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**ENERGY DIVISION**

**FLEET VEHICLES IN THE UNITED STATES:  
COMPOSITION, OPERATING CHARACTERISTICS,  
AND FUELING PRACTICES**

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## ABSTRACT

As fleets become a larger proportion of the new vehicle population on the road, they have more influence on the characteristics of the total U.S. motor vehicle population. One of the characteristics which fleets are expected to have the most influence on is the overall vehicle fuel economy. In addition, because of the relatively large market share and the high turnover rate of fleet vehicles, fleets have been considered as a useful initial market for alternative fuel vehicles. In order to analyze fleet market potential and likely market penetration of alternative fuel vehicles and to assess infrastructure requirements for successful operations of these vehicles in the future, information on fleet sizes and composition, fleet vehicle operating characteristics (such as daily/annual miles of travel), fuel efficiency, and refueling practices, is essential. The purpose of this report is to gather and summarize information from the latest data sources available pertaining to fleet vehicles in the U.S. This report presents fleet vehicle data on composition, operating characteristics, and fueling practices. The questions these data are intended to address include: (1) How are fleet vehicles operated? (2) Where are they located? and (3) What are their usual fueling practices? Since a limited number of alternative fuel fleet vehicles are already in use, data on these vehicles are also included in this report.

## 1.0 INTRODUCTION

Although improvements in fuel efficiency have made an important contribution to energy conservation within the transportation sector, the overwhelming reliance on petroleum for meeting this sector's demands continues to make it vulnerable to oil price shocks. The U.S. dependence on the Organization of Petroleum Exporting Countries (OPEC) has risen from 11.6% in 1985 to 25.2% in 1990. This along with the wake of the recent Persian Gulf crisis and the widespread public concern over environmental degradation caused by heavy consumption of petroleum based fuels has led to heightened interest in the use of alternative fuels in the transportation sector.

Fleet cars account for a large share of the total new car sales every year, and this share has grown over the past 25 years: 8.9% in 1966, 12.0% in 1970, 13.8% in 1980, and 23.7% in 1990 [Motor Vehicle Manufacturers Association, annual; Bobit Publishing Company, annual]. In contrast to the total retail sales of new cars, which has stayed at a constant level of 10 million per year over the last two decades, the sale of new fleet cars has been growing at an unprecedented rate of 6.6% per year in the last 10 years. Another important observation is that fleet vehicles have higher turnover rates than the rest of the vehicle population. For example, fleet cars are typically kept for about 3.3 years (40 months) and then sold in retail markets [NAFA, 1991; Runzheimer International, 1991]. A typical U.S. passenger car, on the other hand, has a median age of 7.8 years and a lifetime of 11.8 years [MVMA, 1991; Davis and Hu, 1991]. This suggests that fleet cars are purchased at a faster rate than cars in general. Therefore, the changes in new cars, such as fuel economy and alternative fuel capability, can be introduced to the general public more rapidly through fleet vehicle markets than through non-fleet vehicle markets.

As fleets become a larger proportion of the new vehicle population on the road, they have more influence on the characteristics of the total U.S. motor vehicle population. One of the characteristics which fleets are expected to have the most influence on is the overall vehicle fuel economy [Shonka, 1978]. Because of the relatively large market share and the high turnover rates, fleets have long been considered a potential initial market for alternative fuel vehicles. However, under the current technology, alternative fuel vehicles are still limited in performance characteristics such as range, payload, speed, and acceleration, when compared to gasoline-powered vehicles. In addition, the current infrastructures for providing alternative fuels and related services have not yet been fully developed. Therefore, the usage of alternative fuel vehicles in the near future may be limited.

It is precisely these limitations that led most of the studies to conclude that the fleet market is relatively more attractive for new technologies than the retail market. The conclusion is based on the following [Shonka, 1978; Wagner, 1979]:

1. Organizational resources, both managerial and monetary, which permit the fleet operators to accept some of the risk associated with the testing of new technologies;
2. Bulk buying practices, which enable an auto manufacturer to focus its operations on a limited number of products and a small number of customers;
3. Ability to assign certain vehicles with limited performance characteristics to less-demanding vehicle missions;
4. Conscientious maintenance and record-keeping practices; and
5. Fast mileage accumulation, which allows an auto manufacturer to quickly acquire a large amount of operational data about a particular design of alternative fuel vehicles.

In order to (1) determine the feasibility and practicality of introducing alternative fuel vehicles into the fleet market, (2) analyze potential penetration of alternative fuel vehicles in fleet vehicle markets, and (3) establish infrastructure requirements for successful operations of alternative fuel vehicles in the future, information on fleet sizes and vehicle compositions, fleet vehicle operating characteristics, such as daily/annual vehicle miles of travel, fuel efficiency, and refueling practices, is essential.

No comprehensive nationwide fleet vehicle survey is currently available. Many studies have explored the fleet market potential for different types of alternative fuel vehicles, such as electric vehicles (EVs) [e.g., Shonka, 1980; Bevilacqua-Knight, Inc., 1987; Berg, et al., 1984], natural gas based vehicles [Biederman and Blazek, 1990; Marshment, 1991; Easton Consultants, 1991], and methanol-powered vehicles [Wachs and Levine, 1985]. However, the focus and the scope of these studies were often different. These studies together with several regularly published fleet publications, such as the *Automotive Fleet* by Bobit Publishing Company, fleet surveys conducted by National Association of Fleet Administration (NAFA), and the *Runzheimer Survey & Analysis of Business Car Policies & Costs* by Runzheimer International, provide limited and often not comparable information on fleets.

The purpose of this study is to summarize information about fleet vehicles in the U.S. by using the existing data sources and by conducting a small scale information gathering effort of our own. Data included in this study focus on fleet vehicle composition, operating characteristics, and fueling practices. The specific questions these data are intended to address include: (1) How are fleet vehicles operated? (2) Where are they located? and (3) What are their usual fueling practices? Overall, this report will cover several major areas pertaining to fleet vehicles in the U.S.:



1. Available data sources.
2. Fleet stock composition and historical trends by vehicle size and business type.
3. Fleet operating characteristics, such as vehicle age, expected lifetime, turnover rate, vehicle disposal, fleet size, vehicle purchase decision factors, vehicle miles of travel, and garage locations.
4. Comparisons of fleet usage by business sector, such as business, utility, or government.
5. Fueling practices.

This report also presents limited data on alternative fuel fleet vehicles already in use.

Chapter 2 provides a brief discussion of fleet definitions. Chapter 3 gives an overview of the data sources used in this study. Chapter 4 presents information on fleet vehicle composition and historical trends. Chapter 5 describes fleet vehicle operating characteristics. Chapter 6 summarizes fueling practices of fleets in general and the type and size of alternative fuel vehicles currently used by fleet operators. Chapter 7 suggests future data needs.

## 2.0 FLEET DEFINITIONS

The definition of a fleet is not consistent within the fleet industry. Shonka [1978] gave a fairly comprehensive review of the possible discrepancies among different fleet definitions. A discussion on fleet definitions which basically follow that of Shonka [1978] is included in this chapter.

Ideally, a fleet is defined as a group of vehicles, including cars, vans, station wagons, buses, and trucks, operated under a corporation or an institution (i.e., under a unified control) for nonpersonal activities. Several important features that may help to distinguish fleet vehicles from non-fleet vehicles (owned by households or individuals) are that (1) these vehicles are typically purchased in bulk, (2) vehicles are used for non-personal use during business hours, and (3) in some instances, such vehicles are engaged in pick-up and delivery activities along a fixed or predictable route and are often operated under frequent stop-and-go conditions.

Much of the discrepancy in the fleet definition lies in a distinction between what number constitutes a fleet (e.g., 4 vehicles vs. 10 vehicles), as well as whether vehicles are purchased in bulk or whether they are operated under a central control. Typically, a cutoff point of 10 vehicles is used in the fleet industry. For example, statistics on fleet cars published by Bobit Publishing Company are based on those cars which are operated in groups of ten or more. However, this definition does not require that these cars be purchased in a bulk of 10 or more. On the other hand, R.L. Polk and Company dealt with new fleet registrations only. They classify a vehicle as a member of a fleet only if it is sold to a customer who buys ten or more vehicles within a two-year period [Shonka, 1978]. The rationale favoring a cutoff at 10 vehicles or more is that this would allow a definite distinction between vehicles purchased for personal and non-personal uses, since an individual or household is very unlikely to own more than 10 vehicles [Shonka, 1978].

There is also some confusion as to whether a fleet must be homogeneous in vehicle type or whether it may consist of a mixture of different types of vehicles (i.e., passenger cars, vans, buses, or trucks). Since the major distinction between fleet and non-fleet vehicles is their usage (i.e., personal vs. non-personal use), it is not critical to require a fleet to be comprised of homogeneous vehicles.

A fleet vehicle may be leased, rented, or privately owned by either an individual or an institution (business, utilities, or government). The types of fleet operations that are most commonly used in the fleet industry are as follows [Bobit Publishing Company, annual]:

1. Business/corporate - including company or salesman owned or leased;
2. Government;
3. Utilities;
4. Police;
5. Taxi;
6. Daily rental - defined as transit, daily, weekly, or monthly use of cars or trucks, generally for less than one year, including such firms as Hertz, Avis, Budget, and National;
7. Driver school - was combined with business fleets after 1983; and
8. Individual leasing company - purchased in mass by a leasing agent and are then leased to individuals or companies (from 1 to 9 vehicles).

Due to the discrepancies in fleet definition, one is, therefore, advised to be cautious when comparing statistics from different sources.

## 3.0 DATA SOURCES

### 3.1 OVERVIEW

Data on fleets are available from several sources. This study used the latest data available. The focus of most data sources is on fleet cars, although some include limited information on fleet buses, vans, and trucks. Different data sources are usually prepared for very different purposes. Consequently, each data source has its own scope in terms of the data collection method, target population, data items collected, level of data aggregation, and data validation procedures. Different objectives frequently result in incomparable data sources.

The following is an overview of the data sources considered in this study.

1. *Federal Motor Vehicle Fleet Report*, by the U.S. General Services Administration (GSA) [1990].

The *Federal Motor Vehicle Fleet Report* summarizes data on motor fuel consumption, vehicle miles of travel, and vehicle stock for Federal owned or leased vehicles. The data are provided to the GSA by individual Federal agencies for each fiscal year.

2. *Truck Inventory and Use Survey (TIUS)*, by the U.S. Department of Commerce, Bureau of the Census [every 5 years, e.g., 1977, 1982, 1987].

TIUS provides data on the physical and operational characteristics of the Nation's truck population. The survey is conducted every 5 years for the years ending in 2 and 7. Information is available by truck fleet size category, e.g., 1, 2-5, 6-19, etc. Truck fleet size is, however, based on the number of trucks operated by a truck owner and stationed at the same "base of operation" for the entire sample year. In other words, the fleet is an operational unit and might be smaller than the total fleet that a business entity has, if it operates from more than one base. Therefore, this survey only provides information on fleet vehicles that are operated from the same base.

3. *NAFA's Used Vehicle Marketing Survey (NAFA-UVMS)* and *NAFA's New Vehicle Acquisition Survey (NAFA-NVAS)*, published in *NAFA Fleet Executive*, by the National Association of Fleet Administration (NAFA), Inc. [1991].

NAFA publishes a monthly bulletin for its members of fleet administrators in the U.S. and Canada. NAFA's membership covers business fleets, as well as utility and government fleets. Each year NAFA conducts a used vehicle marketing survey and a new car acquisition survey among the NAFA member fleets. The used vehicle marketing survey contains questions on the types of vehicles sold, vehicle replacement and disposal policies, and selling procedures and prices. The new vehicle acquisition survey explores NAFA member fleets' policies and practices regarding the purchase of new fleet vehicles. Questions include the number and the types of vehicles to be purchased or leased.

NAFA's 1990 Used Vehicle Marketing Survey received a total of 163 responses from the U.S. (133) and Canada (30) fleet executives who administered over 131,000 vehicles. The survey

results were summarized in the 1991 January issue of *NAFA Fleet Executive*. The 1991 Model Year New Vehicle Acquisition Survey results were published in 1991 February issue of *NAFA Fleet Executive*. A total of 372 (U.S. 297, Canada 75) completed questionnaires were received, representing approximately 18% of the NAFA's members.

4. *Runzheimer Survey & Analysis of Business Car Policies & Costs: 1991-1992* [1991], by Runzheimer International, Northbrook, Illinois 60062.

Runzheimer's Survey & Analysis provides data biannually on policies and costs of U.S. and Canadian business, utility, and government fleets. The latest survey (1991) contained nearly 250 questions about fleet management, administration, and vehicles.

5. *Automotive Fleets: Fact Book*, published annually by Bobit Publishing Company.

The Fact Book contains statistics on fleet operations as estimated by the Automotive Fleet Research Department of the company, as well as the used-car data from NAFA's surveys.

6. *Oklahoma Large Fleet Survey (OLFS)*, by the Division of Regional and City Planning, University of Oklahoma [Marshment, 1991].

This survey collected data on fuel consumption and travel characteristics from large fleet operators, operating 25 or more vehicles, within the State of Oklahoma. It is a one-time survey of 18 fleet operators conducted in 1989. The purpose of this study was to determine the feasibility and practicality of introducing natural gas based alternative fuels into the fleet vehicle market.

7. *Vehicle Fleets Survey in the South Coast Air Basin (VFS-SCAB)*, by the Urban Innovations Group for the South Coast Air Quality Management District [Wachs and Levine, 1985].

Urban Innovations Group conducted a one-time survey for the South Coast Air Quality Management District in California to determine the potential for methanol fuel use by light- and heavy-duty vehicles in the South Coast Air Basin (SCAB). Separate questionnaires were used for transit and non-transit fleets. Data were collected on fleet size, garage locations, age distribution of the vehicles, typical fleet vehicle lifetime in years and vehicle miles of travel, fuel consumption, and plans and criteria for acquisition of new vehicles.

8. *Commercial Fleet Manager's Survey (CFMS)* by the University of Michigan for the Electric Power Research Institute and Detroit Edison Company [Berg et al., 1984].

This survey was conducted for a study called *Electric Vehicles in Commercial Sector Applications*. The study dealt with fleets of light-duty vehicles. The purpose of this study was to investigate the potential for electric vehicles (EVs). Due to the limited operating ranges of EVs, the questionnaire was designed to focus on vehicle travel requirements, cost and range tradeoffs, and operational practices. Fleet managers in establishments throughout the U.S. were contacted by telephone and 583 interviews in total were conducted during the fall of 1983. The overall response rate for these interviews was 92%.

9. A survey conducted for a study titled *Economic Analysis of Low-Pressure Natural Gas Vehicle Storage Technology* by the Institute of Gas Technology (IGT) for the Gas Research Institute [1990].

The objective of this work was to evaluate the technical requirements and economic implications of using a natural gas system for application in fleet vehicles. Vehicle categories included in the study were: pickup trucks, vans, delivery step vans, and buses. These vehicles have been identified as promising candidates for dedicated compressed natural gas (CNG) and adsorbed natural gas (ANG) fleet applications because they are primarily refueled at a central location, serve a regular route with predictable daily mileage, and have large cargo areas that can accommodate fuel storage tanks. One fleet operator from each vehicle category was interviewed on such factors as fleet size, daily driving range, vehicle fuel efficiency, and required fueling times. Fleet market data used in this study were taken from NAFA's and other surveys.

10. *Natural Gas Vehicle Fleet Market Study* by Easton Consultants, Inc. for the American Gas Association and NGV Coalition (AGA/NGV) [1991].

The objective of this study was to determine key fleet market characteristics and requirements for natural gas vehicles' (NGVs) success. The report focuses on the information gained in a telephone survey among 500 randomly selected fleet managers in five business categories: transit bus fleets, school bus fleets, taxi/limo fleets, service/heavy delivery fleets, and repair service fleets. The sample was drawn from 31 metropolitan or consolidated metropolitan areas. The interviews were conducted during December 1990 and January 1991.

11. Information collection effort by Oak Ridge National Laboratory (ORNL) for the U.S. Department of Energy (ORNL/DOE study).

The information was collected via a discussion guide. Both phone and mailout contacts were used. Only a selected number of fleet operators was contacted during October-December, 1991. The main purpose of this effort was to provide supplementary information on vehicle miles of travel, fleet vehicles' garage locations (central business district, suburban, small city, or rural area), and fueling practices. The data were collected from three major fleet sectors: business, utility, and government, and by four vehicle types: cars, light trucks (and vans), medium trucks, and heavy trucks. The focus was on fleets with 10 or more vehicles. Thirty-three fleets in total participated in this information gathering effort: 21 business (2 overnight delivery service and 19 service/retail) fleets, 5 utility fleets, and 7 government (4 State and 3 municipal) fleets. These fleets operate over 162,000 vehicles. The general profile of these fleet participants and major findings of this study are presented in Appendix A. Since these fleet operators were not selected statistically, the results from this effort should not be used to make inferences of the entire fleet vehicle population.

### **3.2 DATA COLLECTION METHOD**

Except GSA and Bobit, which were total reporting (censuses), the data sources considered were obtained through sampling methods. The data collected in most data sources were, however, not based on a statistically designed probability sample and, therefore, have to be carefully interpreted. Table 1 includes fleet definition, sampling method, types of fleets included, and sample size used in these studies.

Table 1. Sources of Fleet Data Considered in This Study: Target Population, Sampling Method, and Sample Sizes.

Study (year the latest survey was conducted)	Fleet Definition	Target Population	Sampling Method and Response Rate	Sample Size		
				Type of Fleet Operators & Vehicles	Operators	Vehicles
Runzheimer (1991) (biannual)	N/A	Fleets in the U.S. and Canada; Runzheimer maintains lists of fleet operators throughout North America (over 100,000 fleet operators).	Self-Selected; A list of 28,219 "representative" fleet operators were surveyed. A total of 1,087 respondents with completed questionnaires were received.	Cars Business Utility Government <u>Light Trucks &amp; Vans</u> Business Utility Government	654 115 195 686 in total	183,208 53,318 112,159 26,289 64,683 39,368
NAFA-UVMS (1990) (annual)	N/A	NAFA member fleet operators (U.S. & Canada). There were approximately 1,500 NAFA members in total.	Questionnaires were sent to all NAFA member fleet operators. A total of 163 responses were received from U.S. and Canada. (133 from U.S.)	Cars Vans Light Trucks	163 in total	75,258 18,883 37,187
NAFA-NVAS (1991) (annual)	N/A	NAFA member fleet operators (U.S. & Canada). There were approximately 1,500 NAFA members in total.	Questionnaires were sent to all NAFA member fleet operators. A total of 372 responses were received from U.S. and Canada (297 from U.S.)	Cars Vans Light Trucks	297 in total	217,470 42,196 64,916
VFS-SCAB (1985) (one time)	5+ vehicles	15 public transit fleet operators and over 6000 non-transit fleet operators in the South Coast Air Basin (SCAB) in Southern California.	Questionnaires were sent to all 15 transit and about 4,500 non-transit fleet operators in SCAB. All transit fleet operators responded to the survey. About 600 non-transit fleet operators responded, in which 437 completed questionnaires were used in the end.	<u>Transit</u> Buses <u>Non-Transit</u> Buses Cars Light trucks/vans Medium/Heavy trucks	15 437	4,444 2,544 31,094 36,014 16,842



Table 1. (Continued)

Study (year the latest survey was conducted)	Fleet Definition	Target Population	Sampling Method and Response Rate	Sample Size	
				Type of Fleet Operators & Vehicles	Number of Operators Vehicles
TIUS (every 5 years) (e.g., 1977, 1982, 1987)	see Section 3.1 for details	Trucks and vans in operation and registered in the U.S. during the sampling year. Out-of-scope vehicles include: government-owned vehicles, ambulances, buses, motor homes, farm tractors, and unpowered trailer units. The target population was 44.57 million vehicles in 1987 TIUS.	A stratified random sample. The response rates for 1977, 1982, and 1987 TIUS were 90%, 90%, and 78%, respectively.	See Section 3.1 for a detailed definition of "fleet" in TIUS	N/A 135,000 (in 1987 TIUS)
IGT (1989) (one time)	N/A	Light-duty pickup trucks and vans, medium-duty delivery step vans, and heavy-duty passenger buses.	3 fleet operators were interviewed: one overnight delivery service, one service specializing in less-timely delivery of larger packages and parcels, and the Chicago Transit Authority.	Light-duty pickup trucks and vans Medium-duty delivery step vans Heavy-duty passenger buses	1 1 1 N/A
CFMS (1983) (one time)	1+ light-duty vehicle	Light-duty vehicles (cars, trucks, and vans) in the U.S. The target population is about 13 million in total.	A probability sample of establishments drawn from a constructed list. The overall response rate was indicated to be 92%.	Light-duty vehicles	583 N/A
OLFS (1989) (one time)	25+ vehicles	A narrowly defined group of large fleet operators in Oklahoma in 1988: only light duty vehicles with age of 10 years old or younger, excluding rental/leasing companies, financial institutions, and vehicles engaged exclusively in intrastate travel. The target population includes 144 private, 145 public, 2 transit, and 1 State government fleet operators, with a total number of vehicles of 19,880, 8,286, 168, and 4,127, respectively.	A stratified random sample.	Private Public Transit State	4 12 1 1 1,692 1,580 84 4,127

Table 1. (Continued)

Study (year the latest survey was conducted)	Fleet Definition	Target Population	Sampling Method and Response Rate	Sample Size	
				Type of Fleet Operators & Vehicles	Number of Operators Vehicles
AGANGV (1991) (one time)	10+ vehicles	Five business fleet categories: transit bus, school bus, taxi/limo, service/heavy delivery, and repair service fleets, in 31 metropolitan areas were included. Nine of the 31 metropolitan areas were identified as "severe non-attainment" with respect to the Clean Air Act Amendment of 1990.	A stratified random sample.	Fleet Type Transit Bus School Bus Taxi/Limo Delivery Service Repair Service <u>Vehicle Type</u> Car/Taxi/Limo Light Trucks Light Vans Step Vans Small Buses School Buses Medium Trucks (Classes 4-5) Medium Trucks (Class 6) Heavy Trucks Transit Buses	60 110 110 110 110  8,043 4,640 4,634 2,934 513 4,060 2,847 2,584 3,306 2,033

Note: N/A = Not Available

## 4.0 VEHICLE COMPOSITION

### 4.1 HISTORICAL TRENDS

Although fleet cars constitute only a small fraction (5.8%) of the total passenger car registrations, the fleet share of new car sales accounts for a large percentage of the total new car sales every year. This share has grown over the past 25 years: 8.9% in 1966, 12.0% in 1970, 13.8% in 1980, and 23.7% in 1990 (Table 2). In contrast to the total retail sale of new cars, which has stayed at a constant level of 10 million per year over the last two decades, the sale of new fleet cars has been growing at an unprecedented rate of 6.6% per year in the last 10 years (Table 2).

Table 3 shows the size of car fleets from 1966 to 1990 by the eight business categories classified in Chapter 2. Business fleets continue to dominate the fleet vehicle stock: 46% in 1990, followed by individual leasing companies (24.3%) and daily rentals (11.9%). The fastest growing business categories in the last 25 years were daily rentals and individually leased vehicles. Daily rentals have grown at a steady average annual growth rate (AAGR) over the years: 5.0% from 1971 to 1980 and 4.5% from 1984 to 1990. Individually leased vehicles grew at an AAGR of about 10% from 1966 to 1980; this growth has, however, dropped significantly in the last 10 years, with an AAGR of only 1.8%. In the last 15 years, business fleets have grown at a modest AAGR of less than 1.7%, with utility fleets staying at roughly the same size, while government fleets have declined at an AAGR of 2.1%. Within the business fleets, the number of employee-owned cars grew at an AAGR of 4.5% in the last 10 years, a much higher growth rate compared to that of company-owned and company-leased cars (about 1.2%).

The size of government car fleets reported in Table 3 is about one-half of that reported in *Highway Statistics* [Federal Highway Administration (FHWA), annual]. FHWA's numbers, as shown in Table 4, suggest that there are 1.158 million publicly-owned cars, as opposed to the 0.538 million reported by Bobit Publishing Company. This discrepancy is because FHWA's "cars" include vans, station wagons, and jeep-like vehicles. FHWA's numbers indicate a slight increase of publicly-owned vehicles in recent years: 2.8%, 1.4%, and 2.5% for cars, buses, and trucks, respectively, from 1983 to 1990. FHWA's numbers are compiled from GSA report and vehicle registration data submitted by each State. Vehicle classes included in States' vehicle registration data, however, are not consistent across States. For example, some States include vehicles operated by safety departments (fire and police departments), public educational institutions, public transit authorities; while others do not.

**Table 2. U.S. Passenger Car Registrations and New Car Retail Sales: Total vs. Fleet of 10 or More.**

Calendar Year	Registrations (in 1000's)		Fleet Share of Registration (percent)	Retail Sales (in 1000's)		Fleet Share of Retail Sales (percent)
	Total <sup>1</sup>	Fleet <sup>2</sup>		Total <sup>1</sup>	Fleet <sup>2,3</sup>	
1990	145,010	8,312	5.7	9,301	2,201 <sup>4</sup>	23.7
1989	143,081	8,318	5.8	9,772	2,103	21.5
1988	141,252	8,201	5.8	10,530	2,643	19.4
1987	137,324	7,934	5.8	10,277	1,837	17.9
1986	135,431	7,756	5.7	11,460	1,879	16.4
1985	131,864	7,485	5.7	11,042	1,910	17.3
1984	128,158	7,268	5.7	10,390	1,638	15.8
1983	126,444	6,895	5.4	9,182	1,301	14.2
1982	123,702	6,820	5.5	7,982	1,135	14.2
1981	123,098	7,149	5.8	8,536	1,217	14.3
1980	121,601	7,163	5.9	8,979	1,238	13.8
1979	118,429	7,019	5.9	10,673	1,361	12.8
1978	116,573	6,876	5.9	11,314	1,505	13.3
1977	112,288	6,517	5.8	11,183	1,344	12.0
1976	110,189	6,287	5.7	10,110	1,165	11.5
1975	106,706	5,956	5.6	8,624	955	11.1
1974	104,229	5,836	5.6	8,853	1,083	12.2
1973	101,412	5,744	5.7	11,424	1,291	11.3
1972	96,553	5,373	5.6	10,940	1,105	10.1
1971	92,221	5,150	5.6	10,250	1,098	10.7
1970	88,775	5,041	5.7	8,405	1,009	12.0
1969	86,414	4,889	5.7	9,583	1,093	11.4
1968	83,189	4,548	5.5	9,656	985	10.2
1967	79,999	4,254	5.3	8,337	825	9.9
1966	77,752	4,106	5.3	9,028	800	8.9
<b>AAGR (%)<sup>5</sup></b>						
1966-75	3.5	4.1		-0.5	2.0	
1971-80	3.1	3.7		-1.5	1.3	
1976-85	2.0	1.9		1.0	5.5	
1981-90	1.8	1.7		1.0	6.6	

1. Source: *MVMA Motor Vehicle Facts and Figures*, by Motor Vehicle Manufacturer Association, annual.
2. Source: *Automotive Fleet: Fact Book*, by Bobit Publishing Company, annual.
3. New car fleet registrations (not actual sales).
4. November and December figures were estimated.
5. Average annual growth rate (AAGR) in percent.

**Table 3. U.S. Passenger Cars in Fleets by Type of Business (including both owned and leased).**  
(in thousands)

Calendar Year	Business Fleets						Individually Leased	Government Fleets	Utility Fleets	Other Fleets			All Fleets		
	Employee Owned	Company Owned	Company Leased	10-24 Cars	25+ cars	Total				Police	Taxi	Daily Rental	Driver School	10+ Cars	4+ Cars
1990	509	754	2,560	934	2,889	3,823	2,020	538	551	249	141	990	8,312	10,607	
1989	518	762	2,507	879	2,908	3,787	2,140	543	553	244	144	907	8,318	10,592	
1988	425	716	2,548	829	2,860	3,689	2,160	543	553	242	144	870	8,207	10,577	
1987	410	727	2,427	809	2,755	3,564	2,098	538	550	240	144	800	7,934	10,578	
1986	420	740	2,370	800	2,730	3,530	1,975	535	545	238	143	790	7,756	10,560	
1985	348	678	2,458	760	2,724	3,484	1,800	528	540	233	140	760	7,485	10,508	
1984	344	684	2,392	749	2,671	3,420	1,657	528	540	228	140	755	7,268	10,475	
1983	340	672	2,353	741	2,624	3,365	1,653	500	533	221	139	466	6,895	10,400	
1982	340	678	2,288	738	2,568	3,306	1,645	500	530	223	141	457	6,820	10,076	
1981	341	678	2,268	734	2,553	3,287	1,713	649	537	284	198	462	7,149	10,436	
1980	345	680	2,234	724	2,535	3,259	1,708	651	532	288	205	500	7,163	10,433	
1979	348	685	2,141	726	2,448	3,174	1,690	645	529	291	207	462	7,019	10,428	
1978	350	683	2,091	716	2,408	3,124	1,610	648	523	294	205	448	6,876	10,423	
1977	353	683	2,031	716	2,351	3,067	1,385	642	518	292	202	385	6,517	10,414	
1976	357	694	1,989	707	2,333	3,040	1,217	635	508	286	202	373	6,287	10,403	
1975	364	705	1,840	675	2,234	2,909	1,072	628	497	278	193	354	5,956	10,398	
1974	373	715	1,814	674	2,228	2,902	1,008	611	482	261	185	361	5,836	10,324	
1973	381	738	1,744	674	2,189	2,863	994	598	467	249	182	364	5,744	10,214	
1972	392	760	1,483	665	1,970	2,635	925	592	438	236	177	341	5,373	10,094	
1971	411	799	1,336	668	1,878	2,546	834	611	421	218	174	319	5,150	10,070	
1970	419	781	1,304	652	1,852	2,504	803	601	416	207	171	314	5,041	9,992	
1969	438	884	1,188	726	1,784	2,510	697	594	404	191	169	297	4,889	9,780	
1968	455	844	1,082	664	1,717	2,381	573	592	394	185	153	281	4,548	9,166	
1967	461	813	964	615	1,623	2,238	487	588	386	174	146	204	4,254	8,940	
1966	475	783	901	569	1,590	2,159	395	660	374	165	142	180	4,106	8,710	
AAGR (%)															
1966-75	-3.0	-1.2	7.9	1.9	3.8	3.3	11.1	-0.6	3.2	5.8	3.4	7.5	4.1	2.0	
1971-80	-1.9	-1.8	5.7	0.9	3.3	2.7	8.0	0.7	2.6	3.1	1.8	5.0	3.7	0.4	
1976-85	-0.3	-0.3	2.4	0.8	1.7	1.5	4.3	-2.1	0.7	-2.3	-4.1	(4.5)	1.9	0.1	
1981-90	4.5	1.2	1.3	2.7	1.4	1.7	1.8	-2.1	0.3	-1.5	-3.8	(4.5)	1.7	0.2	
Comp (%)															
1970	8.3	15.5	25.9	13.0	36.7	49.7	15.9	11.9	8.3	4.1	3.4	6.2	100.0	100.0	
1980	4.8	9.5	31.2	10.1	35.4	45.5	23.8	9.1	7.4	4.0	2.9	7.0	100.0	100.0	
1990	6.1	9.1	30.8	11.2	34.8	46.0	24.3	6.5	6.6	3.0	1.7	11.9	100.0	100.0	

Source: *Automotive Fleet*; *Fact Book*, by Bobit Publishing Company, annual.  
 Notes: (1) 25+ = 25 or more, 10+ = 10 or more, 4+ = 4 or more; (2) — Combined with business fleets; (3) AAGR = Average Annual Growth Rate; (4) Comp (%) = Composition in percent; (5) Government fleets may not include Federal cars [see Davis and Hu, 1991]; (6) Daily rentals were underestimated before 1984 [see Davis and Hu, 1991] (AAGR=4.5% for 1984-1990 period).

**Table 4. Publicly-Owned Vehicles - Highway Statistics [FHWA, annual].**

Calendar Year	Federal Civilian Agencies			State, County, and Municipal Governments			All Publicly-Owned Vehicles			
	Cars	Buses	Trucks & Truck Tractors	Cars	Buses	Trucks & Truck Tractors	Cars	Buses	Trucks & Truck Tractors	Total Vehicles
1990	99,467	4,551	276,293	1,058,931	346,943	1,470,817	1,158,398	351,494	1,747,110	3,257,002
1989	89,143	4,418	257,175	1,036,416	345,583	1,425,882	1,125,559	350,001	1,683,057	3,158,617
1988	86,588	4,636	244,062	1,010,290	338,876	1,389,285	1,096,878	343,512	1,633,347	3,073,737
1987	85,667	4,518	233,413	991,965	326,548	1,355,745	1,077,632	331,066	1,589,158	2,997,856
1986	84,580	4,465	231,990	965,835	320,317	1,328,302	1,050,415	324,782	1,560,292	2,935,489
1985	85,112	3,722	224,819	956,209	322,997	1,319,358	1,041,321	326,719	1,544,177	2,912,217
1984	82,904	3,653	220,597	914,767	315,133	1,278,818	997,671	318,786	1,499,415	2,815,872
1983	76,896	3,550	198,162	877,670	314,286	1,263,422	954,566	317,836	1,461,584	2,733,986
AAGR 1983-1990	3.7%	3.5%	4.7%	2.7%	1.4%	2.2%	2.8%	1.4%	2.5%	2.5%

Notes: (1) AAGR = Average Annual Growth Rate; (2) \*Cars \* actually include vans, station wagons, and jeep-like vehicles.

## 4.2 FLEET COMPOSITION

### 4.2.1 Vehicle Size and Type

Bobit's data indicated that there were about 8.312 million fleet cars, including owned and leased, in 1990: Business - 3.823 million, Government - 0.538 million, Utilities - 0.551 million, and Others - 3.400 million (Table 3). Table 5 shows the composition of car fleets by size and business type in recent years as reported in Runzheimer surveys. Although subcompacts and compacts accounted for a significant share of business fleets in 1983 (60%), this share decreased to 15% in 1991. The share of intermediate cars increased significantly, from 29% in 1983 to 52% in 1991. Minivans have doubled their business sector share from 4% in 1987 to 8% in 1991.

Government fleets, including mainly State and local governments, have shown a similar decrease in compact and subcompact shares, but with a substantial increase in full-size cars. On average, government fleets have a larger share of large cars than that of the business fleets. However, Federal car fleets are dominated by subcompact and compact cars [GSA, 1990]. The number of Federal-owned cars (sedans) comprises, however, only a fraction of the total government fleet cars. There were about 99,467 domestic sedans owned by Federal civilian agencies in fiscal year 1988, compared to the total government-owned cars of 543,000 (Table 3).

According to Bobit's data, there were about 2.209 million fleet trucks, including light and medium trucks, in 1990: Business - 1.214 million, Government - 0.246 million, Utilities - 0.592 million, and Others - 0.157 million. (Note that the total U.S. truck registrations were 44.48 million in 1990 [FHWA, annual].) Table 6 presents the composition of light-truck and van fleets by business type from the latest Runzheimer survey. About 50% of the light-truck/van fleets are pickup trucks across all three business types. Overall, pickups and full-size vans dominate the light-truck/van fleets in all business sectors, especially, in government and utility fleets. The business sector has a relatively higher percentage of minivans in its fleet composition than the utility and government sectors do.

Table 7 compares the shares of new car registrations by car size between fleets and non-fleets [Bobit Publishing Company, annual]. No obvious changes in car-size shares of fleets can be observed, which is inconsistent with Runzheimer's data. There are at least three possible reasons for this inconsistency: (1) Bobit's data included only a selected number of vehicle models, (2) Vehicle classification schemes were different between two sources, and (3) Runzheimer's survey was not based on a probability sample. More data will be needed to verify the findings from Runzheimer's surveys (Table 5).

Table 5. Composition of Typical Vehicle Fleets by Business Type: Runzheimer.  
(in percent)

Vehicle Size	Business					Utility			Government		
	1983	1985	1987	1989	1991	1989	1991	1985	1987	1989	1991
	Subcompact	23	6	5	3	4	12	15	13	10	6
Compact	37	19	12	11	11	34	26	27	20	21	20
Intermediate	23	40	44	45	43	28	33	30	23	24	26
Intermediate-Specialty	9	17	16	13	9	8	4	12	8	7	6
Full-Size	7	15	16	20	16	12	12	16	36	39	36
Luxury	1	3	3	3	5	2	0	0	0	0	0
Minivan	NA	NA	4	5	8	NA	6	NA	NA	NA	5
Station Wagon	NA	NA	NA	NA	4	4	4	1	2	3	3
Total	100	100	100	100	100	100	100	100	100	100	100

NA = Not Asked

Table 6. Composition of Light Trucks and Van Fleets in Year 1991: Runzheimer.  
(in percent)

Vehicle Type	Business	Utility	Government
Pickups	50	49	50
Full-Size Vans	23	29	29
Minivans	22	15	6
Utility Vehicles	3	6	12
Other	2	1	3
Total	100	100	100



**Table 7. Fleet vs. Non-Fleet: New Car Registrations (in millions) by Model Year and Vehicle Size**  
**[Bobit Publishing Company, annual].**

Model Year	Subcompact		Compact		Intermediate		Standard		Luxury		Total	
	Fleet	Retail	Fleet	Retail	Fleet	Retail	Fleet	Retail	Fleet	Retail	Fleet	Retail
1990	0.38 (20%)	1.86 (24%)	0.54 (28%)	2.11 (27%)	0.59 (31%)	2.19 (29%)	0.20 (11%)	0.78 (10%)	0.19 (10%)	0.74 (10%)	1.90 (100%)	7.68 (100%)
1989	0.33 (17%)	2.26 (27%)	0.54 (28%)	2.11 (25%)	0.68 (36%)	2.43 (29%)	0.18 (9%)	0.83 (10%)	0.19 (10%)	0.77 (9%)	1.92 (100%)	8.40 (100%)
1988	0.22 (14%)	1.58 (25%)	0.43 (27%)	1.61 (25%)	0.59 (36%)	1.94 (31%)	0.22 (13%)	0.66 (10%)	0.16 (10%)	0.55 (9%)	1.62 (100%)	6.34 (100%)
1987	0.26 (17%)	1.60 (25%)	0.35 (23%)	1.45 (23%)	0.57 (38%)	1.90 (30%)	0.17 (12%)	0.79 (13%)	0.15 (10%)	0.59 (9%)	1.50 (100%)	6.33 (100%)
1986	0.32 (21%)	1.71 (26%)	0.33 (22%)	1.32 (20%)	0.54 (35%)	2.03 (31%)	0.19 (12%)	0.90 (13%)	0.15 (10%)	0.66 (10%)	1.53 (100%)	6.62 (100%)
1985	0.31 (19%)	1.83 (27%)	0.34 (21%)	1.38 (21%)	0.59 (37%)	1.84 (28%)	0.21 (13%)	0.97 (14%)	0.14 (9%)	0.65 (10%)	1.59 (100%)	6.67 (100%)
1984	0.25 (17%)	1.54 (24%)	0.30 (20%)	0.99 (16%)	0.62 (41%)	2.25 (36%)	0.19 (13%)	0.88 (14%)	0.14 (9%)	0.66 (10%)	1.50 (100%)	6.32 (100%)
1983	0.16 (14%)	1.27 (22%)	0.32 (27%)	0.92 (16%)	0.45 (39%)	2.09 (36%)	0.12 (10%)	0.72 (12%)	0.12 (10%)	0.78 (14%)	1.17 (100%)	5.78 (100%)

Note: This table includes only a selected number of models.

Table 8 shows a detailed breakdown of vehicle composition for five business fleet types [Easton Consultants, Inc., 1991]: transit bus, school bus, taxi/limo, service/heavy delivery, and repair service. The service/heavy delivery fleet respondents indicated that 42% of their vehicles were vans/light trucks, 28% medium trucks, and 19% heavy trucks. The majority of vehicles operated by repair service fleets are vans or light trucks (68%).

#### **4.2.2 Vehicle Makes**

Data on detailed fleet vehicle stock by make are not available from any data sources. However, some interesting observations could be made from some of the surveys. The four most popular fleet cars in 1990, according to Runzheimer [1991], were the Buick Century, Chevrolet Lumina, Ford Taurus, and Dodge Dynasty. NAFA's new vehicle acquisition survey [1991] indicated that 39% of responding fleet managers are most likely to purchase their vehicles from Ford-Lincoln/Mercury, 35% from General Motors, and 22.3% from Chrysler. Imports will account for only 2.7% of the purchases. Furthermore, 89% of both U.S. and Canadian fleet respondents do not buy vehicles with traditionally "foreign" nameplates. Of these, 50% in the U.S. and 68% in Canada said that they do not buy such vehicles because of a perceived "Buy North American" company policy. However, only 19% of U.S. fleet managers indicated that their companies have a written "buy domestic only" policy. Fifty-two percent of the respondents indicated that they would not buy "foreign" vehicles even if they were primarily manufactured in the U.S. The Bobit data, however, did not support NAFA's "purchase intent" statistics. It indicated that import shares of new fleet cars were quite significant in recent years: 18.5% for 1988, 24.8% for 1989, and 15.9% for 1990. This suggests that data from NAFA's respondent fleets may not be representative.

#### **4.2.3 Type of Business Vehicle Program**

Most business fleets used one or a combination of the following three business vehicle programs: company-owned, company-leased, or employee-provided. At this time of economic "downturn," corporations have sought ways to rein in their fleets to contain the costs of operating business. Many fleet operators use leased or employee-provided programs to protect themselves from having to dispose of used vehicles in a depressed market, and also as a hedge against the risk of acquiring a vehicle model whose resale value declines at a greater than average rate [Wagner, 1979; Runzheimer International, 1991]. Table 9 shows this trend in recent years--more corporations gave up a "company-owned only" program in favor of a combination of "company-leased" and "employee-provided" business vehicle program.

**Table 8. Vehicle Composition of Five Business Fleet Types - Easton Consultants, Inc. [1991]**  
(in percent)

Fleet Type	Cars/Taxi/Limo	Light Vans	Step Vans	Small Buses	School Buses	Transit Buses	Light Trucks	Medium Trucks (Classes 4-5)	Medium Trucks (Class 6)	Heavy Trucks	Total
Transit Bus	5	4	1	2	2	81	1	1	2	0	100
School Bus	3	7	2	7	67	2	9	1	0	1	100
Taxi/Limo	82	3	1	1	3	0	1	0	0	0	100
Service/Heavy Delivery	11	14	16	0	0	0	12	14	14	19	100
Repair Service	9	21	4	0	0	0	43	12	7	4	100

Notes: Classes 4-5 = 14,000-19,500 lbs;  
Class 6 = 19,500-26,000 lbs.

**Table 9. Trends in the Types of Business Vehicle Programs: Runzheimer.**  
(in percent)

Type of Program	1983	1985	1987	1989	1991
Company-Owned Only	29	31	28	25	19
Employee-Provided Only	7	7	12	19	21
Leased Only	24	20	18	17	19
Company-leased & Employee-Provided	6	6	4	9	12
Company-Owned & Company-Leased	20	20	20	14	13
Company Owned & Employee-Provided	7	8	7	9	9
All Three Programs	7	8	11	7	7
Total	100	100	100	100	100

The composition of fleet vehicles by whether they are company-owned, leased, or employee-owned is also available by business type from the *Automotive Fleet Fact Book* [Bobit Publishing Company, annual]. Table 10 shows the percentages of passenger cars and light trucks operated for business purposes in business, utility, and government fleets. This table indicates that the percentage of company-owned fleet cars has been declining over the last few years in all business types, especially government and utility sectors. Employee-owned business cars in the business sector, on the other hand, has increased from 19.1% to 23.3%. These trends, however, do not appear in light trucks. The percentage of company-owned light trucks has increased with a commensurate decrease in company-leased (or company-managed) light trucks. In contrast to the business sector, government and utility sectors usually do not depend on employee-owned vehicles.

#### 4.2.4 Vehicle Weight

The data on the composition of fleet vehicles by vehicle weight are quite limited. Table 8 gives some information on truck weight for five business fleet categories. Table 11 gives a breakdown of Federal-civilian-agency *in-use* domestic vehicles by vehicle type. Light trucks (GVWR  $\leq$  8,500 lbs) dominate the Federal government fleets (63.8%).

The ORNL/DOE study suggests that, except for delivery and transportation service fleets, most of the business fleets operate mainly passenger cars, with a small number of light trucks and vans. Delivery and transportation service fleets, on the other hand, operate a significant proportion of light and medium trucks in their fleet. Out of the 72,450 vehicles operated by the largest overnight delivery service company, 8.4% are light trucks/vans, 79.0% medium trucks, and 12.6% heavy trucks. However, the distribution for the second largest delivery service is very different -- 68.9% light trucks/vans, 20.9% medium trucks, and 10.0% heavy trucks. For the five utility fleets examined in the ORNL/DOE study, 39.0% are light trucks, 15.0% medium trucks, and 23.4% heavy trucks.

**Table 10. Composition of Fleet Vehicles by Whether They are Company-owned, Leased, or Employee-Provided:  
Bobbit Publishing Company.  
(As of January 1 of Each Year, in percent)**

Vehicle Type	Business Types and Business Car Programs	1985	1987	1989	1990	1991
<b>CARS</b>						
	<u>Business</u> (with 10 or more Cars) Leased or Managed Company-Owned Employee-Owned Total	69.2 11.7 19.1 100	67.1 11.8 21.1 100	69.3 10.0 20.7 100	66.2 9.9 23.9 100	67.4 9.4 23.2 100
	<u>Government</u> Leased or Managed Government-Owned Employee-Owned Total	14.8 85.2 0.0 100	15.9 84.1 0.0 100	18.6 81.4 0.0 100	19.3 80.7 0.0 100	20.1 79.9 0.0 100
	<u>Utility</u> Leased or Managed Company-Owned Employee-Owned Total	4.6 95.4 0.0 100	8.3 91.7 0.0 100	11.2 88.8 0.0 100	13.6 86.4 0.0 100	17.1 82.9 0.0 100
<b>LIGHT TRUCKS (1985-1990: Class I-III, &lt;14,000 lb, 1991: Class I-V, &lt;19,500 lb)</b>						
	<u>Business</u> (with 10 or more Trucks) Leased or Managed Company-Owned Employee-Owned Total	72.2 27.8 0.0 100	70.3 29.7 0.0 100	69.9 30.1 0.0 100	70.5 29.5 0.0 100	69.7 30.3 0.0 100
	<u>Government</u> Leased or Managed Government-Owned Employee-Owned Total	24.0 76.0 0.0 100	22.1 77.9 0.0 100	17.7 82.3 0.0 100	19.0 81.0 0.0 100	16.5 83.5 0.0 100
	<u>Utility</u> Leased or Managed Company-Owned Employee-Owned Total	17.7 82.3 0.0 100	16.5 83.5 0.0 100	10.6 89.4 0.0 100	9.9 90.1 0.0 100	7.4 92.6 0.0 100

Table 11. Federal Civilian Agencies (Including Postal Service) *in-use* Domestic Vehicles and their Operating Characteristics in Fiscal Year 1988.

Vehicle Type	Number and Percent of In-Use Vehicles	Miles Operated (10 <sup>6</sup> )	Miles per Vehicle	Fuel Consumption (10 <sup>6</sup> gallons)	Fuel Efficiency (mpg)
Sedan	73,260 ( 23.2%)	988.84	13,498	48.36	20.4
Station Wagons	10,462 ( 3.3%)	110.99	10,510	5.96	18.6
Ambulances	339 ( 0.1%)	2.78	8,199	0.32	8.6
Buses	1,975 ( 0.6%)	28.48	14,420	3.53	8.1
Trucks (GVWR <sup>1</sup> ≤ 8,500 lbs)	201,339 ( 63.8%)	1350.04	6,705	126.34	10.7
Trucks (8,500 lbs < GVWR <sup>1</sup> < 23,999 lbs)	20,755 ( 6.6%)	143.75	6,926	17.45	8.2
Trucks (GVWR <sup>1</sup> ≥ 24,000 lbs)	7,572 ( 2.4%)	121.57	16,055	21.07	5.8
Total	315,702 (100.0%)	2746.45	8,700	223.03	12.3

Source: *Federal Motor Vehicle Fleet Report*: for fiscal year 1988, by the U.S. General Services Administration [1990].

<sup>1</sup>GVWR = Gross vehicle weight rating: the weight of a vehicle when loaded to its capacity.

## 5.0 OPERATING CHARACTERISTICS

### 5.1 VEHICLE AGE, REPLACEMENT PLANS, AND PURCHASE DECISIONS

NAFA's latest survey (NAFA-UVMS) indicated that: Cars are usually kept for 40 months or operated for 73,980 miles and then sold in the retail market, Vans 56 months or 73,120 miles, Light Duty Trucks 68 months or 72,483 miles. Results from Runzheimer survey also showed that passenger cars were kept for 38 months or operated for 67,648 miles. A typical U.S. passenger car, on the other hand, has a median age of 7.8 years (93.6 months) and a lifetime of 11.8 years (141.6 months) [MVMA, 1991; Davis and Hu, 1991]. This suggests that fleet cars are purchased at a faster rate than cars in general. Therefore, the changes in new cars, such as fuel economy and alternative fuel capability, can be introduced more rapidly through fleet vehicle markets than through non-fleet vehicle markets. Runzheimer's survey also indicated that the predominant measure to cope with economic hardship by executives responsible for business, government, and utility fleets is to lengthen replacement cycles and tighten operating expense controls. A 1988 survey conducted by the National Conference of State Fleet Administrators (NCSFA) suggested that the replacement policy of State government fleets varies from State to State, with a typical range of 5 to 7 years or 75,000 to 100,000 miles [personal communication with staff members of NCSFA, 1992].

Table 12 shows statistics from the ORNL/DOE study on how long a typical fleet vehicle is kept before it is sold to others. These statistics are presented by both vehicle type and business type. Government and utility sectors tend to keep their passenger cars longer (68 and 81 months) than those operated by business sector (35 months). The heavier the vehicles, the longer they are kept. Heavy trucks are kept for about 8.5-11 years, while light trucks are kept for about 4.5-7 years. However, the statistics presented by the ORNL/DOE study are not conclusive since only 21 business, 5 utility, and 7 government fleets are included.

The estimated average lifetime of a vehicle was reported in VFS-SCAB as: public transit (bus), 11.2 years/585,000 miles, non-transit vehicles operated by public agencies, 11 years/109,000 miles, and non-transit vehicles operated by private organizations, 8 years/210,000 miles. Non-transit vehicles include both passenger cars, vans, buses, and trucks.



**Table 12. The Average Length of Time Vehicles are Kept Before Sold to Others:  
ORNL/DOE study.  
(in months)**

	Business	Utility	Government
Cars	35	68	81
Light Trucks	56	60	82
Medium Trucks	83	86	96
Heavy Trucks	103	132	117

The business fleet operators in Runzheimer's survey responded that the most financially rewarding method of disposal is selling a used fleet car to an employee, followed by selling directly to the public, and last returning to lessor. The government fleets, on the other hand, chose auction (81%), trade-in (7%), and sealed bids (7%); and utility fleets selected auction (62%), trade-in (16%), and sell to employee (9%) as the most commonly used methods. NAFA's 1990 used vehicle marketing survey suggested that most fleet vehicles were disposed at auctions (cars: 53% and vans/light trucks: 45.54%), followed by selling to employees (cars: 24%, vans/light trucks: 25.8%) and returning to wholesaler (cars: 19.2%, vans/light trucks: 15%). Table 13 shows the selling methods of fleet vehicles used by NAFA's members. Consistent with Runzheimer's survey, a higher percentage of vehicles owned by business fleets was sold to their employees than those owned by government and utility fleets. Also, most government and utility fleet vehicles were sold through wholesale/auction, although the percentage of vehicles sold to employees has increased in the last few years.

The majority of the business fleets have indicated that initial purchase price and job suitability are the most important factors when purchasing or leasing new vehicles [NAFA-NVAS, 1991; Runzheimer, 1991]. California's *Vehicle Fleets Survey* (VFS-SCAB) indicated that the most important characteristic sought in new vehicles was the reliability. Runzheimer's survey suggested that the leading fleet management problems for business fleets are: (1) Cost of Maintenance and Repair (19%), (2) Vehicle Disposal (16%), (3) New Car Price (13%), and (4) Cost of Gasoline (12%); while the problems for the government fleets are (1) Cost of Maintenance and Repair (37%), (2) Cost of Gasoline (28%), (3) Quality of Car Maintenance and Repair (11%), and (4) New Car Price (8%), indicating government fleet managers may be less concerned with the initial purchase price.

**Table 13. Selling Methods of Fleet Vehicles: NAFA's Used-Vehicle Marketing Survey**  
 [Bobit Publishing Company, annual].  
 (in percent)

	1986	1987	1988	1989
<u>Business Fleets</u>				
Wholesale/Auction	58.2	51.3	59.9	67.2
Employee	30.4	29.2	30.9	28.6
Used Car Dealer	3.8	5.9	2.8	1.8
New Car Dealer (Trade-in)	7.6	6.3	6.4	2.4
Salvage/Other	NA	7.3	NA	NA
Total	100	100	100	100
<u>Government Fleets</u>				
Wholesale/Auction	95.2	94.0	99.2	89.4
Employee	0.0	0.6	0.5	8.1
Used Car Dealer	1.2	0.7	0.0	0.4
New Car Dealer (Trade-in)	3.6	2.3	0.3	2.1
Salvage/Other	NA	2.4	NA	NA
Total	100	100	100	100
<u>Utility Fleets</u>				
Wholesale/Auction	89.9	65.6	80.5	61.4
Employee	9.1	15.9	12.1	38.5
Used Car Dealer	1.0	14.5	6.8	0.1
New Car Dealer (Trade-in)	0.0	0.9	0.6	0.0
Salvage/Other	NA	3.1	NA	NA
Total	100	100	100	100

Note: NA = Not Asked.

## **5.2 FLEET SIZE**

The average fleet sizes for the Nation (as indicated in Runzheimer's survey) are: (1) Business - 231 cars per fleet, (2) Government - 569 cars per fleet, and (3) Utility - 310 cars per fleet. The Oklahoma large fleet survey (OLFS) indicated that the average fleet sizes are: (1) Private Operator - 138 vehicles per fleet, (2) Public Operator - 57 vehicles per fleet, (3) Transit - 84 vehicles per fleet, and (4) Oklahoma State Government - 4,127 vehicles. The VFS-SCAB survey in Southern California showed that non-transit fleets had an average fleet size of 198 vehicles. The median fleet size was, however, 33.5 vehicles. The substantial difference between the mean and the median indicates that a relatively small number of very large fleets was included in the sample.

Table 14 shows the estimates of fleet size for five business fleet categories [Easton Consultants, 1991]. The average fleet sizes are 250 vehicles for transit bus fleet, 106 vehicles for school bus fleet, 91 vehicles for taxi/limo fleet, 71 vehicles for service/heavy delivery fleet, and 38 vehicles for repair service fleet.

Most fleet operators do not anticipate any real changes in fleet size in the near future. For example, 57% of NAFA-NVAS respondents indicated that no changes in their fleet size are planned, 13% will increase their fleet sizes, and 14% will reduce their fleet sizes. The VFS-SCAB survey in California showed that most of the new buses will be used to replace the aging ones in the next three years; while 80% of the new vehicles purchased by the non-transit fleets will replace existing ones in the next 3 years, and only 20% will be used for fleet expansion.

Table 14. Estimated Fleet Size for Five Business Categories - Easton Consultants, Inc. [1991].<sup>1</sup>

Fleet Type	Total # of Fleets in the U.S. <sup>2</sup>	Total # of Vehicles in the U.S. <sup>2</sup>	Fleet Size					
			Median	Mean	10-25	26-50	50-100	100+
Transit Bus	300+	75,000+	78	250	20%	17%	20%	43%
School Bus	5,600+	600,000+	57	106	15%	31%	22%	32%
Taxi/Limo	2,000+	180,000+	36	91	37%	24%	20%	19%
Service/Heavy Delivery	30,000+	2,200,000+	37	71	32%	30%	25%	13%
Food/Vending	2,100+	110,000+	31	51	40%	20%	30%	10%
Routine	2,000+	420,000+	36	201	23%	31%	8%	38%
Materials	1,500+	70,000+	33	45	45%	23%	29%	3%
Other Service	2,100+	80,000+	34	37	39%	37%	24%	0%
Beverage	5,300+	510,000+	51	95	23%	27%	28%	23%
Institutional Food	4,500+	320,000+	41	70	30%	30%	30%	30%
Other Food/Grocery	5,100+	245,000+	32	48	33%	36%	24%	8%
Other Heavy Delivery	7,400+	445,000+	38	60	38%	26%	24%	12%
Repair Service	32,600+	1,300,000+	27	38	47%	36%	14%	4%
Appliance	5,200+	240,000+	37	46	29%	39%	30%	2%
Plumbing/Water Heating/Pool	5,900+	185,000+	26	31	49%	38%	12%	0%
Outside/Landscape/Etc.	5,500+	205,000+	24	37	55%	40%	0%	5%
Construction Trades	7,800+	250,000+	19	32	69%	15%	12%	4%
Other Repair	8,200+	420,000+	33	51	35%	36%	19%	9%

<sup>1</sup> Fleets with 10 or more vehicles.

<sup>2</sup> + means "more than" the number indicated.

### 5.3 ANNUAL VEHICLE MILES AND DAILY DRIVING RANGE

The annual vehicle miles traveled (VMT) by each fleet vehicle and its daily driving range are reported in different studies as follows.

1. Runzheimer (includes all business fleets in the Nation):

#### Fleet Cars

- 1987 - 20,426 miles/year or 81.7 miles/day;
- 1989 - 19,671 miles/year or 78.7 miles/day; and
- 1991 - 22,121 miles/year or 88.5 miles/year.

The daily driving range is computed from the annual mileage at 250 operating days per year. The travel includes both business use (about 80%) and personal use (about 20%).

2. OLFS (includes fleet vehicles in Oklahoma State only): 10,507 miles/year or 42.0 miles/day (@250 operating days/year). The general vehicle population in Oklahoma operates 12,972 miles per year per vehicle.
3. VFS-SCAB (for Southern California):
  - Non-transit fleets: 10,550 miles/year or 42.2 miles/day (@250 operating days/year); and
  - Transit fleets (buses): 34,200 miles/year or 136.8 miles/day (@250 operating days/year).
4. IGT (only one fleet operator for each vehicle category was contacted):
  - Light-duty trucks/vans: 23,400 miles/year or 75 miles/day;
  - Medium trucks - varying from 11,000 to 48,000 miles/year or 35 to 154 miles/day; and
  - Transit buses - 34,000 miles/year or 110 miles/day.

The daily driving ranges were obtained from fleet respondents.

5. GSA (all Federal-civilian-agency *in-use* domestic vehicles): see Table 11.
6. Based on the data from CFMS, 19.8% of light-duty commercial fleet vehicles traveled less than 30 miles a day, 26.2% between 30 and 59 miles a day, 18.6% between 60 and 89 miles per day, and 35.4% greater than 90 miles a day. Although 46.0% of all light-duty vehicles in commercial fleets are typically driven less than 60 miles a day, about 56 to 59% of these vehicles must occasionally be driven beyond the 60-mile range. Daily driving range was found to be similar for cars and trucks. However, cars are more likely to take occasional longer trips than trucks. Over 21% of the establishments responded that it would be easy to assign

the longer trips to other vehicles, and another 16% said it would not be difficult to do so. Approximately 21% of the vehicles surveyed never had to travel over 60 miles a day, and the trip pattern of an additional 9% could be easily modified to remain within the 60-mile range. As estimated by this study, over 3.5 million light-duty commercial fleet vehicles typically traveled less than 60 miles a day.

7. AGA/NGV: Median annual vehicle miles, as well as estimated daily driving range, for five business fleet categories are presented in Table 15. The daily driving range of a typical business fleet vehicle exceeds 60 miles/day.
8. ORNL/DOE study (based on a limited number of fleet operators): annual/daily vehicle miles are computed by business type and vehicle type and are presented in Table 16.

In general, the annual vehicle miles of travel of business fleet vehicles are over 20,000 miles for cars, about 20,000 miles for light trucks/vans, and the mileage for medium and heavy trucks varies from study to study (11,000-65,000 miles). Transit buses were driven over 34,000 miles per year, school buses 15,000 miles/year, and taxi/limo 65,000 miles/year. Vehicles operated by government and utilities tend to be driven less in a year than business fleet vehicles.

The ORNL/DOE study provided some data on the types of areas (urban vs. rural ) where fleet vehicles are typically operated (Table 17). According to the information, most of the travel by fleet cars occurred in urban area (over 38%) or for interstate travel (over 22%), most of the light and medium trucks were engaged in urban travel, and the majority of the travel by heavy trucks in business fleets were interstate travel.

Table 15. Selected Characteristics for the Fleet's Most Important Vehicle Types - Easton Consultants, Inc. [1991]

Fleet Type	% of Total Fleet Vehicles	% Return to Central Location	Annual Purchase Rate(%)	% of Diesel Vehicles	Mileage (Median)		Fuel Gallons (Median)	
					Year (000)	Per Day @250 Days/Yr <sup>1</sup>	Year	Per Day @250 Days/Yr <sup>1</sup>
Transit Bus - Transit Buses	81	100	7	100	36.5	146	9,125	36.5
School Bus - School Buses	67	88	7	56	15.2	80	1,900	10.0
Taxi/Limo - Taxis	82	83	11	NA	64.8	259	3,086	12.3
Service/Heavy Delivery Food/Vending								
- Heavy Trucks	37	100	20	100	31.5	126	5,250	21.0
- Step Vans	20	95	14	10	12.0	48	1,000	4.0
Routine Delivery								
- Step Vans	28	89	2	20	25.8	103	2,150	8.6
- Med. Trucks (C6) <sup>2</sup>	23	100	12	95	12.5	50	1,563	6.3
Materials Delivery								
- Light Trucks	24	72	12	10	25.9	104	1,619	6.5
- Med. Trks (C4-5) <sup>2</sup>	24	68	16	60	46.9	188	4,690	18.9
Other Service Delivery								
- Light Vans	31	79	27	15	14.8	59	925	3.7
- Heavy Trucks	16	100	16	100	14.0	56	2,333	9.3
Beverage Delivery								
- Med. Trucks (C6) <sup>2</sup>	36	91	11	70	14.5	58	1,813	7.3
- Heavy Trucks	19	93	20	100	25.0	100	4,167	16.7
Institutional Food								
- Heavy Trucks	35	86	6	100	60.0	240	10,000	40.0
- Cars	32	1	14	NA	19.0	76	905	3.6

Table 15. (Continued)

Fleet Type	% of Total Fleet Vehicles	% Return to Central Location	Annual Purchase Rate(%)	% of Diesel Vehicles	Mileage (Median)		Fuel Gallons (Median)	
					Year (000)	Per Day @250 Days/Yr <sup>1</sup>	Year	Per Day @250 Days/Yr <sup>1</sup>
Other Food/Grocery - Heavy Trucks - Step Vans	47	94	6	100	52.4	210	8,733	34.9
	25	83	4	25	46.0	184	3,833	15.3
Other Heavy Delivery - Light Trucks - Heavy Trucks	27	91	26	10	21.0	84	1,313	5.3
	18	95	6	100	21.8	87	3,633	14.5
Repair Service Appliance Repair - Light Van - Light Trucks	59	48	12	5	25.5	102	1,594	6.4
	27	64	14	5	21.8	87	1,363	5.5
Plumbing/Water/Pool - Light Trucks - Light Vans	55	74	7	5	17.0	68	1,063	4.3
	16	59	12	5	21.3	85	1,331	5.3
Outside/Landscape/Etc - Light Trucks - Med. Trucks (C6) <sup>2</sup>	43	90	13	10	11.0	44	688	2.8
	26	91	4	20	15.2	61	1,520	6.1
Construction Trades - Light Trks - Light Vans	46	75	9	20	19.0	76	1,188	4.8
	15	94	12	35	11.0	44	1,375	5.5
Other Repair Service - Light Trucks - Med. Trks (C4-5) <sup>2</sup>	43	82	16	5	27.7	111	1,731	6.9
	17	87	15	42	15.7	63	1,570	6.3

<sup>1</sup> School bus fleets are based on 190 operating days per year.

<sup>2</sup> C4-5 = 14,000-19,500 lbs; C6 = 19,500-26,000 lbs.



Table 16. Average Annual/Daily Vehicle Miles of Travel: ORNL/DOE Study.

Vehicle Type	Business		Utility		Government	
	Miles/Yr (000)	Miles/Day @250 Days/Yr	Miles/Yr (000)	Miles/Day @250 Days/Yr	Miles/Yr (000)	Miles/Day @250 Days/Yr
Cars	29.2	117	14.5	58	13.7	55
Light Trucks	26.6	106	17.5	70	13.9	56
Medium Trucks	17.5	70	11.8	47	11.9	48
Heavy Trucks	64.4	258	13.8	55	10.7	43

Table 17. The Type of Areas Where Vehicles Were Operated: ORNL/DOE study.  
(in percent)

Vehicle Type	Area Type	Business	Utility	Government
Cars	Urban	49	38	56
	Suburban	20	17	11
	Rural	9	16	8
	Interstate	22	29	25
Light Trucks	Urban	44	38	62
	Suburban	17	17	14
	Rural	16	16	8
	Interstate	23	29	16
Medium Trucks	Urban	50	34	60
	Suburban	25	23	11
	Rural	7	17	16
	Interstate	18	26	13
Heavy Trucks	Urban	21	23	78
	Suburban	4	27	17
	Rural	4	33	1
	Interstate	71	17	4

#### **5.4 NUMBER AND TYPES OF GARAGE LOCATIONS**

For refueling and maintenance purposes, fleets having central garage facilities are more likely to be able to adopt alternative fuel vehicles, such as EVs and CNG-powered vehicles, than fleets that do not have central garage facilities. Vehicles operated by large business fleet operators, as well as utility and government fleet operators (including public transits), are likely to be centrally garaged (see next Chapter).

Very limited statistics are available on this area. AGA/NGV data (Table 15) suggested that the majority of transit bus, school bus, taxi, and those truck/van operated by delivery and repairing services in metropolitan areas do return to a central location. The ORNL/DOE study indicated that the number of vehicles per garage location is about 32 vehicles for large business fleets, 29 vehicles for utility fleets, and 35 vehicles for government fleets. The VFS-SCAB survey suggested that the majority of public and private fleets were based at a single garage. On average, the number of transit buses that are garaged at one location is 139, while the number for the non-transit vehicles is 75. Large business fleets investigated in the ORNL/DOE study said that 42% of their garages are located in central business district/major metro areas (CBDs), 24% in suburbs, 21% in rural areas, and 13% in small cities. The corresponding breakdowns for a limited number of government fleets are 51.2% in CBDs, 21.8% in suburbs, 22.8% in rural areas, and 4.2% in small cities.

## 6.0 FUELING PRACTICE

### 6.1 FUEL ECONOMY

In the Oklahoma study (OLFS), comparisons with the general vehicle population within the State of Oklahoma revealed that fleet vehicles are less fuel efficient than non-fleet vehicles. The reported fuel economy of all vehicles owned by fleet respondents is 11.2 miles per gallon (mpg), of which private operator is 13.4 mpg, public operator 7.8 mpg, transit operator 10.2 mpg, and State government 14.8 mpg. (Note that the fuel economy of the entire vehicle population in Oklahoma is 18.3 mpg.) The California study (VFS-SCAB) suggested that the fuel economy of transit buses was 3-4.5 mpg, while fuel economy for non-transit fleets, including cars, vans, trucks, buses, was 9.2 mpg. Fuel economy was also estimated in the AGA/NGV study for different business fleets and vehicle types: transit buses - 4 mpg, school buses - 8 mpg, taxi - 21 mpg, light vans/trucks - 16 mpg, step vans - 12 mpg, medium trucks - 10 mpg, and heavy trucks - 6 mpg (see Table 15).

Table 18 presents the VMT-weighted truck mpg by fleet size and area of operation, generated from the 1987 TIUS. The overall truck fuel economy was 8.8 mpg. In general, fuel economy decreases as the range of operations increase, indicating that heavier trucks are used more often for long range operations than lighter trucks.

### 6.2 CENTRAL FUELING

According to the Runzheimer survey, fleets can save on expenses by buying fuel in bulk, and the median cents per gallon saved through bulk purchase in 1991 was 14 cents for business sector, 14.7 cents for utility sector, and 18.5 cents for government sector. The difference in cents per gallon saved between government fleets and business/utility fleets is partly due to the fact that fuel used by government fleets is exempted from fuel taxes. Table 19 shows the percentage of fleets that purchased fuel in bulk. Nearly one-third of the business respondents (31%) indicated that the company purchased some types of fuel in bulk. In addition, 30% of the business respondents said that they purchased gasoline in bulk, 18% diesel fuel, and less than 0.5% methanol. As indicated in Runzheimer's report, of those business fleet respondents that operated gasoline storage/supply tanks in their facilities, 71% of the gasoline consumed was pumped from companies' own fueling facilities. Typically, the types of companies that have fuel tanks in their facilities are those that operated trucks and buses. For example, 90% of the utility fleets and 50% of the business fleets with light trucks and vans operate their own fuel tanks.

**Table 18. TIUS 1987 Statistics by Fleet Size and Area of Operation.**

Fleet Size	Area of Operation	VMT	No. of Vehicles	VMT-Weighted MPG
1	Unknown	149,801,805	7,742	12.9
	Off-road	2,842,400,156	345,590	12.0
	< 50 miles	48,665,808,170	4,042,062	12.5
	50 - 200 miles	20,695,665,496	1,112,417	11.3
	> 200 miles	10,164,228,928	241,343	6.6
2 - 5	Unknown	471,837	54	8.0
	Off-road	2,395,412,725	342,547	10.4
	< 50 miles	42,121,570,361	3,847,516	10.9
	50 - 200 miles	14,559,163,559	734,322	9.8
	> 200 miles	5,085,254,224	140,512	6.3
6 - 19	Unknown	4,960,036	244	5.1
	Off-road	1,105,603,092	146,813	8.8
	< 50 miles	22,235,311,188	1,583,323	9.2
	50 - 200 miles	10,522,588,376	411,949	7.6
	> 200 miles	5,006,973,648	94,544	5.7
> 19	Unknown	407,083,195	32,587	9.5
	Off-road	854,632,190	91,689	7.5
	< 50 miles	19,103,632,346	1,159,614	7.9
	50 - 200 miles	15,736,396,895	443,751	6.4
	> 200 miles	20,653,817,252	245,264	5.5
<b>Total</b>		<b>242,310,775,479</b>	<b>15,023,883</b>	<b>8.8</b>

Notes: (1) The fleet size is defined in Chapter 3; (2) VMT = vehicle miles traveled.

**Table 19. Percentages of Fleets that Purchased Fuel in Bulk in 1991: Runzheimer.**

Fuel Types	Business	Utility	Government
Gasoline	30	80	89
Diesel	18	78	76
Methanol	<0.5	0	2
CNG	0	9	6
No Bulk Purchase	69	20	11

Note: Total exceeds 100% because of multiple responses.

For the five business fleet categories surveyed in the AGA/NGV study, the percentages of fleets that operate on-site fueling facilities were: transit bus - 97%; school bus - 93%; taxi/limo - 36%; service/heavy delivery - 65%; and repair service - 44% (Table 20). Approximately 74 to 95% of the fuel consumed by these fleet vehicles was taken from the company's own fueling facilities.

The VFS-SCAB study suggested that large fleets usually use centralized fueling stations, and that public fleets are more likely than private ones to have such facilities. The ORNL/DOE study indicated that most of the small business fleets are not centrally fueled, while over 79% of the vehicles operated by the three largest business fleets are centrally fueled. The ORNL/DOE study also indicated that over 80% of the vehicles operated by utility fleets and over 75% of the vehicles operated by government fleets were centrally fueled.

### **6.3 ALTERNATIVE FUEL VEHICLES**

The main alternative fuels, which are considered potential near-term supplements to gasoline, include ethanol, methanol, propane, compressed natural gas (CNG), synthetic fuels, and electricity.

Certain uses of fleets have identifiable characteristics which electric and other alternative vehicle specifications can satisfy. The most promising candidate vehicles for alternative fuels are those that are primarily refueled at a central location, serve a regular route with predictable daily mileage, and have large cargo areas that can accommodate fuel storage tanks or batteries. Some alternative fuels are already in use (Tables 20 and 21). Limited statistics on the performance and operating characteristics of these alternative fuel vehicles are available. The information presented in the following is based mainly on Runzheimer's survey.

Table 21 shows that 24% of the utility fleet and 13% of the government fleet respondents are operating some kind of alternative fuel vehicles, while only 2% of the business fleet respondents indicated so. Of those fleet respondents that have alternative fuel vehicles, the average number of alternative fuel vehicles in the fleet is 51.4 in utility fleets and 33.8 in government fleets, and only 11.5 in business fleets.

Of those fleets with alternative fuel vehicles, the types of vehicles operating on alternative fuels are presented in Table 22. The majority of the alternative fuel vehicles are full-size pickups/vans and passenger cars. Of those fleets with alternative fuel vehicles, the types of alternative fuels used are shown in Table 23. Business fleets comprised mainly propane-powered vehicles, while utility and government fleets comprised both natural gas and propane-powered vehicles.

**Table 20. Fueling Practices of Five Business Fleet Types - Easton Consultants, Inc. [1991].  
(in percent)**

Fleet Type	Have On-Site Fueling Facilities	% of Fuel Taken from Company's Own Facilities	Have Alternative Fuel Vehicles <sup>1</sup>
Transit Bus	97	95	18
School Bus	93	93	8
Taxi/Limo	36	74	6
Service/Heavy Delivery	65	89	18
Food/Vending	60	92	20
Routine	69	79	38
Materials	77	86	11
Other Service	46	78	22
Beverage	68	94	23
Institutional Food	80	89	10
Other Food/Grocery	67	89	12
Other Heavy Delivery	72	88	12
Repair Service	44	82	9
Appliance	36	75	5
Plumbing/Water Heating/Pool	41	77	8
Outside/Landscape/Etc.	60	78	10
Construction Trades	46	86	12
Other Repair	51	87	6

<sup>1</sup> Most of the alternative fuel vehicles are powered with propane.

**Table 21. Alternative Fuel Vehicles by Business Type: Runzheimer.**

		Business	Utility	Government
Percentage of fleets with alternative fuel vehicles		2	24	13
Number of alternative fuel vehicles in fleet*	Average	11.5	51.4	33.8
	Median	11.5	51.5	16.0
Percentage of fleet composed of alternative fuel vehicles*	Average	18	17	11
	Median	18	2	2

Notes: \* Of those fleets that have alternative fuel vehicles.

**Table 22. Types of Vehicles Operating on Alternative Fuels by Business Sector: Runzheimer.**  
(in percent)

Vehicles Types	Business	Utility	Government
Passenger Cars	17	15	21
Minivans	17	5	0
Compact Pickups	0	15	21
Full-Size Pickups	33	15	26
Full-Size Vans	16	35	11
Heavy-Duty Trucks	0	10	5
Step Vans	0	0	11
Buses	0	0	0
Other	16	5	5
Total	100	100	100



**Table 23. Types of Alternative Fuels used by Business Sector**  
 (Data source: personal communication with Runzheimer International.)  
 (in percent)

Fuel Types	Business	Utility	Government
Natural Gas	25	60	61
Propane	75	30	50
Electric	25	20	0
Methanol	0	10	0
Ethanol	25	0	0
Other	0	0	0

Note: Totals exceed 100% because of multiple answers.

As to whether there are plans in the near future to change the number of alternative fuel vehicles operating in fleets, most business fleets are reluctant to increase or to try alternative fuel vehicles (Table 24). However, over 22% of the utility and government fleet respondents are planning on increasing or trying alternative fuel vehicles.

**Table 24. Plan to Change the Number of Alternative Fuel Vehicles, the Types of Alternative Fuel Vehicles in 1992: Runzheimer.**  
 (in percent)

Plan for 1992	Business	Utility	Government
<b>Fleets With Alternative Fuel Vehicles:</b>			
Increase	3	25	24
Decrease	1	6	2
Same	96	69	74
Total	100	100	100
<b>Fleets Without Alternative Fuel Vehicles:</b>			
Add	4	24	21
Won't Add	75	52	53
Undecided	21	24	26
Total	100	100	100

## 7.0 FUTURE DATA NEEDS

No comprehensive nationwide fleet vehicle survey is currently available in the U.S. This report summarizes information on fleet vehicle operating/fueling characteristics using over eleven existing data sources. Whenever possible, these characteristics are presented by business type and vehicle configuration. However, these data sources are incompatible in many cases, and data provided by these data sources are oftentimes sparse. Information summarized in this report focuses on (1) vehicle composition by size, make, business program, and weight, (2) vehicle operating characteristics, such as vehicle replacement cycle, fleet size, annual/daily vehicle miles of travel, the areas (e.g., rural, suburbs, urban) where fleet vehicles are operated, and the number and types of garage locations, (3) fueling practices, including fuel economy, the types of fuel used, and whether the vehicles are centrally fueled.

The areas where data are particularly lacking include vehicle weight (or payload), the areas where fleet vehicles are operated (e.g., rural, suburbs, urban), and the number and types of garage locations. Although average daily driving range can be estimated from annual vehicle miles of travel, the detailed *distribution of daily vehicle trips* by driving range is not available. To help assess the potential fleet market of alternative fuel vehicles, "trip-based" data are particularly useful since they can address the issues on "where", "how", and "why" the trips are made, and "who" makes them. It is recommended that more "trip-based" data on fleet vehicles be collected in the future.

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## APPENDIX A

### ORNL/DOE STUDY

The ORNL/DOE study data were collected via a discussion guide. Both phone and mailout contacts were used. A selected number of fleet operators was contacted during October-December, 1991. The Environmental Protection Agency at Michigan, GE Capital Fleet Services, and PHH Corporation have participated in gathering the information from these fleet operators. The main purpose of this information collection effort was to provide supplementary information on vehicle miles of travel, fleet vehicles' garage locations (central business district, suburban, small city, or rural area), and fueling practices. The data were collected from three major fleet sectors: business, utility, and government, and by four vehicle types. Vehicle types included were: cars, light trucks/vans (GVWR < 8,500 lbs), medium trucks (GVWR = 8,500-26,000 lbs), and heavy trucks (GVWR > 26,000 lbs). The focus was on fleets with 10 or more vehicles. A total of 33 fleet operators provided information: 21 business (2 overnight delivery service and 19 service/retail) fleets, 5 utility fleets, and 7 government (4 State and 3 municipal) fleets. These fleets operate over 162,213 vehicles: 43,258 cars, 38,972 light trucks (vans), 65,800 medium trucks, and 14,783 heavy trucks. The general profile of these fleet participants are presented in Table A-1. Given the data, which may be incomplete in some cases, the major findings on vehicle composition, operating characteristics, and fueling practices of these fleet participants are presented in this appendix whenever applicable. Since these fleet operators were not selected statistically, the results from this effort should not be used to make inferences of the entire fleet vehicle population.

#### A.1 VEHICLE COMPOSITION

##### Fleet Size

The average fleet sizes for the three business types are: 6,626 vehicles per business fleet, 1,259 vehicles per utility fleet, and more than 2,395 vehicles per government fleet. These fleet sizes are considerably larger than the national averages reported by Runzheimer (see Section 5.2). Business fleets included in the ORNL/DOE data are dominated by three large fleet operators - 2 overnight delivery service fleets and 1 service/retail fleet. These fleets operate more than 110,000 vehicles, which represent about 80% of the total business fleet vehicles.

Table A-1. General profile of the fleet participants: ORNL/DOE Study.

Fleet Type	Company Name	Business Type	Location	Fleet Size			Business Car Program			
				Cars	Light Trucks and Vans	Medium Trucks	Heavy Trucks	Owned	Leased	Employee Provided
1.		Service/Retail		10,925	460	58	57	0%	100%	YES
2.		Pharmaceutical		6,400	75	0	0	0%	100%	NO
3.		Service		3,265	114	6	0	3%	99.7%	NO
4.		Service/Retail		400	98	2	0	0%	100%	DK
5.		Retail		3,300	0	0	0	100%	0%	YES
6.		Delivery		0	6,111	57,193	9,146	100%	0%	NO
7.		Delivery		50	17,958	5,452	2,596	57%	43%	NO
8.		Service		650	468	120	12	20%	80%	NO
9.		Retail		270	1,230	0	0	0%	100%	NO
10.		Service		0	328	0	0	0%	100%	YES
11.		Service		63	12	1	0	100%	0%	YES
12.		Retail		1,764	36	0	0	0%	100%	YES

Table A-1. (Continued)

Fleet Type	Company Name	Business Type	Location	Fleet Size				Business Car Program		
				Cars	Light Trucks and Vans	Medium Trucks	Heavy Trucks	Owned	Leased	Employee Provided
13.		Retail		62	0	0	0	0%	100%	NO
14.		Service		602	1,829	871	592	40%	60%	NO
15.		Service		2,000	95	5	0	2%	98%	YES
16.		Retail		65	2	0	0	0%	100%	YES
17.		Service		60	0	0	0	0%	100%	YES
18.		Retail		566	74	10	0	0%	100%	YES
19.		Service		600	50	0	0	5%	95%	NO
20.		Service		1,750	0	0	0	0%	100%	YES
21.		Service		900	400	0	0	0%	100%	NO
Total				33,692	29,340	63,718	12,403			
<u>Utility</u>										
1.		Gas		38	33	2	2	100%	0%	YES
2.		Electric/ Gas/Water		25	260	140	0	100%	0%	YES

Table A-1. (Continued)

Fleet Type	Company Name	Business Type	Location	Fleet Size				Business Car Program		Employee Provided
				Cars	Light Trucks and Vans	Medium Trucks	Heavy Trucks	Owned	Leased	
3.		Electric/ Gas/Water		15	49	21	0	100%	0%	NO
4.		Electric/ Gas		800	640	387	473	90%	10%	YES
5.		Electric		548	1,473	391	997	0%	100%	YES
Total				1,426	2,455	941	1,472			
<u>Government</u>										
1.	Denver	City	Denver CO	254	200	DK	DK	100%	0%	YES
2.	Knoville	City	Knoville TN	450	120	130	10	40%	60%	NO
3.	Colorado	State	Denver CO	1,058	1,117	23	0	100%	0%	YES
4.	Connecticut	State	Hartford CT	3,100	420	280	0	100%	0%	YES
5.	Sacramento	City	Sacramento CA	440	450	279	200	100%	0%	YES
6.	Tennessee DOT	State	Nashville TN	288	1,020	429	98	100%	0%	YES
7.	New York	State	Albany NY	2,550	3,850	DK	DK	100%	0%	YES
Total				8,146	7,177	1,141	308			

Notes: DK = Don't Know; Total = Known Total.



## Vehicle Size and Weight

**Table A-2. Vehicle Composition by Vehicle Type: ORNL/DOE study.  
(in percent)**

Fleet Type	Cars	Light Trucks & Vans	Medium Trucks	Heavy Trucks	Total
Business	24.2	21.1	45.8	8.9	100
Utility	22.6	39.0	15.0	23.4	100
Government	48.5	42.8	6.8	1.8	100

### Business Car Program

Most of business fleet participants leased vehicles, while government and utility fleets owned most of their vehicles. Twenty percent of business fleets, 78% of utility fleets, and 91% of government fleets, owned (as opposed to leased) their vehicles. About 50% of business fleets, 80% of utility fleets, and 86% of government fleets allow operating expenses (including mileage reimbursement) for employees to operate their own vehicles for business purposes. Most fleets indicated, however, that companies have no control over employee-owned vehicles in terms of their fueling practices.

## A.2 OPERATING CHARACTERISTICS

### Replacement Plans

See Table 12 in Chapter 5.

### Annual and Daily Driving Range

See Table 16 in Chapter 5.

### Operational Areas (Urban vs. Rural)

See Table 17 in Chapter 5.

### Number and Types of Garage Locations

Some fleet operators have difficulties answering these questions, especially those businesses that have branch or division offices across a State or the U.S. For those fleets that centrally garage their vehicles, the ORNL/DOE study indicated that the number of vehicles per garage location is about 32 vehicles for large business fleets, 29 vehicles for utility fleets, and 35 vehicles for government fleets. Large business fleets investigated in the ORNL/DOE study said that 42% of their garages are located at central business district/major metro areas (CBDs), 24% at suburbs, 21% at rural areas, and 13% at small cities. The corresponding breakdowns for a limited number of government fleets are 51.2% at CBDs, 21.8% at suburbs, 22.8% at rural areas, and 4.2% at small cities.

### A.3 FUELING PRACTICES

#### Truck Fuels

Table A-3. The Breakouts of Fleet Trucks/Vans by Fuel Type: ORNL/DOE study. (in percent)

Fuel Type	Business Fleet	Utility Fleet	Government Fleet
Gasoline	82.4	50.6	79.4
Diesel	17.6	42.9	20.4
CNG/LPG	~0	6.5	0.2
All Fuels	100	100	100

Notes: CNG = Compressed Natural Gas; LPG = Liquefied Petroleum Gas.

#### Central Fueling

The data indicated that most of the small business fleets are not centrally fueled, while over 79% of the vehicles operated by the three largest business fleets are centrally fueled. The data also indicated that over 80% of the vehicles operated by utility fleets and over 75% of government fleets are centrally fueled.

### A.4 LESSONS LEARNED

Some lessons have been learned from the ORNL/DOE study:

1. There is a need to have a separate vehicle category for vans, station wagons, and jeep-like vehicles when requesting for vehicle information. Without this vehicle category, some fleet operators would include these vehicles in passenger car category, while others would include them in light truck category.
2. When requesting information from government fleet operators, it is essential to be clear on which government agencies within a governmental unit should be included. Some government

fleet operators report only those vehicles operated by transportation departments; some include those operated by their associated agencies, such as fire department, police department, schools, universities, public utilities (gas/water/electricity), and even National Guard/coast guard, while others do not.

3. There is a need for a clearer definition of "number of garage locations." Some fleet operators had trouble answering how many locations garaged their vehicles over night. Some only reported locations where there were multiple vehicles; while some included locations where one vehicle was at a spot (field offices, private homes, and even motels while on road). In order to get consistent information, perhaps a garage location should be defined as "a central location, which is managed by the company, where 10 or more vehicles are typically parked when these vehicles are not being used."

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