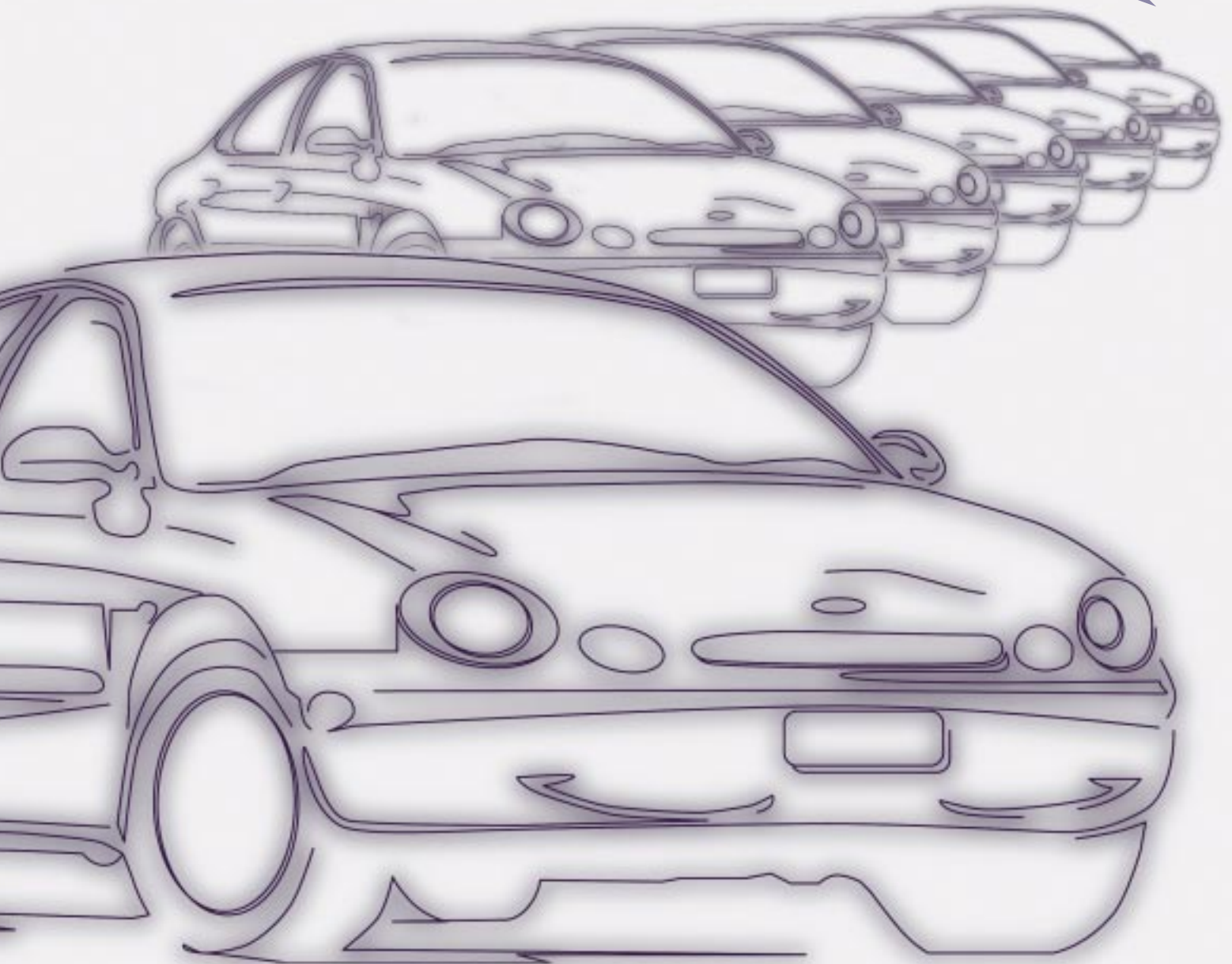


# Perspectives on AFVs:

## 1996 Federal Fleet Manager Survey



Produced for the U.S. Department of Energy (DOE)  
by the National Renewable Energy Laboratory (NREL),  
a U.S. DOE national laboratory



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# Introduction

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In an effort to reduce national dependence on imported oil and to improve urban air quality, the U.S. Department of Energy (DOE) is promoting the development and deployment of alternative fuels and alternative fuel vehicles (AFVs). To support this activity, DOE has directed the National Renewable Energy Laboratory (NREL) to develop and conduct projects to evaluate the performance and acceptability of light-duty AFVs compared to similar gasoline vehicles. As part of this effort, NREL has undertaken a number of evaluation projects, including conducting telephone surveys with fleet managers and drivers of AFVs in the federal fleet.

These surveys were initiated, in part, to replace a large self-response AFV data collection effort that NREL conducted with the federal fleet from 1991 through 1995. In the previous project (Whalen et al. 1996) drivers of AFVs and similar gasoline vehicles were asked to provide fueling, mileage, and driveability information on their vehicles for extended periods of time. The surveys were developed to collect similar information from both drivers and fleet managers with higher quality and increased efficiency at a lower cost. This report summarizes the results from the survey of fleet managers.

## The U.S. Federal Fleet

The U.S. federal fleet was selected for study because it contains a relatively large number of AFVs. The federal fleet contains more than 550,000 light-duty vehicles (LDVs), including more than 19,000 AFVs (Energy Information Administration [EIA] 1996). The LDV classification includes sedans, pickup trucks, and some passenger/cargo vans, and is generally

applied to a vehicle with a gross vehicle weight up to 8500 lb. Government-owned LDVs, including AFVs, are operated by almost all federal agencies. These vehicles are located throughout the country and are used in various types of service.

The primary types of AFVs in the federal fleet can be grouped by the alternative fuel used: ethanol (E85), methanol (M85) and compressed natural gas (CNG). The ethanol and methanol vehicles are flexible-fuel models from the original equipment manufacturers (OEM). Flexible-fuel means that they can operate on any combination of the respective alternative fuel and gasoline, up to a blend of 85% alternative fuel and 15% gasoline. CNG vehicles can be any of three different types—dedicated OEM models, which run only on CNG; aftermarket conversions, which can be dedicated or bi-fuel; and qualified vehicle modifier (QVM) models, which are generally bi-fuel. The bi-fuel vehicles can run on either CNG or gasoline, but not both at the same time. The QVMs are difficult to clearly place in the OEM or aftermarket conversion category (for more information see the sidebar on page 2).

Most of the federal AFVs are in the fleets of the General Services Administration (GSA; these are leased to other agencies), the U.S. Department of Defense, and the U.S. Postal Service. GSA has almost exclusively purchased AFVs from the OEMs; other agencies have also included aftermarket conversions in their AFV fleets.

## Other AFV Surveys

Other AFV-related surveys have been conducted in recent years, each with differing

objectives and approaches. DOE's EIA has conducted several surveys to collect information on AFVs and alternative fuel use (EIA 1995). The EIA surveys focused on estimating the numbers and types of AFVs in use, the consumption of alternative fuel, and the number and types of AFVs available. EIA relied heavily on secondary sources for much of its data, including government agencies (federal, state, and local), and energy suppliers.

Runzheimer International, a management consulting firm specializing in travel and living costs, has also conducted surveys to collect information on AFVs. Runzheimer's publication (*AFV Strategist* 1996) summarizes a series of national surveys with fleets. The publication

compiles information about, knowledge of, attitudes toward, expectations of, and experience with AFVs. It also contains baseline data on the size, distribution, vehicle types, mileage driven, and refueling patterns of fleets. Because the Runzheimer survey does not specifically focus on fleets that operate AFVs, information on actual AFV experience is limited.

The current survey, then, differs from previous surveys in that it was designed to collect information from fleet managers about in-service vehicles in fleets that are actually operating AFVs. It also sought some comparative information from fleet managers about similar gasoline vehicles in their fleets.

### Principal Types of AFVs

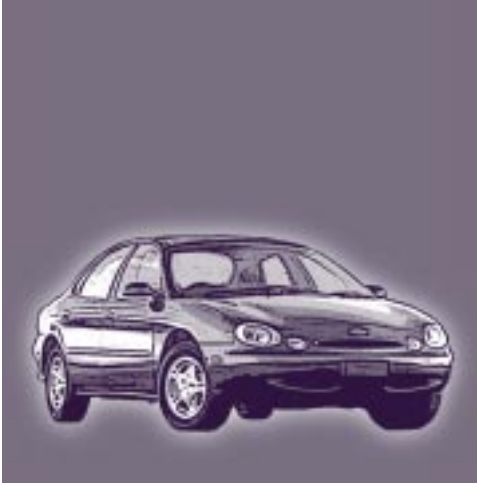
Three principal types of AFVs are available: original equipment manufacturer (OEM) vehicles, qualified vehicle modifier (QVM) vehicles, and aftermarket conversions (CON).

The OEM vehicles are designed and built by the OEMs (such as Chrysler, Ford, or General Motors). OEM AFVs are designed with the engine, suspension, and chassis upgrades to result in optimum performance and durability when operating on alternative fuels. These vehicles have single comprehensive warranties that cover all components, including those that are specific to alternative fuels. Current OEMs are either dedicated (CNG vehicles) or flexible-fuel (alcohol vehicles).

The QVM vehicles are similar to the OEMs except the manufacturer has joined with a "qualified" conversion company to complete the final assembly that enables the vehicle to operate on an alternative fuel. A qualified conversion company must meet a variety of stringent standards set forth by the OEM, including strict parts quality requirements. QVMs generally have the same upgrades to the engine and chassis as the OEMs, meet the same safety and emissions standards, and offer a single comprehensive warranty. The QVMs, which are currently available in CNG and liquefied petroleum gas (LPG) models, may be dedicated or bi-fuel, depending on owner preference.

Aftermarket conversions are conversions of gasoline vehicles by an independent company after the vehicle has been purchased. The converted vehicles do not have the engine and chassis upgrades offered in the OEM and QVM vehicles. The conversion company generally provides a separate warranty from the OEM, and the OEM warranty will not cover problems or damages resulting from installation or operation of the vehicle on the alternative fuel. Available aftermarket conversions enable operation on CNG or LPG, and may be bi-fuel or dedicated, depending on owner preference. CNG-fueled vehicles are identified as CNG-OEM, CNG-QVM, or CNG-CON, where appropriate throughout this report.

Electric vehicles (EVs) were not considered for purposes of this report because none were deployed in the federal fleet at the time the study was undertaken.



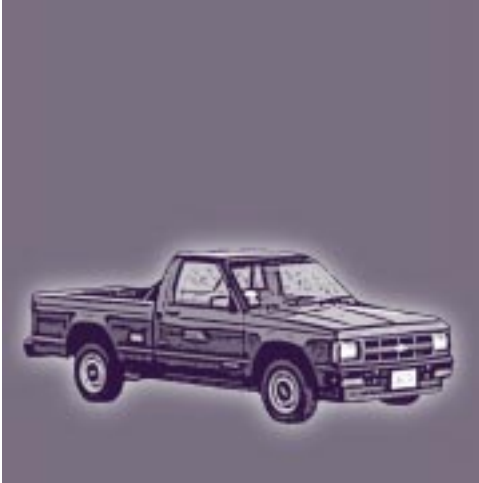
# Survey Development, Implementation, and Data Analysis

With assistance from GSA and other sources, the most complete list possible of appropriate fleet managers was constructed. In addition to the information from GSA, contacts were included from sites involved in a previous aftermarket conversion project sponsored by DOE/NREL (Motta et al. 1996), and from a number of military installations known to operate AFVs. Although fleet managers were randomly selected from the contact list, an effort was made to choose participants from areas of the country where alternative fuels were known to be available.

NREL personnel developed the survey questionnaire, which included questions about AFV acceptability, fuel use, and subjective vehicle performance. Surveys were conducted in January, April, July, and October of 1996 (numbered as Quarter 1, 2, 3, and 4, respectively, throughout the remainder of this report). The four survey periods were selected to capture potential seasonal differences. A single individual conducted all the surveys, using conventional telephone interview techniques. Additional details on the survey development and implementation are provided in Appendix A.

The general approach to the analysis of the survey data involved use of cross-tabulations and contingency tables. Descriptive statistics (such as means, percentages, and standard deviations) were also compiled. Formal tests of statistical significance were performed to assess differences between categories and groups, where appropriate.

The survey data was subdivided into appropriate groupings for analysis. The primary groupings involved subdivision by survey period, and subdivision by primary AFV type operated by each fleet. Although no target numbers were established in advance, a fairly equal number of fleet managers with E85 and M85 vehicles as their primary AFVs, and a somewhat larger number of fleet managers who identified CNG models as the primary AFVs were surveyed. Because little data was collected on the CNG-QVMs, with only two (out of 275) fleet managers identifying CNG-QVMs as their primary AFV type, those responses were eliminated from the detailed survey analysis.



# Respondent and Fleet Characteristics

Two hundred seventy-five fleet managers were surveyed in 1996: 50 in Quarter 1, and 75 in each of the subsequent survey quarters, including two surveys with CNG-QVMs as their primary AFV type. Fleet managers in 26

One hundred and six fleet managers (39.3%) identified CNG models as the primary AFV type in their fleets, with the remainder of fleet managers' responses split about equally between E85 (83 or 30.4%) and M85 (84 or 30.8%) models. Among respondents with CNG models as their primary AFV type, fleets with OEMs predominated.

The fleets represented by the 273 survey respondents contained a total of 45,838 vehicles (all types combined). More vehicles (24,127 or 52.6%) were represented by the 50 fleet managers responding in Quarter 1 than in the last three quarters combined, indicating that Quarter 1 respondents represented the largest fleets. The sampling and frame-construction procedures employed appear to have resulted in larger fleets being identified earlier in the survey process.

Of particular interest are the numbers of AFVs contained in the fleets of the survey respondents. The responding fleet managers reported having a total of 3,956 AFVs (8.6% of all vehicles) in their fleets.

The five vehicle models most frequently reported by the fleet managers to be their primary AFVs were the Dodge Spirit, Ford Taurus, Dodge Caravan, Dodge Ram Van, and Chevrolet Lumina. Two hundred forty-one of the 273 fleet managers (88.3%) named one of these five vehicles as their primary AFV.

In evaluating the distribution of fleet sizes (see Figure 3), a majority (156 or 57.1%) of the fleets represented by the survey contain ten or fewer vehicles (all types combined). Fleets containing ten or fewer vehicles were predominant in each survey quarter and for each of the primary AFV type categories (E85, M85, and CNG). When evaluating the distribution of numbers of AFVs in the fleets,

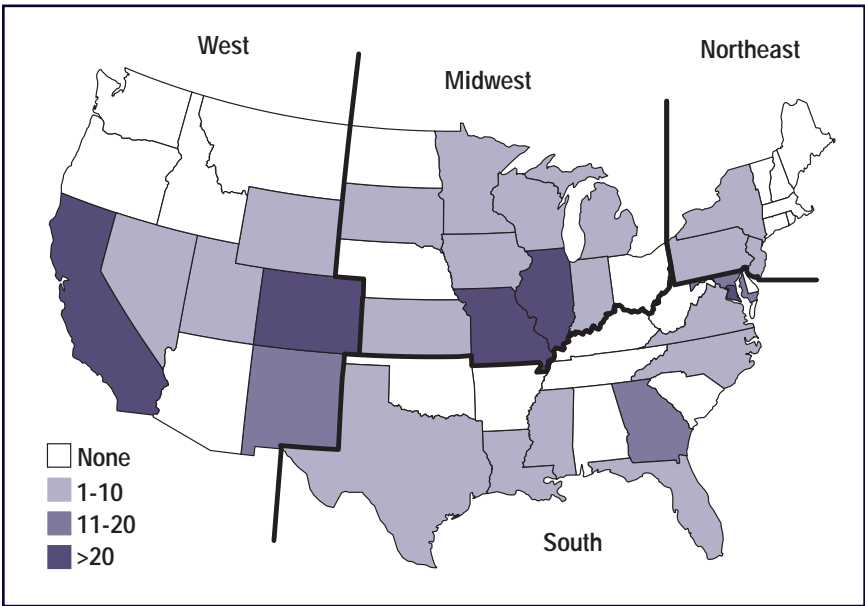
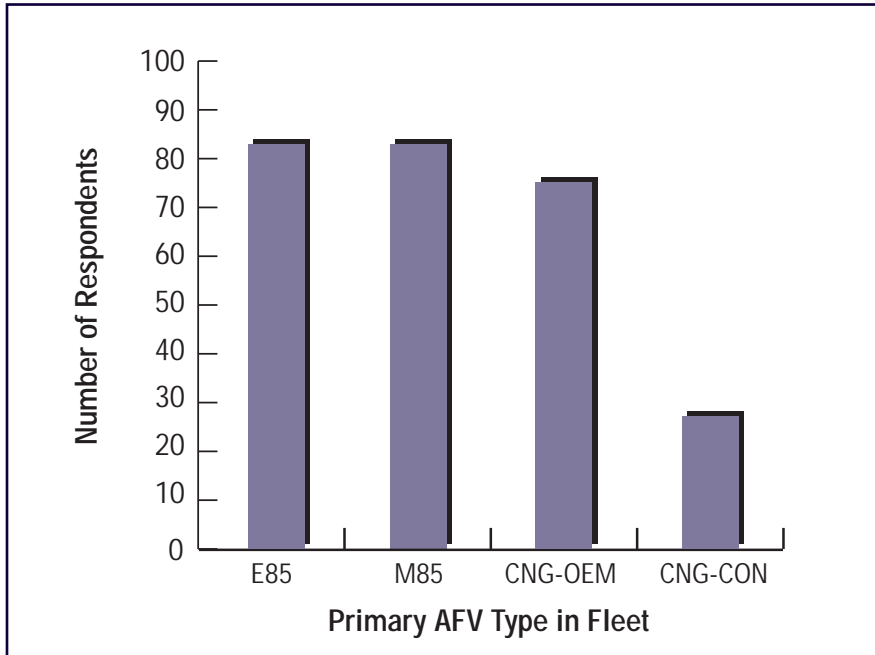


Figure 1. Number of respondents by state. Census regions are identified. No respondents were from Alaska or Hawaii.

different states and the District of Columbia were surveyed. Figure 1 shows the states covered and the numbers of respondents per state. All census regions of the country were represented in the survey. (Additional maps indicating the survey distribution by quarter and by primary AFV type are provided in Appendix B).

During the interview process, fleet managers were asked to identify the primary type of AFV in their fleet. Figure 2 shows the number of respondents whose primary AFV was an E85, M85, or CNG model. The responses about CNG models were further divided into OEMs, CONs, and QVMs as described above. Responses from two fleet managers who operated CNG-QVMs as their primary AFVs were eliminated from this analysis.



similar results were found. Most fleet managers (228 out of 273, or 83.5%) reported having 10 or fewer AFVs in their fleet, as shown in Figure 4. (Additional total and AFV fleet size distribution data are included in Appendix C.)

The fleet sizes represented by the respondents varied widely from thousands of vehicles to only one or two vehicles. The overall median fleet size was determined to be seven vehicles. The median, or 50th percentile, is an average value that is not sensitive to wide numerical fluctuations. Figure 5 shows the median fleet sizes for total fleets and total AFVs, grouped by primary AFV types. This figure indicates

Figure 2. Number of respondents according to the primary type of AFV in their fleets

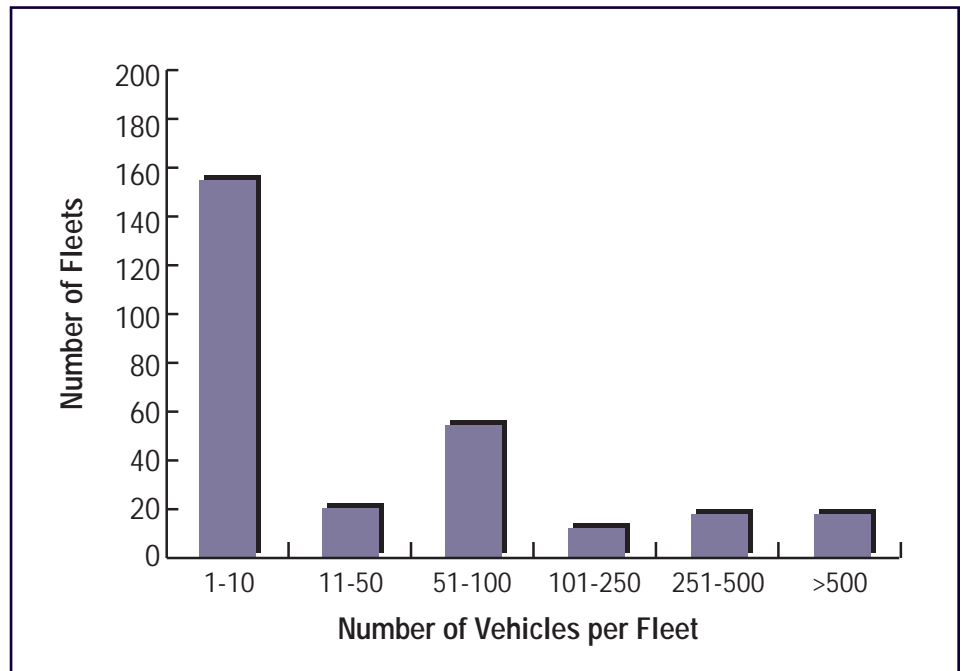


Figure 3. Fleet size distribution (all vehicles)

## Perspectives on AFVs

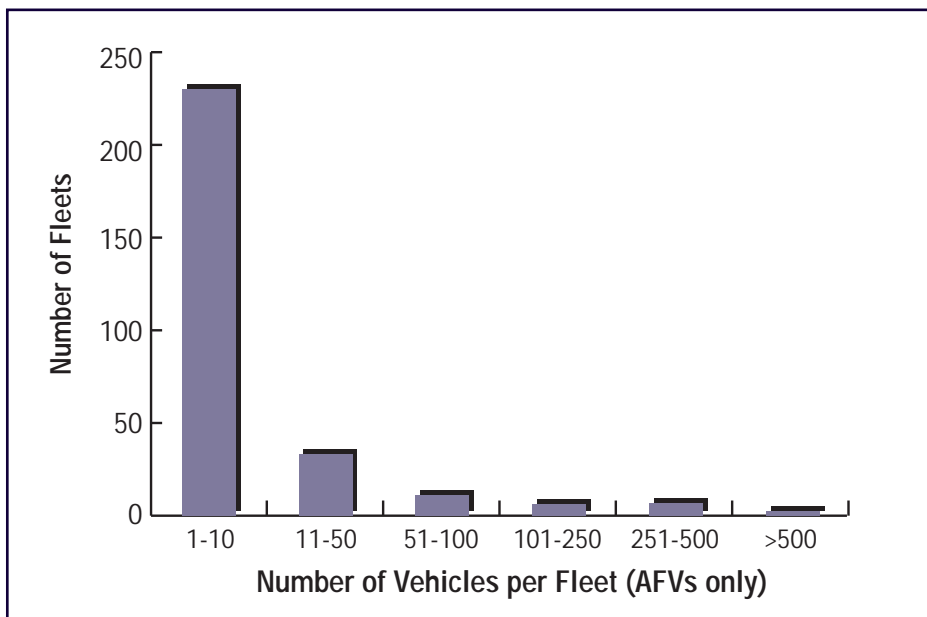


Figure 4. Fleet size distribution (AFVs only)

that fleets with CNG vehicles as their primary AFV type tend to be larger than fleets with E85 or M85 vehicles as their primary AFV type. It also indicates that the median numbers of AFVs are rather small (two vehicles for E85, two vehicles for M85, and one vehicle for CNG-OEM). Fleets with CNG-CON as their primary AFV type were the exception, with a median of 29 AFVs per fleet.

Although most fleets contain only one type of AFV, some contain more. Of the 273 fleets, 57 (20.8%) reported operating more than one AFV type, meaning their fleets contain AFVs that operate on one or more other alternative fuels.

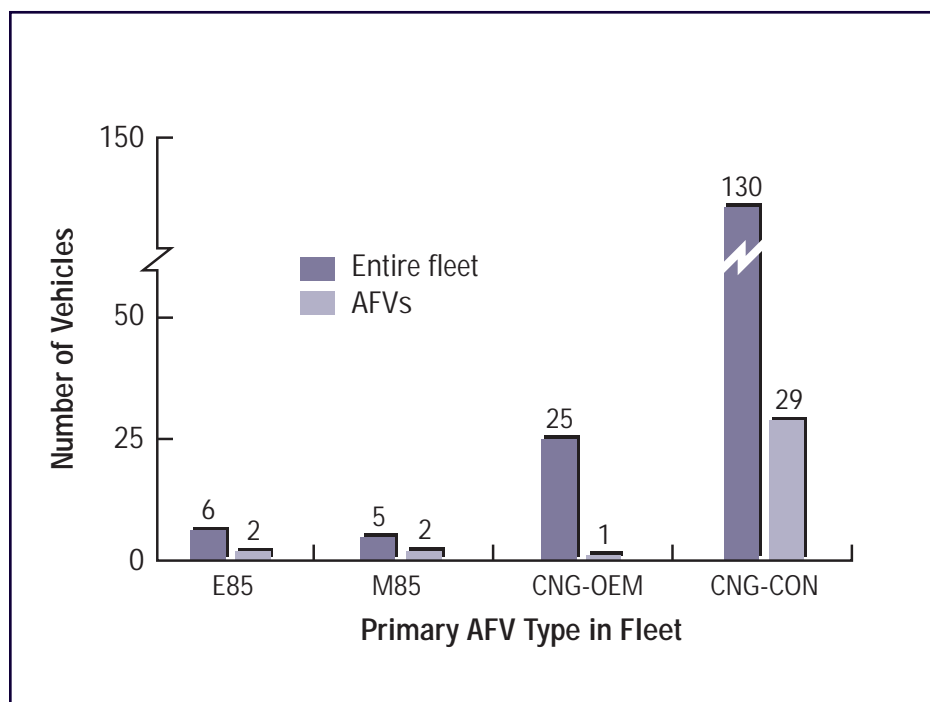


Figure 5. Median sizes of all fleets, by primary type of AFV in those fleets





# Results: Vehicle Use, Performance, and Acceptability

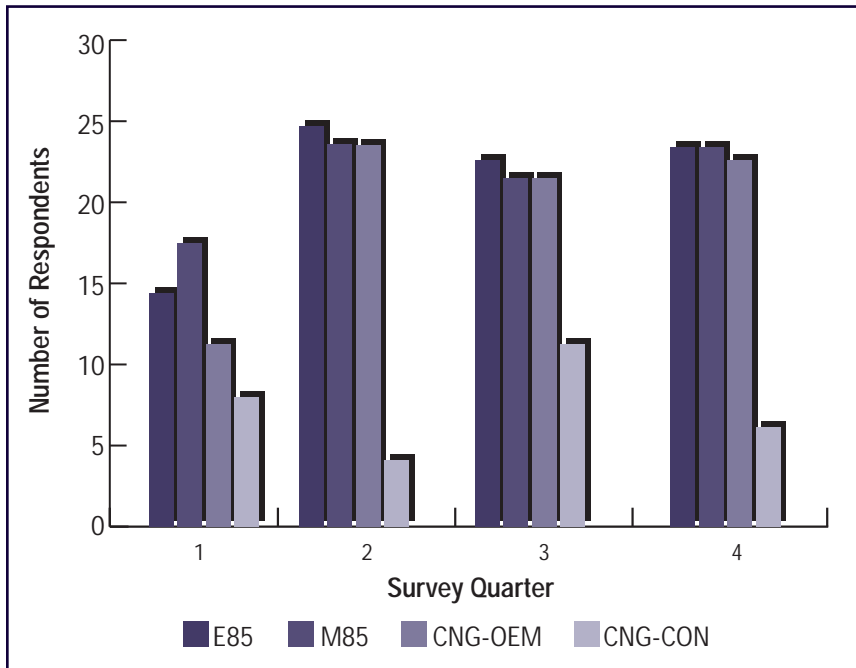


Figure 6. Number of respondents, by quarter and by the primary type of AFVs in their fleets

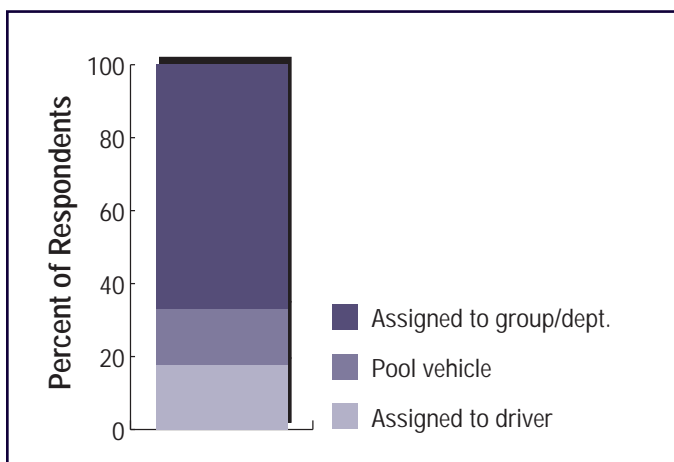


Figure 7. Responses to "How are fleet vehicles assigned?"

## Seasonality

The survey results, analyzed and compared by survey period, generally showed no strong seasonal differences. For example, Figure 6 presents a quarterly breakdown of fleet managers reporting each of the five vehicle types as their primary AFV. The difference between Quarter 1 and the last three quarters reflects a change in sample rates, rather than a seasonal difference. Responses where there might be a seasonal effect are identified in the appropriate sections below.

## Vehicle Assignment

Most survey participants (67%) reported that their fleet vehicles are assigned to a specific group or department, as shown in Figure 7. Only 17.6% of the fleet managers indicated that the vehicles they manage are assigned to individual drivers. This implies that most of the vehicles represented in the survey have multiple drivers, which may affect the types and amount of feedback the fleet managers receive about them.

## Driver Acceptability

Fleet managers were asked whether drivers of their fleet vehicles specifically want AFVs. The responses are summarized in Figure 8. More than 65% of fleet managers whose primary AFV types are CNG-CON, E85, and M85 vehicles said their drivers are neutral about AFVs. By contrast, 44% of respondents whose primary AFV type is CNG-OEM indicated their drivers do not want to drive

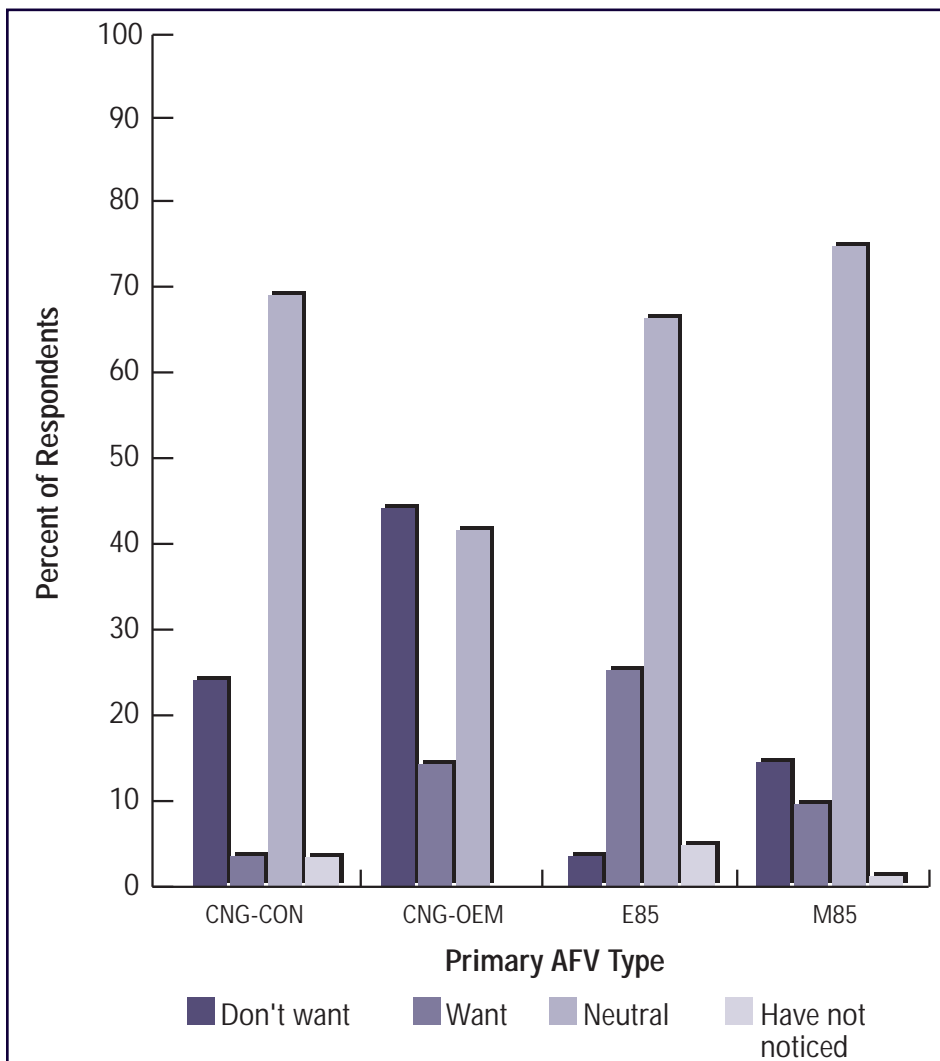


Figure 8. Responses to “How acceptable are AFVs to your drivers?”

AFVs. It is worth noting that many fleet managers also indicated that, drivers generally do not have a choice of what vehicle they are assigned.

The highest percentage of fleet managers indicating that drivers want AFVs (25.3%), as well as the lowest percentage reporting that drivers do not want to drive AFVs (~4%), occurred for respondents with E85 vehicles as their primary AFV type. The most common reasons for drivers *not* wanting AFVs included lack of range (mostly fleets whose primary AFV type was CNG), lack of convenient fueling stations, and lack of available alternative fuel (mostly fleets whose primary AFV type was E85 or M85).

### Alternative Fuel Availability

Fleet managers were questioned about their AFV fueling practices. One hundred and sixteen of the respondents (42.5% ±5.4%) reported that there was not an alternative fuel station reasonably close by. Fleet manager responses by primary AFV type are summarized in Figure 9. In this figure, responses from participants operating primarily CNG-CON and CNG-OEM vehicles are grouped together as CNG because there was no significant difference between their responses. It appears that fleet managers operating M85 vehicles as their primary AFVs have the least access to alternative fuel; about 65% indicated that there is no alternative fuel station nearby. On the other hand, alternative fuel stations were reported to be reasonably close to 75% of respondents operating CNG vehicles as their primary AFVs, and 58% of respondents operating E85 vehicles as their primary AFVs.

### Fueling Practices

Fleet managers were asked whether the AFVs are usually fueled with alternative fuel or gasoline, and Figure 10 summarizes the responses. These results include only responses from fleet managers operating bi-fuel and flexible-fuel vehicles. Of the respondents, 78.6% whose primary AFV type is CNG-CONs, 57.8% whose primary AFV type is E85, and 31.3% whose primary AFV type is M85 indicated that their AFVs are usually fueled with alternative fuel. This difference in percentages is statistically significant at the 99% confidence level ( $\chi^2 = 22.74, 2 \text{ d.f.}$ ). It is interesting to note that the percentages of fleet managers who say their AFVs usually fuel with alternative fuel are nearly identical (by AFV type) to the

percentages of fleet managers indicating alternative fuel is available nearby. Figure 11 provides a geographic distribution of the percentages of respondents that usually fuel their AFVs with alternative fuel.

### Vehicle Performance

Fleet managers were asked if drivers tended to report more vehicle performance complaints about AFVs or about similar gasoline vehicles, and Figure 12 summarizes the results. More than 71% ( $\pm 5\%$ ) of responding fleet managers say they received about the same number of complaints about their AFVs and gasoline vehicles, 20.6% ( $\pm 4.4\%$ ) indicated they receive more complaints about AFVs, and 7.7% ( $\pm 2.9\%$ ) reported receiving more complaints about their gasoline vehicles.

Table 1 presents the fleet managers' responses about driver complaints by primary AFV type. Fleet managers operating CNG-OEMs as their primary AFV received significantly more complaints about their AFVs (36% compared to 18% for CNG-CON, 14% for E85, and 13% for M85). The distribution of responses from participants whose primary AFV type is CNG-OEM is statistically different from the distribution of responses from participants operating other primary AFV types ( $\chi^2 = 34.33, 6 \text{ d.f.}, p < .0001$ ).

Fleet managers were asked whether they had received any of eight specific

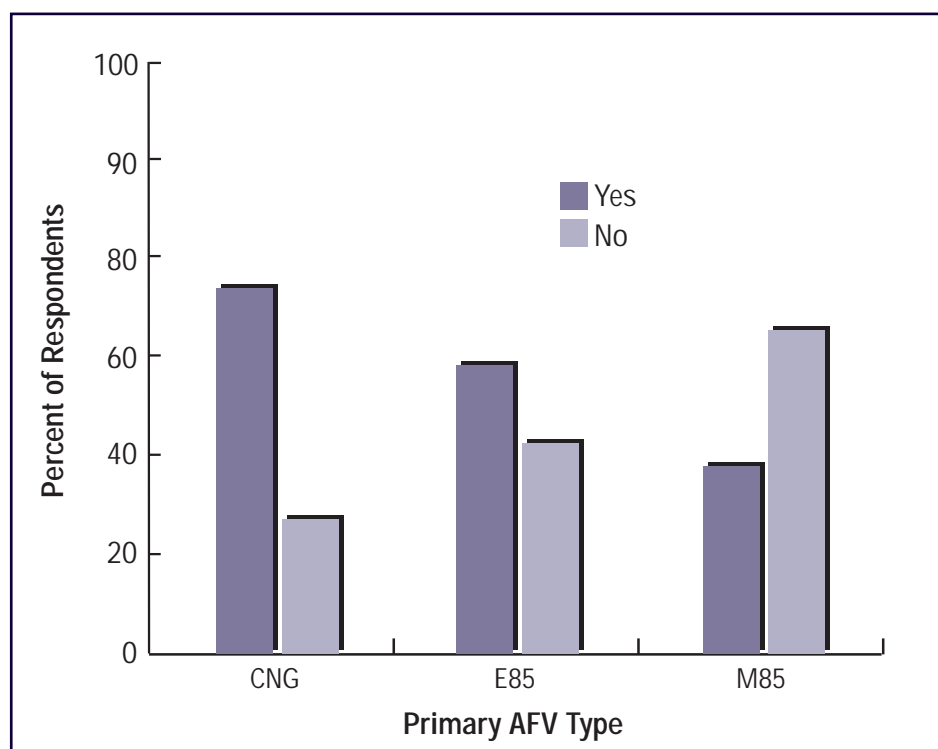
More Complaints from Drivers about AFVs about Gasoline equal Total	Primary AFV Type in the Fleet							
	CNG-CON		CNG-OEM		E85		M85	
	No.	%	No.	%	No.	%	No.	%
about AFVs	5	17.8	28	36.4	12	14.5	11	13.1
about Gasoline	1	3.6	13	16.9	3	3.6	4	4.8
equal	22	78.6	36	46.8	68	81.9	69	82.1
Total	28	100	77	100	83	100	84	100

performance-related complaints about their AFVs in the last month. The number of fleet managers reporting specific complaints is tabulated by survey quarter in Table 2. Only 14 out of 273 fleet managers (5.1%) reported receiving at least one of the performance-related complaints.

Table 2 also summarizes the total numbers of each specific complaint reported. If every fleet manager reported one complaint for each of the eight specific performance-related issues, 2184 responses would have been reported. However, a total of only 19 complaint responses were received (a rate of 0.9%). The individual numbers indicate more complaints

Table 1. Fleet Managers' Reports of Drivers' Complaints

Figure 9. Responses to "Is there an alternative fuel station nearby?"



## Perspectives on AFVs

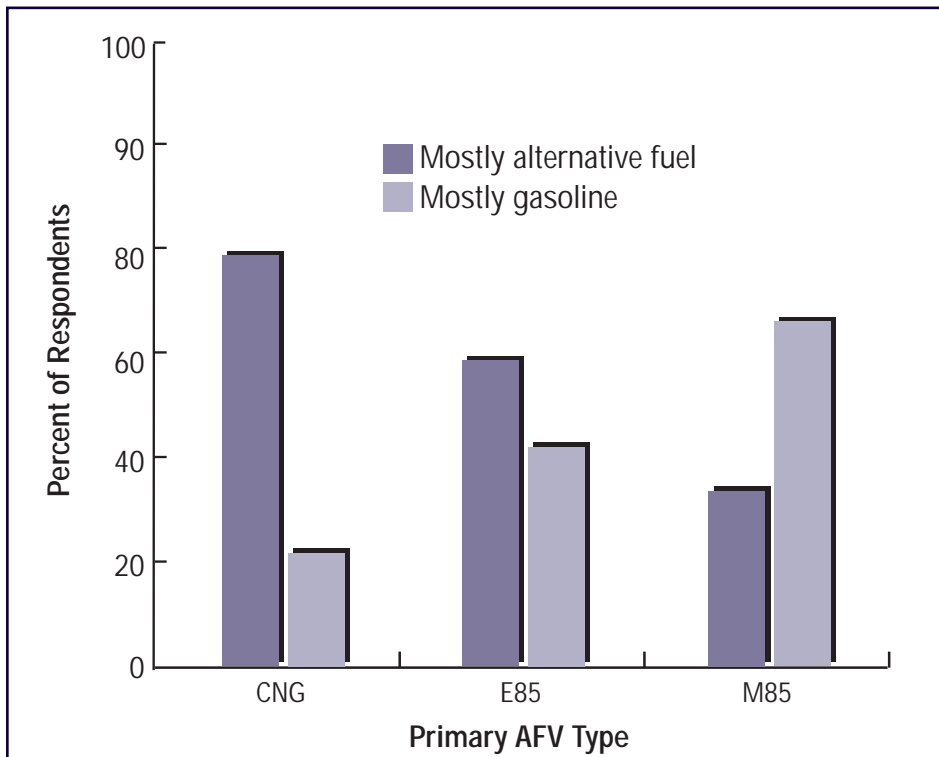


Figure 10. Responses to "What fuel are your AFVs usually operated on?"

were reported during Quarter 1, with 14.0% of fleet managers reporting at least one complaint (versus 2.7%, 5.4%, and 1.3% in each subsequent quarter, respectively). Nine of the 19 complaint

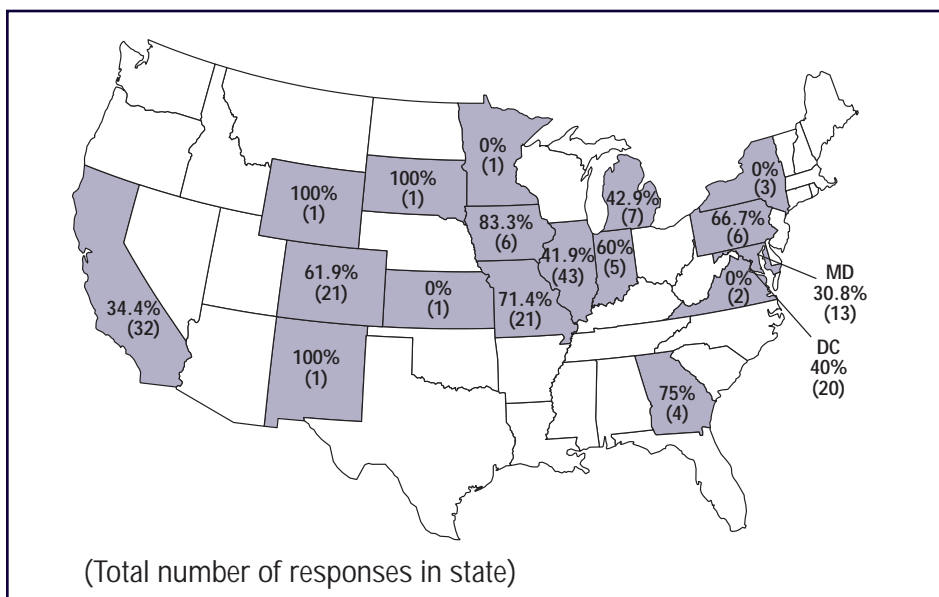


Figure 11. Percentage of respondents indicating that AFVs in their fleets usually fuel with alternative fuel (by state)\*

\*Only includes CNG-CON, E85 and M85 AFVs (bi-fuel and flex-fuel vehicles)

responses were reported by respondents surveyed during the first quarter. The most frequently reported complaint was of vehicles being hard to start, and five of seven "hard to start" reports were received from fleet managers interviewed in Quarter 1.

Overall, the number of responses concerning specific performance-related complaints for the AFVs was low, but the information presented above may suggest a possible seasonal variation. More reports of performance problems might have been anticipated for Quarter 1 because vehicle performance tends to diminish in colder weather. However, the suggestion of a seasonal difference in these results is not necessarily supported by analysis of fleet managers' responses to other survey questions.

Table 3 presents the performance-related complaint information grouped by primary AFV type. A higher percentage of fleet managers with CNG-CONs as their primary AFV type reported receiving at least one performance-related complaint than fleet managers operating other primary AFV types (13.7% operating CNG-CONs as primary AFVs, compared to 3.9%, 4.8%, and 3.6%, respectively, for those operating CNG-OEM, E85, and M85 vehicles as their primary AFV types).

Finally, the only complaint reported for all of the different primary AFV types was vehicles being hard to start. Fleet managers operating CNG-CONs as their primary AFV type reported the highest frequency of this complaint—three reports—followed by those operating E85 as their primary AFV with two reports, and one report each by fleet managers operating CNG-OEMs and M85 vehicles as their primary AFV.

About 21% of the interviewees reported that they receive more complaints about the AFVs in their fleets than about similar gasoline vehicles. However, when pressed to identify specific performance-related complaints, only about 5% responded with specific complaints. Several possible reasons may contribute to this situation. Possibly, the fleet managers may be biased against AFVs. It is also possible that the performance complaints received by the fleet managers are different from those about which they were questioned in this survey.

Overall, the results of this survey show that this group of federal fleet managers has received very few performance-related complaints about AFVs. In addition, the numbers of reported complaints are not significantly different from those received about similar gasoline vehicles.

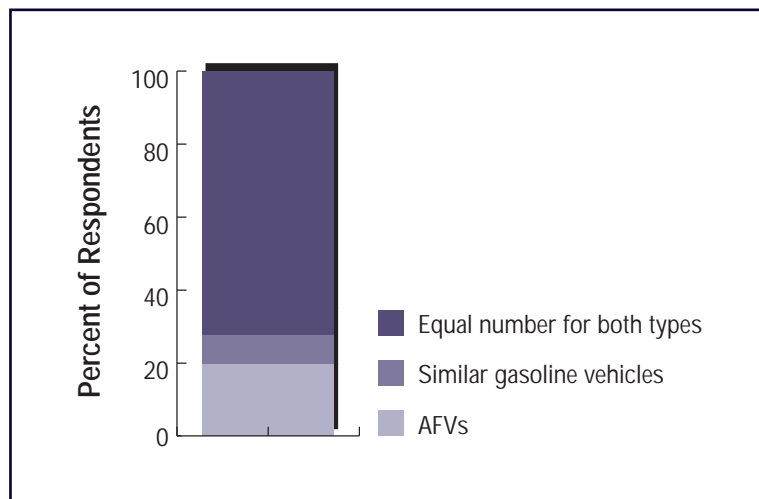


Figure 12. Responses to "Which vehicle type do you receive more complaints about?"

Performance-Related Problem	Survey Quarter								Total	
	1		2		3		4		No.	%
Hard to start	5	56	0	0	1	14.3	1	100	7	37
Stall after starting	0	0	0	0	1	14.3	0	0	1	5
Stall in traffic	1	11	0	0	1	14.3	0	0	2	11
Poor idle	0	0	0	0	1	14.3	0	0	1	5
Hesitation	0	0	0	0	1	14.3	0	0	1	5
Lack of power	1	11	0	0	2	28.5	0	0	3	16
Engine ping	0	0	1	50	0	0	0	0	1	5
Check engine light on	2	22	1	50	0	0	0	0	3	16
<b>Total</b>	<b>9</b>	<b>100</b>	<b>2</b>	<b>100</b>	<b>7</b>	<b>100</b>	<b>1</b>	<b>100</b>	<b>19</b>	<b>100</b>
Fleet managers receiving complaints*										
Number	7 of 50		2 of 74		4 of 74		1 of 75		14 of 273	
%	14.0		2.7		5.4		1.3		5.1	

Table 2. Reports of Specific Performance-Related Complaints about AFVs by Quarter

\*Several fleet managers reported multiple complaints about AFVs in their fleet, so numbers may not match above totals.

### Vehicle Maintenance

Fleet managers were also asked several questions about vehicle maintenance. Most (92% ±3%) indicated that different or additional scheduled maintenance was not required on their primary AFVs. Figure 13 shows the results by primary AFV type. Only 22 respondents reported differences in the frequency and types of scheduled maintenance for AFVs compared to similar gasoline vehicles. Twenty-one of the 22 reported having E85 or M85 models as their primary AFV type, and they most often cited the need for special oil and more frequent oil changes as the difference in scheduled maintenance.

Survey participants were also asked about the frequency and types of unscheduled maintenance, and Figure 14 summarizes these results by survey quarter. As in the case of the scheduled maintenance results, most interviewees (94%±3%) responded that they experienced no difference in the types or frequency of unscheduled maintenance for their primary AFVs. However, more reports of differences in unscheduled maintenance were received during the first survey quarter (18%) compared to the subsequent survey quarters (which ranged from 2.7% to 5.3%). This finding could indicate a seasonal difference, but there is no other strong evidence to support this possibility.

Performance-Related Problem	Primary AFV Type									
	CNG-CON		CNG-OEM		E85		M85		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Hard to start	3	50	1	33	2	40	1	20	7	37
Stall after starting	0	0	0	0	0	0	1	20	1	5
Stall in traffic	0	0	0	0	1	20	1	20	2	11
Poor idle	1	17	0	0	0	0	0	0	1	5
Hesitation	0	0	0	0	0	0	1	20	1	5
Lack of power	2	33	0	0	0	0	1	20	3	16
Engine ping	0	0	0	0	1	20	0	0	1	5
Check engine light on	0	0	2	67	1	20	0	0	3	16
<b>Total</b>	<b>6</b>	<b>100</b>	<b>3</b>	<b>100</b>	<b>5</b>	<b>100</b>	<b>5</b>	<b>100</b>	<b>19</b>	<b>100</b>

Fleet managers receiving complaints*										
Number	4 of 29		3 of 77		4 of 83		3 of 84		14 of 273	
%	13.7		3.9		4.8		3.6		5.1	

Table 3. Reports of Specific Performance-Related Complaints about AFVs by Vehicle Type

\*Several fleet managers reported multiple complaints about AFVs in their fleet, so numbers may not match above totals.

Figure 15 summarizes the responses pertaining to reports of differences in unscheduled maintenance, by primary AFV type. Ten to 15% more fleet managers with CNG vehicles as their primary AFV type indicated that their AFVs require more or different unscheduled maintenance than did fleet managers operating alcohol AFVs.

The final maintenance-related question dealt with AFV vehicle downtime compared to that of similar gasoline vehicles. Most respondents (94%) indicated no difference in downtime between the primary alternative fuel and gasoline vehicles in their fleets.

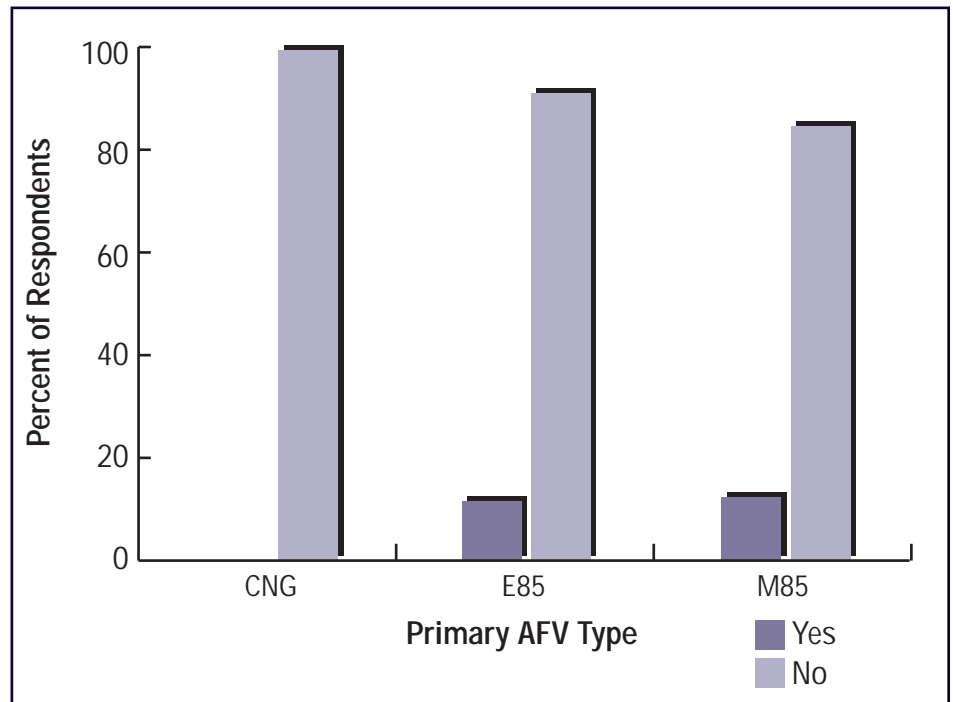


Figure 13. Responses to "Do your AFVs require more or different scheduled maintenance than similar gasoline vehicles?"

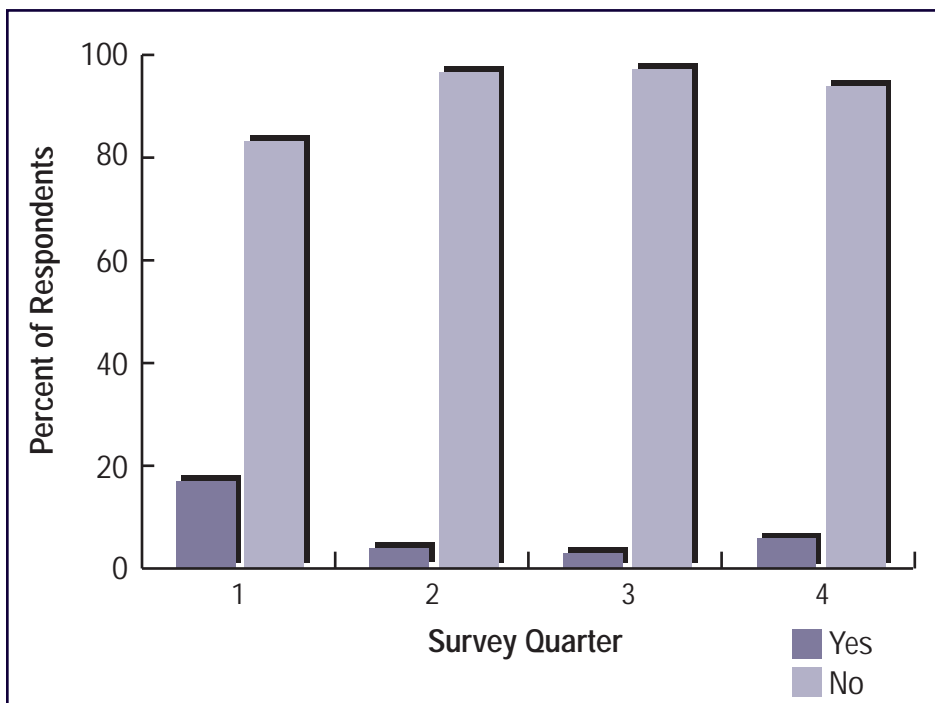


Figure 14. Responses to "Do your AFVs require more or different **unscheduled** maintenance than similar gasoline vehicles?" (by quarter)

### Comparing Responses about Different Issues

Fleet managers' responses to several survey questions were compared to determine if there were any correlations among them. Two of the more interesting comparisons are discussed here.

The first comparison contrasts responses to the question about more complaints on AFVs or gasoline vehicles to the responses to the question about driver acceptability of AFVs. Figure 16 is a cross-tabulation of the fleet managers' responses. Roughly 71% (39 out of 55) of those who responded that their drivers do not want AFVs also indicated

that they receive more complaints about them. Only 9.1% (5 of 55) reported that they received more complaints about gasoline vehicles.

On the other hand, fleet managers whose drivers tend to want AFVs generally reported receiving about the same number of complaints (85.4% of these fleet managers) about AFVs and gasoline vehicles. Differing levels of vehicle acceptance appears to have an effect on which fleet managers receive more complaints.

The second comparison also has to do with driver acceptability of AFVs, but here the responses were contrasted with those resulting from the question: Is there an AFV refueling site nearby? Figure 17 summarizes the results of this cross-tabulation.

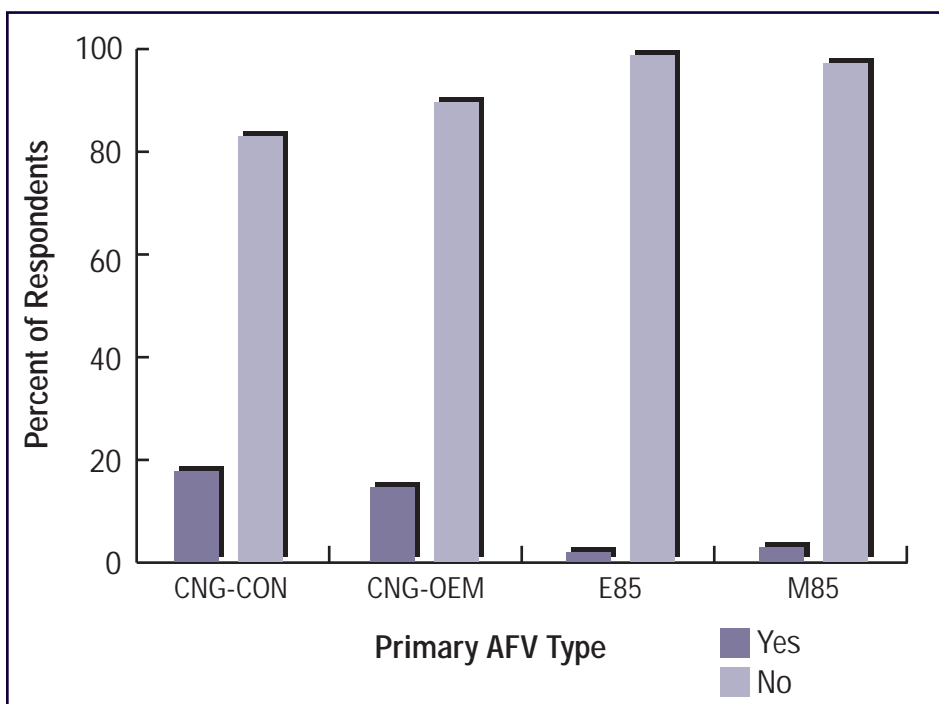


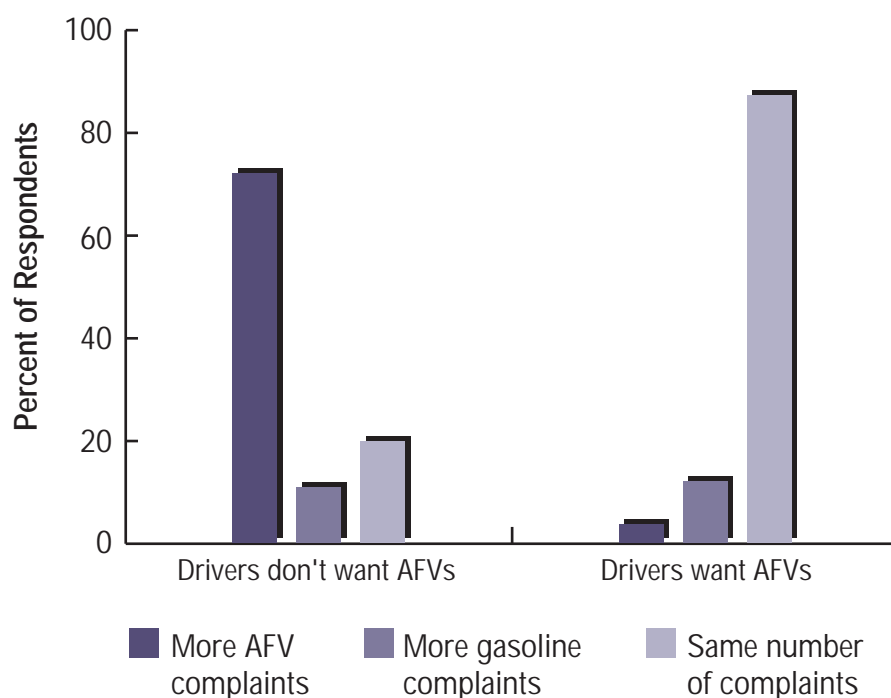
Figure 15. Responses to "Do your AFVs require more or different *unscheduled* maintenance than similar gasoline vehicles?" (by primary AFV type)



Most fleet managers gave a neutral response as to whether or not drivers want AFVs, regardless of whether they had also indicated that alternative fueling stations were nearby. About 62% of fleet managers who said that an alternative fuel station was nearby, and about 63% of those who said that one was not, also reported that their drivers are neutral about AFVs.

The responses of the remainder of the fleet managers are more interesting. Of the respondents indicating that an alternative fuel station was nearby, 19.8% indicated their drivers want AFVs, while 15.9% said their drivers do not want them. However, 27% of fleet managers who responded that an alternative fuel station was not nearby said their drivers do not want AFVs,

Figure 16. Comparing fleet manager responses: drivers' acceptability of AFVs versus frequency of vehicle complaints



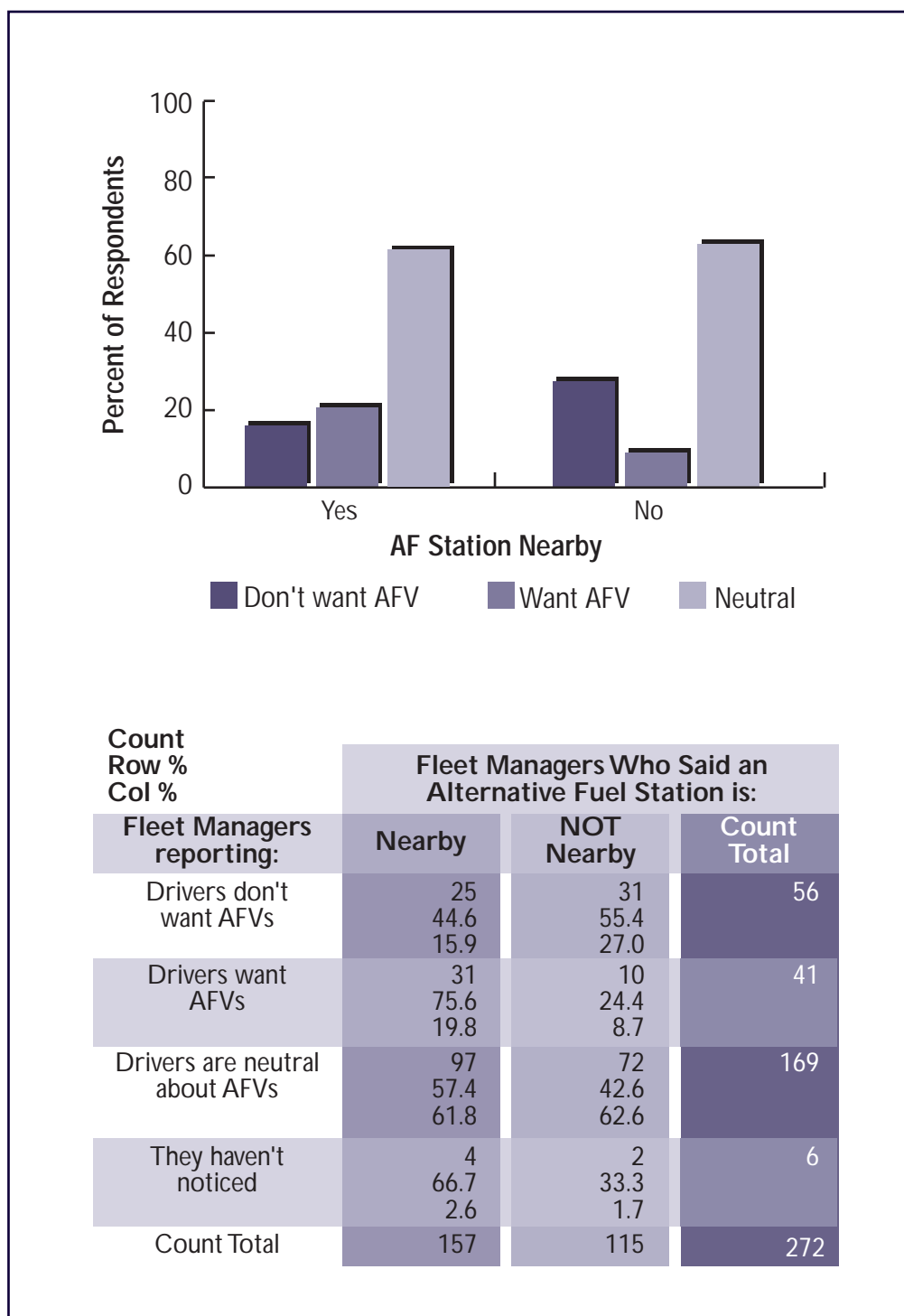
Fleet Managers who reported receiving:	Fleet Manager Who Said:				Count Total
	Drivers don't want AFV	Drivers want AFV	Drivers are neutral	They have not noticed	
more complaints about AFVs	39 70.9 70.9	1 1.8 2.4	14 25.5 8.3	1 1.8 16.7	55
more complaints about gasoline vehicles	5 23.8 9.1	5 23.8 12.2	11 52.4 6.5	0 0.0 0.0	21
equal number of complaints for both vehicle types	11 5.6 20	35 18.0 85.4	144 73.9 85.2	5 2.6 83.3	195
Count Total	55	41	169	6	271

## Perspectives on AFVs

while only 8.7% of these fleet managers said their drivers do want them. The difference in the two distributions of responses is statistically significant ( $\chi^2 = 9.505, 3 \text{ d.f.}, p = .0233$ ). Despite the large number of neutral responses, alternative fuel availability does appear to

have an impact on drivers' acceptance of AFVs. It is still worth noting that many drivers of federal fleet vehicles do not have a choice in the vehicles they use.

Figure 17. Comparing fleet managers' responses: drivers' acceptability of AFVs versus proximity of alternative fuel stations





## Summary

As a result of improving vehicle technology, greater vehicle production by the OEMs, and changing government regulation, light-duty AFVs continue to be added to fleets—particularly federal, state, and local government fleets. Information on real-world experiences from fleets currently operating AFVs is valuable to other fleets that plan to add AFVs, either voluntarily or in response to regulatory mandates.

This survey focused on obtaining fleet manager perspectives on use, acceptability, and performance of AFVs being operated by the federal government. Randomly selected fleet managers from across the country provided candid feedback on the AFVs in their fleets. For the most part, the responses from these fleet managers provided favorable feedback on AFV use and operation. The survey results can be summarized as follows:

- The fleet managers included in this survey reported having a total of 3,956 AFVs in their fleets: 8.6% of all their vehicles.
- Most respondents (83.5%) reported having 10 or fewer AFVs in their fleets.
- More than 62% ( $\pm 5\%$ ) of the interviewees said their drivers are neutral about using AFVs. Fleet managers operating CNG-OEMs had the smallest percentage reporting their drivers want AFVs. The group with the highest percentage reporting that drivers want AFVs were those operating E85 vehicles as their primary AFV.
- The most common reasons reported for drivers not wanting to use AFVs include limited vehicle range (primarily associated with CNG-fueled AFVs), lack of convenient fueling stations, and lack of available alternative fuel (primarily associated with alcohol AFVs).
- Alternative fuel stations were reported to be in close proximity by 75% of fleet managers operating CNG vehicles as their primary AFVs, and by 58% of fleet managers operating E85 vehicles as their primary AFVs. Only 35% of fleet managers operating M85 vehicles as their primary AFVs said alternative fuel stations were nearby.
- More than 78% of respondents operating CNG-CONs as their primary AFV type indicated they are mostly fueled with alternative fuel. Fifty-eight percent of fleet managers operating E85 vehicles as their primary AFVs responded in this way. However, only 31.3% of fleet managers operating M85 vehicles as their primary AFVs indicated they are fueled mostly with alternative fuel.
- More than 71% ( $\pm 5\%$ ) of all respondents reported receiving the same number of complaints about their AFVs and their gasoline vehicles. Very few specific performance-related complaints (hard to start, stalling, etc.) were reported by these fleet managers.

## Perspectives on AFVs

- Most fleet managers (> 90%) reported no difference in the types or frequency of maintenance—scheduled or unscheduled—between AFVs and similar gasoline vehicles in their fleet. Nearly all interviewees reporting differences in *scheduled* maintenance operate E85 and M85 vehicles as their primary AFVs. Also, a higher percentage of fleet managers who operate CNG vehicles as their primary AFVs reported a difference in *unscheduled* maintenance.
- Most fleet managers (94% ±3%) reported no difference in downtime between AFVs and similar gasoline vehicles in their fleets.



# Acknowledgments

This work was sponsored by the Office of Technology Utilization, which is part of the Office of Transportation Technologies at the U.S. Department of Energy in Washington, D.C. Frank Mallgrave is DOE's technical monitor for the light-duty vehicle evaluation projects at NREL. Bill Gilbert served as the project manager for Dwights Energydata, and Gary Starkey of Dwights conducted all the telephone interviews.

Appreciation is extended to the numerous federal fleet managers for their willingness to participate in this survey.

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# Appendix A:

## Details of Survey Development, Implementation, and Data Analysis

### Frame Construction

As explained in the report, fleet managers of federal fleet vehicles were selected as the target population for this survey because the federal fleet contains a relatively large number of AFVs. Unfortunately, the population of federal fleet managers is so functionally and geographically diverse, and the definition of a fleet manager so uncertain, that a single comprehensive list of names was initially unavailable. With assistance from GSA, the most complete list possible of federal fleet managers operating AFVs was compiled (GSA's information about the placement and location of AFVs is fairly reliable). This task was still fairly time-consuming because fleet managers' names had to be verified (fleet managers change jobs with some frequency).

A final frame was constructed from the information provided by GSA, along with the names of individuals at sites involved in a previous light-duty after-market vehicle conversion project sponsored by DOE/NREL (Motta et al. 1996), and contacts at military installations known by NREL to operate AFVs. The frame contained the names of 1,683 fleet managers located in 40 different states and the District of Columbia.

### Sample Selection

Fleet managers were selected at random from the frame, except there was an effort to choose participants from areas of the country where alternative fuels were known to be available. However, there was no prior stratification on the basis of fuel availability or on the basis of AFV types.

A fixed number of fleet managers were chosen for questioning in each of four survey periods (see discussion below). No fleet manager was selected for participation in the survey more than once during the entire year (sampling without replacement).

### Sampling Rate, Sample Representativeness, and Margin of Error

In total, 275 fleet managers were selected for questioning from the list of 1,638, yielding an overall sampling rate of 16.3%. Fifty fleet managers (approximately 3%) were selected for questioning in the first survey period, after which the sampling rate was increased to 75 (approximately 4.5%) for each of the successive survey periods.

The 273 fleet managers that were interviewed reported operating a total of 3,956 AFVs. This total represents 20% of all the light-duty AFVs (19,750) estimated by the U.S. Energy Information Administration (EIA 1996) to have been operated by all federal organizations during 1995. In addition, the surveyed fleet managers were located throughout the United States, resulting in broad geographic coverage. Along with the 16.3% sampling rate, these circumstances point to a highly representative sample on which to base the survey conclusions.

Under the most conservative circumstances for estimating proportions or percentages (that is, the pre-survey estimate of the proportion of interest in the entire population of fleet managers is no better or worse than 0.5), this sample size is sufficient to maintain an

## Perspectives on AFVs

overall margin of error of approximately .06 with 95% confidence. Owing to smaller effective sample sizes, the margins of error associated with estimates of proportions or percentages in subgroups of the population may be higher. For example, the corresponding margin of error for a proportion estimated from the responses of fleet managers interviewed in the first survey period alone (sample size of 50) is approximately 0.14.

Margins of error are stated for selected percentages presented in the report, and can be directly computed using the following equation:

$$ME = t_{(1-\alpha, n-1)} \sqrt{\frac{N-n}{N-1}} \sqrt{\frac{p(1-p)}{n}}$$

where  $N$  = population size

$n$  = sample size

$p$  = estimate of the percentage in question

$1-\alpha$  = desired confidence level  
(for 95% confidence,  
 $1-\alpha = .05$ )

$n-1$  = degrees of freedom,

and  $t$  = associated percentile of the t-distribution.

This equation applies when the percentages or proportions of interest are estimated for the overall population of fleet managers. Different equations may apply when the percentages represent subgroups of that target population—particularly when such subgroups are constructed after completion of the survey (post-stratification) for purposes of data analysis.

## Questionnaire Design

The survey questionnaire was developed by NREL personnel, and pretesting before conducting the actual survey resulted in changes and improvements. This instrument was developed to specifically obtain fleet managers' perspectives about AFVs relative to similar vehicles operated on gasoline. A number of questions pertaining to issues ranging from vehicle acceptability to vehicle performance were included in the questionnaire. The questionnaire contained a total of 17 items. Survey participants were also asked to identify individuals that they knew to be drivers of AFVs (for use in a related AFV driver survey).

## Survey Operations and Data Collection

Interviews were conducted in January, April, July, and October of 1996 (referred to in the report as Quarters 1, 2, 3, and 4, respectively). The four different survey periods were used in order to capture potential seasonal differences.

For consistency purposes, all interviews were conducted by a single individual, using conventional telephone interviewing techniques. Each interview was completed in about five minutes. Dwights Energydata, a subcontractor to NREL, supplied the interviewer and was otherwise responsible for actual sample selection and for all survey operations. Dwights was also responsible for compiling the results from each survey period in an electronic format that could be imported into DOE's

Alternative Fuels Data Center (AFDC) at NREL, and for providing a quarterly summary of data trends. Table A-1 contains all the individual responses received and summarized in this report.

### **Response Rate**

There was essentially a 100% response rate to the fleet manager's survey, in that every subject responded to at least part of the telephone interview. Such a high degree of success is attributable to the keen interest of federal fleet managers in AFVs (the federal fleet is mandated to contain a certain number of AFVs) and the fact that federal fleet managers are accustomed to being questioned about their AFVs. In addition, the interviewer was able to develop a solid rapport with the respondents at the initial introduction. Most fleet managers were also contacted by letter in advance of the interview telephone call.

### **Data Analysis Approach**

The general data analysis approach involved the use of cross-tabulations and contingency tables. Descriptive statistics (such as means, proportions/percentages, frequencies, and standard deviations) were also compiled. Where appropriate, formal tests of statistical significance were conducted to assess differences among categories or groups.

Some of the results of such tests are reported (usually in the form of Chi-square statistics and associated probabilities) in the body of the report. All data analyses were conducted using the JMP statistical software available from SAS Institute.

The survey data was subdivided into a number of categories and groupings for analysis (some of which were constructed through post-stratification). Aside from the initial subdivision by survey period, the most important grouping had to do with the primary type of AFV operated by each fleet. Although no target numbers of AFVs by type were established in advance, the survey encompassed a fairly equal number of fleet managers having E85 and M85 models as their primary AFVs, and a somewhat larger number of fleet managers having CNG models (all types) as their primary AFVs. Only two fleet managers reported having CNG-QVMs as their primary AFVs; and because of this small count, those responses were eliminated from further consideration.

Comparisons of fleet managers' responses about AFVs to their responses about similar (not necessarily identical) gasoline vehicles were of major interest. The data analysis approach placed considerable emphasis on understanding such vehicle type differences.



**Table A-1: Individual Fleet Managers' Responses to Survey Questions\***

Quarter	Vehicle/ Fuel type	LDVs in Fleet	AFVs in Fleet	AFV Model	Year	Vehicles	Want/Don't	Complaints	Reported Performance Complaints									Use	Alt. Fuel							Location	
						Assigned	Want AFVs	from drivers	1	2	3	4	5	6	7	8	9	Alt. Fuel	Nearby	10	11	12	13	14	15	City/Base	State
1	CNG-CON	2800	100	Various		assigned - driver	haven't noticed	about same									don't know	yes	no	no	yes	<1 day		ST LOUIS	MO		
1	CNG-CON	18	8	GMC Truck		assigned - group	don't want									mostly gasoline	no	no	no	yes	<1 day		ANDREWS AFB	MD			
1	CNG-CON	300	67	Various		assigned - group	neutral	about same						yes		mostly AF	no	no	no	yes	<1 day		BETHESDA	MD			
1	CNG-CON	250	67	Various		pool vehicle	neutral	about same	yes					yes		mostly AF	yes	no	yes	yes	<1 day		USAF ACADEMY	CO			
1	CNG-CON	199	75	Caravan		assigned - group	neutral	about same						yes		mostly AF	yes	no	yes	no		AFV	25	CAMP PENDLETON	CA		
1	CNG-CON	740	72	Various		pool vehicle	neutral	about same						yes		mostly gasoline	yes	no	no	yes	<1 day		SANTA ANA	CA			
1	CNG-CON	200	2	Caprice	1990	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day		GLYNCO	GA			
1	CNG-CON	500	29	Various	1988	pool vehicle	neutral	about same						yes		mostly AF	yes	no	no	yes	<1 day		ROBBINS AFB	GA			
1	CNG-OEM	350	7	Caravan	1995	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day		CAMP PENDLETON	CA			
1	CNG-OEM	310	32	Caravan	1994	assigned - group	don't want	about same						yes		mostly AF	yes	no	yes	yes	<1 day		TUPMAN	CA			
1	CNG-OEM	180	1	Ram Van	1994	assigned - driver	don't want	yes - AFV						yes		mostly AF	no	no	yes	no		AFV	5	FT CARSON	CO		
1	CNG-OEM	1	1	Ram Van	1991	assigned - group	don't want	yes - AFV						yes		mostly AF	no	yes	yes	yes	<1 day		HARAHAN	LA			
1	CNG-OEM	65	1	Voyager	1994	pool vehicle	neutral	about same								mostly AF	yes	no	no	yes	<1 day		RES. TRIANGLE P	NC			
1	CNG-OEM	600	2	Ram Van	1994	pool vehicle	neutral	about same								mostly AF	yes	no	no	yes	<1 day		ALBUQUERQUE	NM			
1	CNG-OEM	5	1	C1500		assigned - group	don't want	yes - AFV								mostly AF	no	no	no	yes	<1 day		LAS VEGAS	NV			
1	CNG-OEM	240	8	Caravan	1994	assigned - group	want	about same						yes		mostly AF	yes	no	yes	no		AFV		AMARILLO	TX		
1	CNG-OEM	9	1	Caravan	1994	assigned - group	don't want	yes - AFV								mostly AF	yes	no	no	yes	<1 day		FT. LAUDERDALE	FL			
1	CNG-OEM	560	1	Ram Van	1994	assigned - group	don't want	yes - AFV						yes		mostly AF	yes	no	yes	yes	<1 day		KIRTLAND AFB	NM			
1	CNG-OEM	9	7	Ram Van	1994	assigned - driver	neutral	about same	yes							mostly AF	yes	no	yes	yes	<1 day		CHARLOTTE	NC			
1	E85	6	1	Lumina	1992	assigned - driver	don't want	yes - AFV	yes							mostly AF	yes	no	no	yes	<1 day		WASHINGTON	DC			
1	E85	34	3	Lumina	1994	assigned - driver	neutral	yes - AFV								mostly gasoline	no	no	no	yes	<1 day		WASHINGTON	DC			
1	E85	4	1	Taurus	1995	pool vehicle	don't want	yes - AFV								mostly gasoline	no	yes	no	yes	<1 day		CHICAGO	IL			
1	E85	9	5	Taurus	1995	assigned - group	neutral	about same								mostly gasoline	no	no	no	yes	<1 day		CHICAGO	IL			
1	E85	5	2	Taurus	1995	assigned - group	want	about same								mostly gasoline	no	no	no	yes	<1 day		ELGIN	IL			
1	E85	225	1	Lumina	1993	assigned - driver	neutral	about same								mostly AF	yes	yes	no	yes	<1 day		PEORIA	IL			
1	E85	200	1	Taurus	1995	assigned - group	neutral	about same								mostly gasoline	yes	no	no	yes	<1 day		ST LOUIS	MO			
1	E85	5	2	Taurus	1995	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day		ST LOUIS	MO			
1	E85	18	2	Taurus	1994	pool vehicle	neutral	about same								mostly gasoline	no	no	no	yes	<1 day		ARLINGTON	VA			
1	E85	16	3	Taurus	1994	assigned - driver	want	about same								mostly AF	yes	no	no	yes	<1 day		MADISON	WI			
1	E85	4	2	Taurus	1993	pool vehicle	neutral	about same								mostly AF	yes	no	no	yes	<1 day		MADISON	WI			
1	E85	2	1	Taurus	1994	pool vehicle	want	about same								mostly AF	yes	no	no	yes	<1 day		MADISON	WI			
1	E85	26	7	Lumina	1993	pool vehicle	neutral	yes - AFV					yes			mostly AF	yes	no	no	yes	<1 day		WASHINGTON	DC			
1	E85	9	1	Lumina	1993	assigned - driver	want	yes - AFV	yes	yes						mostly AF	yes	no	no	yes	<1 day		WASHINGTON	DC			
1	M85	1758	100	Taurus	1993	assigned - group	neutral	about same						yes		mostly gasoline	no	yes	no	yes	<1 day		FT. GEORGE G. M	MD			
1	M85	10	4	Spirit	1993	pool vehicle	don't want	about same								mostly gasoline	no	yes	no	yes	<1 day		BELL	CA			
1	M85	2	1	Spirit	1994	assigned - driver	want	about same								mostly gasoline	no	yes	no	yes	<1 day		BRADLEY	CA			
1	M85	3	1	Spirit	1993	pool vehicle	neutral	about same								mostly gasoline	yes	no	no	yes	<1 day		BRADLEY	CA			
1	M85	13	10	Spirit	1994	assigned - driver	don't want	about same								mostly gasoline	no	no	no	yes	<1 day		BURBANK	CA			
1	M85	3	2	Spirit	1993	assigned - driver	don't want	yes - AFV						yes		mostly AF	yes	no	no	yes	<1 day		DENVER	CO			
1	M85	52	1	Ram Van	1994	assigned - driver	don't want	about same						yes		mostly AF	yes	no	yes	no		AFV	2	GOLDEN	CO		
1	M85	30	2	Taurus	1995	assigned - group	don't want	yes - AFV	yes							mostly gasoline	no	yes	no	yes	<1 day		DETROIT	MI			
1	M85	1	1	Spirit	1993	pool vehicle	neutral	about same								mostly AF	yes	no	no	yes	<1 day		PHILADELPHIA	PA			
1	M85	2	1	Spirit	1993	pool vehicle	neutral	about same								mostly AF	yes	no	no	yes	<1 day		PHILADELPHIA	PA			
1	M85	6	2	Spirit	1993	pool vehicle	want	about same						yes		mostly AF	yes	no	no	yes	<1 day		PHILADELPHIA	PA			
1	M85	67	19	Spirit	1993	assigned - group	.	yes - AFV								mostly gasoline	no	yes	no	no		AFV	2	CLINTONTOWNSHIP	MI		
1	M85	14000	50	Ram Van	1994	assigned - group	neutral	about same								mostly gasoline	no	yes	no	yes	<1 day		CHICAGO	IL			
1	M85	274	7	Lumina	1994	assigned - group	neutral	about same						yes		mostly gasoline	no	no	no	yes	<1 day		FT. MEADE	MD			
1	M85	1	1	Spirit	1993	assigned - driver	neutral	yes - AFV								mostly gasoline	no	no	no	yes	<1 day		PHILADELPHIA	PA			
1	M85	1	1	Spirit	1993	pool vehicle	neutral	about same								mostly AF	yes	no	no	yes	<1 day		DENVER	CO			
1	M85	5	3	Spirit	1993	pool vehicle	don't want	yes - AFV								mostly gasoline	no	yes	no	yes	<1 day		FRESNO	CA			
2	CNG-CON	6	2	Chevy S-10	1994	assigned - group	neutral	about same								mostly AF	yes	no	yes	no		AFV	3	EDWARDS AFB	CA		
2	CNG-CON	700	6	Chevy Pickup	1994	assigned - group	neutral	yes - gasoline								mostly AF	yes	no	no	yes	<1 day		CRANE	IN			
2	CNG-CON	300	66	Sedan		assigned - group	don't want	about same								mostly AF	no	no	no	yes	<1 day		BETHESDA	MD			
2	CNG-CON	300	66			assigned - group	neutral	about same						yes		mostly AF	no	no	yes	no		AFV	2	BETHESDA	MD		
2	CNG-OEM	1500	15	Ram Van	1995	pool vehicle	don't want	yes - AFV								mostly AF	yes	no	no	yes	<1 day		FT BELVIR	VA			
2	CNG-OEM	150	2	Ram Van	1994	pool vehicle	don't want	yes - gasoline								mostly AF	yes	no	no	yes	<1 day		BAKERSFIELD	CA			

Quarter	Vehicle/ Fuel type	LDVs in Fleet	AFVs in Fleet	AFV Model	Year	Vehicles Assigned	Want/Don't Want AFVs	Complaints from drivers	Reported Performance Complaints									Use Alt. Fuel	Alt. Fuel Nearby	10	11	12	13	14	15	Location	
									1	2	3	4	5	6	7	8	9									City/Base	State
2	CNG-OEM	34	2	Ram Van	1992	assigned - group	neutral	about same								yes	mostly AF	yes	no	no	yes	<1 day			BOULDER	CO	
2	CNG-OEM	1	1	Ram Van	1994	assigned - group	neutral	yes - AFV									mostly AF	yes	no	no	yes	<1 day			DENVER	CO	
2	CNG-OEM	30	1	Ram Van	1994	pool vehicle	don't want	yes - gasoline									mostly AF	no	no	no	yes	<1 day			GRAND JUNCTION	CO	
2	CNG-OEM	114	2	Caravan	1994	assigned - group	don't want	yes - gasoline									mostly AF	yes	no	no	yes	<1 day			GRAND JUNCTION	CO	
2	CNG-OEM	4	1	Ram Van	1995	assigned - driver	want	yes - gasoline									mostly AF	yes	no	no	yes	<1 day			GRAND JUNCTION	CO	
2	CNG-OEM	3	1	Ram Van	1994	assigned - group	don't want	yes - AFV									mostly AF	yes	no	no	yes	<1 day			WASHINGTON	DC	
2	CNG-OEM	5	1	Ram Van	1992	pool vehicle	neutral	yes - gasoline									mostly AF	no	no	no	yes	<1 day			WASHINGTON	DC	
2	CNG-OEM	12	1	Ram Van	1994	assigned - driver	neutral	about same									mostly AF	yes	no	no	yes	<1 day			WASHINGTON	DC	
2	CNG-OEM	28	3	Ram Van	1994	assigned - group	don't want	yes - AFV								yes	mostly AF	yes	no	no	yes	<1 day			KENNEDY SPACE C	FL	
2	CNG-OEM	350	4	Caravan	1994	pool vehicle	neutral	yes - gasoline									mostly AF	yes	no	no	yes	<1 day			KENNEDY SPACE C	FL	
2	CNG-OEM	225	14	Ram Van	1994	assigned - group	want	yes - gasoline									mostly AF	yes	no	no	yes	<1 day			KENNEDY SPACE C	FL	
2	CNG-OEM	44	1	Ram Van	1994	assigned - group	want	yes - gasoline									mostly AF	yes	no	no	yes	<1 day			PEMBROKE PINES	FL	
2	CNG-OEM	4	1	Ram Van	1994	assigned - group	don't want	yes - AFV									mostly AF	no	no	no	yes	<1 day			ATLANTA	GA	
2	CNG-OEM	2	1	Ram Van	1992	pool vehicle	don't want	yes - AFV									mostly AF	no	no	no	yes	<1 day			ATLANTA	GA	
2	CNG-OEM	3	1	Ram Van	1994	assigned - group	neutral	yes - gasoline									mostly AF	yes	no	no	yes	<1 day			DES MOINES	IA	
2	CNG-OEM	22	1	Ram Van	1994	assigned - group	don't want	about same									mostly AF	no	no	no	yes	<1 day			BATAVIA	IL	
2	CNG-OEM	110	2	Ram Van	1994	assigned - driver	don't want	yes - gasoline									mostly AF	yes	no	no	yes	<1 day			ROCK ISLAND	IL	
2	CNG-OEM	2	1	Ram Van	1994	pool vehicle	neutral	about same									mostly AF	yes	no	no	yes	<1 day			DALLAS	TX	
2	CNG-OEM	1	1	Dodge 10 Pass Van	1994	assigned - driver	want	about same									mostly AF	yes	no	no	yes	<1 day			DENTON	TX	
2	CNG-OEM	41	1	Ram Van	1994	pool vehicle	neutral	yes - gasoline									mostly AF	yes	no	no	yes	<1 day			DRAPER	UT	
2	CNG-OEM	200	6	Ram Van	1993	assigned - group	don't want	yes - AFV								yes	mostly AF	yes	no	yes	no			AFV	2	WASHINGTON	DC
2	CNG-QVM	412	57	Ford F-50	1994	assigned - group	neutral	yes - gasoline									mostly AF	yes	no	no	yes	<1 day			FORT HOOD	TX	
2	E85	20	2	Lumina	1995	assigned - driver	neutral	about same									mostly AF	yes	no	no	yes	<1 day			WASHINGTON	DC	
2	E85	1	1	Lumina	1993	pool vehicle	neutral	yes - AFV									mostly gasoline	no	no	no	yes	<1 day			WASHINGTON	DC	
2	E85	10	1	Lumina	1995	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			WASHINGTON	DC	
2	E85	600	20	Taurus	1994	assigned - group	neutral	yes - gasoline									mostly AF	yes	no	no	yes	<1 day			DES MOINES	IA	
2	E85	7	6	Taurus	1995	pool vehicle	neutral	yes - AFV									mostly gasoline	no	no	no	yes	<1 day			DES PLAINES	IL	
2	E85	500	50	Taurus	1995	assigned - group	haven't noticed	about same									mostly gasoline	no	no	no	yes	<1 day			DES PLAINES	IL	
2	E85	8	1	Taurus	1995	assigned - group	haven't noticed	about same									mostly gasoline	yes	no	no	yes	<1 day			DES PLAINES	IL	
2	E85	2	1	Taurus	1993	assigned - group	haven't noticed	yes - AFV									mostly gasoline	no	no	no	yes	<1 day			OHARE IAP ARS	IL	
2	E85	56	1	Lumina	1993	assigned - driver	neutral	about same									mostly AF	yes	no	no	yes	<1 day			INDIANAPOLIS	IN	
2	E85	48	1	Taurus	1993	assigned - driver	want	about same								yes	mostly AF	yes	yes	no	yes	<1 day			INDIANAPOLIS	IN	
2	E85	1	1	Taurus	1995	assigned - group	neutral	about same									mostly AF	no	no	no	yes	<1 day			ST LOUIS	MO	
2	E85	3	2	Taurus	1995	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			ST LOUIS	MO	
2	E85	1	1	Taurus	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			ST LOUIS	MO	
2	E85	16	7	Taurus	1995	assigned - group	neutral	about same									mostly AF	no	no	no	yes	<1 day			ST. LOUIS	MO	
2	E85	1	1	Taurus	1995	assigned - group	neutral	yes - AFV									mostly AF	yes	no	no	yes	<1 day			ST. LOUIS	MO	
2	E85	33	1	Lumina	1995	assigned - driver	want	about same									mostly AF	no	no	no	yes	<1 day			RAPID CITY	SD	
2	E85	65	5	Lumina	1993	assigned - driver	neutral	yes - AFV									mostly gasoline	no	no	no	yes	<1 day			STERLING	VA	
2	E85	7	1	Taurus	1995	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			MADISON	WI	
2	E85	500	35	Spirit	1993	assigned - group	don't want	about same									mostly gasoline	no	yes	no	yes	<1 day			LONG BEACH	CA	
2	E85	3	3	Lumina	1993	pool vehicle	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			CHICAGO	IL	
2	E85	2	1	Taurus	1994	assigned - group	want	about same									mostly gasoline	no	no	no	yes	<1 day			WEST BRANCH	IA	
2	E85	3	2	Taurus	1995	assigned - driver	neutral	yes - AFV									mostly AF	no	no	no	yes	<1 day			ST LOUIS	MO	
2	E85	30	1	Lumina	1993	assigned - group	haven't noticed	about same									mostly gasoline	yes	no	no	yes	<1 day			CHICAGO	IL	
2	E85	11	1	Taurus	1995	pool vehicle	want	about same									mostly AF	yes	no	no	no			gasoline	2	AMES	IA
2	M85	5	2	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			EL SEGUNDO	CA	
2	M85	26	1	Spirit	1993	pool vehicle	want	about same									mostly gasoline	no	no	no	yes	<1 day			WILLOWS	CA	
2	M85	8	6	Spirit	1993	pool vehicle	neutral	about same									mostly AF	yes	no	no	yes	<1 day			DENVER	CO	
2	M85	2	2	Spirit	1993	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			DENVER	CO	
2	M85	11	3	Lumina	1993	assigned - driver	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			DENVER	CO	
2	M85	2	1	Spirit	1993	assigned - group	don't want	about same									mostly gasoline	no	yes	no	yes	<1 day			DENVER	CO	
2	M85	6	1	Spirit	1993	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			DENVER	CO	
2	M85	2	2	Spirit	1993	assigned - group	neutral	yes - AFV									mostly gasoline	yes	no	no	no			AFV	2	WASHINGTON	DC
2	M85	13	1	Spirit	1993	pool vehicle	neutral	about same									mostly gasoline	yes	no	no	yes	<1 day			WASHINGTON	DC	
2	M85	5	1	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			WASHINGTON	DC	
2	M85	2	1	Spirit	1993	assigned - driver	neutral	about same									mostly AF	yes	no	no	yes	<1 day			WASHINGTON	DC	
2	M85	2	1	Spirit	1993	assigned - group	neutral	yes - gasoline									don't know	no	no	no	yes	<1 day			ATLANTA	GA	
2	M85	5	2	Lumina	1995	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			ATLANTA	GA	

Quarter	Vehicle/ Fuel type	LDVs in Fleet	AFVs in Fleet	AFV Model	Year	Vehicles Assigned	Want/Don't Want AFVs	Complaints from drivers	Reported Performance Complaints									Use Alt. Fuel	Alt. Fuel Nearby	10	11	12	13	14	15	Location	
									1	2	3	4	5	6	7	8	9									City/Base	State
2	M85	9	2	Spirit	1994	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day		BENTON	IL		
2	M85	19	15	Spirit	1993	assigned - driver	neutral	yes - AFV									mostly gasoline	no	no	no	yes	<1 day		CHICAGO	IL		
2	M85	18	1	Spirit	1993	assigned - driver	neutral	yes - gasoline									mostly gasoline	no	no	no	yes	<1 day		CHICAGO	IL		
2	M85	3	2	Spirit	1993	pool vehicle	neutral	about same									mostly gasoline	no	no	no	yes	<1 day		ABERDEEN	MD		
2	M85	4	2	Spirit	1993	assigned - group	neutral	about same							yes	mostly gasoline	no	no	no	no			AFV	3	ROCKVILLE	MD	
2	M85	4	1	Spirit	1993	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				TRC	MI	
2	M85	3	1	Spirit	1993	assigned - group	neutral	about same								mostly gasoline	no	no	no	yes	<1 day				BROOKLYN	NY	
2	M85	1	1	Spirit	1993	assigned - group	neutral	yes - AFV								mostly gasoline	no	no	no	yes	<1 day				PHILA	PA	
2	M85	15	2	Spirit	1993	assigned - group	want	yes - gasoline								mostly AF	yes	no	no	yes	<1 day				PHILA	PA	
2	M85	10	1	Spirit	1993	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				WASHINGTON	DC	
3	CNG-CON	4	1	Chevy S-10	1990	assigned - group	don't want	yes - AFV								mostly AF	yes	no	no	yes	<1 day				EDWARDS AFB	CA	
3	CNG-CON	101	26	Various	1990	pool vehicle	neutral	about same								mostly AF	yes	no	no	yes	<1 day				PORT HUENEME	CA	
3	CNG-CON	570	20	Various	1990	assigned - group	neutral	about same								mostly gasoline	no	no	no	yes	<1 day				PETERSON AFB	CO	
3	CNG-CON	5	5	Chevy S-10	1995	assigned - driver	neutral	about same								mostly gasoline	yes	no	no	yes	<1 day				DENVER	CO	
3	CNG-CON	200	7	Acclains	1994	assigned - driver	neutral	about same								mostly AF	yes	no	no	yes	<1 day				NELLIS AFB	NV	
3	CNG-CON	20	1	Ford 1/2 Ton	1994	assigned - driver	want	about same								mostly AF	yes	no	no	yes	<1 day				ALAMOSA	CO	
3	CNG-CON	4000	300	Various		assigned - group	neutral	about same	yes			yes		yes		mostly AF	yes	no	no	yes	<1 day				SAN DIEGO	CA	
3	CNG-CON	2	2	Various		assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				MONTROSE	CO	
3	CNG-CON	5	2	Dodge Dakota	1994	assigned - driver	neutral	about same								mostly AF	yes	no	no	yes	<1 day				ESTES PARK	CO	
3	CNG-CON	2	2	Lincoln Town Cars	1995	assigned - driver	neutral	about same							yes	mostly gasoline	yes	no	yes	no			AFV	4	WASHINGTON	DC	
3	CNG-CON	100	32	Various		assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				KIRKLAND AFB	NM	
3	CNG-OEM	7	2	Caravan	1994	pool vehicle	neutral	about same								mostly AF	yes	no	no	yes	<1 day				VENTURA	CA	
3	CNG-OEM	5	1	Caravan	1994	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				DENVER	CO	
3	CNG-OEM	1	1	Caravan	1994	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				ENGLEWOOD	CO	
3	CNG-OEM	24	1	Caravan	1994	assigned - group	don't want	yes - AFV								mostly AF	no	no	no	yes	<1 day				ORLANDO	FL	
3	CNG-OEM	2	1	Caravan	1994	pool vehicle	don't want	yes - AFV								mostly AF	no	no	no	yes	<1 day				ATLANTA	GA	
3	CNG-OEM	3500	1	Caravan	1994	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				ATLANTA	GA	
3	CNG-OEM	1	1	Caravan	1994	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				ATLANTA	GA	
3	CNG-OEM	3	1	Caravan	1994	assigned - group	don't want	yes - AFV								mostly AF	no	no	no	yes	<1 day				EAST POINT	GA	
3	CNG-OEM	2	1	Caravan	1994	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				FOREST PARK	GA	
3	CNG-OEM	2	2	Caravan	1994	assigned - group	don't want	yes - AFV								mostly AF	no	no	no	yes	<1 day				FT. MCPHERSON	GA	
3	CNG-OEM	227	2	Caravan	1994	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				ROBINS AF BASE	GA	
3	CNG-OEM	14	1	Caravan	1994	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				DES MOINES	IA	
3	CNG-OEM	2	1	Ram Van	1995	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				HYATTSVILLE	MD	
3	CNG-OEM	8	1	Caravan	1994	assigned - driver	want	about same								mostly AF	no	no	no	yes	<1 day				FAYETTEVILLE	NC	
3	CNG-OEM	33	4	Caravan	1994	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				LOS ALAMOS	NM	
3	CNG-OEM	110	1	Caravan	1994	assigned - driver	neutral	yes - gasoline								mostly AF	yes	no	no	yes	<1 day				LOS ALAMOS	NM	
3	CNG-OEM	65	2	Caravan	1994	assigned - group	don't want	yes - gasoline								mostly AF	yes	no	no	yes	<1 day				LOS ALAMOS	NM	
3	CNG-OEM	35	2	Caravan	1994	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				LOS ALAMOS	NM	
3	CNG-OEM	4	1	Caravan	1994	assigned - group	don't want	yes - AFV								mostly AF	no	no	no	yes	<1 day				AUSTIN	TX	
3	CNG-OEM	40	4	Caravan	1994	assigned - group	neutral	about same								mostly AF	no	no	no	yes	<1 day				SALT LAKE CITY	UT	
3	CNG-OEM	5	1	Caravan	1994	assigned - group	don't want	yes - AFV								mostly AF	yes	no	no	yes	<1 day				LOS ALAMOS	NM	
3	E85	10	1	Lumina	1992	assigned - driver	neutral	about same								mostly gasoline	no	no	no	yes	<1 day				WASHINGTON	DC	
3	E85	20	1	Lumina	1994	assigned - driver	neutral	about same								mostly gasoline	no	yes	no	yes	<1 day				WASHINGTON	DC	
3	E85	3	1	Taurus	1994	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				WEST BRANCH	IA	
3	E85	2	1	Taurus	1996	assigned - group	neutral	about same								mostly gasoline	no	no	no	yes	<1 day				CHICAGO	IL	
3	E85	2	1	Taurus	1996	assigned - driver	want	about same								mostly AF	yes	no	no	yes	<1 day				CHICAGO	IL	
3	E85	3	1	Taurus	1995	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				CHICAGO	IL	
3	E85	4	4	Taurus	1995	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				CHICAGO	IL	
3	E85	7	4	Taurus	1995	assigned - group	neutral	about same								mostly gasoline	no	no	no	yes	<1 day				CHICAGO	IL	
3	E85	4	4	Taurus	1994	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				CHICAGO	IL	
3	E85	6	1	Taurus	1995	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				CHICAGO	IL	
3	E85	4	4	Taurus	1994	assigned - driver	neutral	about same								mostly gasoline	yes	no	no	yes	<1 day				CHICAGO	IL	
3	E85	1	1	Lumina	1993	assigned - group	neutral	about same								mostly gasoline	no	no	no	yes	<1 day				DES PLAINES	IL	
3	E85	1	1	Taurus	1995	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				DES PLAINES	IL	
3	E85	2	1	Lumina	1995	pool vehicle	neutral	about same								mostly gasoline	no	no	no	yes	<1 day				DES PLAINES	IL	
3	E85	4	1	Taurus	1995	assigned - group	neutral	about same								mostly AF	yes	no	no	yes	<1 day				DES PLAINES	IL	
3	E85	3	3	Taurus	1995	assigned - group	want	about same								mostly AF	yes	no	no	yes	<1 day				DES PLAINES	IL	
3	E85	4	2	Taurus	1995	pool vehicle	neutral	about same								mostly gasoline	no	yes	no	yes	<1 day				DES PLAINES	IL	

Quarter	Vehicle/ Fuel type	LDVs in Fleet	AFVs in Fleet	AFV Model	Year	Vehicles	Want/Don't	Complaints	Reported Performance Complaints									Use	Alt. Fuel	Nearby	10	11	12	13	14	15	Location	
						Assigned	Want AFVs	from drivers	1	2	3	4	5	6	7	8	9	Alt. Fuel	City/Base								State	
3	E85	2	1	Taurus	1995	assigned - group	neutral	about same									mostly gasoline	yes	no	no	yes	<1 day			DES PLAINES	IL		
3	E85	4	4	Taurus	1995	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			SCHILLER PARK	IL		
3	E85	8	7	Taurus	1995	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			SCHILLER PARK	IL		
3	E85	9	3	Taurus	1995	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			SPRINGFIELD	IL		
3	E85	2	2	Taurus	1996	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			MADISON	WI		
3	M85	2	1	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			CHICAGO	IL		
3	M85	7	3	Spirit	1993	pool vehicle	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			FT MEADE	MD		
3	M85	2	2	Spirit	1993	assigned - group	don't want	yes - AFV									mostly gasoline	no	no	no	yes	<1 day			ALAMEDA	CA		
3	M85	3	3	Spirit	1993	assigned - group	neutral	about same									mostly AF	no	no	no	yes	<1 day			ANAHEIM HILLS	CA		
3	M85	1	1	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			AUBURN	CA		
3	M85	4	1	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			CANOCA PARK	CA		
3	M85	90	6	Spirit	1993	pool vehicle	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			CRESCENT CITY	CA		
3	M85	2	2	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			EL SEGUNDO	CA		
3	M85	5	1	Spirit	1993	assigned - group	neutral	about same					yes	yes			mostly gasoline	no	no	no	yes	<1 day			FORT IRWIN	CA		
3	M85	2	1	Spirit	1993	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			GARDENA	CA		
3	M85	9	7	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	yes	no	no	yes	<1 day			LONG BEACH	CA		
3	M85	7	1	Spirit	1993	assigned - driver	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			BOULDER	CO		
3	M85	2	2	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			DENVER	CO		
3	M85	5	2	Spirit	1993	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			WASHINGTON	DC		
3	M85	3	1	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			ATLANTA	GA		
3	M85	4	1	Intrepid	1995	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			AMF O'HARE	IL		
3	M85	1	1	Spirit	1993	assigned - group	don't want	yes - AFV									mostly gasoline	no	no	no	yes	<1 day			SELFRIDGE ANGB	MI		
3	M85	4	1	Spirit	1993	assigned - driver	neutral	about same									mostly gasoline	yes	no	no	yes	<1 day			TROY	MI		
3	M85	196	12	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			FT. HAMILTON	NY		
3	M85	2	1	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			NEW YORK	NY		
3	M85	19	9	Spirit	1993	pool vehicle	neutral	about same		yes	yes						mostly gasoline	yes	yes	yes	no		AFV	20	WASHINGTON	DC		
4	CNG-CON	130	80	Various		assigned - group	don't want	yes - AFV									mostly AF	yes	no	no	yes	<1 day			SAN DIEGO	CA		
4	CNG-CON	4	2	Ram Vans		assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			LAKEWOOD	CO		
4	CNG-CON	1000	80	Various		assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			WASHINGTON	DC		
4	CNG-CON	78	6	Dodge B150	1993	assigned - group	don't want	yes - AFV									mostly gasoline	no	no	no	yes	<1 day			NORTH HILLS	CA		
4	CNG-CON	24	2	Dodge B150	1993	assigned - group	don't want	yes - AFV									mostly AF	yes	no	no	yes	<1 day			29 PALMS	CA		
4	CNG-CON	33	33	Various		assigned - group	don't want	yes - AFV	yes								mostly AF	no	no	no	yes	<1 day			F.E.WARREN AFB	WY		
4	CNG-OEM	800	14	Caravan	1994	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			LIVERMORE	CA		
4	CNG-OEM	30	6	Caravan	1994	assigned - group	don't want	yes - AFV									mostly AF	no	no	no	yes	<1 day			FT CARSON	CO		
4	CNG-OEM	34	3	Caravans	1994	assigned - group	don't want	yes - AFV						yes			mostly AF	yes	no	yes	no		AFV	20	WASHINGTON	DC		
4	CNG-OEM	25	1	Caravan	1994	assigned - group	don't want	yes - AFV									mostly AF	yes	no	no	yes	<1 day			WASHINGTON	DC		
4	CNG-OEM	7	1	Caravan	1994	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			WASHINGTON	DC		
4	CNG-OEM	5	2	Caravans	1994	assigned - group	want	about same									mostly AF	yes	no	no	yes	<1 day			WASHINGTON	DC		
4	CNG-OEM	2	2	Caravans	1994	assigned - group	don't want	yes - AFV									mostly AF	no	no	no	yes	<1 day			TAMPA	FL		
4	CNG-OEM	58	4	Caravans	1994	assigned - driver	don't want	yes - AFV									mostly AF	no	no	yes	no		AFV	5	ATLANTA	GA		
4	CNG-OEM	100	1	Caravan	1994	pool vehicle	don't want	about same									mostly AF	yes	no	no	yes	<1 day			ATLANTA	GA		
4	CNG-OEM	2	1	Caravan	1994	assigned - group	neutral	yes - AFV									mostly AF	yes	no	no	no		AFV	5	FT. MCPHERSON	GA		
4	CNG-OEM	14	1	Caravan	1994	assigned - driver	want	about same									mostly AF	yes	no	no	yes	<1 day			JACKSON	MS		
4	CNG-OEM	10	2	Caravan	1992	assigned - group	want	about same									mostly AF	yes	no	no	yes	<1 day			PRINCETON	NJ		
4	CNG-OEM	820	15	Caravan		assigned - group	want	about same									mostly AF	yes	no	no	yes	<1 day			ALBUQUERQUE	NM		
4	CNG-OEM	1354	32	Caravan	1994	assigned - group	don't want	yes - AFV									mostly AF	yes	no	no	yes	<1 day			LOS ALAMOS	NM		
4	CNG-OEM	40	1	Caravan	1994	assigned - driver	don't want	yes - AFV						yes			mostly AF	yes	no	no	yes	<1 day			LOS ALAMOS	NM		
4	CNG-OEM	42	1	Caravans	1994	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			LOS ALAMOS	NM		
4	CNG-OEM	50	2	Caravans	1994	assigned - group	want	about same									mostly AF	yes	no	no	yes	<1 day			LOS ALAMOS	NM		
4	CNG-OEM	14	1	Caravan	1994	assigned - group	neutral	about same									mostly AF	no	no	no	yes	<1 day			LAS VEGAS	NV		
4	CNG-OEM	4	1	Caravan	1994	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			PITTSBURGH	PA		
4	CNG-OEM	30	11	Caravans	1994	assigned - group	don't want	yes - AFV									mostly AF	no	no	yes	yes	<1 day			OGDEN	UT		
4	CNG-OEM	3	1	Caravan	1994	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			FORT BELVOIR	VA		
4	CNG-OEM	100	3	Ram Vans	1994	assigned - group	don't want	yes - AFV									mostly AF	yes	no	no	yes	<1 day			MILWAUKEE	WI		
4	CNG-QVM	200	25	Ford	1995	assigned - group	don't want	yes - AFV						yes			mostly AF	yes	yes	no	no		AFV	5	HOUSTON	TX		
4	E85	12	9	Taurus	1995	assigned - group	want	about same						yes			mostly AF	yes	no	yes	yes	1-5 days			AMES	IA		
4	E85	1	1	Taurus	1995	assigned - driver	neutral	yes - AFV									mostly AF	yes	no	no	yes	<1 day			DES MOINES	IA		
4	E85	9	7	Taurus	1996	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			CHICAGO	IL		
4	E85	18	2	Taurus	1995	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			CHICAGO	IL		

Quarter	Vehicle/ Fuel type	LDVs in Fleet	AFVs in Fleet	AFV Model	Year	Vehicles Assigned	Want/Don't Want AFVs	Complaints from drivers	Reported Performance Complaints									Use Alt. Fuel	Alt. Fuel Nearby	10	11	12	13	14	15	Location	
									1	2	3	4	5	6	7	8	9									City/Base	State
4	E85	19	4	Taurus	1995	assigned - driver	want	about same									mostly AF	yes	no	no	yes	<1 day			SPRINGFIELD	IL	
4	E85	2	2	Taurus	1995	assigned - group	want	about same									mostly gasoline	no	no	no	yes	<1 day			INDIANAPOLIS	IN	
4	E85	83	6	Taurus	1995	assigned - group	neutral	about same									mostly gasoline	no	yes	no	yes	<1 day			WICHITA	KS	
4	E85	159	23	Taurus	1996	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			MINNEAPOLIS	MN	
4	E85	6	3	Taurus	1996	assigned - group	want	about same							yes		mostly AF	no	no	no	yes	<1 day			ST LOUIS	MO	
4	E85	6	6	Taurus	1995	assigned - group	want	about same									mostly AF	yes	no	no	yes	<1 day			ST LOUIS	MO	
4	E85	12	1	Taurus	1995	assigned - group	want	about same									mostly AF	yes	no	no	yes	<1 day			ST LOUIS	MO	
4	E85	3	1	Taurus	1995	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			ST LOUIS	MO	
4	E85	3	2	Taurus	1995	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			ST LOUIS	MO	
4	E85	4	3	Taurus	1995	assigned - group	neutral	about same									mostly gasoline	yes	no	no	yes	<1 day			ST LOUIS	MO	
4	E85	4	2	Taurus	1996	assigned - group	want	about same									mostly AF	yes	no	no	yes	<1 day			ST LOUIS	MO	
4	E85	3	2	Taurus	1995	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			ST LOUIS	MO	
4	E85	46	2	Spirit	1993	assigned - group	neutral	yes - gasoline									mostly gasoline	no	yes	no	yes	<1 day			ST LOUIS	MO	
4	E85	1	1	Taurus	1995	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			ST LOUIS	MO	
4	E85	13	1	Taurus	1995	assigned - driver	want	yes - gasoline									mostly gasoline	no	no	no	yes	<1 day			ST LOUIS	MO	
4	E85	3	2	Taurus	1995	assigned - driver	neutral	about same									mostly AF	no	no	no	yes	<1 day			ST. LOUIS	MO	
4	E85	1	1	Taurus	1996	assigned - group	want	about same									mostly AF	yes	no	no	yes	<1 day			CHICAGO	IL	
4	E85	56	19	Taurus	1996	assigned - group	want	about same									mostly gasoline	yes	no	no	yes	<1 day			INDIANAPOLIS	IN	
4	E85	2	2	Taurus	1995	assigned - group	want	about same									mostly AF	yes	yes	no	yes	<1 day			ST ANN	MO	
4	M85	70	30	Spirit	1993	assigned - group	don't want	yes - AFV									mostly gasoline	no	no	no	yes	<1 day			FT GEORGE MEADE	MD	
4	M85	2	2	Spirit	1993	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			SAN FRANCISCO	CA	
4	M85	2	1	Taurus	1995	assigned - group	haven't noticed	about same									mostly AF	yes	no	no	yes	<1 day			SAN FRANCISCO	CA	
4	M85	10	1	Taurus	1995	assigned - group	neutral	about same									mostly gasoline	no	yes	no	yes	<1 day			SAN FRANCISCO	CA	
4	M85	2	2	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	yes	no	yes	<1 day			SAN JOSE	CA	
4	M85	5	1	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			SAN JOSE	CA	
4	M85	1	1	Spirit	1993	assigned - group	don't want	about same									mostly gasoline	no	yes	no	yes	<1 day			SAN MATEO	CA	
4	M85	3	1	Spirit	1993	assigned - group	neutral	about same									mostly AF	yes	no	no	yes	<1 day			DENVER	CO	
4	M85	5	1	Spirit	1993	assigned - group	don't want	about same									mostly AF	yes	no	no	yes	<1 day			DENVER	CO	
4	M85	40	1	Spirit	1993	assigned - group	want	about same									mostly gasoline	no	no	no	yes	<1 day			ENGLEWOOD	CO	
4	M85	2	1	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			GOLDEN	CO	
4	M85	7	1	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			BOLLING AFB	DC	
4	M85	2	1	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			WASHINGTON	DC	
4	M85	3	1	Spirit	1993	assigned - group	neutral	yes - gasoline									mostly gasoline	no	no	no	yes	<1 day			AMF O' HARE	IL	
4	M85	62	17	Various		assigned - group	want	about same									mostly AF	yes	no	no	yes	<1 day			ARGONNE	IL	
4	M85	2	1	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	yes	no	no	yes	<1 day			CHICAGO	IL	
4	M85	12	4	Spirit	1993	assigned - group	neutral	about same									mostly AF	no	no	no	yes	<1 day			CHICAGO	IL	
4	M85	80	10	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			GREAT LAKES	IL	
4	M85	2	1	Spirit	1993	assigned - driver	neutral	about same									mostly AF	no	no	no	yes	<1 day			LANDOVER	MD	
4	M85	10	1	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			LANDOVER	MD	
4	M85	2	1	Spirit	1993	assigned - group	neutral	about same									mostly gasoline	no	no	no	yes	<1 day			SALISBURY	MD	
4	M85	20	6	Taurus	1996	assigned - group	want	about same									mostly AF	yes	no	no	yes	<1 day			DETROIT	MI	
4	M85	220	10	Taurus	1996	assigned - group	want	about same									mostly AF	yes	no	no	yes	<1 day			LANSING	MI	

Reported Performance Complaints

- 1- Hard to start
- 2 - Stall after starting
- 3 - Stall in traffic
- 4 - Poor idle
- 5 - Hesitation
- 6 - Lack of power
- 7 - Engine ping
- 8 - Check engine light on
- 9 - Other

Note: Blanks indicate no response provided, or no complaints reported depending on the column

Other numbered columns

- 10 - AFVs have different or additional SCHEDULED maintenance than gasoline vehicles
- 11 - AFVs have differences in frequency or types of UNSCHEDULED maintenance than gasoline vehicles
- 12 - Downtime about same for AFVs and gasoline vehicles
- 13 - Average downtime for fleets' vehicles each month
- 14 - If NO in column numbered 12, which vehicle has more downtime: AFV or gasoline
- 15 - Average number of days per month downtime (for vehicles in column numbered 14)

\*Each row in the table contains the responses from one fleet manager.

# Appendix B:

## Geographic Distribution of Survey Participants by Primary AFV Type and By Quarter\*

\*Census regions are shown on all maps; no participants were located in Alaska or Hawaii.

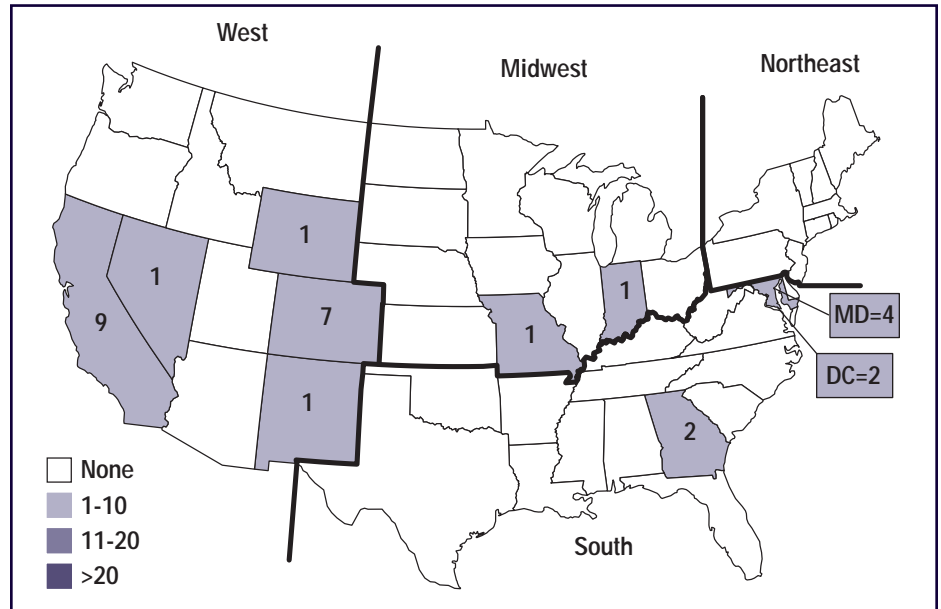


Figure B-1. Fleet manager survey distribution: CNG conversions primary AFV type

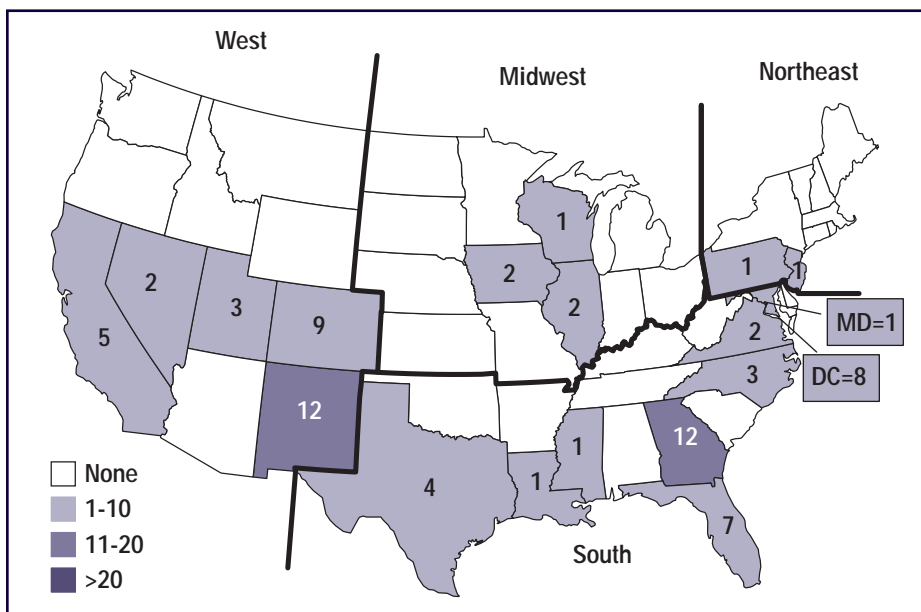


Figure B-2. Fleet manager survey distribution: CNG-OEM primary AFV type

# Perspectives on AFVs

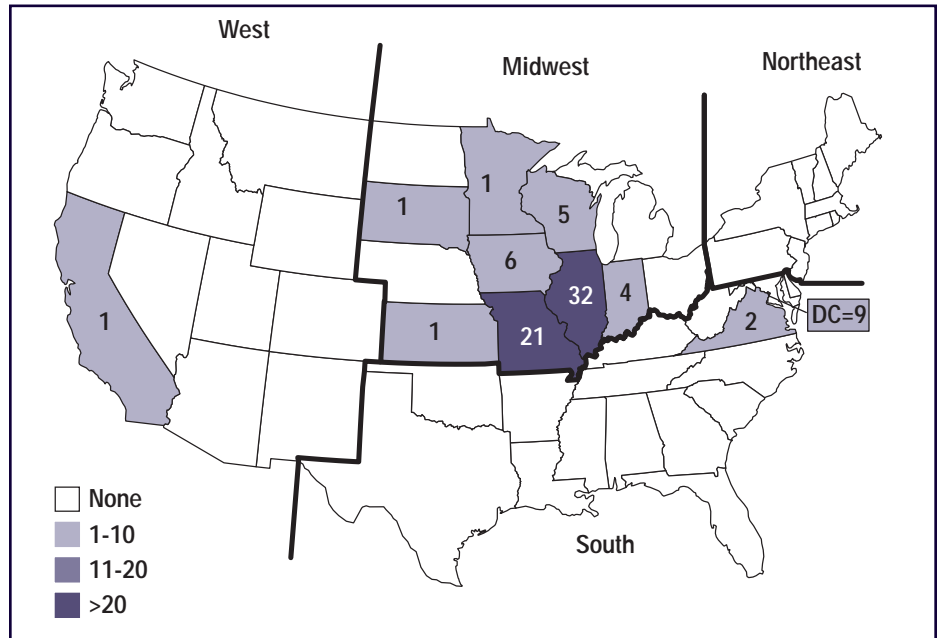


Figure B-3. Fleet manager survey distribution: E85 primary AFV type

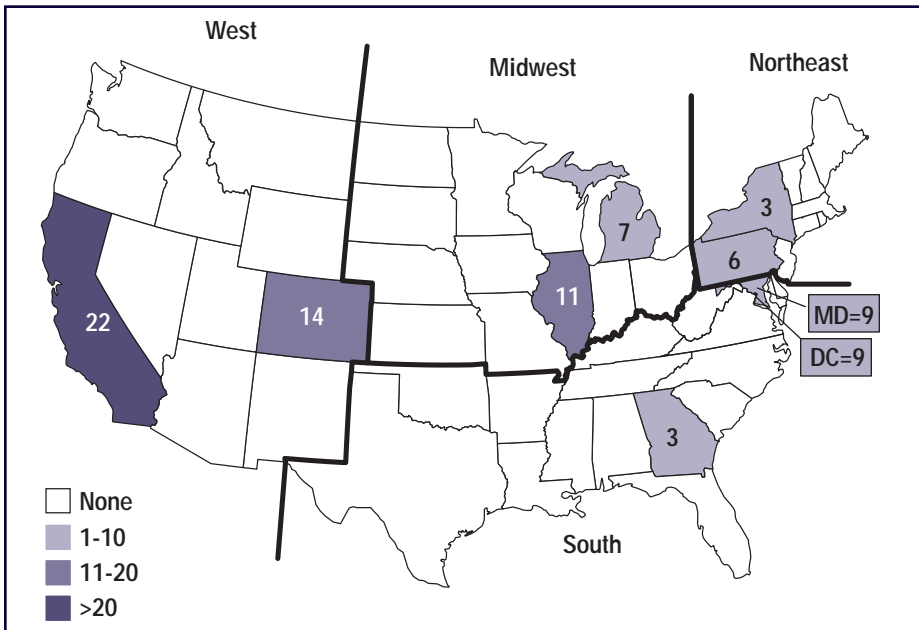


Figure B-4. Fleet manager survey distribution: M85 primary AFV type

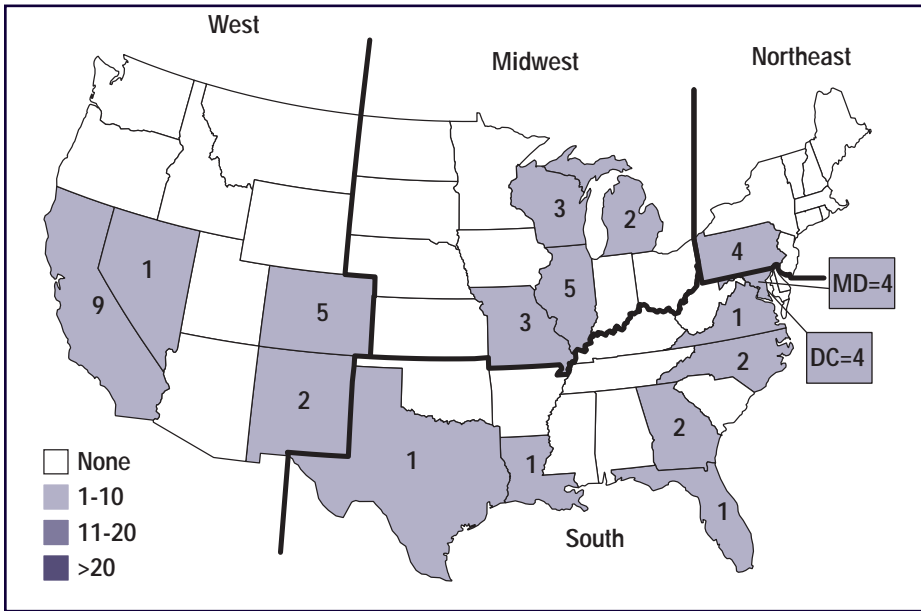


Figure B-5. Fleet manager survey distribution: Quarter 1

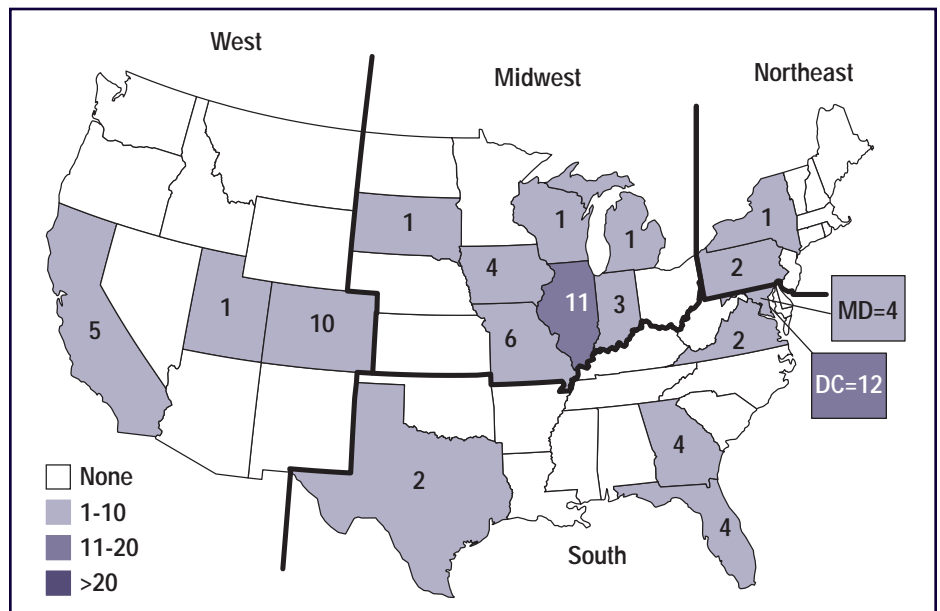


Figure B-6. Fleet manager survey distribution: Quarter 2



# Perspectives on AFVs

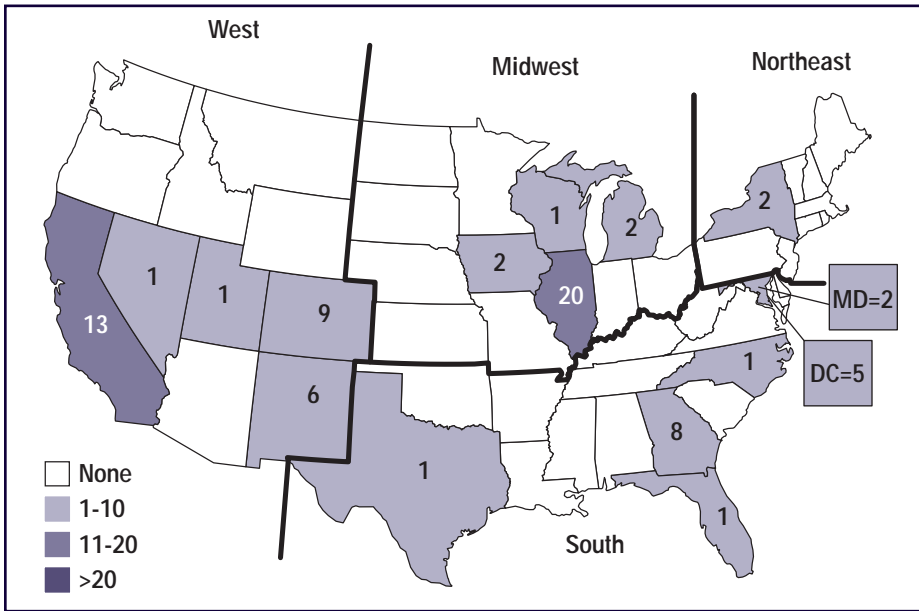


Figure B-7. Fleet manager survey distribution: Quarter 3

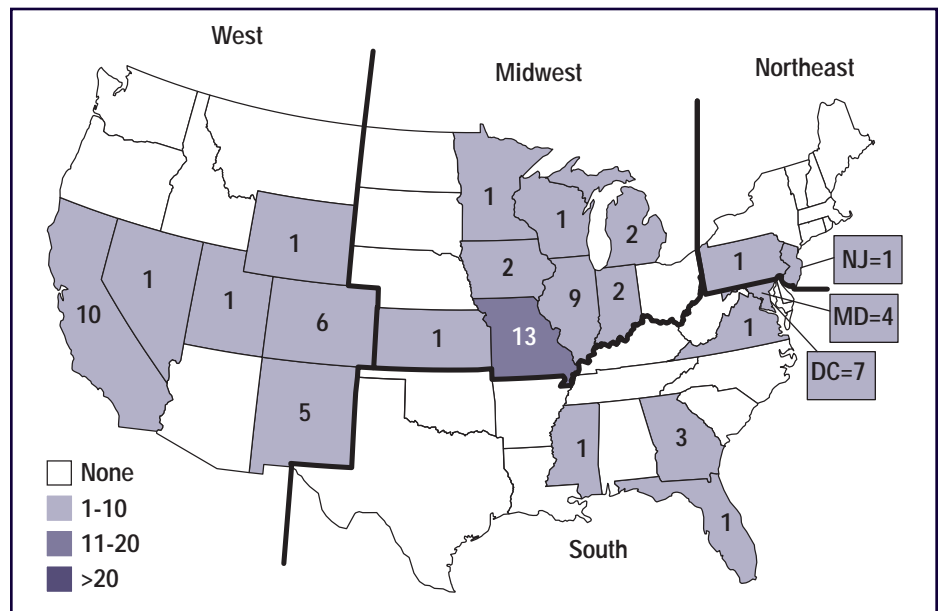


Figure B-8. Fleet manager survey distribution: Quarter 4

# Appendix C:

## Fleet Size Distribution— All Vehicles, and AFVs Only

Figure C-2. Fleet size distribution (all vehicles), by fleet size class and primary type of AFV in the fleet

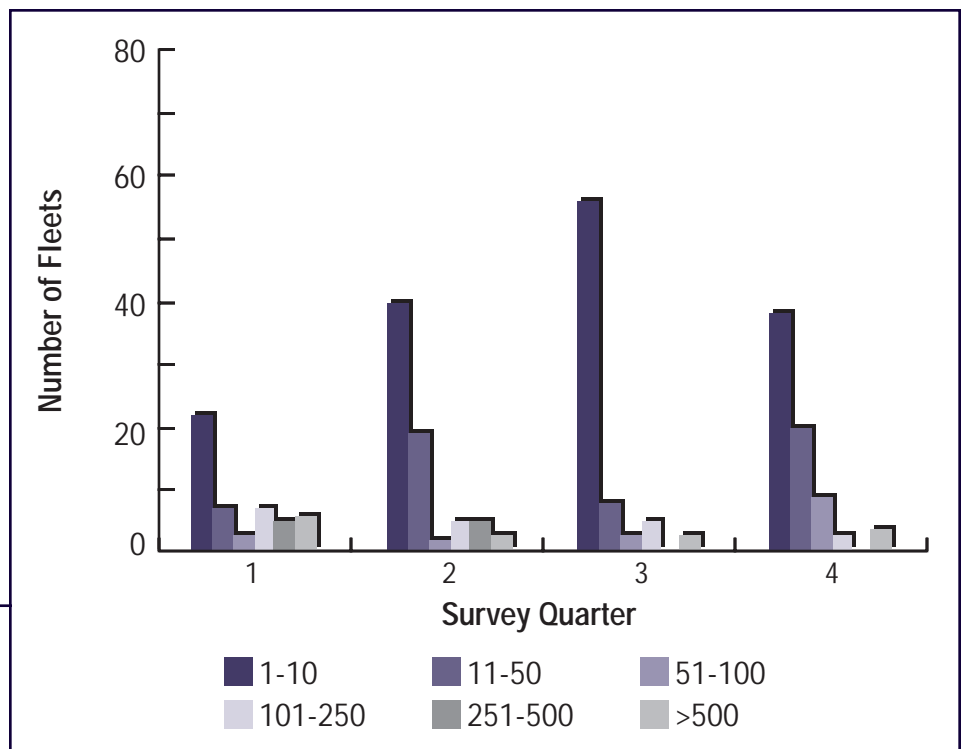
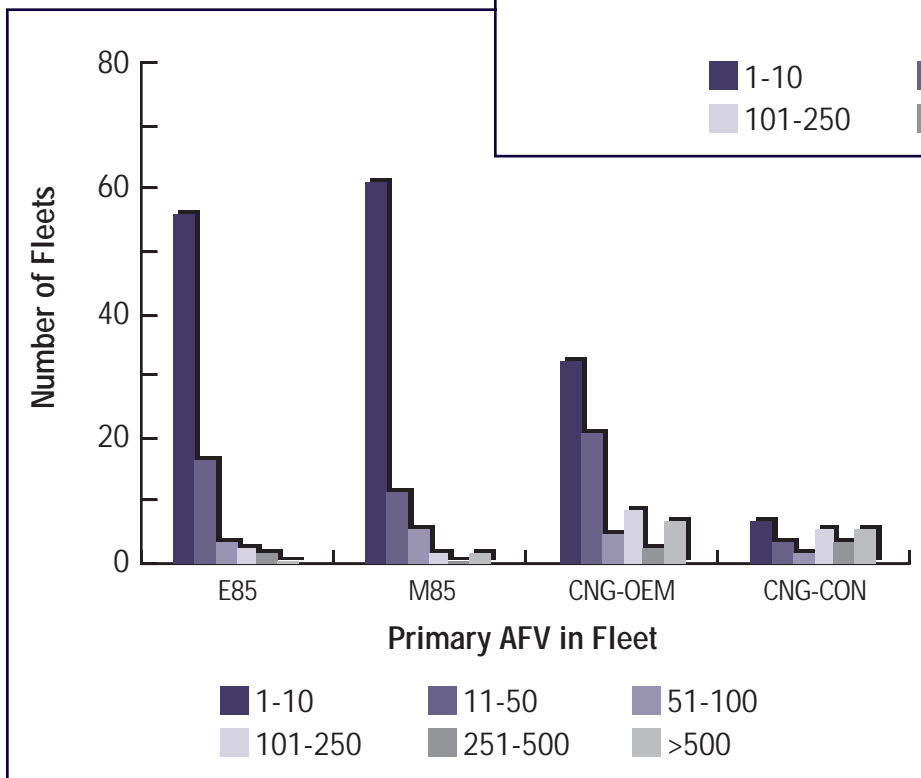


Figure C-1. Fleet size distribution (all vehicles), by survey quarter and fleet size class

# Perspectives on AFVs

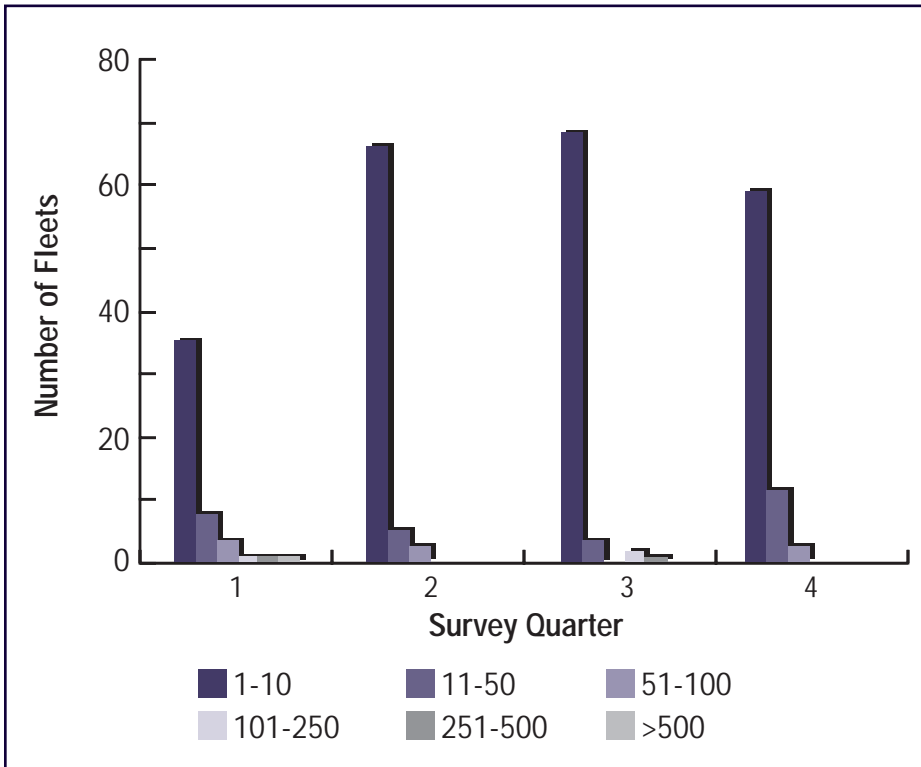


Figure C-3. Fleet size distribution (AFVs only), by survey quarter and fleet size class

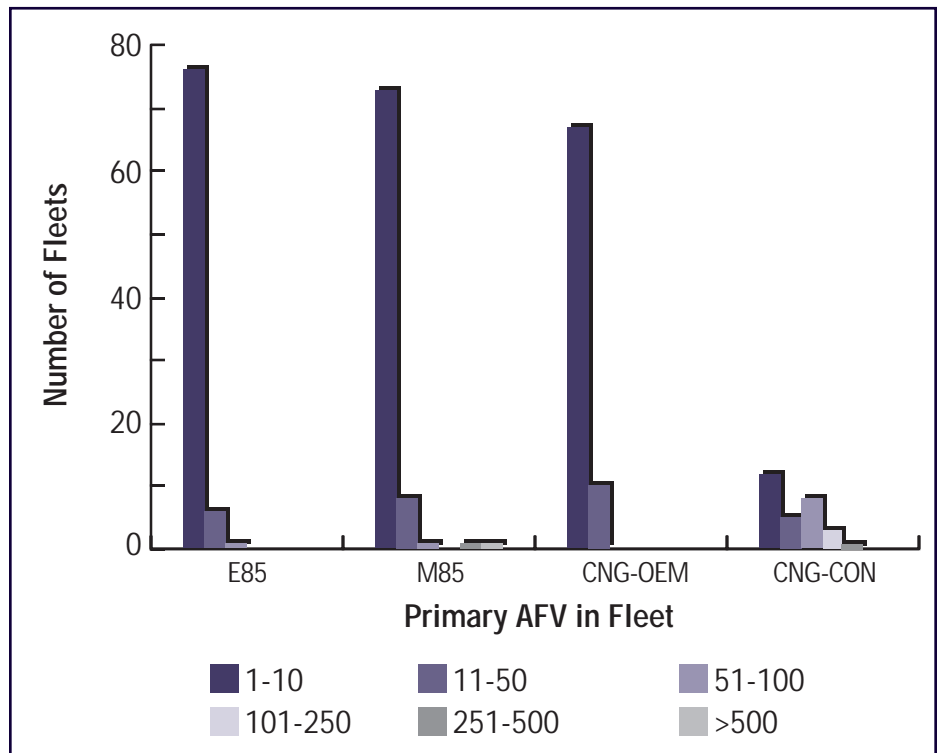


Figure C-4. Fleet size distribution (AFVs only), by fleet size class and primary type of AFV in the fleet

Produced for the U.S. Department of Energy by:

**NREL**

1617 Cole Boulevard  
Golden, Colorado 80401-3393

World Wide Web: <http://www.afdc.nrel.gov>

July 1997  
NREL/TP-540-22720



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