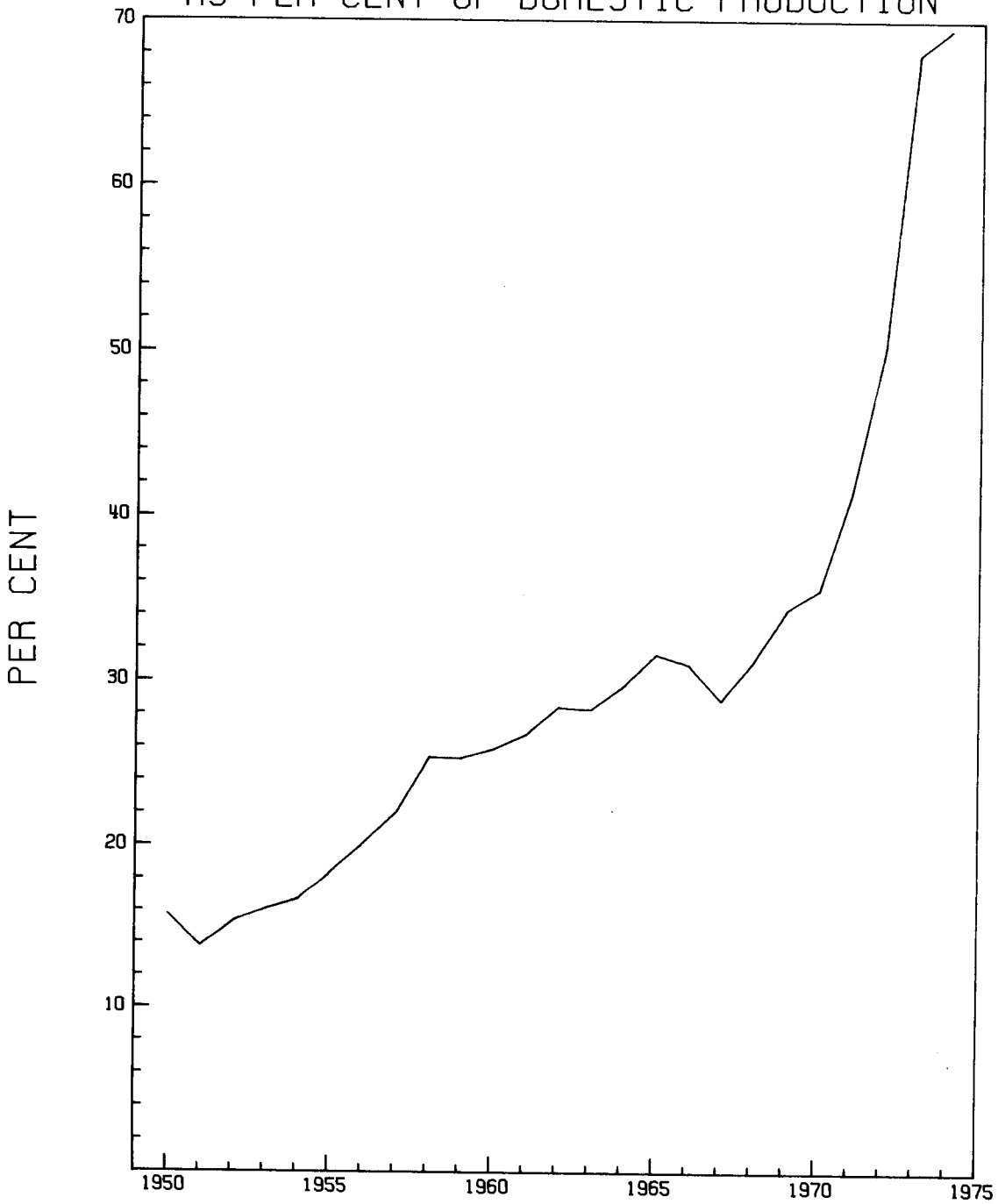


SOURCE: PETROL. STATS.

5.1.03

UNITED STATES CRUDE OIL IMPORTS

AS PER CENT OF DOMESTIC PRODUCTION



SOURCE: PETROL. STATS.

UNITED STATES DOMESTIC PRODUCTION OF CRUDE OIL,
NATURAL GASOLINE, AND OTHER HYDROCARBONS

(THOUSANDS OF BARRELS)

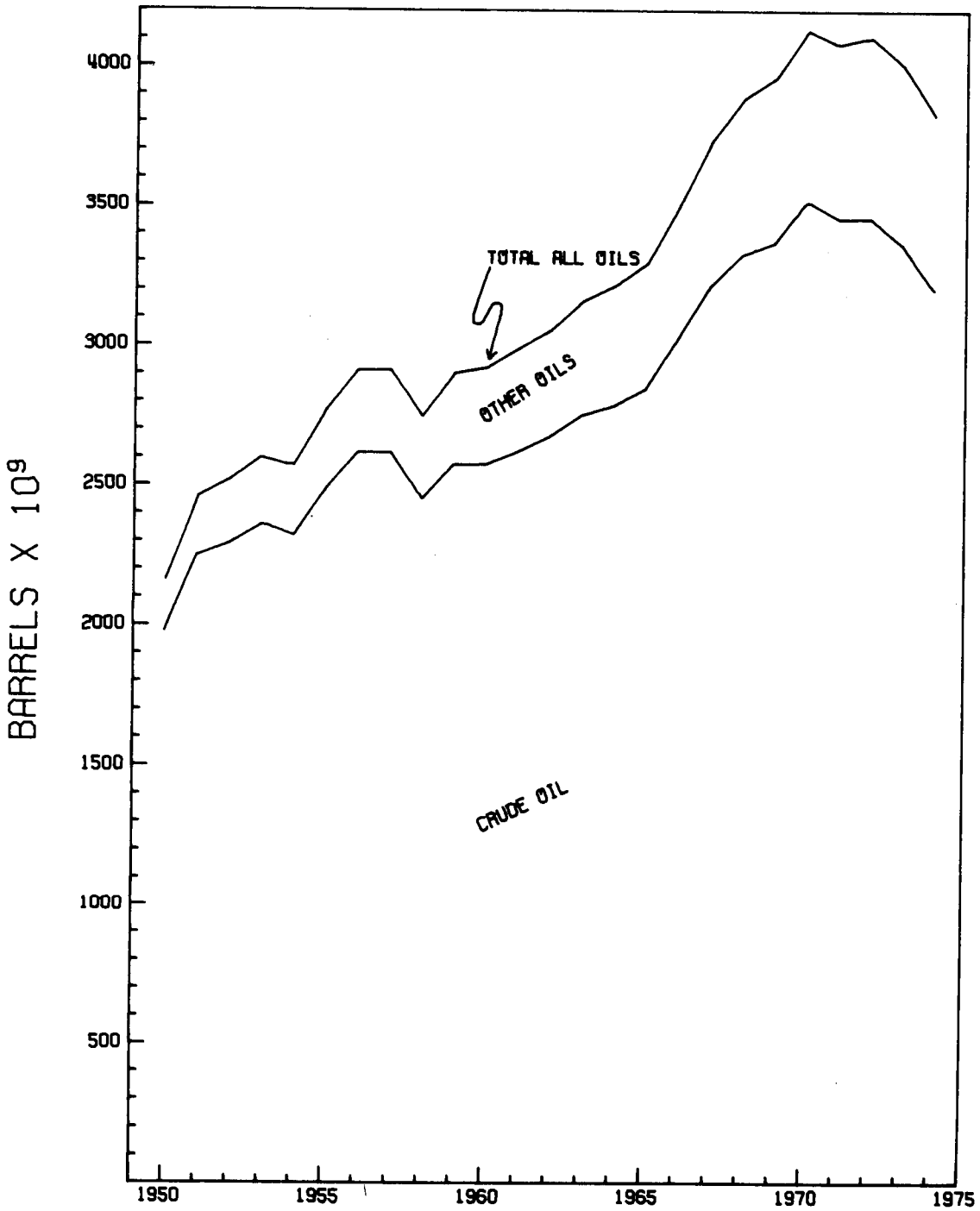
Year	Crude (1)	Daily Average	Natural Gasoline	Other	All Oils Total Production	Daily Average
1950	1,973,574	5,407	181,961	158	2,155,693	5,906
1951	2,247,711	6,158	204,754	211	2,452,676	6,720
1952	2,289,836	6,256	223,515	382	2,513,733	6,868
1953	2,357,082	6,458	238,579	505	2,596,166	7,113
1954	2,314,988	6,342	252,133	507	2,567,628	7,035
1955	2,484,428	6,807	281,371	526	2,766,325	7,579
1956	2,617,283	7,151	292,727	504	2,910,514	7,952
1957	2,616,901	7,170	294,990	252	2,912,143	7,978
1958	2,448,987	6,709	294,749	416	2,744,152	7,518
1959	2,574,590	7,054	320,757	324	2,895,671	7,933
1960	2,574,933	7,035	340,157	275	2,915,365	7,965
1961	2,621,758	7,183	361,689	169	2,983,616	8,174
1962	2,676,189	7,332	372,665	91	3,048,854	8,353
1963	2,752,723	7,542	401,116	80	3,153,919	8,641
1964	2,786,822	7,614	422,471	29	3,209,322	8,769
1965	2,848,514	7,804	441,556	13	3,290,083	9,014
1966	3,027,763	8,295	468,635	30	3,496,428	9,579
1967	3,215,742	8,810	514,456	87	3,730,285	10,220
1968	3,329,042	9,096	550,311	3,377	3,882,730	10,608
1969	3,371,751	9,238	580,241	4,213	3,956,205	10,839
1970	3,517,450	9,637	605,916	6,238	4,129,604	11,314
1971	3,453,914	9,463	617,815	6,074	4,077,803	11,172
1972	3,455,368	9,441	638,216	10,118	4,103,702	11,212
1973	3,360,903	9,208	634,423	10,716	4,006,042	10,975
1974	3,199,328	8,765	616,098	13,057	3,828,483	10,489

(1) Includes field condensate.

Source: Twentieth Century Petroleum Statistics, Thirty-first Edition, p. 27, DeGolyer and MacNaughton, Dallas, Texas, 1975.

5.2.02

UNITED STATES DOMESTIC OIL PRODUCTION



SOURCE: PETROL. STATS.

UNITED STATES CRUDE OIL RESERVES AND PRODUCTION

(THOUSANDS OF BARRELS)

Year Reserves of Crude Oil Only (3)	Estimated Proved Reserves Beginning of Year	New Reserves Proved During Year (1)	Crude Oil Production During Year	Estimated Proved Reserves End of Year
1950	24,649,489	2,562,685	1,943,776	25,268,398
1951	25,268,398	4,413,954	2,214,321	27,468,031
1952	27,468,031	2,749,288	2,256,765	27,960,554
1953	27,960,554	3,296,130	2,311,856	28,944,828
1954	28,944,828	2,873,037	2,257,119	29,560,746
1955	29,560,746	2,870,724	2,419,300	30,012,170
1956	30,012,170	2,974,336	2,551,857	30,434,649
1957	30,434,649	2,424,800	2,559,044	30,300,405
1958	30,300,405	2,608,242	2,372,730	30,535,917
1959	30,535,917	3,666,745	2,483,315	31,719,347
1960	31,719,347	2,365,328	2,471,464	31,613,211
1961	31,613,211	2,657,567	2,512,273	31,758,505
1962	31,758,505	2,180,896	2,550,178	31,389,223
1963	31,389,223	2,174,110	2,593,343	30,969,990
1964	30,969,990	2,664,767	2,644,247	30,990,510
1965	30,990,510	3,048,079	2,686,198	31,352,391
1966	31,352,391	2,963,978	2,864,242	31,452,127
1967	31,452,127	2,962,122	3,037,579	31,376,670
1968	31,376,670	2,454,635	3,124,188	30,707,117
1969	30,707,117	2,120,036	3,195,291	29,631,862
1970	29,631,862	12,688,918 (2)	3,319,445	39,001,335
1971	39,001,335	2,317,732	3,256,110	38,062,957
1972	38,062,957	1,557,848	3,281,397	36,339,408
1973	36,339,408	2,145,831	3,185,400	35,299,839
1974	35,299,839	1,993,573	3,043,456	34,249,956
1975	34,249,956			

(1) Reflects revisions of earlier estimates based on additional information.
(2) Includes 9.6 billion barrels for Alaska's Prudhoe Bay Field discovered in 1968 and not previously included.
(3) Does not include condensate.

Source: Twentieth Century Petroleum Statistics, Thirty-first Edition, p. 24, DeGolyer and MacNaughton, Dallas, Texas, 1975.

CRUDE OIL PRODUCTION IN UNITED STATES, WESTERN HEMISPHERE AND WORLD
(THOUSANDS OF BARRELS)

Year	United States Annual Total (1)	United States Daily Average	Western Hemisphere Annual Total	Western Hemisphere Daily Average	World Annual Total	World Daily Average
1950	1,973,574	5,407	2,719,273	7,450	3,802,995	10,419
1951	2,247,711	6,158	3,099,480	8,492	4,282,730	11,733
1952	2,289,836	6,256	3,194,595	8,728	4,504,708	12,308
1953	2,357,082	6,458	3,266,773	8,950	4,798,055	13,145
1954	2,314,988	6,342	3,304,471	9,053	5,016,843	13,745
1955	2,484,428	6,807	3,614,299	9,902	5,625,883	15,413
1956	2,617,283	7,151	3,917,189	10,703	6,124,676	16,734
1957	2,616,901	7,170	4,056,058	11,112	6,438,444	17,640
1958	2,448,987	6,710	3,829,032	10,490	6,607,750	18,103
1959	2,574,590	7,054	4,060,290	11,124	7,133,238	19,543
1960	2,574,933	7,035	4,130,061	11,284	7,674,460	20,968
1961	2,621,758	7,183	4,268,037	11,693	8,186,213	22,428
1962	2,676,189	7,332	4,470,817	12,249	8,881,858	24,334
1963	2,752,723	7,542	4,593,471	12,585	9,538,346	26,132
1964	2,786,822	7,614	4,706,615	12,860	10,309,644	28,168
1965	2,848,514	7,804	4,827,447	13,226	11,062,515	30,308
1966	3,027,763	8,295	5,018,545	13,749	12,021,786	32,936
1967	3,215,742	8,809	5,350,760	14,660	12,914,340	35,382
1968	3,329,042	9,096	5,600,002	15,300	14,146,318	38,651
1969	3,371,751	9,238	5,647,813	15,473	15,222,511	41,706
1970	3,517,450	9,637	5,894,815	16,150	16,718,708	45,805
1971	3,453,914	9,463	5,812,551	15,925	17,662,793	48,391
1972	3,455,368	9,441	5,804,018	15,858	18,600,501	50,821
1973	3,360,903	9,208	5,903,966	16,175	20,367,981	55,803
1974	3,199,328	8,765	5,607,921	15,364	20,518,139	56,214

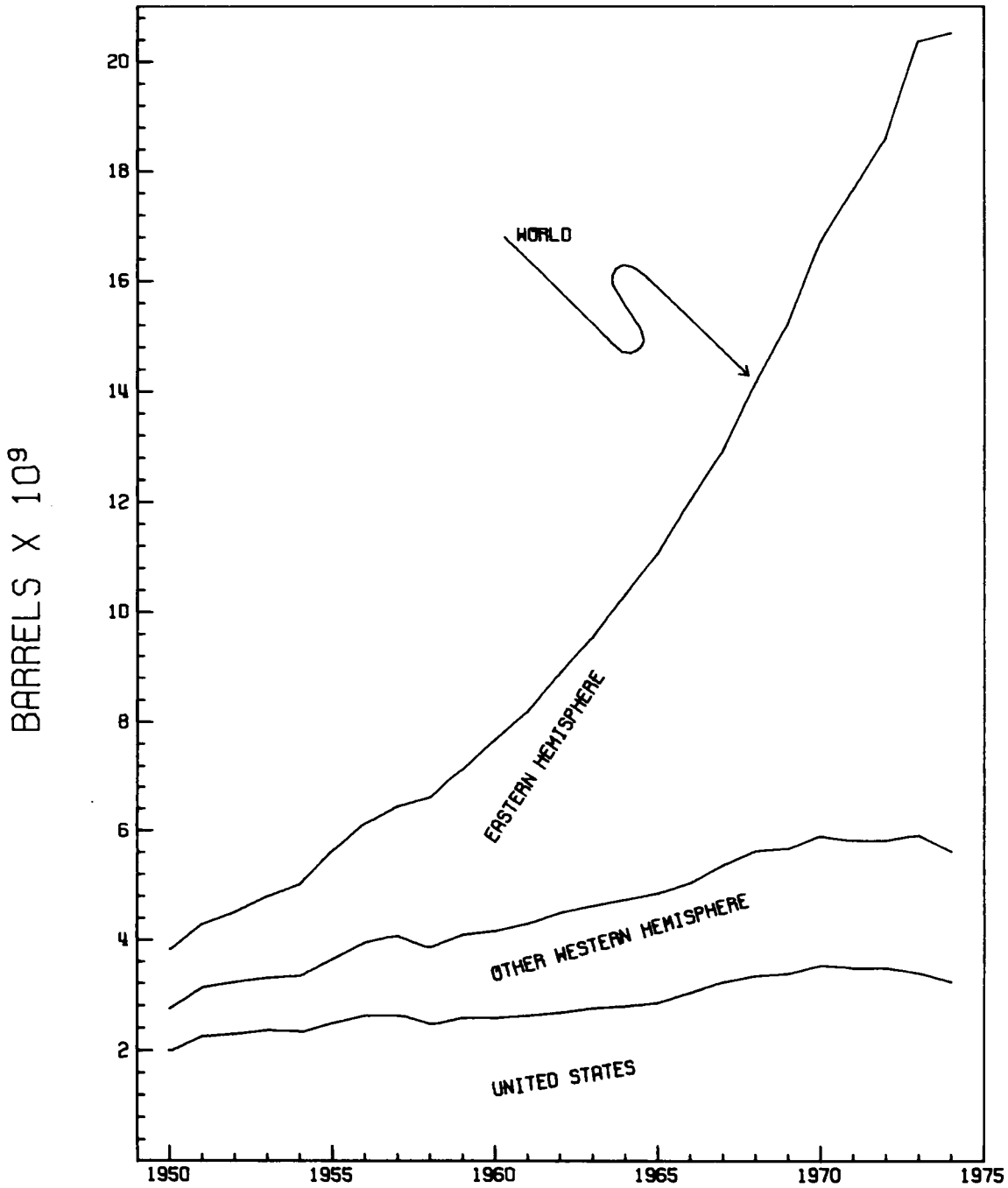
(1) Includes field condensate.

Source: Twentieth Century Petroleum Statistics, Thirty-first Edition, p. 13, DeGolyer and MacNaughton, Dallas, Texas, 1975.

5.2.05

CRUDE OIL PRODUCTION

U. S., WESTERN HEMISPHERE, & WORLD



SOURCE: PETROL. STATS.

PERCENTAGE YIELDS OF THE MAJOR REFINED PRODUCTS IN UNITED STATES

Year	Motor Fuel	Kerosene	Jet Fuel	Distillate and Residual Fuel Oil	Lubricants	Wax	Coke	Asphalt	Other Finished Products & Shortage
1950	43.0	5.6	...	39.2	2.5	0.2	0.8	2.8	5.9
1951	42.4	5.7	...	39.7	2.6	0.2	0.8	2.8	5.8
1952	43.0	5.4	...	39.9	2.3	0.2	0.7	2.9	5.6
1953	43.9	4.8	...	38.3	2.1	0.2	0.8	2.8	7.1
1954	43.9	4.8	1.8	37.7	2.1	0.2	1.0	2.9	5.6
1955	44.0	4.3	2.1	37.3	2.0	0.2	1.0	3.0	6.1
1956	43.4	4.2	2.3	37.6	2.0	0.2	1.1	3.1	6.1
1957	43.8	3.8	2.2	37.5	1.9	0.2	1.2	3.0	6.4
1958	45.2	3.9	2.6	35.3	1.8	0.2	1.3	3.2	6.5
1959	44.9	3.8	3.2	34.9	1.9	0.2	1.4	3.3	6.4
1960	45.2	4.6	3.0	33.6	2.0	0.2	2.0	3.3	6.1
1961	44.7	4.7	3.1	33.6	2.0	0.2	2.5	3.4	5.8
1962	44.8	5.0	3.3	32.8	2.0	0.1	2.6	3.5	5.9
1963	44.1	5.1	3.6	32.5	2.0	0.1	2.6	3.5	6.5
1964	45.2	2.9 (I)	5.6 (1)	30.8	2.0	0.1	2.6	3.5	7.3
1965	44.0	2.8	5.8	31.1	1.9	0.2	2.6	3.7	7.9
1966	44.6	3.0	6.2	30.2	1.9	0.2	2.6	3.8	7.5
1967	44.0	2.7	7.5	29.9	1.8	0.2	2.5	3.5	7.9
1968	44.0	2.6	8.3	29.3	1.7	0.2	2.5	3.6	7.8
1969	44.9	2.6	8.2	28.4	1.7	0.1	2.6	3.5	8.0
1970	45.5	2.4	7.5	28.8	1.6	0.2	2.7	3.7	7.6
1971	46.3	2.1	7.4	28.7	1.6	0.2	2.6	3.8	7.3
1972	46.5	1.8	7.2	29.0	1.5	0.1	2.8	3.6	7.5
1973	45.8	1.7	6.8	30.2	1.5	0.1	2.9	3.7	7.3
1974	46.2	1.3	6.8	30.5	1.6	0.2	2.8	3.7	6.9

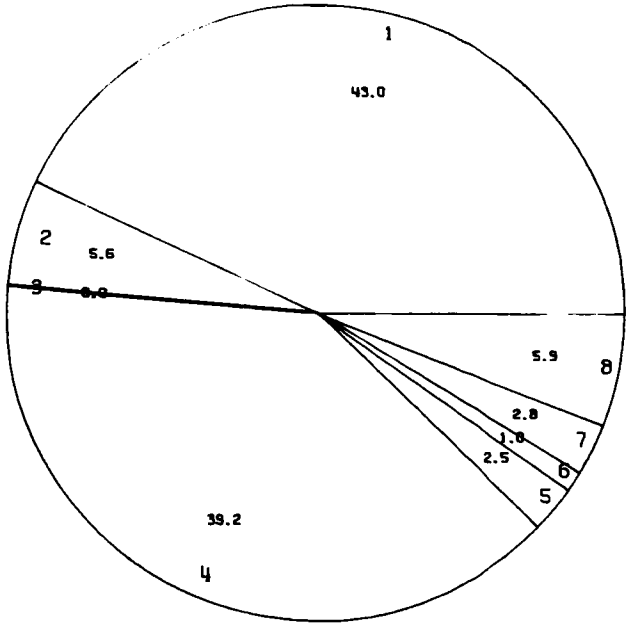
(1) Data for commercial jet fuel, previously included with kerosene, now included in total jet fuel.

Source: Twentieth Century Petroleum Statistics, Thirty-first Edition, p. 63, DeGolyer and MacNaughton, Dallas, Texas, 1975.

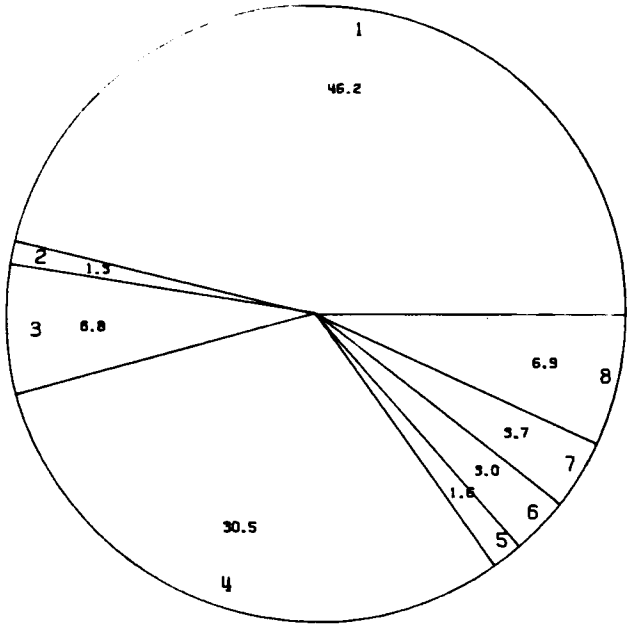
5.2.07

YIELD FROM A BARREL OF CRUDE OIL

	PERCENT	SECTOR
43.00	46.20	1) MOTOR FUEL
5.60	1.30	2) KEROSENE
0.0	6.80	3) JET FUEL
39.20	30.50	4) DISTILLATE & RESIDUAL FUEL OIL
2.50	1.60	5) LUBRICANTS
1.00	3.00	6) WAX & COKE
2.80	3.70	7) ASPHALT
5.90	6.90	8) OTHER PRODUCTS & SHORTAGE



1950



1974

SOURCE: PETROL. STATS.

UNITED STATES IMPORTS OF CRUDE OIL BY SOURCE COUNTRY (1)

(THOUSANDS OF BARRELS)

Year	Canada	Mexico	Total North America	Colombia	Venezuela	Total South America	Algeria	Egypt	Libya	Nigeria	Total Africa
1950	...	12,307	12,307	16,159	107,019	123,789	...	...	...	...	...
1951	463	13,862	14,325	16,312	107,437	123,749	...	...	...	...	...
1952	1,116	8,483	9,599	16,209	121,963	138,172	...	...	...	...	...
1953	2,527	2,897	5,424	15,860	120,178	136,128	...	...	...	...	...
1954	2,565	3,018	5,583	12,415	128,377	142,427	...	...	...	...	...
1955	16,810	5,510	22,320	8,125	140,754	150,816	...	...	...	...	...
1956	42,739	4,666	47,405	9,009	167,050	177,602	...	...	...	...	...
1957	55,131	2,441	57,572	8,366	193,756	204,166	...	...	...	...	...
1958	30,426	672	31,098	9,411	158,167	168,158	...	...	...	...	...
1959	33,730	112	33,842	12,437	165,883	178,865	...	...	...	...	...
1960	41,349	925	42,274	14,799	172,887	187,955	284	1,167	...	...	1,451
1961	66,614	3,655	70,269	10,050	155,751	167,726	...	1,887	...	...	1,887
1962	85,152	3,644	88,796	8,614	168,993	178,884	1,543	1,543	6,722	...	9,808
1963	90,394	3,657	94,051	8,293	174,537	184,882	380	1,772	7,021	...	9,173
1964	101,607	3,577	105,184	9,606	174,222	183,828	2,249	1,077	14,417	...	17,743
1965	107,762	2,552	110,314	15,211	157,852	173,063	3,256	881	15,152	5,296	24,585
1966	126,712	...	126,712	14,424	147,427	163,088	1,400	852	25,177	4,114	31,543
1967	150,409	...	150,409	11,855	131,089	150,593	1,447	1,318	15,293	1,432	20,151
1968	169,418	...	169,418	11,981	125,737	146,559	1,944	10,795	41,591	3,131	57,461
1969	203,298	...	203,298	15,551	111,722	134,549	358	14,778	48,862	17,958	82,380
1970	245,258	...	245,258	7,313	97,996	106,108	2,093	7,626	17,156	17,490	44,365
1971	263,294	...	263,294	3,175	110,574	114,808	4,685	6,924	19,426	34,826	68,361
1972	312,440	...	312,440	1,695	93,300	109,359	31,753	3,091	40,069	88,887	172,105
1973	365,370	489	365,859	778	125,742	166,379	43,619	5,296	48,585	163,687	285,481
1974	288,763	597	289,360	...	116,437	157,174 (2)	65,764	3,227	1,495	254,358	356,121 (3)

(1) Total may include amounts imported from countries not listed.
(2) Includes 15,225 from Ecuador, 23,045 from Trinidad, and 2,467 from Bolivia.
(3) Includes 17,989 from Angola, 4,519 from Tunisia, 670 from Congo, and 8,552 from Gabon.

Source: Twentieth Century Petroleum Statistics, Thirty-first Edition, P. 75, DeGolyer and MacNaughton, Dallas, Texas, 1975.

UNITED STATES IMPORTS OF CRUDE OIL BY SOURCE COUNTRY (1)

(THOUSANDS OF BARRELS)

Year	Abu Dhabi	Iran	Iraq	Kuwait	Neutral Zone	Saudi Arabia	Total Middle East	Indonesia	Others	Total All Countries
1950	...	111	...	26,741	...	14,650	41,618	...	...	177,714
1951	...	...	...	21,601	...	15,900	37,501	...	3,498	179,073
1952	...	...	705	26,444	...	29,407	56,556	3,640	1,624	209,591
1953	...	...	2,287	38,611	...	36,668	80,934	13,969	...	236,455
1954	...	204	2,188	41,046	2,983	27,819	77,764	13,705	...	239,479
1955	...	3,202	6,988	48,954	6,639	29,050	100,344	11,941	...	285,421
1956	...	7,257	9,650	50,953	3,072	27,670	103,517	13,309	...	341,833
1957	...	6,624	4,477	51,389	2,050	21,011	87,798	23,719	...	373,255
1958	...	5,348	8,972	68,098	12,007	27,081	123,019	21,053	4,679	348,007
1959	...	8,961	7,667	59,169	15,091	24,756	115,875	20,023	3,739	352,344
1960	...	13,056	6,363	47,512	16,363	28,232	113,175	26,720	...	371,575
1961	...	21,970	7,362	44,311	19,278	22,501	118,997	22,669	...	381,548
1962	...	17,735	856	40,749	15,837	24,359	109,071	24,480	...	411,039
1963	...	22,717	321	29,680	15,855	28,806	103,214	21,340	...	412,660
1964	1,112	24,143	...	23,263	17,565	35,464	108,841	23,047	...	438,643
1965	5,035	28,633	5,695	20,208	9,756	48,235	121,908	22,170	...	452,040
1966	4,781	30,833	9,447	9,543	7,028	45,771	107,579	18,198	...	447,120
1967	1,936	23,781	1,716	6,859	4,006	29,679	67,977	22,519	...	411,649
1968	5,605	21,154	...	15,863	10,749	18,959	72,330	26,555	...	472,323
1969	5,051	15,306	...	12,539	15,864	12,665	61,616	32,271	...	514,114
1970	23,047	12,184	...	12,123	8,398	6,140	61,892	25,670	...	483,293
1971	29,026	38,576	3,932	10,650	(2)	41,971	124,155	40,232	2,567	613,417
1972	26,873	49,700	1,315	13,205	(2)	63,626	155,982	59,633	1,616	811,135
1973	25,764	78,990	1,529	15,208	(2)	168,525	292,988	73,055	234	1,183,996
1974	25,158	168,956	...	1,820	(2)	159,827	362,186 (3)	103,482	832	1,269,155

(1) Totals may include amounts imported from countries not listed.
(2) Included with Saudi Arabia.
(3) Includes 6,189 from Qatar, and 236 from Oman.

Source: Twentieth Century Petroleum Statistics, Thirty-first Edition, p. 75 and p. 76, DeGolyer and MacNaughton, Dallas, Texas, 1975.

5.3.02

UNITED STATES IMPORTS OF REFINED PRODUCTS AND CRUDE OIL
(THOUSANDS OF BARRELS)

	REFINED IMPORTS		REFINED AND CRUDE OIL	
Year	Total	Daily Average	From All Countries	Daily Average
1950	132,547	363	310,261	850
1951	129,121	354	308,194	844
1952	138,916	380	348,507	952
1953	141,044	386	377,499	1,034
1954	144,476	396	383,955	1,052
1955	170,143	466	455,564	1,248
1956	183,758	502	525,591	1,436
1957	201,334	552	574,589	1,574
1958	272,582	747	620,589	1,700
1959	297,239	814	649,583	1,780
1960	292,536	804	664,111	1,819
1961	318,118	872	699,666	1,917
1962	348,754	935	759,793	2,082
1963	364,922	1,000	777,582	2,130
1964	388,093	1,060	826,736	2,259
1965	448,732	1,229	900,772	2,468
1966	492,042	1,348	939,162	2,573
1967	514,342	1,409	925,991	2,537
1968	567,046	1,549	1,039,369	2,837
1969	641,437	1,757	1,155,551	3,166
1970	764,769	2,095	1,248,062	3,419
1971	819,463	2,245	1,432,880	3,926
1972	924,179	2,525	1,735,314	4,741
1973	1,099,497	3,012	2,283,493	6,256
1974	953,024	2,611	2,222,179	6,088

Source: Twentieth Century Petroleum Statistics, Thirty-first Edition, p. 77, DeGolyer and MacNaughton, Dallas, Texas, 1975.

5.4.01

WELLS DRILLED AND AVERAGE PRICES OF
CRUDE PETROLEUM IN THE UNITED STATES

Year	Total Wells Drilled (1) (Number)	Average Price per Bbl. (Dollars)
1950	43,307	2.51
1951	45,996	2.53
1952	46,509	2.53
1953	49,480	2.68
1954	52,197	2.78
1955	55,879	2.77
1956	58,418	2.79
1957	53,783	3.09
1958	49,101	3.01
1959	50,179	2.90
1960	46,831	2.88
1961	45,644	2.89
1962	45,997	2.90
1963	43,126	2.89
1964	44,149	2.88
1965	40,374	2.86
1966	36,883	2.88
1967	32,473	2.92
1968	30,939	2.94
1969	30,815	3.09
1970	27,408	3.18
1971	26,077	3.39
1972	27,864	3.39
1973	26,081	3.89
1974	33,470	6.85

(1) Includes service wells.

Source: Twentieth Century Petroleum Statistics, Thirty-first Edition, p. 41, DeGolyer and MacNaughton, Dallas, Texas, 1975.

POSTED PRICE PER BARREL OF PETROLEUM
BY MAJOR EXPORTING COUNTRIES

YEAR END PRICES

YEAR	Iran (1) Light, ex Kharg Is. 34.0°-34.9°	Iraq Basrah, ex Fao 35.0°-35.9°	Kuwait ex Mena al Ahmadi 31.0°-31.9°	Libya Brega ex Marsa el Brega 40.0°-40.9°	Nigeria Light, ex Bonny 34.0°-34.9°	Saudi Arabia (2) ex Sidon 34.0°-34.9°	Saudi Arabia (2) ex Ras Tanura 34.0°-34.9°
1950	$ ...	$ ...	$ ...	$ ...	$ ...	$ 2.410	$ 1.750
1951	...	1.670	...	...	...	2.410	1.750
1952	...	1.670	...	...	...	2.410	1.750
1953	...	1.920	1.720	...	...	2.390	1.970
1954	1.910	1.920	1.720	...	...	2.390	1.970
1955	1.910	1.920	1.720	...	...	2.390	1.970
1956	1.910	1.870	1.720	...	...	2.460	1.970
1957	2.040	1.980	1.850	...	...	2.570	2.080
1958	2.040	1.980	1.850	...	...	2.490	2.080
1959	1.860	1.800	1.670	...	...	2.270	1.900
1960	1.780	1.720	1.590	...	...	2.170	1.800
1961	1.780	1.720	1.590	2.230	...	2.170	1.800
1962	1.780	1.720	1.590	2.230	...	2.170	1.800
1963	1.780	1.720	1.590	2.230	...	2.170	1.800
1964	1.780	1.720	1.590	2.230	...	2.170	1.800
1965	1.780	1.720	1.590	2.230	...	2.170	1.800
1966	1.790	1.720	1.590	2.230	...	2.170	1.800
1967	1.790	1.720	1.590	2.230	2.170	2.170	1.800
1968	1.790	1.720	1.590	2.230	2.170	2.170	1.800
1969	1.790	1.720	1.590	2.230	2.170	2.170	1.800
1970	1.790	1.720	1.680	2.550	2.420	2.370	1.800
1971	2.274	2.259 (3)	2.187	3.399	3.178	3.136	2.285
1972	2.467	2.451 (3)	2.373	3.620	3.409	3.321	2.479
1973	5.254	4.978 (3)	4.822	9.061	8.404	7.034	5.036
1974	11.475	11.272 (3)	11.145	15.768	14.691	13.247	11.251

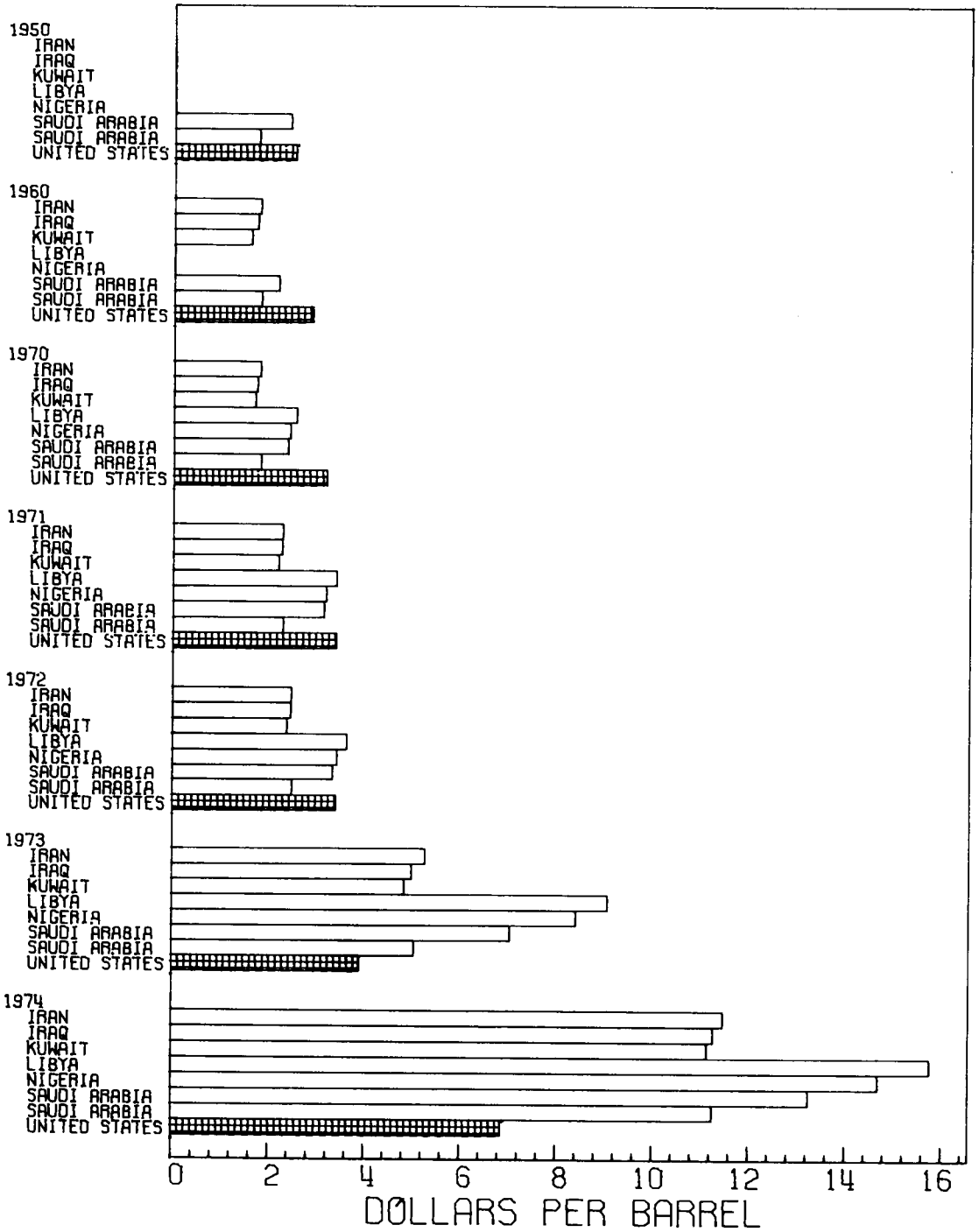
(1) Prior to 1966 port of export was Bandar Mashur.
(2) A.P.I. gravity for crude is 36.0°-36.9° from 1950-1956.
(3) Ex. Khor-al-Amaya.

Source: Twentieth Century Petroleum Statistics, Thirty-first Edition, p. 15, DeGolyer and MacNaughton, Dallas, Tx., 1975.

5.4.03

POSTED PRICE OF PETROLEUM

BY MAJOR PRODUCING COUNTRIES



SOURCE: B. MINES

5.4.04

Gasoline prices and fuel cost per mile
1950 – 1974

Year	Nominal gas price ($/gal)	Real gas price 1967 dollars ($/gal)	Real fuel cost per mile[a] ($)	Real fuel cost per mile index[a] (1967=1.00)
1950	0.2676	0.3712	0.0248	1.042
1951	0.2715	0.3490	0.0233	0.979
1952	0.2756	0.3467	0.0236	0.992
1953	0.2869	0.3582	0.0244	1.025
1954	0.2904	0.3607	0.0248	1.042
1955	0.2907	0.3625	0.0250	1.050
1956	0.2993	0.3677	0.0256	1.076
1957	0.3096	0.3673	0.0255	1.071
1958	0.3038	0.3508	0.0245	1.029
1959	0.3049	0.3493	0.0244	1.025
1960	0.3113	0.3510	0.0246	1.034
1961	0.3076	0.3433	0.0239	1.004
1962	0.3064	0.3382	0.0235	0.987
1963	0.3042	0.3317	0.0233	0.979
1964	0.3035	0.3267	0.0229	0.962
1965	0.3115	0.3296	0.0234	0.983
1966	0.3208	0.3300	0.0236	0.992
1967	0.3316	0.3316	0.0238	1.000
1968	0.3371	0.3235	0.0235	0.987
1969	0.3480	0.3169	0.0233	0.979
1970	0.3569	0.3069	0.0266	0.950
1971	0.3643	0.3003	0.0221	0.929
1972	0.3613	0.2883	0.0214	0.899
1973	0.3882	0.2917	0.0223	0.937
1974	0.5241	0.3548	0.0271[b]	1.139[b]

[a]Based on fleet fuel economy.

[b]Assumed the 1973 fleet fuel economy.

Source: Platts Oil Price Handbook and Almanac for nominal price series, U.S. Department of Labor, Bureau of Labor Statistics for Consumer Price Index, annual.

UNITED STATES CAPABILITY TO PRODUCE PETROLEUM PRODUCTS

(M Bbls/Day)

	Low Demand Case[1]					High Demand Case[2]				
	Total Demand	NGL Direct Sales	Net Demand	Refinery Output	Imports	Total Demand	NGL Direct Sales	Net Demand	Refinery Output	Imports
1975	16,600	800	15,800	13,800	2,000	16,000	800	15,800	13,809	2,000
1976	16,600	794	15,800	14,900	900	17,300	794	16,500	14,957	1,500
1977	16,600	783	15,800	15,200	600	18,000	783	17,200	15,945	1,300
1978	17,100	780	16,300	15,500	800	18,800	780	18,000	16,409	1,600
1979	17,600	777	16,800	15,900	900	19,600	777	18,800	17,472	1,300
1980	18,100	775	17,300	16,200	1,100	20,350	775	19,600	17,691	1,900
1981	18,400	769	17,600	16,500	1,100	21,000	769	20,200	18,251	1,900
1982	18,700	763	17,900	16,800	1,100	21,600	763	20,800	18,847	2,000
1983	19,000	757	18,200	17,200	1,000	22,200	757	21,400	19,445	2,000
1984	19,300	752	18,500	17,500	1,000	22,900	752	22,100	20,046	2,100
1985	19,600	747	18,900	17,900	1,000	23,750	747	23,000	20,670	2,300

[1]The Low Demand Case considers a constrained demand as reflected in the President's State of the Union Message. See the White House Fact Sheet, January 15, 1975.

[2]The High Demand Case uses the highest demand projection from Project Independence Blueprint, which assumes unconstrained oil supplies at $7 per barrel. See Project Independence, A Summary, p. 25, Table P-3.

Source: Federal Energy Administration, Office of Policy and Analysis and Office of Energy Resource Development, Initial Report on Oil and Gas Resources, Reserves, and Productive Capacities, P. 1X-7, Washington, D.C., 1975.

PROJECTED UNITED STATES REFINERY CAPACITY AND OPERATIONS
LOW DEMAND CASE*

	Refinery Operations					Major Petroleum Products Produced		
	Refinery Capacity	Crude Runs	NGL and Other	Processing Gain	Total Output	Motor Gasoline	Distillate Fuel Oil	Residual Fuel Oil
1975	14,751	12,538	782	489	12,809	6,462	2,758	1,254
1976	15,070	13,563	777	556	14,896	6,880	2,957	1,424
1977	15,390	13,851	766	596	15,213	6,957	2,992	1,524
1978	15,710	14,139	763	636	15,538	7,041	3,026	1,626
1979	16,030	14,427	760	678	15,865	7,122	3,059	1,731
1980	16,350	14,715	758	721	16,194	7,203	3,090	1,839
1981	16,670	15,003	752	765	16,520	7,278	3,121	1,950
1982	16,990	15,291	756	810	16,847	7,352	3,303	2,064
1983	17,310	15,579	740	857	17,176	7,423	3,178	2,181
1984	17,630	15,867	735	904	17,506	7,494	3,205	2,301
1985	17,950	16,155	730	969	17,854	7,564	3,231	2,423

*From President's State of the Union Message, White House Fact Sheet, January 15, 1975

Source: Federal Energy Administration, Office of Policy and Analysis and Office of Energy Resource Development Initial Report on Oil and Gas Resources, Reserves, and Productive Capacities, p. 1X-8, Washington, D.C., 1975.

PROJECTED UNITED STATES REFINERY CAPACITY AND OPERATIONS
HIGH DEMAND CASE*

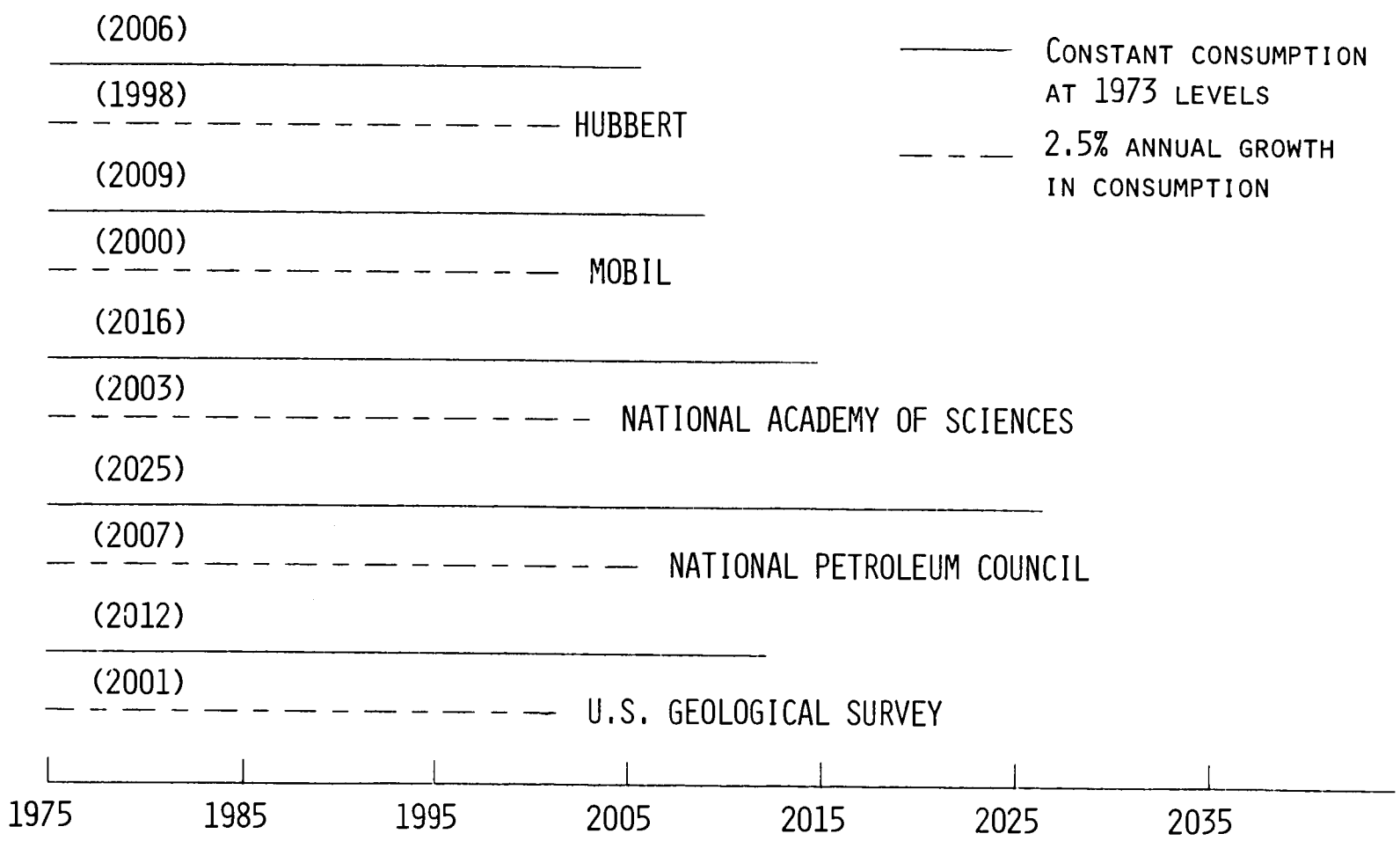
	Refinery Operations					Major Petroleum Products Produced		
	Refinery Capacity	Crude Runs	NGL and Other	Processing Gain	Total Output	Motor Gasoline	Distillate Fuel Oil	Residual Fuel Oil
1975	14,751	12,538	782	489	13,809	6,462	2,758	1,254
1976	15,136	13,622	777	558	14,957	6,907	2,970	1,430
1977	16,170	14,553	766	626	15,945	7,271	3,143	1,601
1978	16,635	14,972	763	674	16,409	7,411	3,204	1,722
1979	17,735	15,962	760	750	17,472	7,799	3,384	1,915
1980	17,935	16,142	758	791	17,691	7,828	3,390	2,018
1981	18,500	16,650	752	849	18,251	7,995	3,463	2,165
1982	19,100	17,190	756	911	18,847	8,172	3,541	2,321
1983	19,700	17,730	740	975	19,445	8,346	3,617	2,482
1984	20,300	18,270	735	1,041	20,056	8,518	3,691	2,649
1985	20,900	18,810	730	1,130	20,670	8,687	3,762	2,822

*Project Independence - A Summary, Table P-3, P.35

Source: Federal Energy Administration, Office of Policy and Analysis and Office of Energy Resource Development, Initial Report on Oil and Gas Resources, Reserves, and Productive Capacities, p. 1X-10, Washington, D.C., 1975.

5.5.04

YEAR OF EXHAUSTION OF DOMESTIC OIL AND NATURAL GAS LIQUID RESOURCES
(ASSUMING 35% IMPORTS)



SOURCE: NATIONAL OCEAN STUDY, MARCH 1975, AND GEOLOGICAL SURVEY CIRCULAR 725, 1975.

Bibliography — Chapter 5

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TRANSPORTATION DEMAND

Transportation Demand

This chapter presents statistics relevant to population characteristics (Section 6.1) and economic determinants (Section 6.2) that influence transportation demand. The descriptions of the population and economic activity included in this chapter focus on the level and type of transportation services demanded. In Section 6.1, statistics are given that characterize the population by such variables as age, income, purchases of cars, average miles driven, and travel by purpose. In Section 6.2, transportation activity in the National Product and Income Accounts shows the influence of transportation on the overall economy and highlights the interdependencies between transportation and other economic activities.

One of the key determinants of transportation demand is population, and more specifically, population of driving age. Data contained in Section 6.1 illustrate past and future trends in population prepared by the U.S. Bureau of the Census. The projection series shows that alternative assumptions regarding fertility can significantly affect population levels, which, in turn, cause differences in driving age populations. Page 186 shows that the average number of miles driven by age group is fairly uniform across groups, with the exception of drivers below the age of 20 and above the age of 65, which average roughly one half the number of miles driven of other age groups.

The relationship between transportation activity and other types of economic activity is important because changes in economic activity influence the demand for transportation services, and also because the

transportation sector is sufficiently large that changes in transportation expenditure may influence the overall level of economic activity. That is, transportation energy use may decline substantially as a result of an economic downturn, and policies designed to reduce transportation energy use significantly could affect the level of economic activity.

Data contained in Section 6.2 show that transportation expenditures have remained at a relatively constant fraction of total personal consumption expenditure since 1950, roughly 13 percent, while increasing roughly four-fold in absolute terms (page 193).

In terms of employment, the transportation services sector accounted for approximately three percent of total employment in 1974; however, this figure understates the importance of transportation, since it leaves out significant amounts of manufacturing, service, and retail and wholesale trade employment linked directly to transportation (see page 208).

6.1.1.01

Estimates and projections[1] of
total population: 1970 to 2025

(number in thousands)

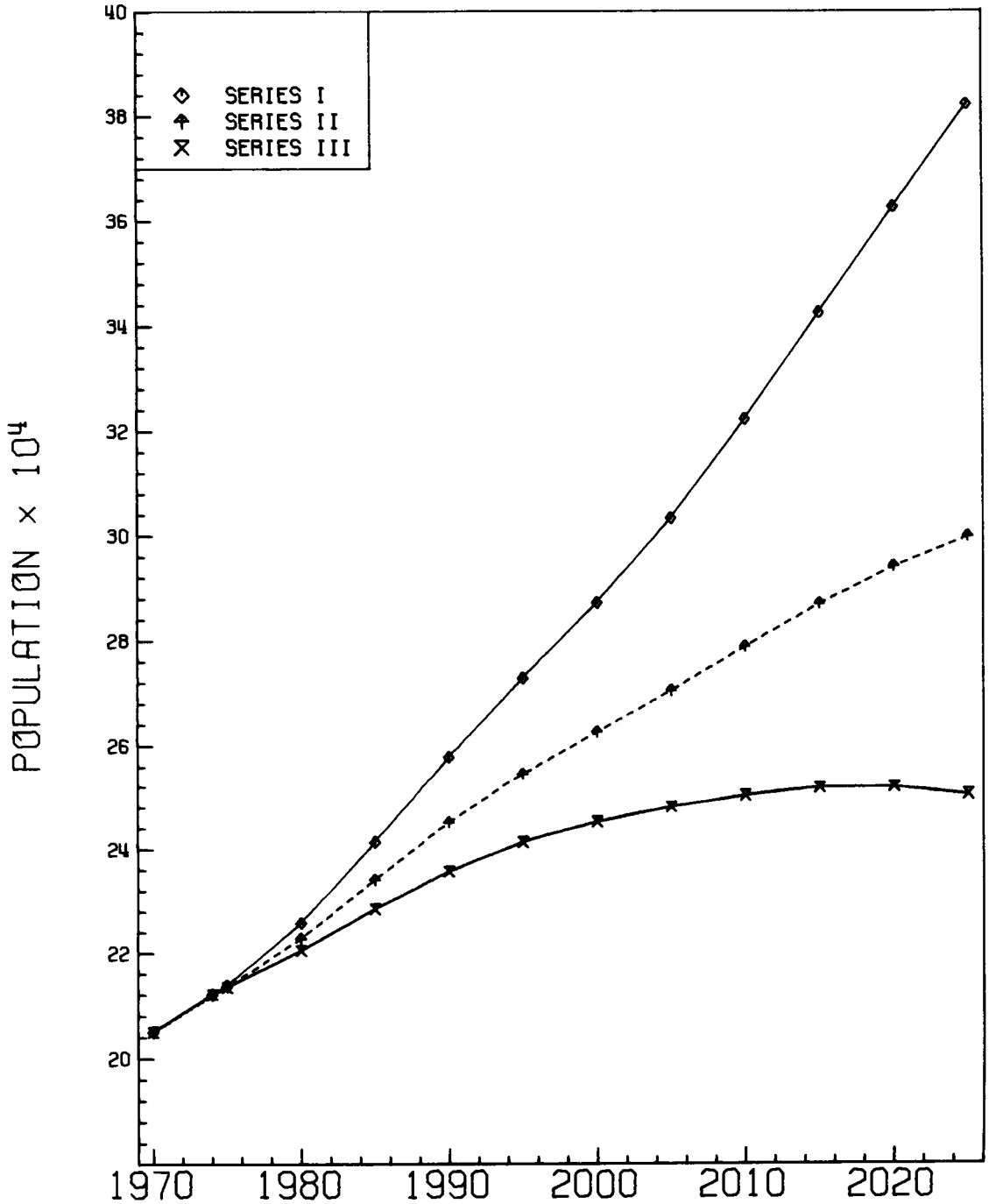
Year	Series I	Series II	Series III
ESTIMATES			
1970		204,875	
1974		211,909	
PROJECTIONS			
1975	213,641	213,450	213,323
1980	225,705	222,769	220,356
1985	241,274	234,068	228,355
1990	257,663	245,075	235,581
1995	272,685	254,495	241,198
2000	287,007	262,494	245,098
2005	303,144	270,377	247,926
2010	322,049	278,754	250,193
2015	342,340	286,960	251,693
2020	362,348	294,046	251,884
2025	382,011	299,713	250,421

[1]U.S. Bureau of the Census Projection Series I assumes a completed cohort fertility rate of 2.7 births per woman; Series II, 2.1 (replacement level); and Series III, 1.7.

Source: U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 541, Table A., U.S. Government Printing Office, Washington, D.C., 1975.

6.1.1.02

POPULATION ESTIMATES AND PROJECTIONS



SOURCE: CURRENT POP. REPORTS P-25

U.S. population by 5-year age groups, 1950-2000

6.1.1.03

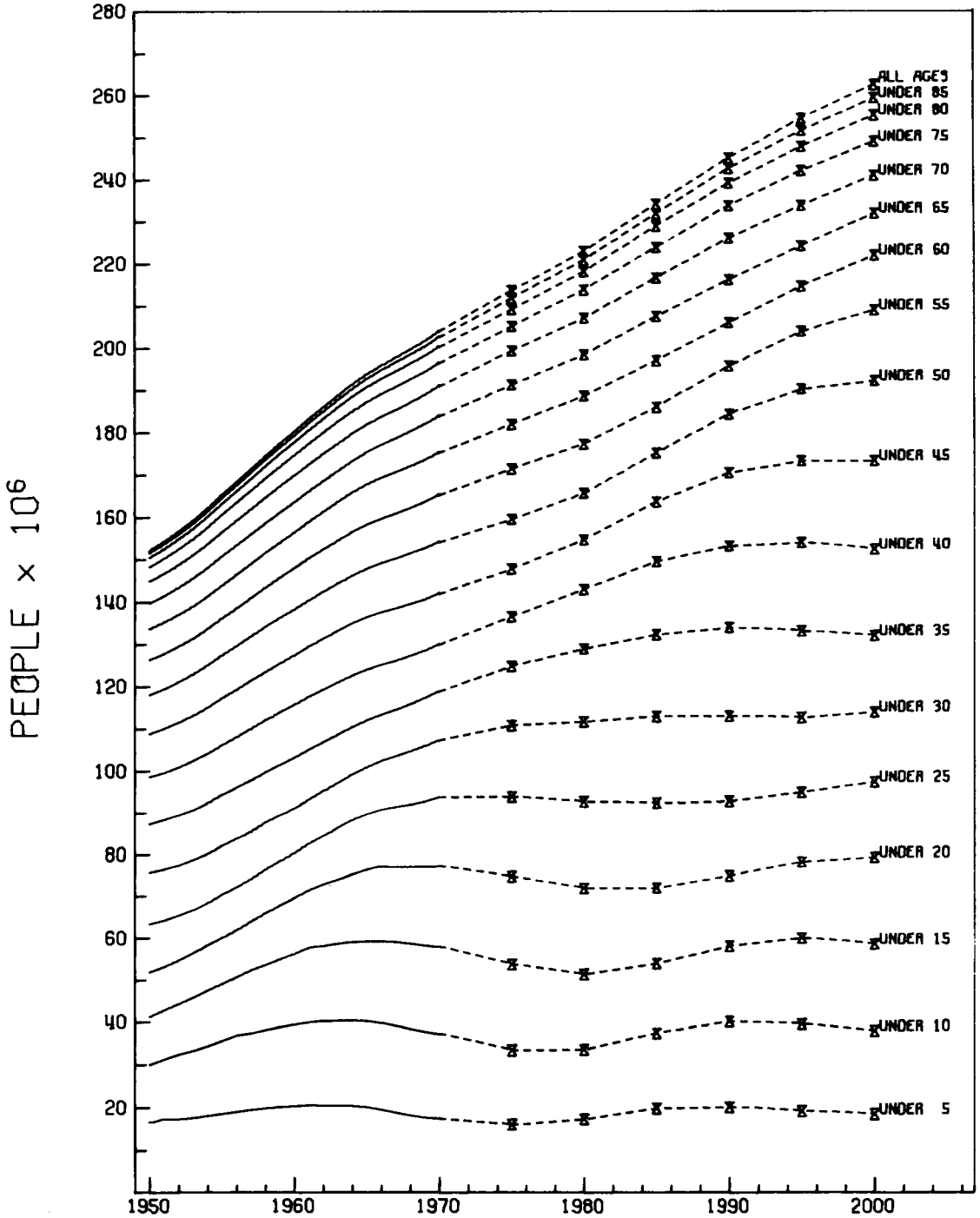
	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80+	Total	15+
									Numbers in millions										
1950[1]	16.41	13.38	11.21	10.60	11.52	12.29	11.62	11.32	10.28	9.14	8.31	7.29	6.10	5.05	3.44	2.16	1.75	151.87	110.87
1960	20.34	18.81	16.92	13.33	10.87	10.82	11.90	12.48	11.64	10.90	9.66	8.47	7.15	6.28	4.77	3.08	2.54	179.96	123.89
1970	17.16	19.90	20.83	19.21	16.56	13.58	11.49	11.07	11.96	12.13	11.16	10.00	8.67	7.02	5.46	3.86	3.74	203.80	145.91
1980	17.26	16.14	17.80	20.59	20.91	18.93	17.22	14.03	11.68	11.01	11.63	11.30	9.74	8.66	6.75	4.29	4.82	222.76	171.56
1990[2]	20.10	20.02	17.97	16.80	17.95	20.16	20.90	19.25	17.29	13.85	11.36	10.29	10.19	9.86	7.67	5.40	6.00	245.06	186.97
2000[2]	18.36	19.39	20.81	20.71	18.14	16.51	17.99	20.43	20.89	18.95	16.79	12.95	9.99	9.02	8.06	6.22	7.30	262.51	203.95
									Percent distribution										
1950[1]	10.8	8.8	7.4	7.0	7.6	8.1	7.6	7.4	6.8	6.0	5.5	4.8	4.0	3.3	2.3	1.4	1.2	100.0	73.0
1960	11.3	10.4	9.4	7.4	6.0	6.0	6.6	6.9	6.5	6.0	5.4	4.7	4.0	3.5	2.7	1.7	1.4	100.0	68.9
1970	8.4	9.8	10.2	9.4	8.1	6.7	5.6	5.4	5.9	6.0	5.5	4.9	4.3	3.4	2.7	1.9	1.8	100.0	71.6
1980[2]	7.8	7.3	8.0	9.2	9.4	8.5	7.7	6.3	5.2	4.9	5.2	5.1	4.4	3.9	3.1	1.9	2.1	100.0	76.9
1990[2]	8.2	8.2	7.3	6.9	7.3	8.2	8.5	7.9	7.1	5.7	4.6	4.2	4.2	4.0	3.1	2.2	2.4	100.0	76.3
2000[2]	7.0	7.4	7.9	7.9	6.9	6.3	6.8	7.8	8.0	7.2	6.4	4.9	3.8	3.4	3.1	2.4	2.8	100.0	77.7

[1]Figures for 1950 do not include armed forces overseas.
[2]Projections are taken from the Bureau of the Census Projection Series II which assumes a completed cohort fertility rate of 2.1 births per woman.

Sources: U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 310, Table 1, U.S. Government Printing Office, Washington, D.C., 1965.
U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 519, Table 1, U.S. Government Printing Office, Washington, D.C., 1974.
U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 541, Table 2, U.S. Government Printing Office, Washington, D.C., 1975.

6.1.1.04

U. S. POPULATION BY FIVE-YEAR-AGE-GROUP



SOURCE: BUREAU OF THE CENSUS

6.1.1.05

Number of drivers by age & sex, 1974
(in thousands)

Age	Male	Female	Total	
			Number	Percent
Under 20	6,171	5,066	11,237	9.0
20-24	8,849	7,777	16,626	13.3
25-29	8,068	7,168	15,236	12.2
30-34	6,687	5,963	12,650	10.1
35-39	5,745	5,124	10,869	8.7
40-44	5,707	5,011	10,718	8.6
45-49	5,791	5,002	10,793	8.6
50-54	5,506	4,588	10,094	8.1
55-59	4,750	3,802	8,552	6.8
60-64	4,032	3,036	7,068	5.6
65-69	3,116	2,090	5,206	4.1
70 and over	3,977	2,140	6,117	4.9
Total	68,399	56,767	125,166	100.0

Source: 1975 Automobile Facts & Figures, pg. 35, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975.

6.1.1.06

Projections of licensed drivers

Year	Driving age population (15 years and over)	Licensed drivers	Percent of licensed drivers of the forecasted persons of driving age (15 and over)
		Estimated	
1975	157.5	126.5	80.3
1980	167.9	137.8	82.1
1985	179.1	149.8	83.6
1990	189.7	161.2	85.0

Source: U.S. Department of Transportation, Federal Highway Administration, Highway Travel Forecasts, p. 27, Washington, D.C., November, 1974.

6.1.2.01

Index of median family income in current dollars and in 1974 constant dollars for the United States 1947 to 1974

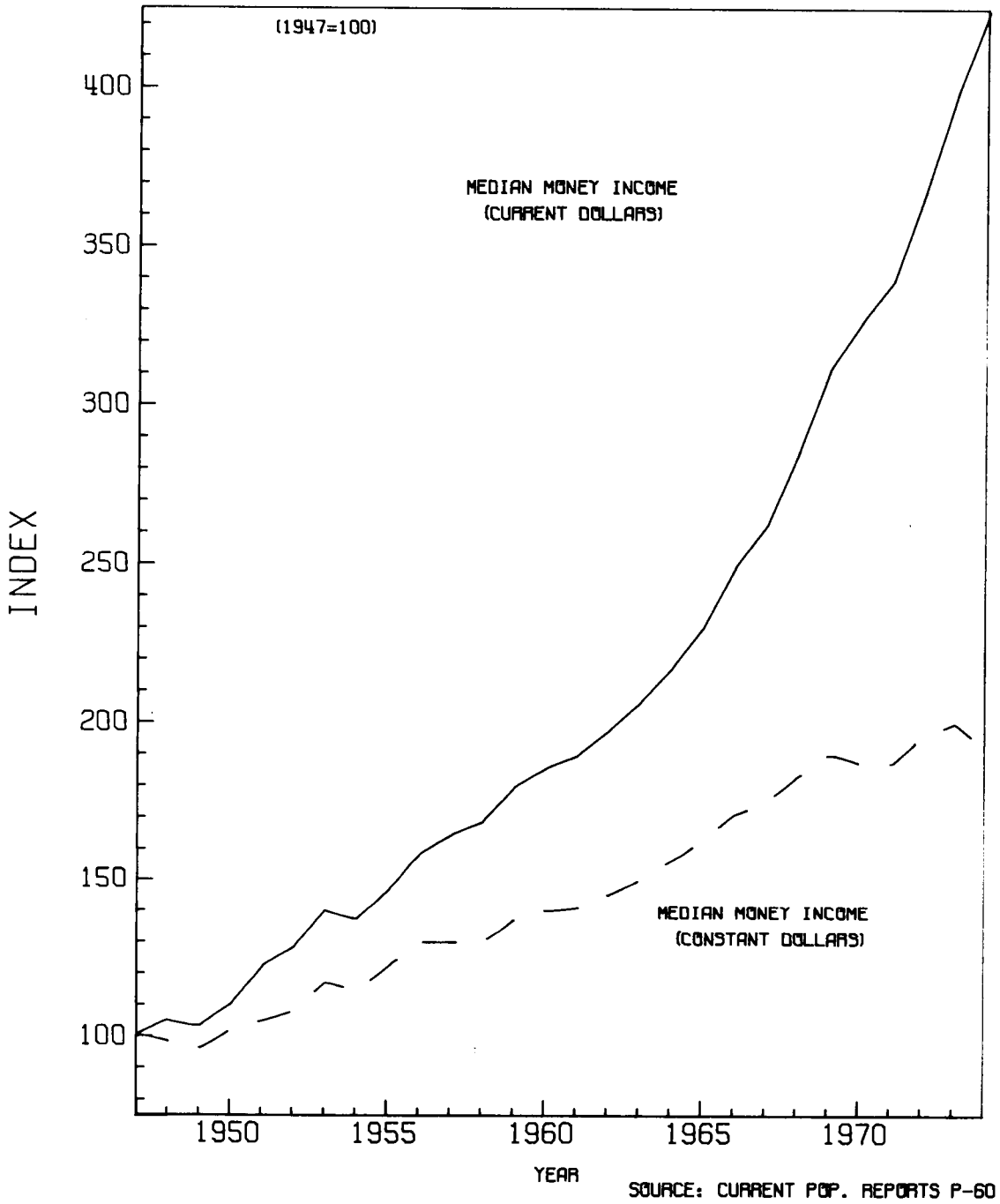
Median income

Year	Current dollars		1974 constant dollars	
	Amount (dollars)	Index (1947 = 100)	Amount (dollars)	Index (1947 = 100)
1974	12,836	424	12,836	192
1973	12,051	398	13,373	200
1972	11,116	367	13,103	196
1971	10,285	339	12,523	187
1970	9,867	326	12,531	167
1969	9,433	311	12,649	190
1968	8,632	285	12,236	183
1967	7,933	262	11,717	175
1966	7,532	249	11,445	171
1965	6,957	230	10,874	163
1964	6,569	217	10,444	156
1963	6,249	206	10,064	150
1962	5,956	197	9,709	145
1961	5,735	189	9,454	141
1960	5,620	185	9,358	140
1959	5,417	179	9,165	137
1958	5,087	168	8,676	130
1957	4,966	164	8,701	130
1956	4,780	158	8,673	130
1955	4,418	146	8,137	122
1954	4,167	137	7,646	114
1953	4,242	140	7,821	117
1952	3,890	128	7,227	108
1951	3,709	122	7,081	105
1950	3,319	110	6,800	102
1949	3,107	103	6,428	96
1948	3,187	105	6,530	98
1947	3,031	100	6,691	100

SOURCE: U.S. Bureau of the Census, Current Population Reports, Series P-60, No. 101, "Money Income in 1974 of Families and Persons in the U.S.," Tables 10 and 11, U.S. Government Printing Office, Washington, D.C., 1976.

6.1.2.02

INDEX OF MEDIAN FAMILY INCOME IN CURRENT AND CONSTANT DOLLARS FOR THE UNITED STATES



SOURCE: CURRENT POP. REPORTS P-60

6.1.2.03

Per capita income projections

	1967 dollars	Relative to 1971
1971	3,544	1.00
1980	4,700	1.33
1985	5,400	1.52
1990	6,100	1.72
2000	8,100	2.29
2020	13,200	3.72

Source: 1972 OBERS Projections, Series E, Population, Volume 1, U.S. Water Resources Council, Washington, D.C., April 1974.

Household purchases of new and used passenger cars, 1968-1973

	New cars				Used cars			
	Number purchased (thousands)	Number purchased per 100 households	Average price paid*	Total expend-itures (billions)	Number purchased (thousands)	Number purchased per 100 households	Average price paid*	Total expend-itures (billions)
1973**	8,548	12.3	$3,496	$29.9	12,507	18.0	$1,288	$16.1
1972	8,539	12.8	3,372	28.8	15,021	22.5	1,054	15.8
1971	8,148	12.5	3,294	26.8	14,564	22.4	1,017	14.8
1970	7,051	11.1	3,025	21.3	12,504	19.7	960	12.0
1969	8,069	13.0	3,021	24.4	12,808	20.6	952	12.2
1968	7,960	13.1	2,936	23.4	13,407	22.1	919	12.3

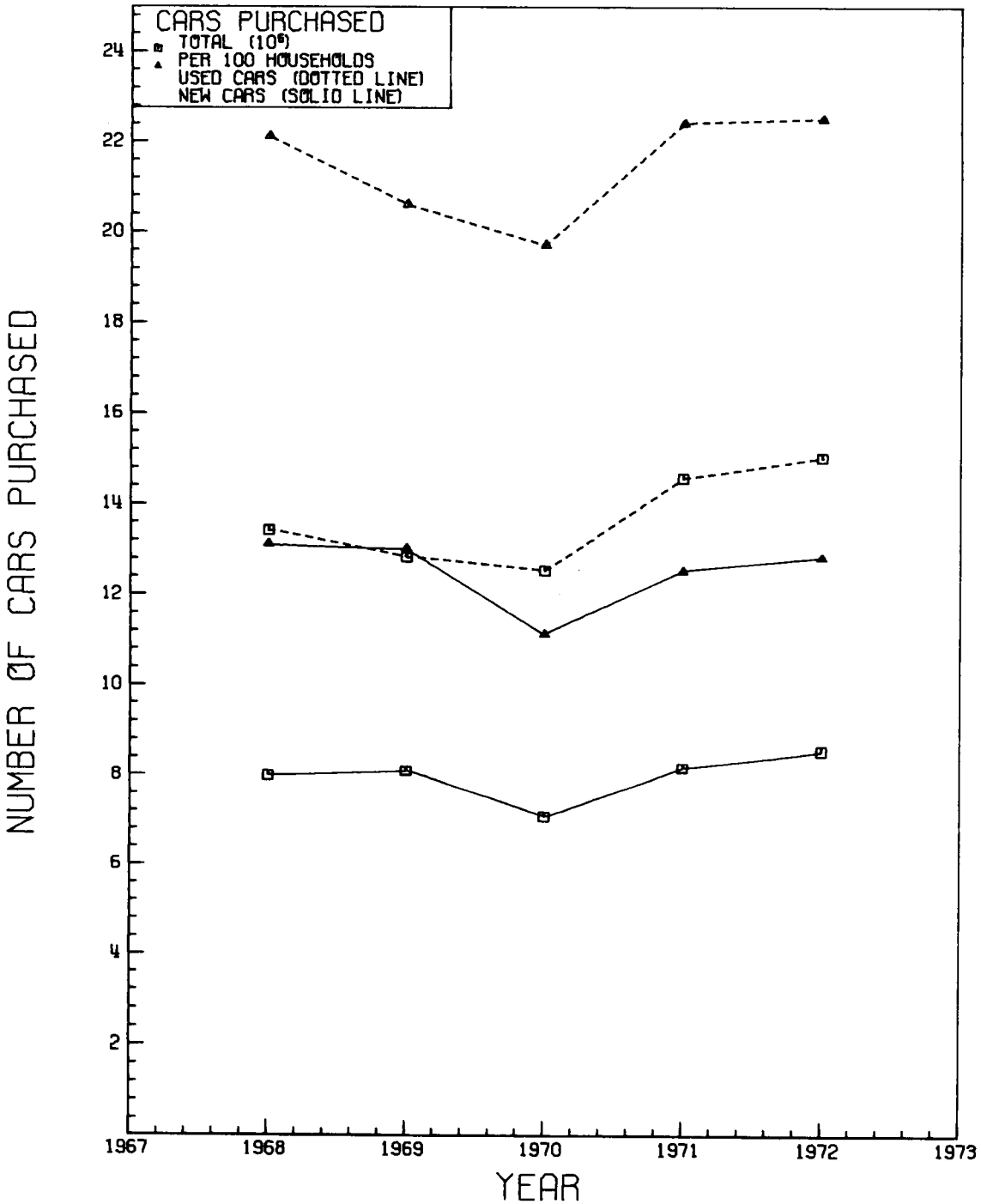
*Net price, after allowance for trade-in.
**Not strictly comparable to previous years, data collected from Fall 1972-Fall 1973.

Source: 1975 Automobile Facts & Figures, p. 33, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975.

6.1.3.02

HOUSEHOLD PURCHASES

NEW AND USED CARS

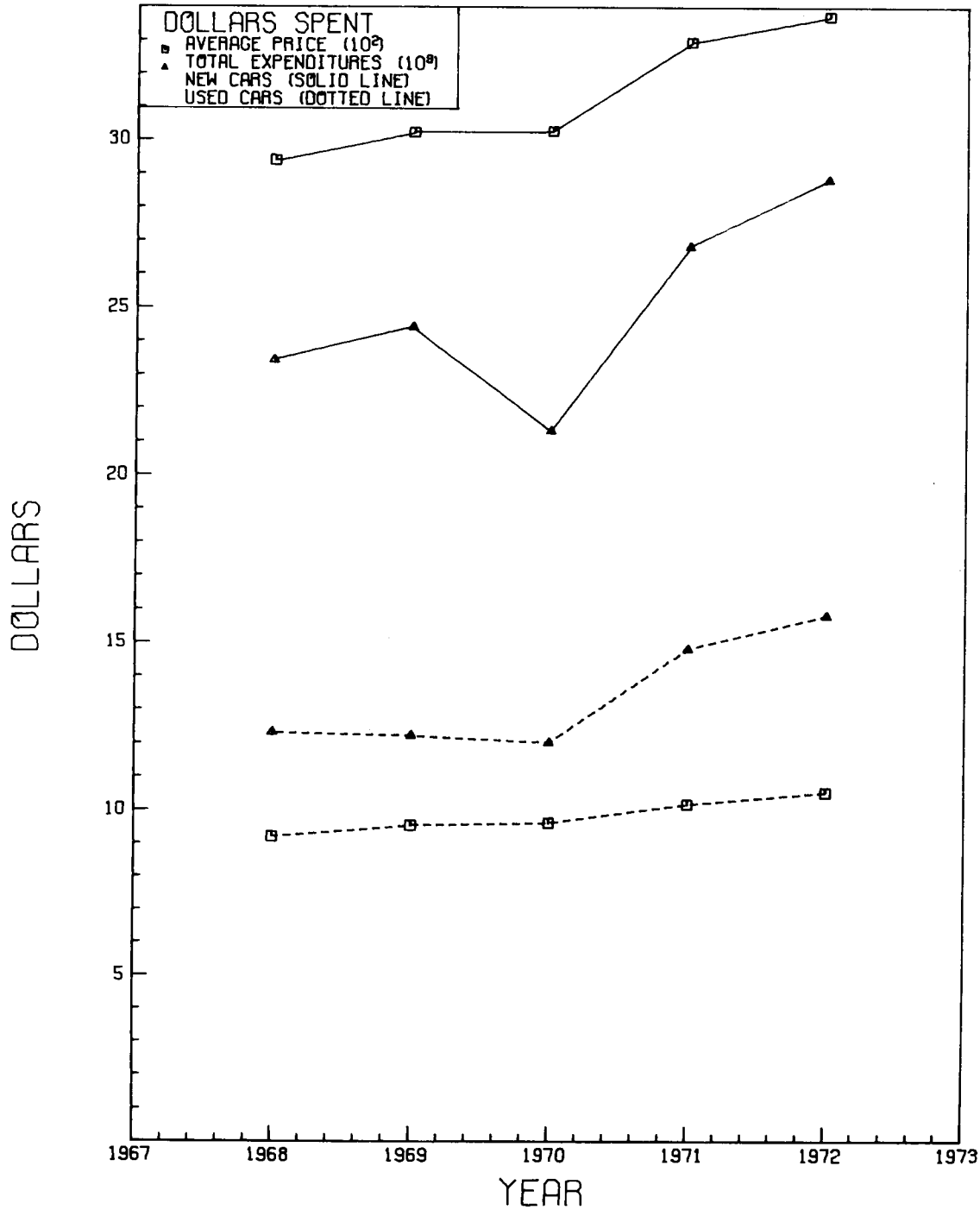


SOURCE: B. CENSUS

6.1.3.03

HOUSEHOLD EXPENDITURES

NEW AND USED CARS



SOURCE: B. CENSUS

Household purchases of new and used cars, by family income
1971-1973, by quarters

(number of cars purchased per 100 households)

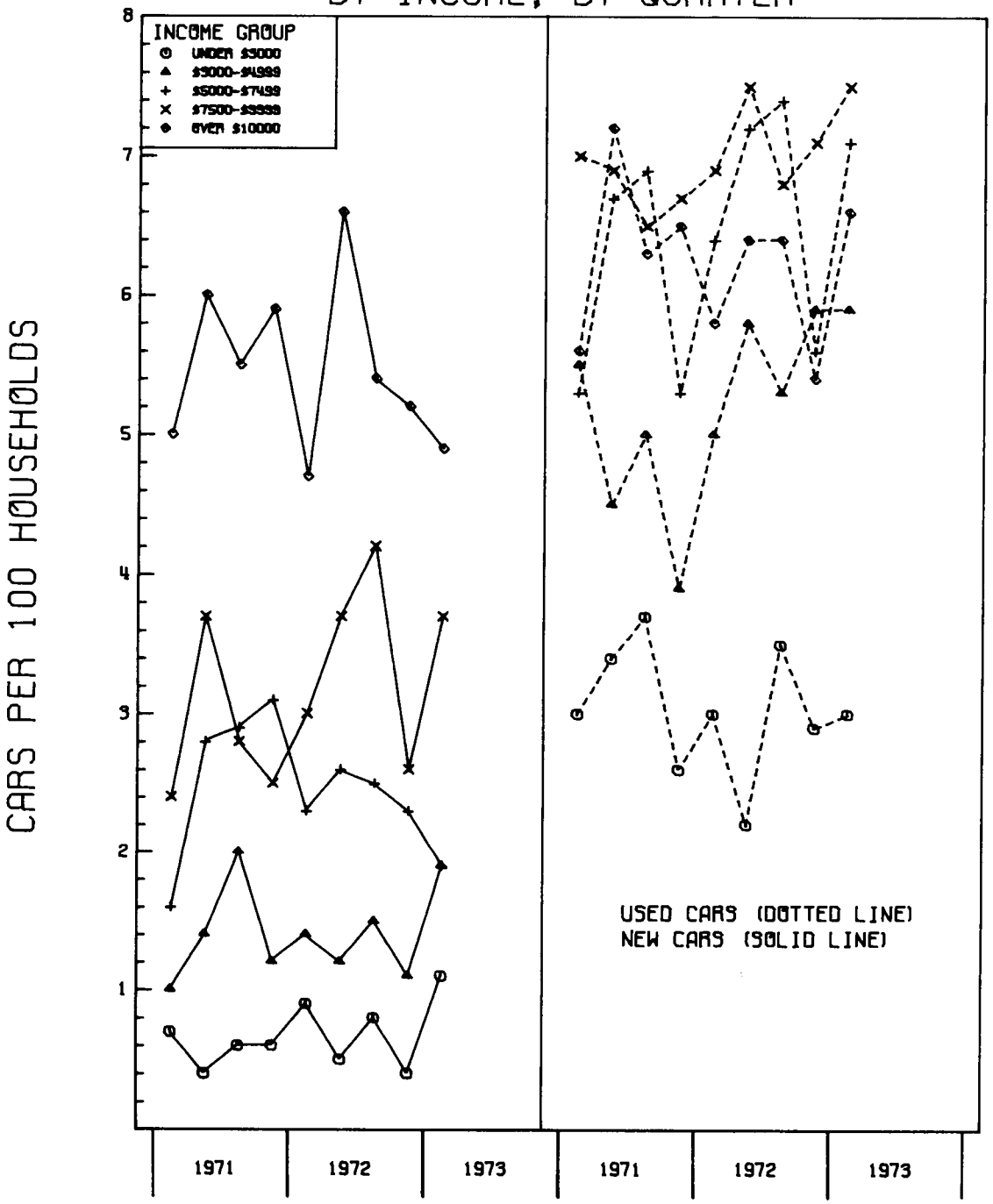
Purchase and quarter	All households	Income				
		Under $3,000	$3,000 to $4,999	$5,000 to $7,499	$7,500 to $9,999	$10,000 and over
New car purchases						
Jan.-March 1971	2.6	0.7	1.0	1.6	2.4	5.0
April-June 1971	3.4	0.4	1.4	2.8	3.7	6.0
July-Sept. 1971	3.2	0.6	2.0	2.9	2.8	5.5
Oct.-Dec. 1971	3.2	0.6	1.2	3.1	2.5	5.9
Jan.-March 1972	2.9	0.9	1.4	2.3	3.0	4.7
April-June 1972	3.6	0.5	1.2	2.6	3.7	6.6
July-Sept. 1972	3.4	0.8	1.5	2.5	4.2	5.4
Oct.-Dec. 1972	2.9	0.4	1.1	2.3	2.6	5.2
Jan.-March 1973	3.1	1.1	1.9	1.9	3.7	4.9
Used car purchases						
Jan.-March 1971	5.2	3.0	5.5	5.3	7.0	5.6
April-June 1971	6.1	3.4	4.5	6.7	6.9	7.2
July-Sept. 1971	5.8	3.7	5.0	6.9	6.5	6.3
Oct.-Dec. 1971	5.3	2.6	3.9	5.3	6.7	6.5
Jan.-March 1972	5.4	3.0	5.0	6.4	6.9	5.8
April-June 1972	5.8	2.2	5.8	7.2	7.5	6.4
July-Sept. 1972	6.0	3.5	5.3	7.4	6.8	6.4
Oct.-Dec. 1972	5.3	2.9	5.9	5.6	7.1	5.4
Jan.-March 1973	6.0	3.0	5.9	7.1	7.5	6.6

Source: U.S. Department of Commerce, Bureau of the Census, Consumer Buying Indicators, No. 46, U.S. Government Printing Office, Washington, D.C., Jan., 1974.

6.1.3.05

HOUSEHOLD PURCHASES

NEW & USED CARS BY INCOME, BY QUARTER



SOURCE: CURRENT POP. REPORTS P-65

6.1.4.01

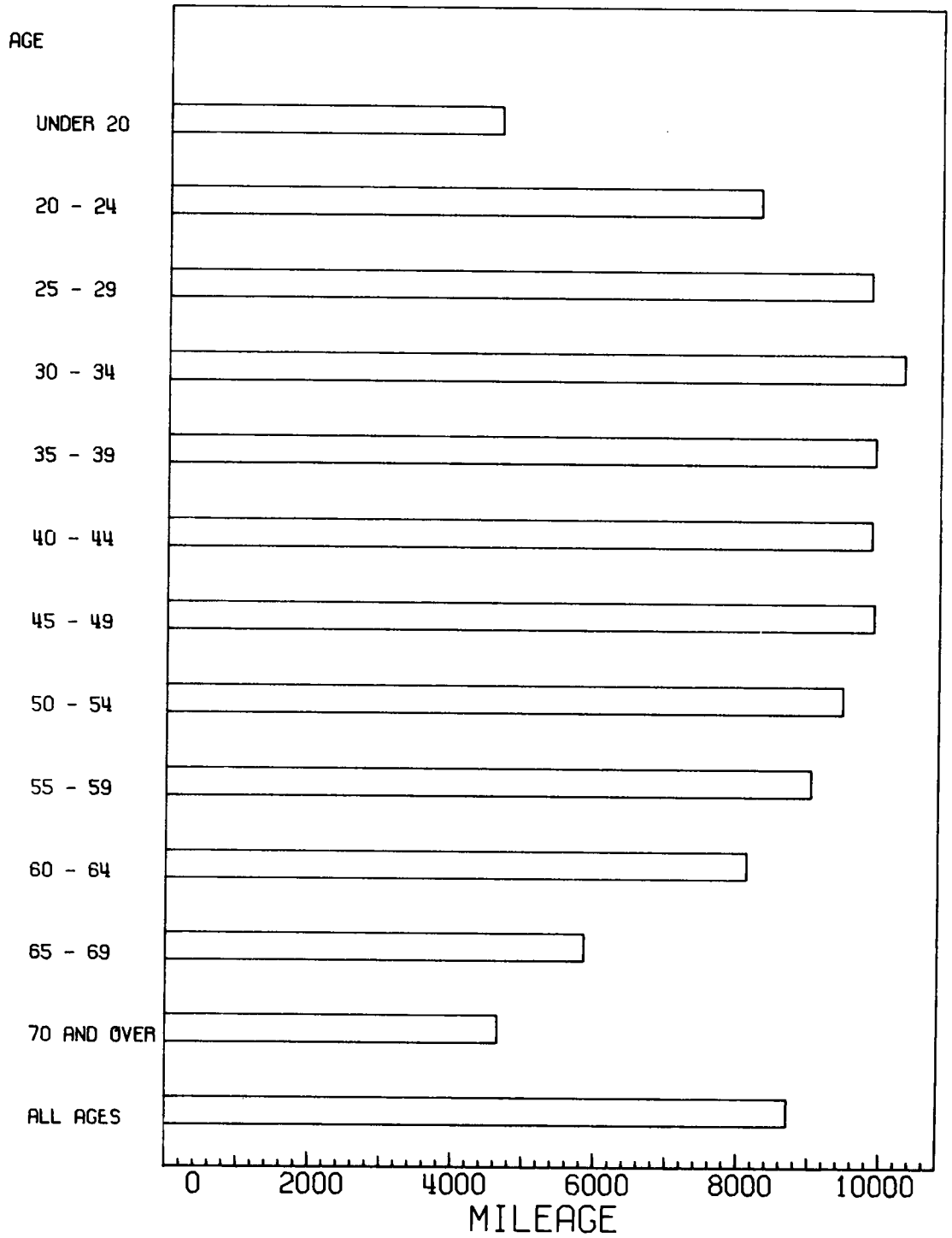
Average annual miles driven by age & sex

Age	Male	Female	All
Under 20	5,461	3,586	4,633
20-24	11,425	5,322	8,260
25-29	13,931	5,539	9,814
30-34	14,496	5,752	10,274
35-39	13,035	6,232	9,878
40-44	13,133	5,950	9,833
45-49	12,818	6,271	9,875
50-54	12,345	5,454	9,447
55-59	11,495	5,439	9,009
60-64	9,710	5,291	8,112
65-69	6,915	4,173	5,850
70 and over	5,302	3,183	4,644
All ages	11,352	5,411	8,685

Source: 1975 Automobile Facts & Figures, p. 35, Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan, 1975.

6.1.4.02

AVERAGE ANNUAL MILES DRIVEN



SOURCE: 1975 AUTO FACTS

6.1.4.03

Passenger car use by purpose of travel

1960-1970

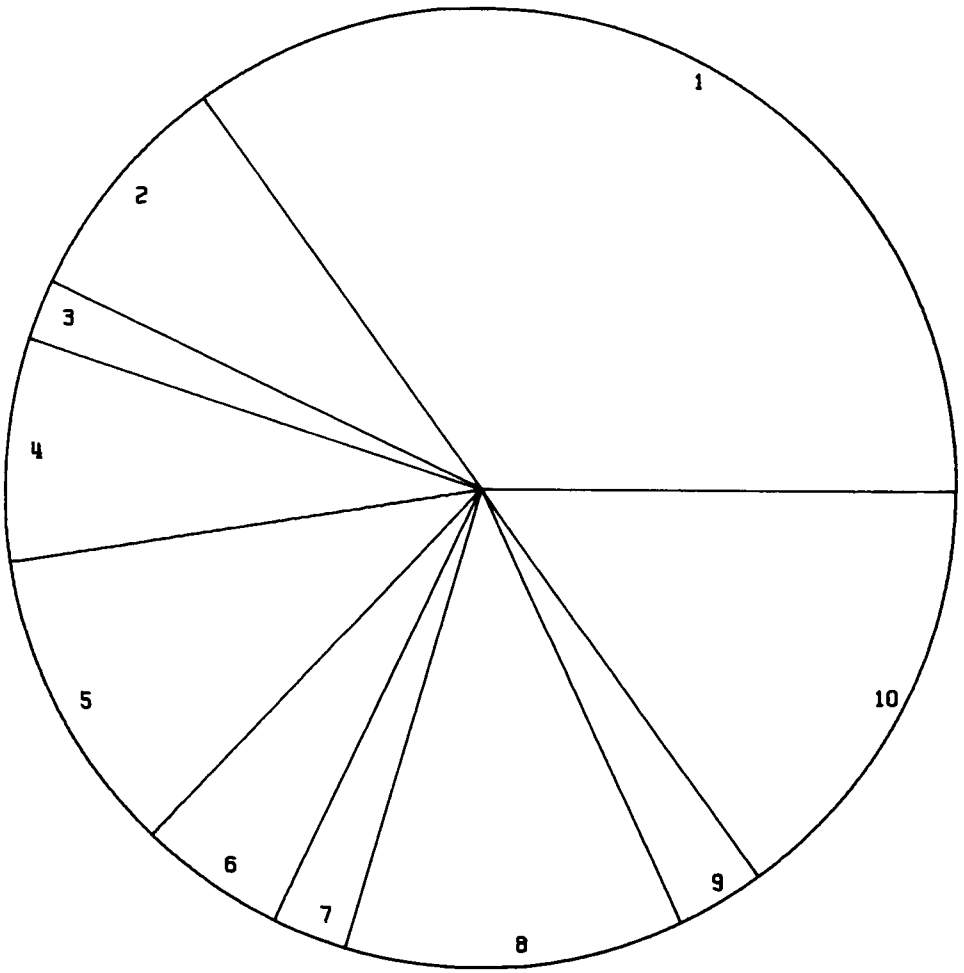
	Vehicle miles	Passengers per vehicle	Average trip length (miles)
Total/average	100.0	1.9	8.9
Earning a living			
To/from work	35.0	1.4	9.4
Related business	8.0	1.6	16.0
Family business			
Medical & dental	2.0	2.1	8.3
Shopping	7.5	2.0	4.4
Other	10.5	1.9	6.5
Education/civic/religious	5.0	2.5	4.7
Social/recreational			
Vacations	2.5	3.3	165.1
Visit friends & relatives	11.5	2.3	12.0
Pleasure rides	3.0	2.7	19.6
Other	15.0	2.6	11.4

Source: R. M. Harris, et al., U.S. Transportation — A Summary Appraisal, Figure 9, McLean, Virginia: The MITRE Corporation, 1975.

6.1.4.04

PASSENGER CAR USE BY TRAVEL PURPOSE

VEHICLE MILES AS PERCENT OF TOTAL	SECTOR
35.00	1. TO/FROM WORK
8.00	2. WORK RELATED BUSINESS
2.00	3. MEDICAL & DENTAL
7.50	4. SHOPPING
10.50	5. OTHER FAMILY BUSINESS
5.00	6. EDUCATION/CIVIC/RELIGEOUS
2.50	7. VACATIONS
11.50	8. VISIT FRIENDS
3.00	9. PLEASURE RIDES
15.00	10. OTHER SOCIAL/RECREATIONAL



VEHICLE MILES

SOURCE: U.S. TRANSPORTATION

Household ownership of cars by selected characteristics

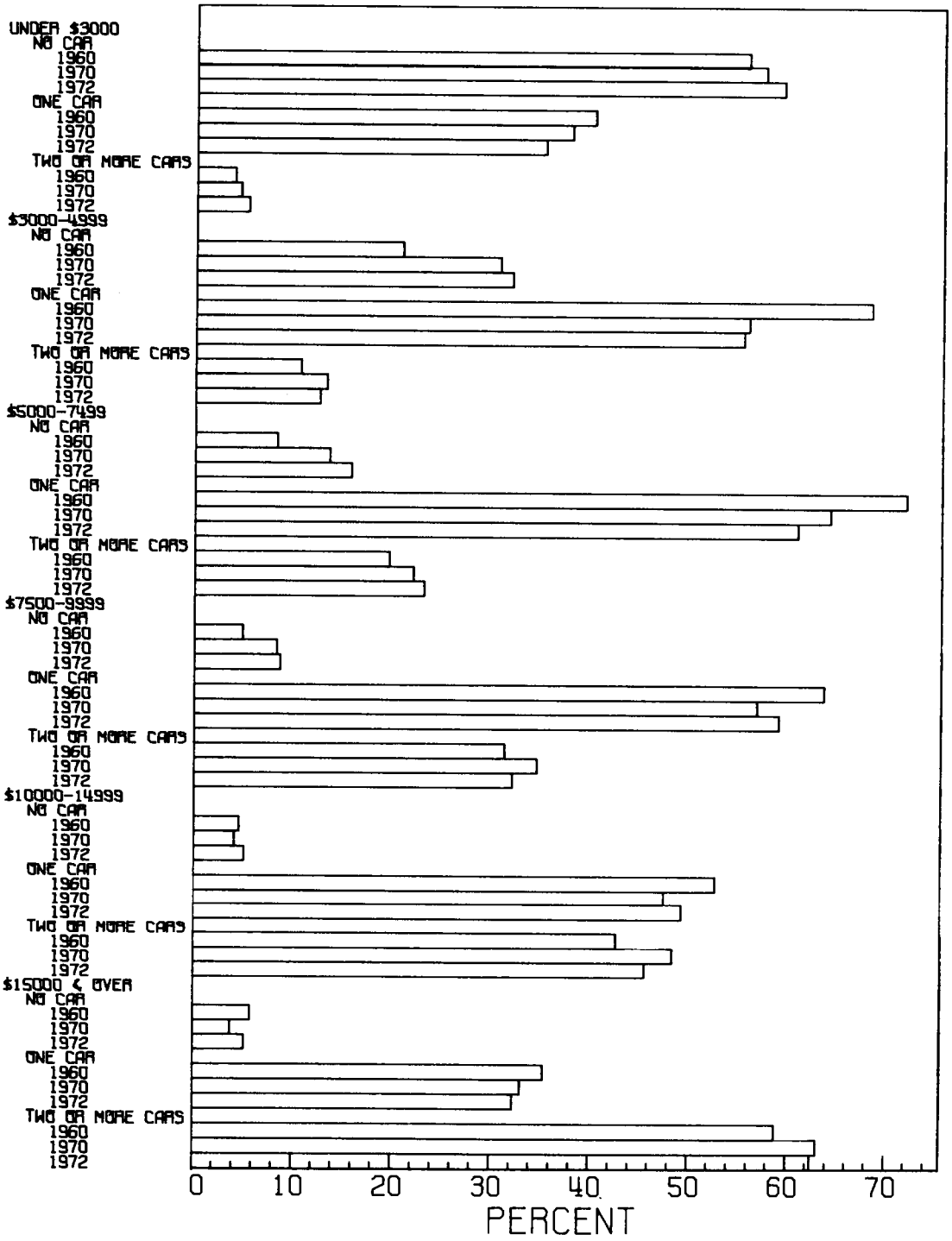
(percent owning in each household group)

	January 1960			July 1970				July 1972				
	No car	One or more	Two or more	No car	One or more	Two or more	Three or more	No car	One or more	Two or more	Three or more	One or more light trucks
Income												
Under $3,000	55.8	44.2	3.9	57.5	42.5	4.5	.7	59.4	40.6	5.3	.4	7.7
$3,000-4,999	20.9	79.1	10.7	30.8	69.2	13.3	1.5	32.0	68.0	12.6	1.8	10.5
$5,000-7,499	8.3	91.7	19.7	13.6	86.4	22.1	2.6	15.8	84.2	23.2	3.1	16.8
$7,500-9,999	4.9	95.1	31.4	8.4	91.6	34.7	4.8	8.7	91.3	32.2	4.5	18.6
$10,000-14,999	4.6	95.4	42.7	4.1	95.9	48.4	8.2	5.1	94.9	45.6	7.6	19.6
$15,000 and over	5.8	94.2	58.8	3.8	96.2	63.1	12.7	5.2	94.8	62.5	18.9	14.1
Age of head												
Under 25 years	20.9	79.1	5.5	19.3	80.7	16.7	1.7	18.6	81.4	22.3	2.1	9.6
25-34 years	16.1	83.9	14.0	12.0	88.0	29.3	2.1	13.2	86.8	29.4	1.8	17.4
35-44 years	15.0	85.0	21.3	11.6	88.4	41.4	6.4	12.5	87.5	41.3	7.1	19.9
45-54 years	20.2	79.8	23.4	13.6	86.4	42.9	9.5	13.9	86.1	45.2	13.6	17.7
55-64 years	28.5	71.5	17.2	19.7	80.3	27.9	5.5	20.8	79.2	29.3	5.8	15.0
65 years and over	50.4	49.6	7.1	44.9	55.1	8.8	.8	42.2	57.8	9.7	1.2	6.7
All households	25.0	75.0	16.4	20.4	79.6	29.3	4.7	20.5	79.5	30.2	5.6	14.8

Source: U.S. Bureau of the Census, Current Population Reports, Series P-65, No. 33 and No. 44, U.S. Government Printing Office, Washington, D.C., 1972.

6.1.4.06

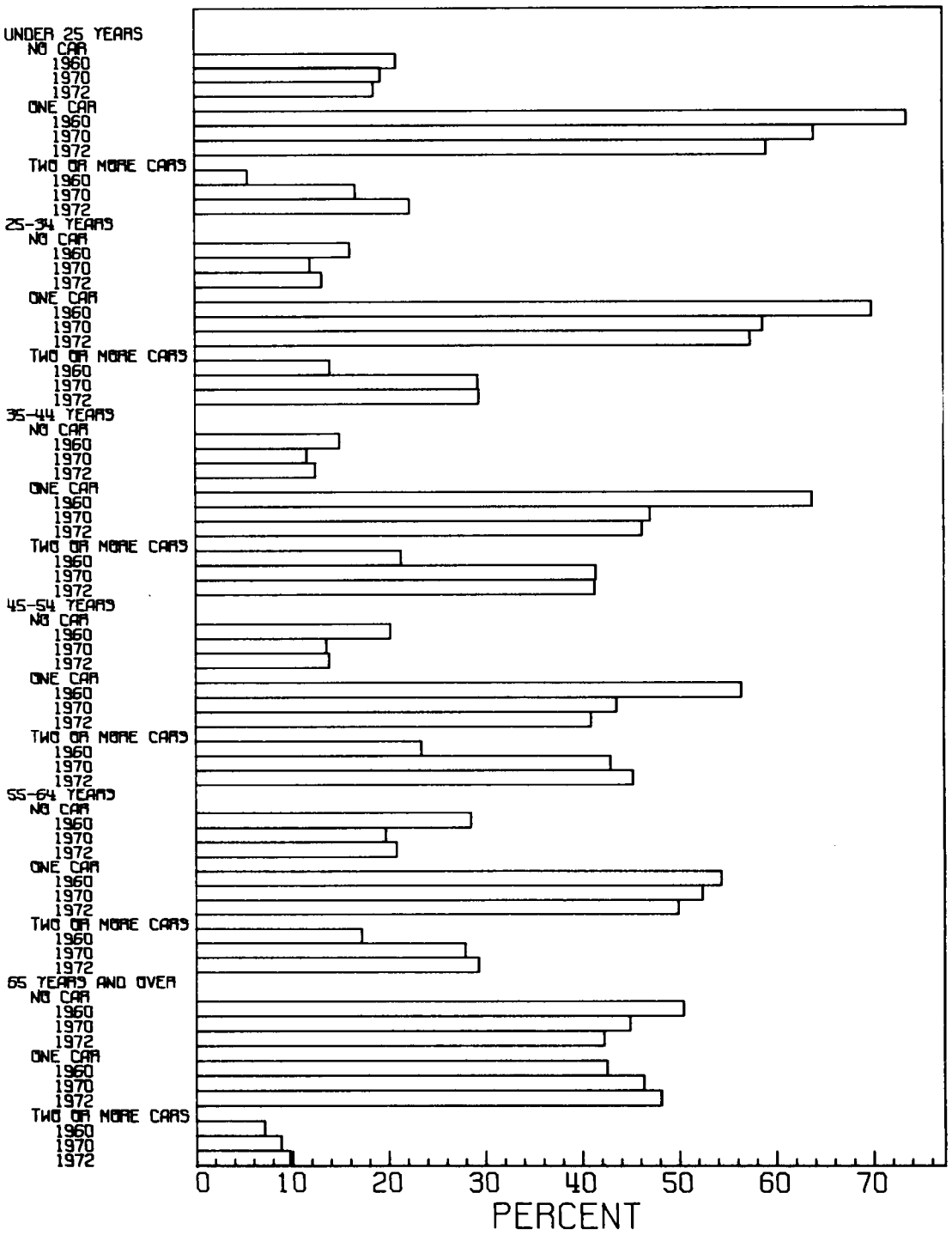
HØUSEHØLD ØWNERSHIP ØF CARS



SØURCE: CURRENT PØP. REPØRTS P-65

6.1.4.07

HOUSEHOLD OWNERSHIP OF CARS



SOURCE: CURRENT POP. REPORTS P-65

Gross national product by major component, 1950-1974

(millions of dollars)

	1950	1955	1960	1965	1970	1971	1972	1973	1974
Gross national product (GNP)	286,172 (100.0)	399,266 (100.0)	505,978 (100.0)	688,110 (100.0)	982,419 (100.0)	1,063,436 (100.0)	1,171,121 (100.0)	1,306,335 (100.0)	1,406,911 (100.0)
Personal Consumption Expenditures (PCE) (% of GNP)	191,966 (67.1)	253,665 (63.5)	324,903 (64.2)	430,154 (62.5)	618,796 (63.0)	668,171 (62.8)	733,034 (62.6)	808,549 (61.9)	885,862 (63.0)
Transportation* (% of PCE)	25,400 (13.2)	34,600 (13.6)	42,400 (13.1)	58,200 (13.5)	78,000 (12.6)	91,000 (13.6)	101,500 (13.8)	110,500 (13.7)	115,300 (13.0)
Gross private domestic investment (% of GNP)	53,815 (18.8)	68,377 (17.1)	76,444 (15.1)	112,015 (16.3)	140,814 (14.3)	159,969 (15.0)	188,275 (16.1)	220,472 (16.9)	212,218 (15.1)
Net exports of goods & services (% of GNP)	1,898 (0.7)	2,218 (0.6)	4,372 (0.9)	7,591 (1.1)	3,946 (0.4)	1,562 (0.1)	-3,293 (-0.3)	7,368 (0.6)	7,746 (0.6)
Government purchases of goods & services (% of GNP)	38,493 (13.4)	75,006 (18.8)	100,259 (19.8)	138,350 (20.1)	218,863 (22.3)	233,734 (22.0)	253,105 (21.6)	269,946 (20.7)	301,085 (21.4)

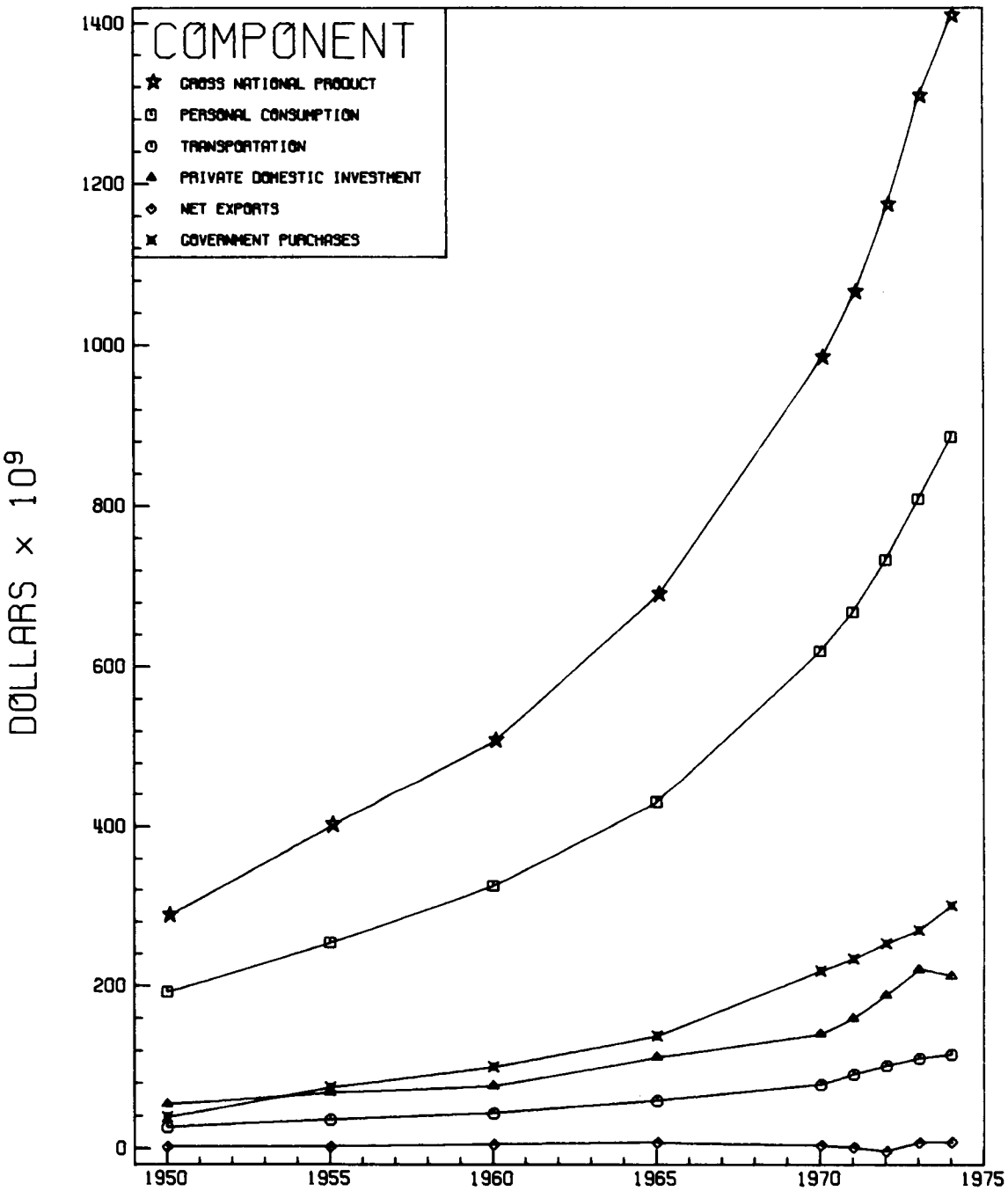
* Includes motor vehicles & parts, gasoline & oil & transportation.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Survey of Current Business - National Income Issue, 56, No. 1, Part 1, Table 1.1, January, 1976; U.S. Department of Commcerce, Bureau of Economic Analysis, Survey of Business - National Income Issue, Part 2, Table 2.3, January, 1976.

6.2.1.02

GROSS NATIONAL PRODUCT

BY MAJOR COMPONENT



SOURCE: STAT. ABS. U.S. 1975

Personal consumption expenditures by type of product, 1960-1973
(millions of dollars)

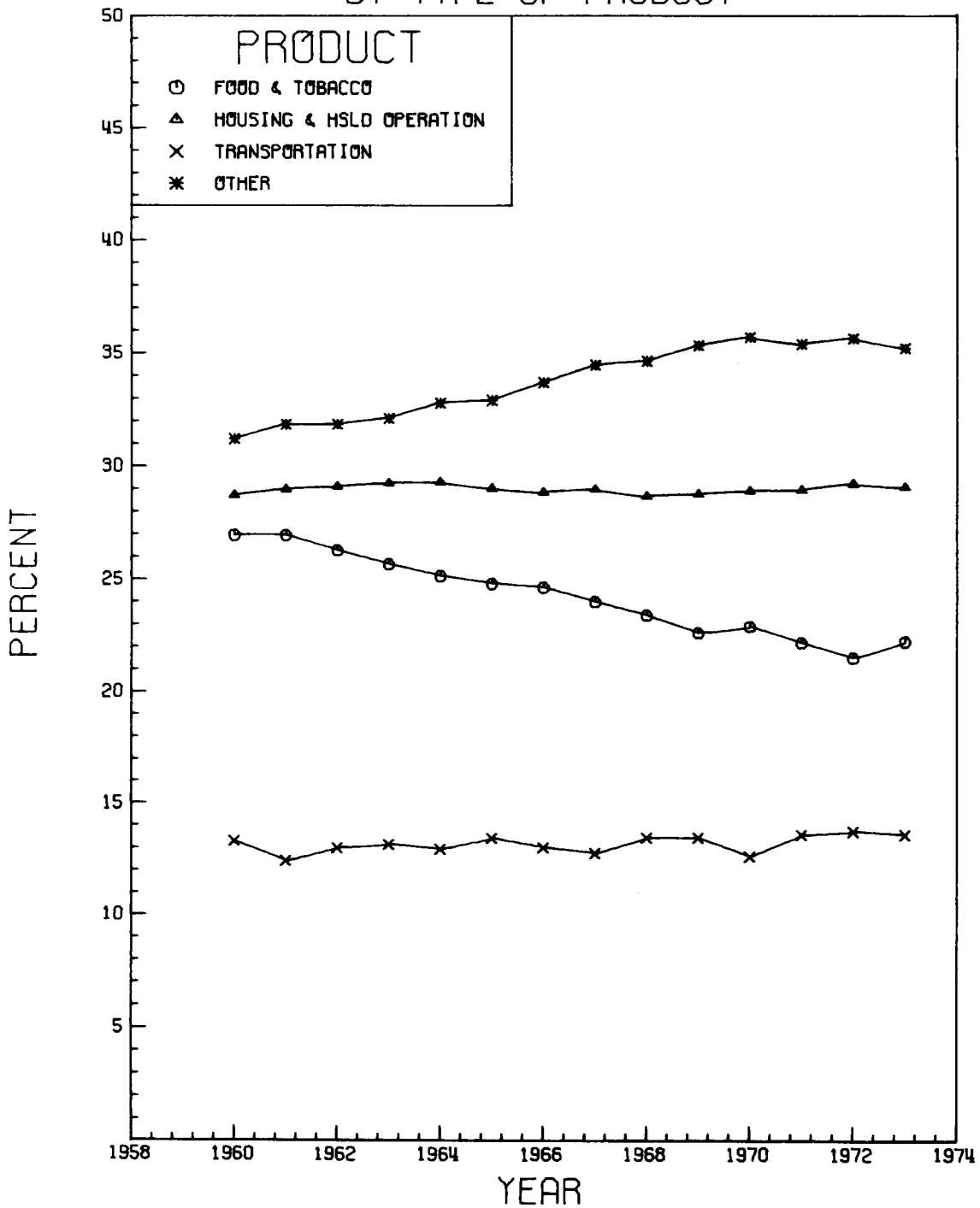
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971[3]	1972[3]	1973
Transportation[2]	43,134	41,455	45,975	49,140	51,753	57,825	60,489	62,588	71,983	77,772	77,776	90,489r	99,949r	109,228
Percent of total	13.3	12.4	12.9	13.1	12.9	13.4	13.0	12.7	13.4	13.4	12.6	13.6	13.7	13.6
Food and tobacco[1]	87,510	90,126	93,054	96,008	100,671	106,791	114,621	117,744	125,134	130,707	141,181	147,680r	156,438r	178,676
Clothing accessories and jewelry	33,032	33,836	35,700	37,049	40,564	43,427	48,360	50,995	55,474	59,924	62,834	67,241r	73,633r	81,274
Personal care	5,324	5,792	6,248	6,530	7,032	7,509	8,068	8,558	9,049	9,760	10,420	10,621r	11,443r	12,315
Housing	46,305	48,717	51,950	55,410	59,189	63,157	67,506	71,848	77,311	84,141	90,926	99,117r	107,895r	116,367
Household operation	46,906	48,258	51,170	54,127	58,255	61,877	66,786	70,514	76,125	82,294	87,360	93,785r	105,057r	117,509
Medical care expenses	19,116	20,321	22,002	23,340	25,681	28,120	31,142	34,491	37,767	42,814	47,401	51,764r	57,230r	62,726
Personal business	14,974	16,021	16,481	18,422	20,066	22,055	24,287	26,182	29,532	33,277	35,314	38,131r	41,421r	45,183
Recreation	18,295	19,506	20,472	22,213	24,573	26,304	28,850	30,758	33,623	36,901	40,653	42,900r	48,123r	52,280
Private education and research	3,718	4,028	4,392	4,736	5,217	5,585	6,608	7,576	8,690	9,536	10,363	10,887r	11,934r	13,225
Religious and welfare activities	4,748	4,926	5,082	5,262	5,527	5,609	6,421	6,948	7,605	8,084	8,601	9,203r	10,096r	10,843
Foreign travel	2,179	2,166	2,529	2,745	2,828	3,206	3,196	3,864	3,795	4,247	4,815	5,217r	5,798r	5,595
Total	325,241	335,152	355,057	374,982	401,356	431,465	466,334	492,066	536,178	579,457	617,644	667,125r	729,017r	805,221

[1]Figures for 1963 and after include consumer expenditures for alcoholic beverages.
[2]Excluding foreign travel.
[3]Figures in the 1971-72 columns are all revised.

Sources: U.S. Department of Transportation, Summary of National Transportation Statistics, p. 65, U.S. Government Printing Office, Washington, D.C., 1975.
U.S. Department of Transportation, Summary of National Transportation Statistics, p. 53, U.S. Government Printing Office, Washington, D.C., 1972.

6.2.1.04

PERSONAL CONSUMPTION EXPENDITURES BY TYPE OF PRODUCT



SOURCE: DOT, 1972, 1975

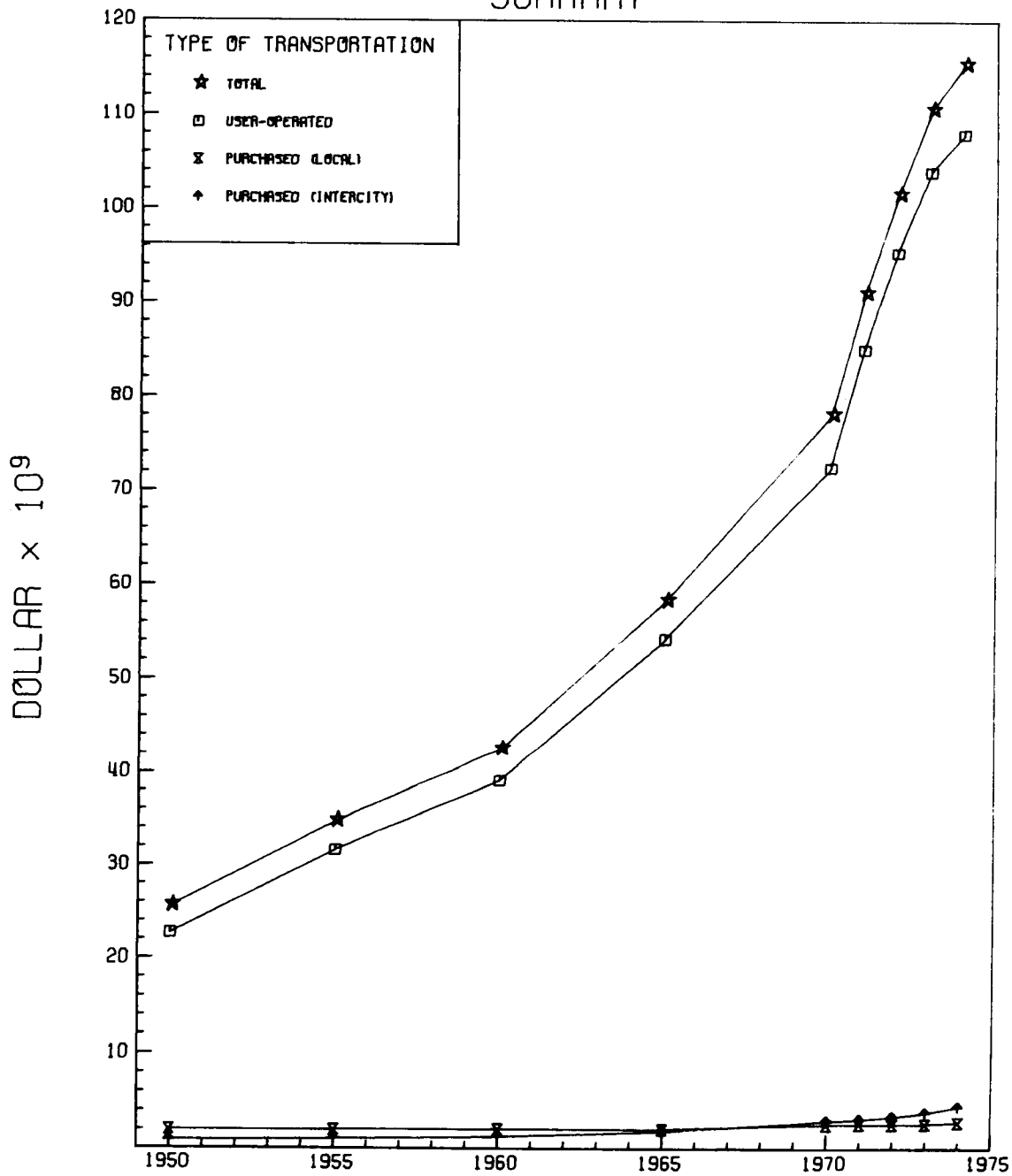
Personal consumption expenditures by transportation sector, 1950-1974
(millions of dollars)

	1950	1955	1960	1965	1970	1971	1972	1973	1974
TRANSPORTATION TOTAL	25,415	34,583	42,391	58,205	78,032	90,915	101,438	110,503	115,330
User-operated Transportation									
Total	22,609	31,598	39,058	54,240	72,503	85,116	95,345	103,959	107,967
New cars and net purchases of used cars	12,173	16,254	17,192	26,578	30,343	38,631	44,860	47,958	41,030
Tires, tubes, accessories and parts	1,545	1,581	2,485	3,223	4,587	5,119	5,691	6,424	6,942
Maintenance	2,509	3,619	5,065	6,901	11,248	12,532	13,922	15,380	17,735
Gasoline and oil	5,522	8,595	11,977	14,696	21,997	23,396	24,879	28,295	36,447
Tolls	97	171	310	463	643	689	745	786	748
Insurance	763	1,378	2,029	2,379	3,685	4,749	5,248	5,116	5,065
Purchased local transportation									
Total	1,934	1,933	2,026	2,061	2,521	2,600	2,604	2,632	2,812
Street, electric, railway and local bus	1,368	1,292	1,295	1,313	1,573	1,596	1,585	1,617	1,720
Taxicab	487	540	609	612	776	828	842	835	892
Railway (commutation)	79	101	122	136	172	176	177	180	200
Purchased intercity transportation									
Total	872	1,052	1,307	1,904	3,008	3,199	3,489	3,912	4,551
Railway (noncommutation)	394	378	306	284	185	155	176	204	259
Intercity bus	309	295	290	375	496	525	523	545	616
Airline	141	349	676	1,191	2,166	2,347	2,637	2,988	3,484
Other	28	30	35	54	161	172	153	175	192

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Benchmark Revision of National Income and Product Accounts: Advanced Tables, Table 2.6, U.S. Government Printing Office, Washington, D.C., 1976.

6.2.1.06

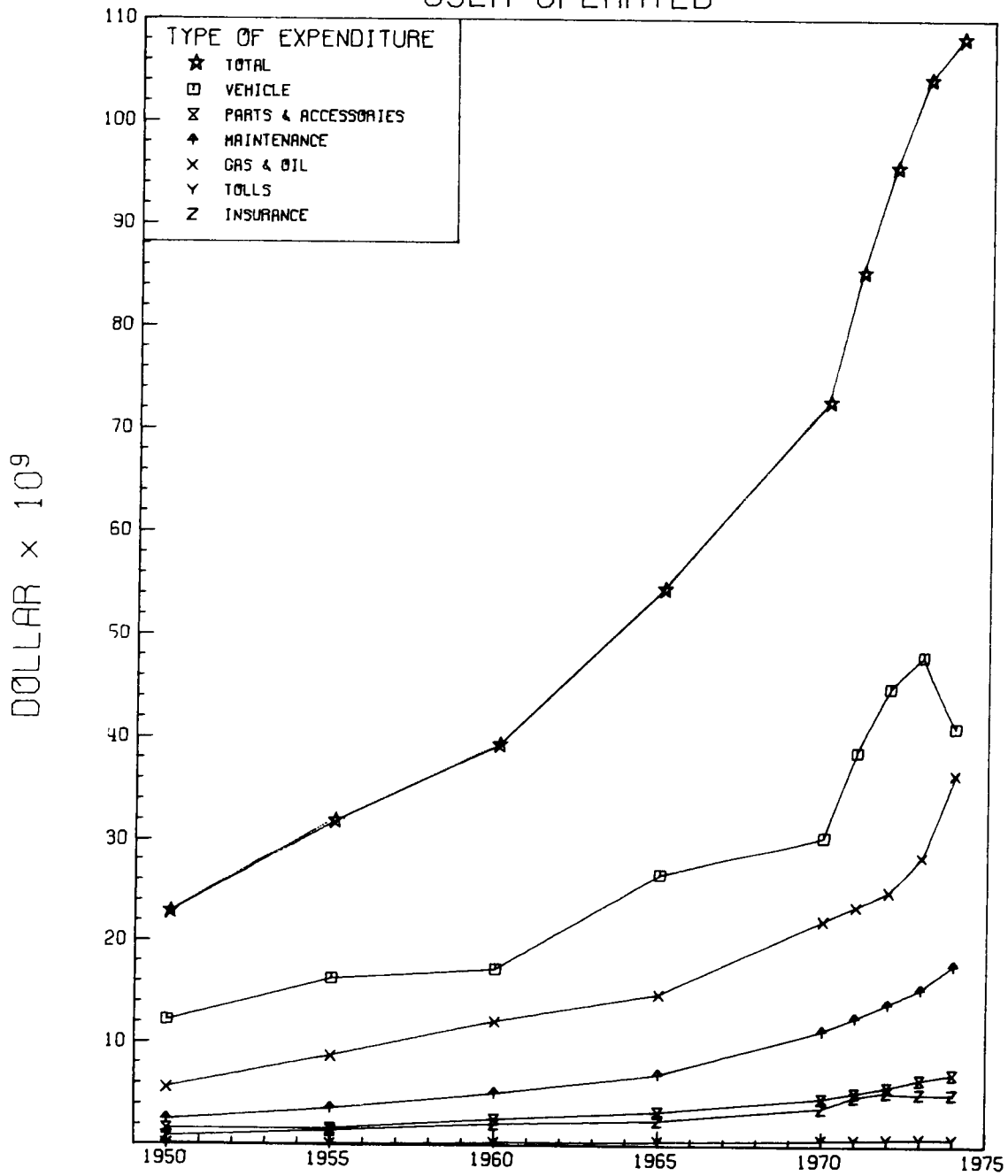
PERSONAL CONSUMPTION EXPENDITURE FOR TRANSPORTATION SUMMARY



SOURCE: B. ECONOMIC ANALYSIS

6.2.1.07

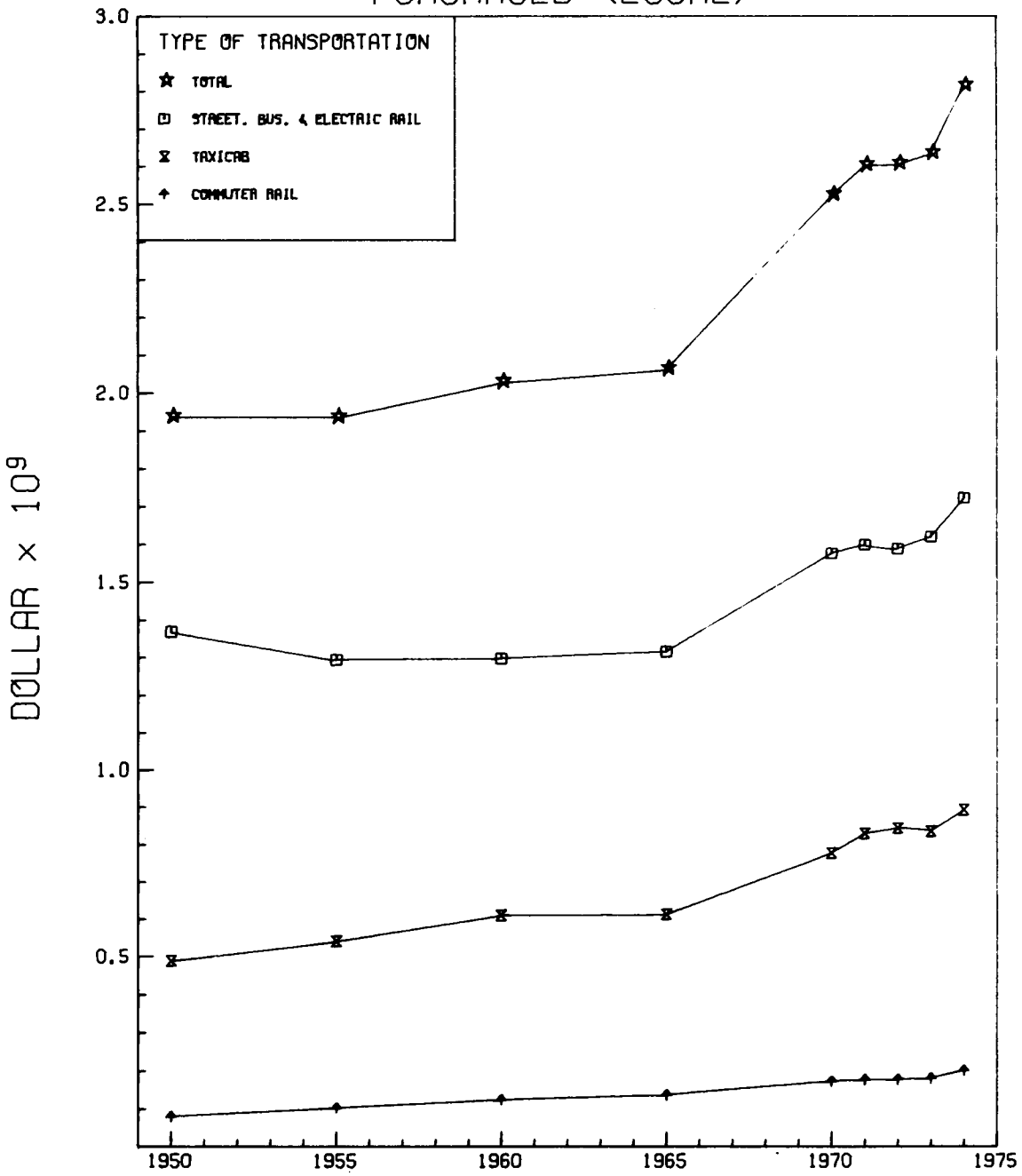
PERSONAL CONSUMPTION EXPENDITURE FOR TRANSPORTATION USER-OPERATED



SOURCE: B. ECONOMIC ANALYSIS

6.2.1.08

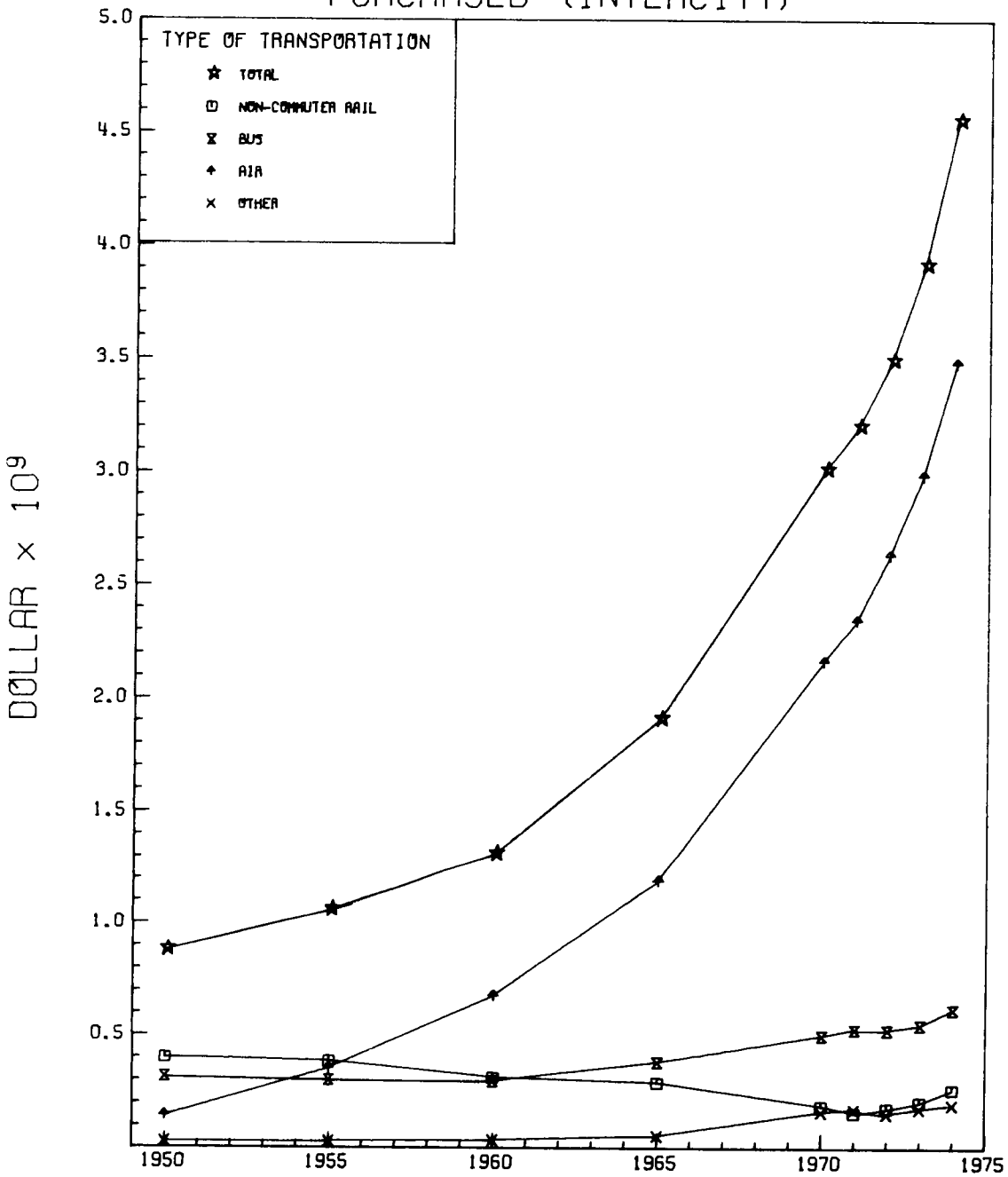
PERSONAL CONSUMPTION EXPENDITURE FOR TRANSPORTATION PURCHASED (LOCAL)



SOURCE: B. ECONOMIC ANALYSIS

6.2.1.09

PERSONAL CONSUMPTION EXPENDITURE FOR TRANSPORTATION PURCHASED (INTERCITY)



SOURCE: B. ECONOMIC ANALYSIS

National income by industry, 1950-1974
(billions of dollars)

	1950	1955	1960	1965	1970	1971	1972	1973	1974	% 1950	% 1974
Total National Income	239.9	329.2	412.1	460.1	795.9	851.7	940.0	1057.2	1131.1	100.0	100.0
Agriculture	17.6	15.4	16.9	21.0	25.6	26.4	31.2	50.6	45.6	7.3	4.0
Mining	5.2	5.9	5.7	6.1	7.7	7.1	8.3	9.4	11.3	2.2	1.0
Contract construction	11.9	16.6	20.8	29.1	42.8	46.6	51.2	57.1	60.6	5.0	5.3
Manufacturing	76.2	107.9	125.8	172.6	217.5	226.5	253.4	287.2	306.1	31.8	27.1
Transportation	13.4	15.9	18.2	23.2	29.8	32.8	36.6	40.4	43.8	5.6	3.9
(Percent of national income)	(5.6)	(4.8)	(4.4)	(5.0)	(3.7)	(3.8)	(3.9)	(3.8)	(3.9)		
Communication	3.3	5.7	8.2	11.2	16.8	17.6	19.4	21.1	22.6	1.4	2.0
Electric, gas, and utility	3.9	6.2	8.9	11.4	14.7	16.2	17.5	19.1	19.6	1.6	1.7
Wholesale and retail	40.9	52.3	64.4	84.3	121.3	131.2	142.3	155.9	166.1	17.0	14.7
Finance, insurance and real estate	22.0	34.1	45.9	61.9	89.9	99.7	108.8	117.8	127.3	9.2	11.2
Services	21.8	31.1	44.4	64.1	102.9	110.0	120.7	134.6	150.1	9.1	13.3
Government	23.6	38.1	52.9	75.2	126.9	137.6	150.7	164.1	177.9	9.6	15.7

Source: U.S. Bureau of the Census, Statistical Abstract of the United States: 1975 (96th Edition), p. 387, U.S. Government Printing Office, Washington, D.C., 1975.

National income by detailed industrial breakdown: manufacturing and transportation, 1950-1974

	1950[2]	1955[2]	1960	1965	1970	1971	1972	1973	1974
Manufacturing[1]	76.2	107.9	125.8	172.6	217.5	226.5	253.4	287.2	306.1
(Percent of national income)	(31.8)	(32.8)	(30.5)	(37.5)	(27.3)	(26.6)	(27.0)	(27.1)	(27.1)
Transportation equipment and ordnance	2.3	6.6	8.3	11.4	14.3	13.4	14.6	15.7	(NA)
(Percent of manufacturing)	(3.0)	(6.1)	(6.6)	(6.6)	(6.6)	(5.9)	(5.8)	(5.5)	
Motor vehicles and motor vehicle equipment	6.6	9.6	8.5	15.4	13.8	19.5	22.3	25.4	(NA)
(Percent of manufacturing)	(8.7)	(8.9)	(6.7)	(8.9)	(6.3)	(8.6)	(8.8)	(8.8)	
Transportation[1]	13.4	15.9	18.2	23.2	29.8	32.8	36.6	40.4	43.8
(Percent of national income)	(5.6)	(4.8)	(4.4)	(5.0)	(3.7)	(3.8)	(3.9)	(3.8)	(3.9)
Railroad	7.1	7.1	6.7	7.0	7.4	8.0	8.6	9.6	(NA)
(Percent of transportation)	(53.0)	(44.6)	(36.8)	(30.2	(24.8)	(24.4)	(23.5)	(23.8)	
Local, suburban, and highway passenger	1.4	1.5	1.6	1.9	2.3	2.4	2.5	2.5	(NA)
(Percent of transportation)	(10.4)	(9.4)	(8.8)	(8.2)	(7.7)	(7.3)	(6.8)	(6.2)	
Motor freight and warehousing	2.8	4.3	5.8	8.3	11.6	13.3	15.3	17.1	(NA)
(Percent of transportation)	(20.9)	(27.0)	(31.9)	(35.8)	(38.9)	(40.5)	(41.8)	(42.3)	
Water	1.0	1.4	1.7	2.0	2.5	2.3	2.5	2.7	(NA)
(Percent of transportation)	(7.5)	(8.8)	(9.3)	(8.6)	(8.4)	(7.0)	(6.8)	(6.7)	
Air	0.5	0.9	1.4	2.7	4.4	5.0	5.8	6.3	(NA)
(Percent of transportation)	(3.7)	(5.7)	(7.7)	(11.6)	(14.8)	(15.2)	(15.8)	(15.6)	

[1]Includes items not shown separately.

[2]Excludes Alaska and Hawaii.

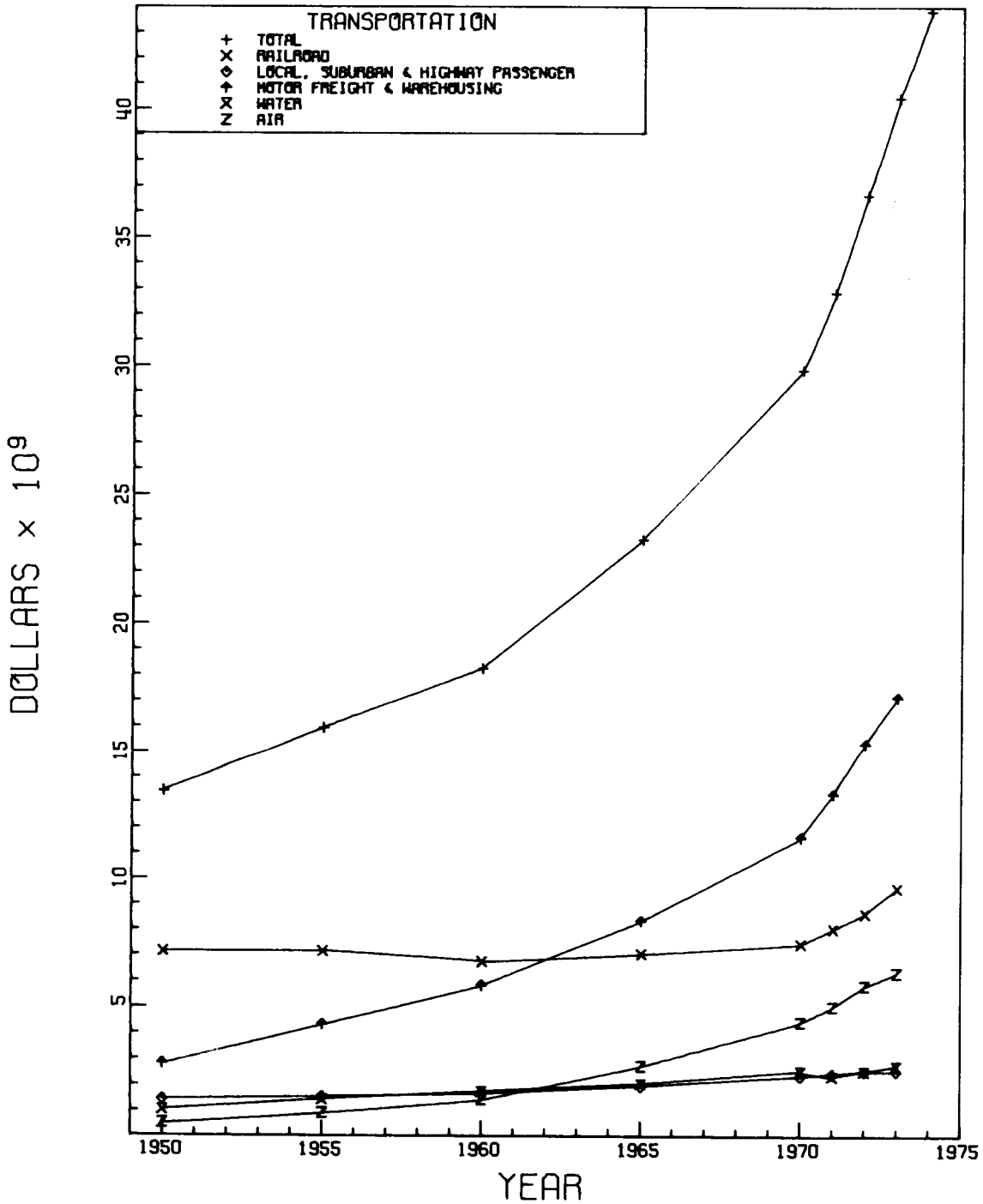
NA = Not available.

Source: U.S. Bureau of the Census, Statistical Abstract of the United States: 1975 (96th Edition), p. 387, U.S. Government Printing Office, Washington, D.C., 1975.

6.2.2.03

NATIONAL INCOME BY TRANSPORTATION

1950-1974



SOURCE: STAT. ABS. U.S. 1975

Employment by industry, 1950-1974
(thousands)

	1950	1955	1960	1965	1970	1971	1972	1973	1974	% 1950	% 1975
Full- and part-time employees[1]	52,432	59,191	62,743	69,542	79,306	79,170	81,081	84,352	85,661	100.0	100.0
Agriculture	2,495	2,227	2,088	1,756	1,492	1,473	1,474	1,524	1,569	4.7	1.8
Mining	925	803	698	633	627	614	623	635	696	1.8	.8
Contract construction	2,388	2,807	2,889	3,276	3,557	3,614	3,789	4,041	3,980	4.5	4.6
Manufacturing	15,232	16,950	16,755	18,088	19,410	18,583	19,049	20,091	20,075	29.0	23.4
Transportation	2,784	2,752	2,562	2,530	2,696	2,645	2,658	2,750	2,782	5.3	3.2
(Percent of total)	(5.3)	(4.6)	(4.1)	(3.6)	(3.4)	(3.3)	(3.3)	(3.3)	(3.2)		
Communications	727	837	839	880	1,123	1,126	1,144	1,176	1,195	1.4	1.4
Electric, gas and utility	548	587	614	626	691	702	716	734	744	1.0	0.9
Wholesale and retail	9,369	10,429	11,434	12,862	15,266	15,563	16,013	16,742	17,116	17.9	20.0
Finance, insurance and real estate	1,931	2,352	2,705	3,094	3,713	3,830	3,972	4,171	4,292	3.7	5.0
Services	7,149	8,161	9,747	11,497	13,490	13,768	14,349	14,923	15,276	13.6	17.8
Government	8,884	11,286	12,412	14,300	17,241	17,252	17,294	17,565	17,936	16.9	20.9

[1]Employment in domestic industries only.

Source: U.S Department of Commerce, Bureau of Economic Analysis, Benchmark Revision of National Income and Product Accounts: Advance Tables, Table 6.8, U.S. Government Printing Office, Washington, D.C., 1976

Employment by detailed industrial breakdown: manufacturing and transportation, 1950-1974
(thousands)

	1950	1955	1960	1965	1970	1971	1972	1973	1974
Manufacturing[1]	15,232	16,950	16,755	18,088	19,410	18,583	19,049	20,091	20,075
Transportation equipment and ordnance	487	1,102	1,078	1,137	1,251	1,085	1,095	1,127	1,100
Motor vehicles and motor vehicle equipment	801	888	717	843	813	846	885	958	908
Petroleum	217	236	207	181	189	187	184	185	190
Transportation[1]	2,784	2,752	2,562	2,530	2,696	2,645	2,658	2,750	2,782
Railroad	1,373	1,197	885	735	626	597	575	572	577
Local, suburban, and highway passenger	359	309	282	270	285	283	274	271	275
Motor freight and warehousing	626	768	866	962	1,080	1,090	1,126	1,194	1,204
Water	239	242	233	225	218	199	201	202	204
Air	87	129	191	228	353	342	346	367	369
Services									
Auto repair, services and garage	206	207	268	327	386	400	415	445	450

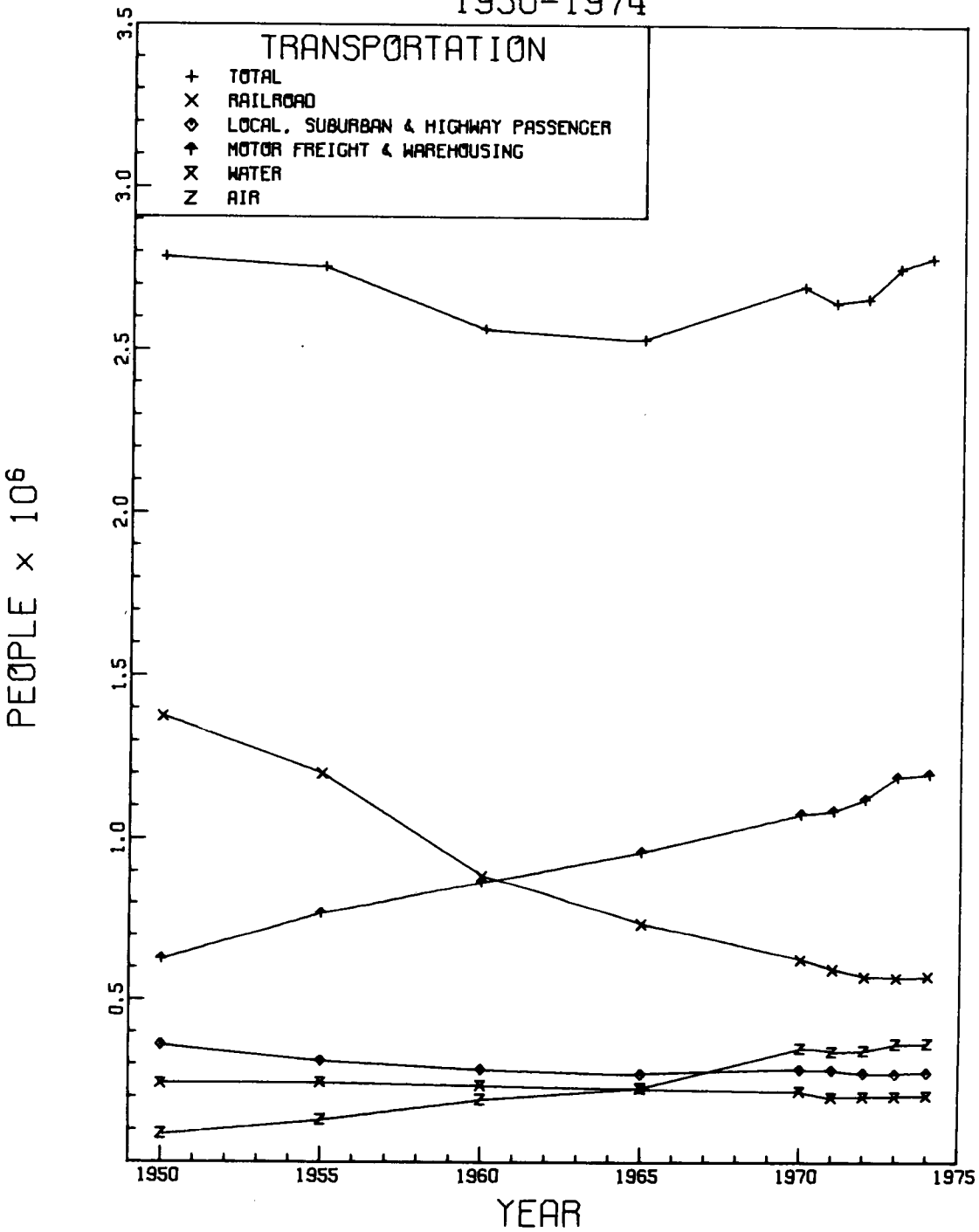
[1]Includes items not shown separately.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Benchmark Revision of National Income and Product Accounts: Advance Tables, Table 6.8, U.S. Government Printing Office, Washington, D.C., 1976.

6.2.3.03

EMPLOYMENT BY TRANSPORTATION

1950-1974



SOURCE: B. ECONOMIC ANALYSIS

6.2.3.04

Employment and establishments for selected motor vehicle-related businesses: 1967 and 1972

Kind of business	Establishments[1] (1,000)		Paid employees[2] (1,000)	
	1967	1972	1967	1972
Retail trade				
Automotive dealers	105.5	131.8	906.8	1,073.0
Motor vehicle dealers — new and used cars	62.0	64.2	696.3	765.6
Motor vehicle dealers — used cars only			38.6	39.4
Tire, battery, and accessory dealers	29.2	37.5	129.6	167.7
Misc. automotive dealers	14.3	30.1	42.2	100.3
Gasoline service stations	213.1	226.5	575.2	747.7
Wholesale trade				
Motor vehicles and auto equipment	31.2	35.6	341.1	391.8
Automobiles and other motor vehicles	4.8	5.6	91.9	102.3
Automotive equipment	23.3	27.0	214.1	246.1
Tires and tubes	3.1	3.0	35.1	43.4
Services				
Auto repairs, services, and garages	139.2	169.0	316.2	392.5
Automobile repair shops	109.9	127.2	187.9	237.9
Automobile parking	10.6	10.5	33.5	37.3
Car, truck rental and leasing; other services	18.7	31.3	95.0	117.3
Manufacturing				
Motor vehicles and equipment	2.7	3.4	739.4	806.6
Motor vehicles	0.2	0.2	321.2	339.2
Motor vehicle parts and accessories	1.7	2.1	364.9	399.9
Truck and bus bodies	0.6	0.8	30.4	42.8
Truck trailers	0.2	0.3	22.9	24.7

[1]As of Dec. 31; represents all establishments, except for wholesale trade and manufacturing, which represent only establishments employing one or more workers at any time during the year.

[2]Workweek including Mar. 12, except quarterly average for manufacturing.

Source: U.S. Bureau of the Census, Statistical Abstract of the United States: 1975 (96th Edition), p. 574, U.S. Government Printing Office, Washington, D.C., 1975.

Wages and salaries by industry, 1950-1974
(millions of dollars)

	1950	1955	1960	1965	1970	1971	1972	1973	1974
Wages and salaries[1]	146,948	211,739	272,074	361,982	546,380	579,946	633,720	700,887	763,043
Agriculture	3,157	3,013	3,500	4,224	5,319	5,462	5,798	6,602	7,603
Mining	3,200	3,763	3,955	4,297	5,799	6,026	6,625	7,289	8,847
Contract construction	7,959	12,317	15,725	21,665	33,161	35,965	38,857	43,339	45,965
Manufacturing	50,288	73,830	89,671	115,506	158,173	160,462	175,249	196,184	211,240
Transportation	9,848	12,448	14,578	17,190	24,350	26,049	28,027	31,568	33,695
(% of total)	(6.7)	(5.9)	(5.3)	(4.7)	(4.4)	(4.5)	(4.4)	(4.5)	(4.4)
Communication	2,280	3,518	4,463	5,756	9,329	10,141	11,488	12,686	14,008
Electric, gas and utility	1,938	2,759	3,688	4,560	6,685	7,247	7,908	8,633	9,376
Wholesale and retail	25,778	34,656	45,512	59,716	89,747	96,107	104,332	115,217	127,231
Finance, Insurance and Real Estate	5,829	8,850	12,553	17,178	27,403	30,202	33,198	36,471	39,793
Services	14,053	20,011	29,279	42,030	70,442	76,503	84,649	94,300	105,228
Government	22,618	36,574	49,150	69,860	115,972	125,782	137,589	148,598	160,057

[1]Wages and salaries for domestic industries only.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Benchmark Revision of National Income and Product Accounts: Advance Tables, Table 6.6, U.S. Government Printing Office, Washington, D.C., 1976.

Wages and salaries by detailed industrial breakdown: manufacturing and transportation, 1950-1974
(millions)

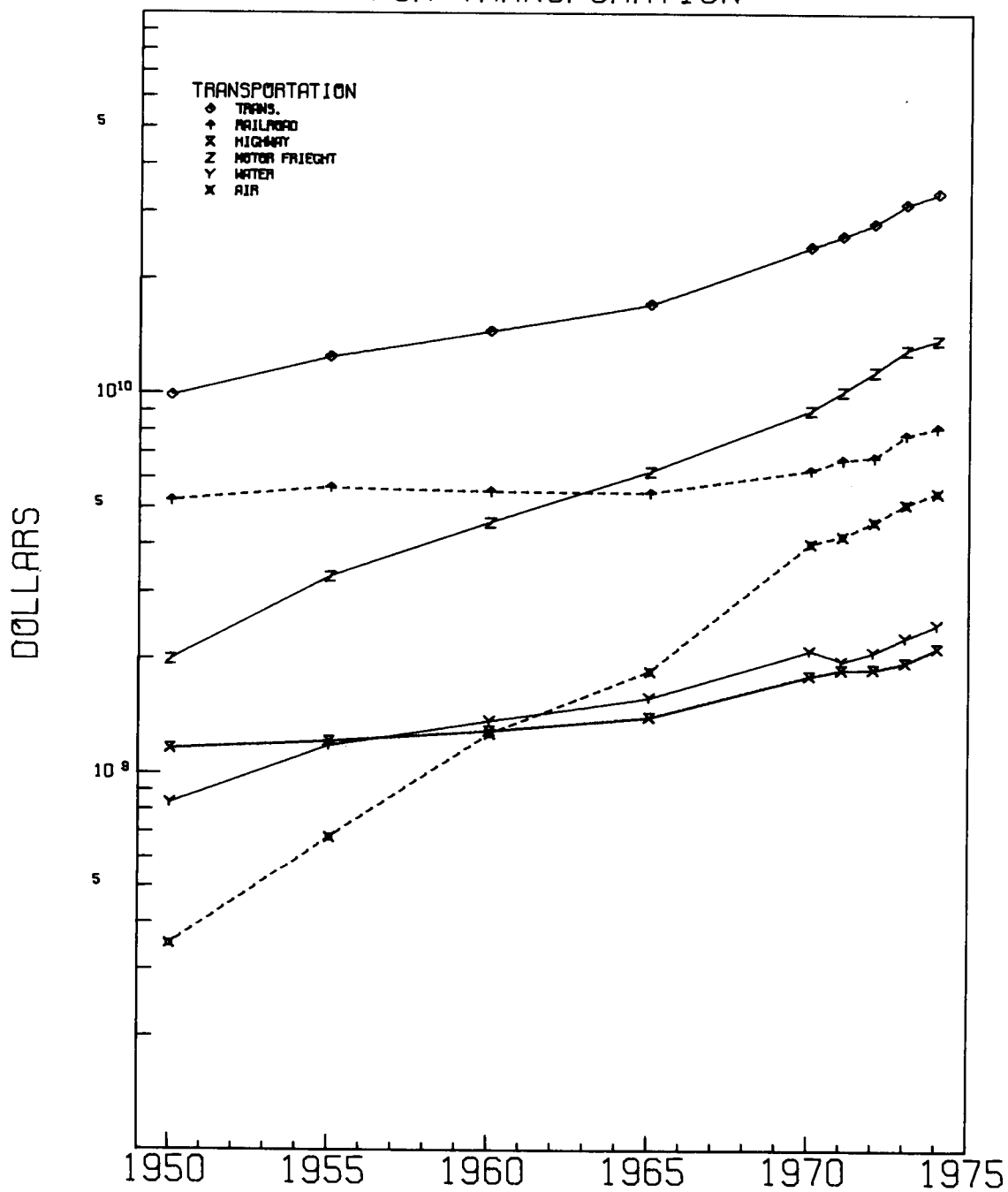
	1950	1955	1960	1965	1970	1971	1972	1973	1974
Manufacturing[1]	50,288	73,830	89,671	115,506	158,173	160,462	175,249	196,184	211,240
Transportation equipment and ordnance	1,817	5,582	7,158	9,075	12,425	11,189	11,945	12,930	13,734
Motor vehicles and motor equipment	3,221	4,870	4,730	6,955	8,128	9,553	11,026	13,029	12,520
Petroleum	961	1,329	1,462	1,500	2,015	2,140	2,271	2,420	2,728
Transportation[1]	9,848	12,448	14,578	17,190	24,350	26,049	28,027	31,568	33,695
Railroad	5,187	5,622	5,499	5,447	6,269	6,691	6,799	7,782	8,147
Local, suburban and highway passenger	1,159	1,213	1,293	1,404	1,808	1,878	1,885	1,962	2,138
Motor freight and warehousing	1,984	3,280	4,558	6,207	9,036	10,133	11,422	13,032	13,866
Water	832	1,183	1,377	1,581	2,108	1,978	2,089	2,281	2,470
Air	350	677	1,268	1,852	4,029	4,208	4,588	5,114	5,481
Services									
Auto repair, services and garage	516	647	1,009	1,452	2,321	2,522	2,782	3,161	3,426

[1]Include items not shown separately.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Benchmark Revision of National Income and Product Accounts: Advance Tables, Table 6.6, U.S. Government Printing Office, Washington, D.C., 1976.

6.2.4.03

WAGES AND SALARIES
FØR TRANSPØRATIØN



SOURCE:B. ECONOMIC ANALYSIS

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Survey of Current Business, U.S. Department of Commerce, Bureau of Economic Analysis, Volume 56, No. 1, Part I, January 1976.

Survey of Current Business, U.S. Department of Commerce, Bureau of Economic Analysis, Volume 56, No. 1, Part II, January 1976.

MISCELLANEOUS

Consumer price indexes for new and used cars, 1950-1975
for urban wage earners and clerical workers
(1967 = 100)

Year or month	New cars	Used cars
1950	83.4	---
1951	87.4	---
1952	94.9	---
1953	95.8	89.2
1954	94.3	75.9
1955	90.9	71.8
1956	93.5	69.1
1957	98.4	77.4
1958	101.5	80.2
1959	105.9	89.5
1960	104.5	83.6
1961	104.5	86.9
1962	104.1	94.8
1963	103.5	96.0
1964	103.2	100.1
1965	100.9	99.4
1966	99.1	97.0
1967	100.0	100.0
1968	102.8	NA
1969	104.4	103.1
1970	107.6	104.3
1971	112.0	110.2
1972	111.0	110.5
1973	111.1	117.6
1974	117.5	122.6
1975	127.6	146.4

Year or month		New cars	Used cars
1974:	Jan	112.9	107.0
	Feb	112.7	103.0
	Mar	112.8	102.2
	Apr	113.3	107.0
	May	114.6	114.4
	June	116.4	122.2
	July	118.0	127.9
	Aug	118.1	132.0
	Sept	118.4	135.9
	Oct	123.7	139.4
	Nov	124.5	141.6
	Dec	124.9	138.4
1975:	Jan	123.4	134.9
	Feb	124.5	133.5
	Mar	127.3	135.3
	Apr	127.5	138.1
	May	126.8	142.2
	June	127.0	147.5
	July	126.6	153.2
	Aug	126.8	156.1
	Sept	126.5	156.6
	Oct	129.9	156.5
	Nov	131.3	153.7
	Dec	134.0	149.6

Source: Department of Labor, Bureau of Labor Statistics.

7.02

BTU values of energy sources[1]

	BTU
Coal (per 2,000 lb. ton)	
Anthracite	25.4×10^6
Bituminous	26.2×10^6
Sub-bituminous	19.0×10^6
Lignite	13.4×10^6
Natural gas (per cubic foot)	
Dry	1,031
Wet	1,103
Liquid (avg.)	4,100
Electricity — 1 kwh	3,413
Petroleum (per barrel)	
Crude oil	5.60×10^6
Residual fuel oil	6.29×10^6
Distillate fuel oil	5.83×10^6
Gasoline (including av. gas)	5.25×10^6
Jet fuel (kerosene)	5.67×10^6
Jet fuel (naphtha)	5.36×10^6
Kerosene	5.67×10^6
Nuclear	
1 gram of fissioned U-235	74,000

[1]These are conventional or average values, not precise equivalents.

Other conversion factors

Electricity — 1 kwh	= 0.88 lbs. of coal = 0.076 gallons of oil = 10.4 cu. ft. of natural gas
Natural Gas — 1 tcf (trillion cubic feet)	= 39,300 tons of coal = 184,000 barrels of oil
Coal — 1 mtce (million tons of coal equivalent)	= 4.48×10^6 barrels of oil = 67 tons of oil = 25.19×10^{12} cu. ft. of natural gas
Oil — 1 million tons (6.65×10^6 barrels)	= 4×10^9 kwh of electricity (when used to generate power) = 12×10^9 kwh unconverted = 1.5×10^6 tons of coal = 41.2×10^9 cu. ft. of natural gas

Approximate conversion factors for oils[1]

To convert —	Barrels to metric tons	Metric tons to barrels	Barrels/day to tons/year	Tons/year to barrels/day
	Multiply by —			
Crude oil	0.136	7.33	49.8	0.0201
Gasoline	0.118	8.45	43.2	0.0232
Kerosene	0.128	7.80	46.8	0.0214
Diesel fuel	0.133	7.50	48.7	0.0205
Fuel oil	0.149	6.70	54.5	0.0184

[1]Based on world average gravity (excluding natural gas liquids).

Source: The World Almanac and Book of Facts 1976, Newspaper Enterprise Association, Inc., p. 100.

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NTIS For sale by the National Technical Information Service
U.S. Department of Commerce
Springfield, Virginia 22161
(Prices subject to change)

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Dupree, W.G. Jr.; Corsentino, J.S.
United States Energy Through the Year 2000 (Revised)
U.S. Dept. of Interior, Bureau of Mines, Washington, DC
72 p.
1975
ABSTRACT: Earlier energy consumption and supply forecasts of the Bureau of Mines are updated in this report, which is based mainly on evaluation of Bureau of Mines fuels data. Net energy consumption is expected to increase from 59,855 trillion Btu in 1974 to 110,230 trillion Btu in 2000. The present trend toward increased use of secondary energy sources will continue. Conversion losses in the electrical, synthetic gas, and synthetic liquids sectors will increase as will the total gross energy inputs. Both net and gross energy inputs per capita are forecast to rise. The difference between net and gross energy inputs will increase over time due to increased dependence on secondary energy sources. In 1974 the energy consumed by the electrical sector represented 26.7% of total gross consumption of energy. By 2000 this sector is expected to consume 48.1% of total gross energy inputs. It is anticipated that the U.S. will continue to rely on conventional fossil fuels (i.e., coal, petroleum and natural gas). Coal resources appear adequate through 2000. However, domestic natural gas and petroleum will have to be supplemented by synthetic fuels and imports. (EYE)
AVAILABILITY: Bureau of Mines, Publications Distribution Branch, 4800 Forbes Ave., Pittsburgh, PA 15213

Fraize, W.E.; Dukowicz, J.K.
Transportation Energy and Environmental Issues
Mitre Corp., McLean, VA 22101
M72-25, 40 p.
1972, February
ABSTRACT: The role of transportation in air pollution and petroleum energy consumption is reviewed, with emphasis on the U.S. situation. Both technological and regulatory solutions for each problem area are discussed. Technological solutions focus on the auto, electric and petroleum-fueled, and on the use of non-petroleum fuels. Regulatory measures seek to reduce transportation energy consumption via improved transportation efficiency or restricted private vehicle use. Future R&D efforts are emphasized. (Auth)

Fraize, W.E.; Dyson, P.; Gouse, S.W., Jr.
Energy and Environmental Aspects of U.S. Transportation
Mitre Corp., Westgate Research Park, McLean, VA 22101
Report No. MTP-391, 76 p., 45 ref.
1974, February
ABSTRACT: U.S. transportation's impact on energy, economy, and environment is briefly reviewed, and the near and long term factors, including national energy and environmental policy, relevant to transportation's future are discussed. A selected statistical profile of the market, energy, and emissions characteristics of U.S. transportation, according to mode, is presented as a background from which the opportunities for transportation energy conservation are analyzed. Transportation energy conservation in the near term is seen to be best effected by pricing measures and more efficient use of existing systems, especially the automobile. Long term transportation energy conservation will rely heavily on technological changes, mode shifts, and improved land use. (Auth)

Gay, W.F.
Summary of National Transportation Statistics
Massachusetts Institute of Technology, Urban Systems Laboratory; U.S. Dept. of Transportation, Transportation Systems Center, MIT, Cambridge, MA; TSC, Kendall Square, Cambridge, MA 02142
111 p. report; Report No. DOT-TSC-OST-75-18, 160 p.
Nov 1972; Jun 1975
ABSTRACT: These periodic reports are compendiums of selected national-level transportation statistics. Included are cost, inventory, and performance data describing the passenger and cargo operations of the following modes: air carrier, general aviation, automobile, bus, truck, local transit, rail, water, and oil pipeline. The report includes basic descriptors of U.S. transportation, such as operating revenues and expenses, number of vehicles and employees, vehicle-miles and passenger miles, etc. As the name imples, these reports are summaries of a larger data base, consisting of time-series collected from a variety of government and private statistical handbooks. In the 1972 and 1975 editions, the selected data cover the periods 1960 through 1970 and 1963 through 1973, respectively. (GRA)
AVAILABILITY: U.S. Dept. of Transportation for 1972 report; GPO $5.05, Stock No. 050-0003-00220-8 for 1975 report

Heywood, J.B.; Jacoby, H.D.; Linden, L.H.
The Role for Federal R & D on Alternative Automotive Power Systems
Massachusetts Institute of Technology, Energy Laboratory, Cambridge, MA 02139
Report No. MIT-EL-74-013, 174 p., 54 references
Nov 1974
ABSTRACT: This question is examined: Is it appropriate for the Federal Government to support R & D on alternative automotive power systems? Potential alternatives to the ICE include the stratified charge, Wankel, diesel, Rankine cycle, Stirling cycle, gas turbine, electric and hybrid systems. These engines may offer advantages over the ICE but considerable development would be required, and Federal support has been proposed. The five sections of the report are: a description of the central issue and a set of underlying issues, a review of the relevant technology, an exploration of the role for Federal R & D in overall Federal policy concerning the automobile, an analysis of present programs in industry and government, and conclusions. Appendices review the history of Federal programs and describe the content of present industry and government programs. The principal conclusions of the report are that it cannot now be forecast whether the ICE or any of the alternatives will be the dominant engine later in this century, that it is important that economically justifiable research and development efforts in this area be carried out, that the automobile industry has active programs underway which reflect a reasonable distribution of internal investments, and that a moderately funded Federally supported effort is well justified. (auth)
AVAILABILITY: NTIS

Hicks, G.V.; Gay, W.F.
Energy Statistics - A Supplement to The Summary of National Transportation Statistics
U.S. Dept. of Transportation, Transportation Systems Center, Kendall Square, Cambridge, MA 02142
Report No. DOT-TSC-OST-73-34, 112 p.; DOT-TSC-OST-74-12, 156p.; DOT-TSC-OST-75-33, 168 p.
Sep 1973; Aug 1974; Aug 1975
ABSTRACT: These reports are compendiums of selected time-series data describing the transportation, production, processing, and consumption of energy. The statistics have been assembled from a wide variety of sources, such as the U.S. Department of the Interior, the Interstate Commerce Commission, and the American Petroleum Institute. These reports are divided into three main sections. The first, entitled "Energy Transport", contains such items as the revenues and expenses of oil pipeline companies, number and capacities of U.S. tank ships, and the total crude oil transported in the U.S. by method of transportation. The second section, entitled "Reserves, Production, and Refining", reveals the growth over time of the U.S. oil and natural gas reserves, refinery capacity, and yields. Trends in the demand for fuel and power are displayed in the third section, entitled "Energy Consumption". Throughout this part, the transportation sector is emphasized. Included are the gasoline and oil costs of automobiles of different sizes, the consumption of petroleum by type of product, the energy intensiveness of the air carriers, the electrical energy consumed by the local transit industry, and other important statistics describing the supply and demand for energy. (Auth)
AVAILABILITY: NTIS for Sep 1973 Supplement and Aug 1974 Supplement ($2.25); GPO for Aug 1975 Supplement

Hirst, E.
Energy Consumption for Transportation in the U.S.
Oak Ridge National Laboratory, ORNL-NSF Environmental Program
ORNL-NSF-EP-15, 34 p.
1972, March
ABSTRACT: Historical, present, and possible future patterns of energy consumption in the transportation sector are examined for inter-city freight and passenger traffic and for urban passenger traffic. The energy-efficiencies among the various transport modes are quite variable. Airplanes are relatively inefficient; cars and trucks are slightly more efficient; and railroads, waterways, pipelines, and buses are quite efficient. The energy implications of changes in the modal mixes for freight and passenger transport are explored using two hypothetical futures. The energy required, directly and indirectly, for automobiles in American society is also computed. This includes the energy needed to produce gasoline; to manufacture and sell cars; to repair, maintain, and insure cars; to provide replacement equipment; and to build and power cars. When total automotive energy consumption is considered the automobile accounts for about 25 percent of total U.S. energy consumption. This is equivalent to 7.1 miles per gallon for the average American car. (Auth)
AVAILABILITY: NTIS, ORNL-NSF-EP-15 $3.00

Mutch, J.J.
Transportation Energy Use in the United States: A Statistical History, 1955-1971
Rand Corp., Santa Monica, CA 90406
Report No. R-1391-NSF, 44 p., 25 references
1973, December
ABSTRACT: Although most of the data contained in this report have been published elsewhere, as far as we know this is the only compilation of historical energy consumption statistics from 1955 through 1971 for all major transportation modes. As such, it should conserve time and effort for researchers, students, legislators, policymakers, and others concerned with transportation and energy consumption. An effort has been made to provide the latest information and to include the following: Data for all major passenger and freight transport modes; Data for both domestic and international operations; Tabular time-series data from 1955 to 1971 (1972 where available) in both energy units (trillion Btu) and physical quantities (gallons, barrels, etc.); Discussions of each mode, explaining trends and causes, the data, their source, and any cautions needed in their interpretation; Careful estimation of otherwise unavailable data; and Reference to all primary and secondary sources to aid in updating the statistics in the future. (Auth, from Reasons for This Study)

Rice, R.A.
System Energy and Future Transportation
Carnegie-Mellon University, Pittsburgh, PA 15213
Technology Review, 74(3), 31-37
1972, January
ABSTRACT: The importance of transportation in energy consumption is discussed. A breakdown is given of the amount of fuel used by each type of transportation and the passenger miles or cargo miles moved. The energy efficiencies of the various transport modes are compared. The human being and bicycle are shown to be very efficient means of transportation, and recently developed transport modes, such as jet airplanes and the SST, are very inefficient. The report suggests that some changes should be made in intercity transport development, and drastic changes should be considered for urban transportation. (MFG)

Stephenson, R.R.
Should We Have a New Engine? An Automobile Power Systems Evaluation. Volume I. Summary. Volume II. Technical Reports
California Institute of Technology, Jet Propulsion Laboratory; California Institute of Technology, Environmental Quality Laboratory, Pasadena, CA 91103
Report No. JPL SP 43-17, v.p.
Aug 1975
ABSTRACT: Alternative automotive power plants were examined for possible introduction during the 1980-1990 time period. Technical analyses were made of the Stratified-Charge Otto, Diesel, Rankine (steam), Brayton (gas turbine), Stirling, Electric, and Hybrid power plants as alternatives to the conventional Otto-cycle engine with its likely improvements. These alternatives were evaluated from a societal point of view in terms of energy consumption, urban air quality, cost to the consumer, materials availability, safety, and industry impact. The results show that goals for emission reduction and energy conservation for the

automobile over the next 5-10 years can be met by improvements to the Otto-cycle engine and to the vehicle. This provides time for the necessary development work on the Brayton and Stirling engines, which offer the promise of eliminating the automobile as a significant source of urban air pollution, dramatically reducing fuel consumption, and being saleable at a price differential which can be recovered in fuel savings by the first owner. Specifically, the Brayton and Stirling engines require intensive component, system, and manufacturing process development at a funding level considerably higher than at present. (auth)
AVAILABILITY: Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Dr., Pasadena, CA 91103 $3.50 (Vol. I) $14.50 (Vol. II) $16.50 (Combined Set)

A National Plan for Energy Research, Development & Demonstration: Creating Energy Choices for the Future, Volume 1: The Plan
Energy Research and Development Administration
Report No. ERDA-48, v.p.
Jun 1975
ABSTRACT: Five national policy goals are recognized as a focus for energy policy: maintain the security and policy independence of the U.S.; maintain a strong and healthy economy; provide for future needs so that life styles are not limited by the unavailability of energy; contribute to world stability through cooperative international efforts in energy; and protect and improve the Nation's environmental quality. The present energy problem is one of limited choices. This plan is designed to create options for the future and delineates innovations in technologies required to overcome energy problems. Individual chapters are devoted to: The Problem: Limited Choice; National Energy Technology Goals; Establishing a Strategic Framework for the Plan; Technology Priorities; Roles of Key Participants in Achieving National Goals; Summary of Federal Program Implementation; Potential Constraints of Implementation; and Future Evolution of the Plan. Eight national energy technology goals are outlined, all of which must be pursued together. Priorities are set for research, development, and demonstration technologies, and broad and specific supporting technologies are also outlined. Five major changes are needed in the nature and scope of the Nation's energy R,D & D program: emphasis on overcoming the technical problems inhibiting expansion of high leverage existing systems - notably coal and light water reactors; immediate focus on conservation efforts; acceleration of commercial capability to extract gaseous and liquid fuels from coal and shale; high priority to the solar electric approach; and increased attention to under-used new technologies that can be rapidly developed, e.g. solar heating and cooling and use of geothermal power. (NPG)
AVAILABILITY: GPO $1.70

A National Plan for Energy Research, Development & Demonstration: Creating Energy Choices for the Future. Volume 2. Program Implementation
Energy Research and Development Administration, Washington, DC
Report No. ERDA-48, Vol. 2 of 2, 176 p.
1975
ABSTRACT: Volume I introduced a proposed National Plan for energy research, development, and demonstration covering programs now underway and supported by the Federal Government, and others which will be considered in the future for Federal support. Volume II is limited to activities supported in whole or part by the Federal Government. It does not cover energy R and D underway in industry or elsewhere unless Federal funds are involved. Together these volumes comprise the first ERDA effort to collect the Federal Government's diverse R,D and D. Within this scope, emphasis is on ERDA's programs. Information on energy programs being conducted by other Government agencies is limited to general descriptions of fields of activity. It reflects the best data that could be assembled in the time available. The coverage of other Federal programs will be increased to make future editions of Program Implementation more comprehensive. ... (from Introduction)
AVAILABILITY: GPO $2.45

A National Plan for Energy Research, Development & Demonstration: Creating Energy Choices for the Future 1976. Volume 1: The Plan
Energy Research and Development Administration, Washington, DC
Report No. ERDA 76-1, 130 p.
1976
ABSTRACT: The first annual update of ERDA's Plan summarizes the agency's current views on the energy technologies needed to accomplish energy independence. Chapter One reviews the energy problem and requirements for its solution. The relative roles of participants in the solution are described. The revised Plan is presented in Chapter Two; the most important change involves increased emphasis on energy conservation. A summary of the Federal energy research, development, and demonstration (RD&D) program is provided in Chapter Three. The next two chapters deal with the institutional mechanics needed to implement the RD&D Program. Factors that have influenced the formulation of the Plan (e.g., events, public comments, and new analytical results) are discussed in Chapter Six. The final chapter examines priority matters to be treated further in the next Plan update. Also included in this document are two appendixes: Perspective on World Resources, and Net Energy Analysis of Nuclear Power Production; a glossary; and a selected bibliography. (BYB)
AVAILABILITY: GPO $2.00, Stock No. 052-010-00478-6

Energy Information in the Federal Government. A Directory of Energy Sources Identified by the Interagency Task Force on Energy Information
Federal Energy Administration, Policy and Analysis, Office of Data and Analysis; Federal Energy Administration, National Energy Information Center, Washington, DC 20461
Report No. PB-246703, FEA/B-75/375, 1038 p.
1975
ABSTRACT: The Federal Energy Information Locator System (FEILS), which contains information on most of the sources of energy data in the Federal Government, is described and illustrated in this directory. FEILS is the beginning of a comprehensive inventory of existing data sources; eventually FEILS will include all government energy data sources. Using this Directory, Federal agencies collecting specific kinds of energy data can be identified rapidly. The following

information on the energy data sources are included in FEIIS: the energy source for which data is collected (e.g., coal, natural gas); major functions associated with that energy source (e.g., exploration, reserves, or extraction); more refined characteristics associated with specific energy data sources, such as geographical location, bed thickness of anthracite coal reserves; identification and description of 44 separate Federal agencies, bureaus, and administrations associated with 261 different programs; and program summaries identifying 200 data collection forms, 600 publications, and 98 computerized data bases or major files. The National Energy Information Center of the Federal Energy Administration will have the responsibility of maintaining and enhancing FEIIS. An updated Directory will be published annually. (BYB)
AVAILABILITY: NTIS

Project Independence Blueprint: Final Task Force Report - Energy Conservation, Volume 2, Project Independence and Energy Conservation: Transportation Sectors
Jack Faucett Associates Inc.; Council on Environmental Quality; Federal Energy Administration; Interagency Task Force on Energy Conservation
318 p.
Nov 1974
ABSTRACT: Energy conservation data in the transportation sector were compiled for a scenario with petroleum prices under $4 per barrel and for scenarios with petroleum prices under $7 and under $11 per barrel. Projections were made of passenger modes and freight and trucking modes. Fuel transportation demands and impacts on demands for transportation of products sensitive to petroleum prices are discussed in an overview. Information presented in five appendices include summary tables of passenger travel projections by purpose and distance interval; summary tables of total passenger travel trip costs by mode; fuel consumption by type of fuel and mode of passenger travel; auto fuel efficiencies considering vehicle-miles and alternative energy projections; and energy consumption for military transportation. (TIC)
AVAILABILITY: GPO $4.20, Stock No. 4118-00039

Automobile Facts & Figures
Motor Vehicle Manufacturers Association of the U.S. Inc., 320 New Center Bldg., Detroit, MI 48202
Annual Report, 72 p.
1975
ABSTRACT: The motor vehicle industry, along with the entire national economy, has been adversely affected by the recession, inflation, energy shortages, and ecological problems during 1974 and 1975. In response to the public's demand for less fuel-intensive cars in the winter of 1973, the automobile industry switched from producing large cars to manufacturing smaller models. However, the public demand has now turned back to large cars, leaving automobile manufacturers with increasing inventories of unsold compact and subcompact cars. Price increases due to inflation and to the costs of complying with federal controls also hurt car sales. Industry reported that profits for 1974 were the lowest since the Great Depression of the 1930's. The rebate program in early 1975 stimulated sales, but cars were sold with little, if any, profit. In order for the automobile industry to obtain a 40% fuel economy improvement on all cars by 1980, Congress is asked to freeze emission standards. These pollution regulations also increase the cost of production, increase prices, and, therefore, have an adverse impact of the economy. A shift from individualized transportation to mass transit is considered improbable. Automobile manufacturers are continuing research on alternate power sources and on variations in the conventional gasoline system. Industry and government are called upon to work together in resolving the automobile industry's problems. Statistical data are presented on production and registration, and use and ownership of automobiles, and on the economic impact of the automobile industry. (BYB)
AVAILABILITY: Statistics Dept., Motor Vehicle Manufacturers Association, 320 New Center Bldg., Detroit, MI 48202

Motor Truck Facts
Motor Vehicle Manufacturers Association of the U.S. Inc., 320 New Center Building, Detroit, MI 48202
Annual report, 64 p.
1974; 1975
ABSTRACT: These annual reports describe the truck industry situation in 1973 and in 1974. In 1973 new records were reached in U.S. motor truck production and use. Even with the economic downturn at the end of 1973, the use of light trucks for personal transportation and recreation increased. Inflation, recession, energy shortages, and government safety and emission regulations contributed to a substantial decline in truck sales during late 1974 and 1975. However, with the expected increase in tonnage shipped by trucks, more and better trucks will be in demand. Progress that U.S. truck manufacturers are making in environmental protection, highway safety, and energy conservation is discussed. Statistical data are presented on production and registration, and use and ownership of trucks, and on the economic impact of the trucking industry. (BYB)
AVAILABILITY: Statistics Dept., Motor Vehicle Manufacturers Association, 320 New Center Bldg., Detroit, MI 48202

National Income and Product Accounts. Benchmark Revision, Advance Tables
U.S. Dept. of Commerce, Bureau of Economic Analysis, Washington, DC
Pt. 2 of January 1976 Survey of Current Business
In Preparation (1976)
ABSTRACT: Revised benchmark tables are presented for Personal Consumption and Expenditures by Type, Product, Income, and Employment by Industry. Personal income and outlay tables by type of expenditure and by product cover 1929-1974. Product, income, and employment by industry tables are presented annually from approximately 1947 through 1974. Included are Gross National Product by industry, compensation of employees by industry, employer contributions, nonfarm proprietors' income, corporate profits and undistributed corporate taxes. (EBH)
AVAILABILITY: GPO (in preparation)

Statistical Abstract of the United States, 1975
U.S. Dept. of Commerce, Bureau of the Census, Washington, DC
Annual publication, National Data Book and Guide to Sources, 96th Annual Edition, 1050 p.
1975
ABSTRACT: Statistical data is included in the following categories: population; vital statistics, health, and nutrition; immigration and naturalization; education; law enforcement, federal courts, and prisons; area, geography, and climate; public lands, parks, recreation, and travel; labor force, employment, and earnings; national defense and veterans affairs; social insurance and welfare services; income, expenditures, and wealth; prices; elections; federal government finances and employment; state and local government finances and employment; banking, finance, and insurance; business enterprise; communications; power; science; transportation - land; transportation - air and water; agriculture; forests and forest products; fisheries; mining and mineral products; construction and housing; manufactures; distribution and services; foreign commerce and aid; outlying areas under the jurisdiction of the United States; comparative international statistics; and metropolitan area statistics. (DCM)
AVAILABILITY: GPO $10.50 (cloth), Stock No. 0324-01049-6; $8.00 (paper), Stock No. 0324-01050-0 for 1975 Edition

1972 National Transportation Report, Present Status - Future Alternatives
U.S. Dept. of Transportation, Washington, DC 20590
437 p., also Executive Summary, 25 p.
1972, July
ABSTRACT: The 1972 National Transportation Report is the first in a series of periodic reports on the status of the Nation's transportation system and alternative plans aimed at improving that system. This first report is focused on transportation needs and plans for investment in capital improvements as seen by State and local governments and on the Federal role in supporting transportation expenditure programs carried out at the State and metropolitan level. In addition, this report provides estimates of private sector capital investment needs and describes the results of special studies of investment and operational alternatives in specific problem areas. (From Chapter I. -Introduction)
AVAILABILITY: GPO, Stock No. 5000-00058 ($3.25)

Highway Statistics: 1974
U.S. Dept. of Transportation, Federal Highway Administration, Washington, DC
Annual publication, 268 p.
1976
ABSTRACT: This annual publication brings together selected statistical tabulations relating to highway transportation in three major areas: 1) highway uses--the ownership and operation of motor vehicles; 2) highway finance--the receipts and expenditures for highways by public agencies; and 3) the highway plant--the extent and changing characteristics of the mileage of public highways, roads, and streets in the Nation. (EBH)
AVAILABILITY: GPO $3.90, Stock No. 050-001-00107-1

Energy Conservation and Conversion Act of 1975. Hearings Before the Committee on Finance, United States Senate, Ninety-Fourth Congress, First Session on H.R. 6860. Part 2 of 2 Parts
U.S. Senate, Committee on Finance, Washington, DC
Hearings held July 15,16,17, and 18, 1975, pp. 461-1002
1975
ABSTRACT: Testimony was recorded from legislators and from organizations who represented practically all phases of energy production, use, and conservation. With the exception of the sponsoring legislators, the consensus of the testimony seemed to be that restrictions on expenditure of energy imposed by H.R. 6860 are not stringent enough, and that the Bill deals inadequately with the problems of increasing energy supplies. The proposals of the Bill relating to allocations, import tariffs, and import quotas provoked much comment--often criticism. The gas and petroleum industries presented strong arguments for deregulation of prices as an energy production incentive. The inadequacy of provision for domestic energy resources was a concern of many witnesses. A panel of witnesses presented reforms of electric rate structure that would encourage energy conservation. Also, the removal of the recycling tax incentive from H.R. 6860 by the Senate was considered to be an anti-conservative action. The testimony also pointed out that conservation alone cannot solve the energy shortage, but that at best conservation could reduce energy growth to 2% annually. Communications received by the Committee expressing an interest in these hearings are appended. (BLM)
AVAILABILITY: GPO $4.60

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U.S. Department of Commerce
Springfield, Virginia 22161
(Prices subject to change)

TIC Information available from the USERDA Technical
Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

If no availability is listed, inquire from the source issuing the document.

Adams, R.L.
An Economic Analysis of the Junk Automobile Problem
U.S. Dept. of Interior, Bureau of Mines, Office of Economic Analysis, Arlington, VA
Information Circular 8596, 168 p.
1973
AVAILABILITY: GPO $2.35, Catalog No. I28.27:8596, Stock No. 2404-01405

Alexander, A.I., III
United States Transportation Fuel Economics (1975-1995)
National Aeronautics and Space Administration, Ames Research Center, Moffett Field, CA 94035
Report No. NASA-TM X-3197, N75-21154, 30 p.
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U.S. House of Representatives, Committee on Science and Astronautics, Subcommittee on Aeronautics and Space Technology
Committee Print Serial No. CC, 25 p.
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Committee Print No. 27, hearings held June 3,4,5,6, 1975, 1144 p.
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Report No. PB-235983, UMTA-IT-06-0092-74-2, 128 p.
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U.S. Dept. of Transportation, Federal Highway Administration, Office of Highway Planning, Program Management Division, 400 Seventh St. SW, Washington, DC 20590
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Report No. 8, 104 p.
Aug 1973

Glossary

Air Carrier Domestic Operations: Operations within and between the 50 states and the District of Columbia. Includes domestic operations of the certificated trunk carriers and Pan American and the local service, helicopter, intra-Alaska, intra-Hawaii, domestic all-cargo and other carriers, also includes transborder operations conducted on the domestic route segments of U.S. air carriers.

Air Carrier International Operations: Operations outside the territory of the United States, including operations between the United States and foreign countries and between the United States and its territories and possessions. Includes both the combination passenger/cargo carriers and all-cargo carriers engaged in international and territorial operations.

BTU — British Thermal Unit: The amount of heat required to raise the temperature of one pound of water one degree Fahrenheit.

Buses (including school buses chassis): A motor vehicle with a long body equipped with seats or benches for passengers, usually operating as part of a scheduled service line.

Cargo Ton-Mile: The transportation of one ton of freight a distance of one mile generates one ton-mile.

Cargo Vehicle: A truck which carries goods or merchandise (freight).

Certificated Carrier: One of a class of air carriers holding certificates of public convenience and necessity issued by the Civil Aeronautics Board, authorizing the performance of scheduled air transportation over specified routes and a limited amount of nonscheduled operations. This general carrier grouping includes the all-purpose carriers (i.e., the so-called passenger/cargo carriers) and the all-cargo carriers, and comprises all of the airlines certificated by the Board, except the supplemental air carriers. Certificated route air carriers are often referred to as "scheduled airlines," although they also perform nonscheduled service.

Chassis: The frame, wheels, and machinery of a motor vehicle, on which the body is supported.

Chassis without Cab: These are units where a body or other equipment is installed after the chassis is shipped from the assembly plant.

Class A Carriers by Inland and Coastal Waterways: A class A carrier by water is one with an average annual operation revenue that exceeds $500,000.

Class B Carriers by Inland and Coastal Waterways: A class B carrier by water is one with an average annual operating revenue greater than $100,000 but less than $500,000.

Class I Railroad: A railroad with an annual operating revenue of greater than $5,000,000. These operating companies represent about 99 percent of the railroad industry in terms of traffic, operate 96 percent of rail mileage and account for 94 percent of the workers employed by all railroad companies.

Class II Railroad: A railroad with an annual operating revenue from $100,000 to $1,000,000.

Class III Railroad: A railroad with an annual operating revenue below $100,000.

Commutation: In reference to Class I rail, passenger traffic handled between designated points at less than the basic fare per trip. It does not include traffic moving on basic rates of round trip, half rates, clergy, charity, military, special excursions, and other special-rated traffic.

Conservation in Buildings and Consumer Products: The development, design, construction, and operation of buildings and consumer products that minimize energy consumption. The technology includes types of insulation and arrangement, proportioning, and design of windows and doors and systems of control to minimize energy requirements, as well as consumer products such as appliances, televisions, and heating, cooling, and ventilating systems that use less energy, or energy more efficiently.

Constant Dollars: A series is said to be expressed in "constant dollars" when the effect of change in the purchasing power of the dollar has been removed. Usually the data are expressed in terms of dollars of some selected year or the average of some set of years.

Conversion Efficiency Factor: The percent of total gross energy going into the final consuming sector.

Current Dollars: Dollars current at the time designated or at which transactions listed took place. In most contexts about the same meaning would be conveyed by the simple term "dollars."

Current Population Survey: This is a monthly nationwide survey of a scientifically selected sample representing the noninstitutional civilian population. The sample is located in about 450 areas comprising more than 850 counties and independent cities with coverage in every state and District of Columbia. About 60,000 housing units and other quarters are designated for the sample at any time.

Domestic Freight: All waterborne commercial movements between points in the United States, Puerto Rico and the Virgin Islands, excluding traffic with the Panama Canal Zone. Cargo moved for the military in commercial vessels is reported as ordinary commercial cargo; military cargo moved in military vessels is omitted.

Dry Cargo Barges and Scows: Both are large, flat-bottomed boats used to transport dry bulk materials; the scow is chiefly used for transporting sand, gravel, or refuse.

Energy Efficiency: In reference to transportation, energy efficiency is defined as the inverse of energy intensiveness, i.e., the ratio of outputs from a process to the energy inputs; for example, passenger miles traveled (PMT).

Energy Intensiveness: In reference to transportation, energy intensiveness is defined as the ratio of energy inputs to a process to the useful outputs from that process; for example, gallons of gasoline per passenger mile, BTU per ton mile.

Fleet: A group of motor vehicles operating under unified control as by a commercial or military organization.

Fleet Size (Truck): Based on the number of trucks (single-unit trucks plus truck-tractors) operated by a truck owner from a single "base of operation," the fleet is an operational unit and is necessarily smaller than the total fleet that an owner has, if he operates from more than one base. The data shown in the fleet section of the tables are based on the number of trucks found in fleets of specified size and not the number of fleets.

General Aviation: This field of aviation employs light planes to work for air taxi services, business firms and other organizations. Flying light planes for commercial purposes requires a commercial pilot license. Included in this field are planes employed for personal use.

Gross Energy: The total of inputs into the economy of the primary fuels (petroleum, natural gas, and coal, including imports) or their derivatives, plus the generation of hydro and nuclear power converted to equivalent energy inputs.

Gross National Product: Total value at market prices of all goods and services produced by the nation's economy. As calculated quarterly by the Department of Commerce, gross national product is the broadest available measure of the level of economic activity.

Gross Vehicle Weight: The empty weight of the vehicle plus the maximum anticipated load weight.

Heavy-Heavy: In reference to truck size class, a gross vehicle weight of 26,001 pounds or more.

Highway Trust Fund: In 1956, Congress established the Highway Trust Fund to finance construction of the National System of Interstate and Defense Highways. Eighty-three percent of the proposed 42,500 mile system is open to traffic with work underway on an additional 17%. Completion is expected in the early 1980's. The Trust Fund has been expanded to support mass transit development in urban areas. Programs funded by the Trust Fund include: Highway safety grants to the states and local governments for highway safety programs, including support of the Federal highway safety program standards; highway safety research by the Department of Transportation; highway mass transit facilities such as reserved lanes, special roadways, shelters, loading platforms, and parking areas; research, development and initial testing of advanced transportation systems and concept for all modes of urban transportation; pilot programs designated to alleviate urban traffic congestion through improved highways and highway-related systems.

ICC-Regulated Carrier: A motor common carrier operating in interstate commerce under a grant of authority from the Interstate Commerce Commission and subject to its economic regulation.

ICC-Regulated Pipeline: A pipeline company operating in interstate commerce under a grant of authorization from the Interstate Commerce Commission, and subject to economic regulation by the Commission. Such a pipeline company is required to report relevant statistics to the ICC. Petroleum companies and pipelines are regulated while only natural gas companies are regulated.

Industry Energy Efficiency: The development, design, construction, and operation of industrial processes and equipment to minimize the energy requirements of fabricating, forming, converting, or producing industrial or agricultural products.

Inland and Coastal Waterways, Inland and Coastal Channels: These terms include the Atlantic Coast Waterways, the Atlantic Intracoastal Waterway, the New York State Barge Canal System, the Gulf Coast Waterways, the Gulf Coast Waterways, the Gulf Intracoastal Waterway, the Mississippi River System (including the Illinois Waterway), Pacific Coast Waterways, the Great Lakes, and all other channels (waterways) of the United States, exclusive of Alaska, that are usable for commercial navigation.

Intercity Bus — Class I: An interstate motor carrier of passengers with an average annual gross revenue of at least $1,000,000 is defined by the ICC as a Class I carrier.

Intercity Bus — Total: This figure includes Class I, II, and III interstate carriers, all of which report to the Interstate Commerce Commission, and intrastate carriers.

International (Foreign) Freight: Movements between the United States and foreign countries and between Puerto Rico, the Virgin Islands and foreign countries. Trade between U.S. territories and possessions (i.e., Guam, Wake, American Samoa, etc.) and foreign countries is excluded. Traffic to or from the Panama Canal Zone is included.

Light: In reference to truck size class, a gross vehicle weight of 10,000 pounds or less.

Light-Heavy: In reference to truck size class, a gross vehicle weight of 20,001 to 26,000 pounds.

Line Mileage: The aggregate length of roadway of all line-haul railroads. It does not include the mileage of yard tracks or sidings, nor does it reflect the fact that a mile of railroad may include two or more parallel tracks. Jointly-used track is counted only once.

Load Factor: A term relating the potential capacity of a system relative to its actual performance.

Local: In reference to area of operation of trucks, mostly in the local area (in or around the city and suburbs, or within a short distance of the farm, factory, mine, or place vehicle is stationed).

Local Rural Roads: Streets outside urban boundaries other than principal arteries of travel.

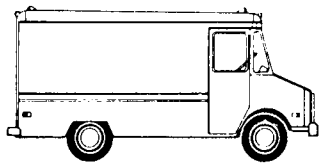
Locomotives: Self-propelled units of equipment designed solely for moving other equipment.

Long Range: In reference to area of operation of trucks, mostly over-the-road trips that usually are more than 200 miles one way to the most distant stop from the place vehicle is stationed.

Main Rural Roads: Streets outside urban boundaries that are generally recognized as principal arteries of travel.

Medium: In reference to truck size class, a gross vehicle weight of 10,001 to 20,000 pounds.

Multi-Stop Truck: Arrangement of this vehicle is such that the driver can stand at the wheel and get in and out easily, for door-to-door deliveries.



Municipal Mileage: Roads inside city, municipal district, or urban boundaries; includes extensions of the state primary system, and state secondary roads within delimited incorporated and unincorporated places, and mileage under local control, e.g., local city streets, roads, and public ways not under State control within such places.

Net Energy: Net energy is the sector inputs (household, commercial, transportation, and industrial), and consists of direct fuels and purchased electricity.

Non-ICC-Regulated Carrier: A motor carrier not subject to the economic regulation of the ICC. The category includes intrastate carriers, private carriers hauling only the goods of their owners, and carriers of commodities, the transportation of which is exempt from ICC economic regulation.

Non-Regulated Pipeline: A pipeline company not operating as a common carrier in interstate commerce, hence neither required to secure a grant of operating authority from the Commission nor to report to it.

Non-Self-Propelled: This term applies to vessels not containing within themselves the means for their own propulsion.

Other Than Commutation: In reference to Class I rail, passenger traffic other than that handled between designated points at less than the basic fare per trip. It does include traffic moving on basic rates of round trip, half rates, clergy, charity, military, special excursions, and other special-rated traffic.

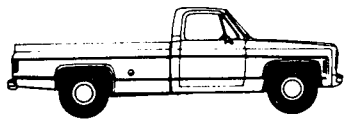
Panel Truck: A small fully enclosed vehicle, such as many stores use for delivery.

Passenger-Miles: This figure represents the total distance traveled by all passengers in passenger cars and taxis. One passenger traveling one mile generates one passenger-mile.

Passenger Train Cars: Cars typically found in passenger trains include coaches, sleeping cars (formerly called Pullman cars), parlor cars, dining cars, lounge cars, baggage cars, crew-dormitory cars, and observation cars.

Personal Consumption Expenditures: As used in the national accounts, the market value of purchases of goods and services by individuals and nonprofit institutions and the value of food, clothing, housing and financial services received by them as income in kind. It includes the rental value of owner-occupied houses, but excludes purchases of dwellings, which are classified as capital goods (investment).

Pick-Up Truck: A vehicle with an enclosed cab for the driver and an open-topped metal box over the rear wheels.



Platform Car: A railroad freight car without permanent raised sides, ends, or covering.

Rack: A spreading framework set on a vehicle for carrying hay, straw, or the like in large loads.

Rural Mileage: Roads outside city, municipal district, or urban boundaries.

Self-Propelled Towboats and Tugs: This towboat is a compact shallow-draft boat with squared bow and towing knees for pushing tows of barges on inland waterways; and a tug is a strongly built boat used for towing and pushing, also termed as towboat. Both of these vessels have within their structure the means for their own propulsion.

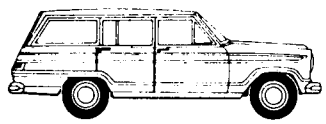
Short Range: In reference to area of operation of trucks, mostly over-the-road (beyond the local area) but usually not more than 200 miles one way to the most distant stop from the place vehicle is stationed.

Stake: One of a number of vertical posts fitting into sockets or staples on the edge of the platform of a vehicle, as to retain the load. This type vehicle is used mainly in the transport of pulpwood and timber.

State Primary System: This refers to highways that have been so officially designated by States. They encompass the principal intercounty, intercity and interstate roads of all states.

State Secondary Roads: This mileage is reported in the tables for the States (taken from the Highway Statistics 1970 Bulletin) that have designated both a primary and a secondary system.

Station Wagon (On Truck Chassis): A truck having an enclosed body of paneled design with several rows of folding or removable seats behind the driver, similar to an automobile station wagon.



Supplemental Air Carrier: One of a class of air carriers now holding certificates, issued by the Civil Aeronautics Board (CAB), authorizing them to perform passenger and cargo charter services supplementing the scheduled service of the certificated route air carriers. Supplemental air carriers are often referred to as "nonskeds," i.e., nonscheduled carriers.

Tank Barges: This term applies to flat barges that travel on inland waterways, have no engines, and must be pulled by a towboat, and that usually carry fluid such as oil.

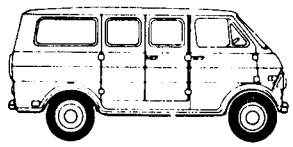
Total Energy: See gross energy.

Total Vehicle Miles Operated: Sum of all passenger vehicle miles operated in line (regular) service, special (charter) service, and nonrevenue service. When vehicles are operated in trains, each vehicle is counted separately, e.g., an eight-vehicle train operating for one mile equals eight vehicle-miles.

Transportation Efficiency: The development, design, construction, and operation of more efficient transport systems. The technology focuses on autos, trucks, planes, trains, pipelines, and ships, as well as the power systems involved.

Urban Streets: Streets within urban boundaries.

Van: A vehicle used to carry bulky loads that must be sheltered from the weather. Used of late as recreational vehicles and for van pooling in commuting.



VMT — Vehicle-Miles Traveled (Automobile): One vehicle traveling one mile generates one vehicle mile. Total vehicle-miles, thus, gives the total mileage traveled by all vehicles.

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