

**ALTERNATIVE FUEL USE AMONG
CALIFORNIA FLEETS:
CURRENT USE, BARRIERS, AND
OPPORTUNITIES**

CONSULTANT REPORT

Prepared For:
California Energy Commission

Prepared By:
Zetetic Associates, Inc.



JUNE 2007
CEC-600-2007-006

Prepared By:

Zetetic Associates, Inc.
Claire Vallotton, PhD, Project Manager
Jenica Huddleston, M.S., President
West Sacramento, California
Contract No. 600-05-009

Prepared For:

California Energy Commission

Asish Gautam
Contract Manager

Tim Olson
Project Manager

Ray Tuvell
Manager
EMERGING FUELS AND TECHNOLOGY

Rosella Shapiro
Deputy Director
FUELS AND TRANSPORTATION

B.B. Blevins
Executive Director

DISCLAIMER

This report was prepared as the result of work sponsored by the California Energy Commission. It does not necessarily represent the views of the Energy Commission, its employees or the State of California. The Energy Commission, the State of California, its employees, contractors and subcontractors make no warrant, express or implied, and assume no legal liability for the information in this report; nor does any party represent that the uses of this information will not infringe upon privately owned rights. This report has not been approved or disapproved by the California Energy Commission nor has the California Energy Commission passed upon the accuracy or adequacy of the information in this report.

TABLE OF CONTENTS

EXECUTIVE SUMMARY..... 4

PREFACE: OBJECTIVES AND METHODS..... 8

CHAPTER 1: NICHE MARKET PENETRATION..... 11

CHAPTER 2: VEHICLE AND INFRASTRUCTURE PERFORMANCE 20

CHAPTER 3: CUSTOMER SATISFACTION..... 37

CHAPTER 4: CUSTOMER MOTIVATION 44

CHAPTER 5: BARRIERS TO ALTERNATIVE FUEL USE 53

CHAPTER 6: REQUIREMENTS FOR GOVERNMENT SUBSIDIES OR OTHER INCENTIVES..... 60

CHAPTER 7: CUSTOMERS’ LIKELIHOOD OF ACCEPTING TAX INCREASES IN EXCHANGE FOR AF BENEFITS 67

CHAPTER 7: CUSTOMERS’ LIKELIHOOD OF ACCEPTING TAX INCREASES IN EXCHANGE FOR AF BENEFITS 67

CHAPTER 8: NICHE MARKET OPPORTUNITIES 68

CHAPTER 9: RECOMMENDATIONS 74

APPENDIX A: SURVEY 79

APPENDIX B: INVITATION..... 90

ABSTRACT

The California Energy Commission sponsored a survey as part of an effort to increase alternative fuel (AF) use in California's transportation sector to meet standards reducing greenhouse gas emissions. The primary objective of this survey was to describe niche opportunities for AF market penetration among California fleets by characterizing the attitudes of fleet operators likely to affect their AF decisions. This report describes results from this survey of 1,330 fleet operators, and two focus groups. Thirteen percent of fleets use AFs; most use AFs in only 1 to 20 percent of vehicles. Current AF users are satisfied with vehicle performance and reliability; 72 percent plan to continue AF use. Lack of fueling infrastructure and vehicle choice limit expansion of AFs among current users. Sixty five percent of non-users are interested in AFs; 30 percent are undecided. Respondents are most interested in biodiesel, followed by E85, then electric. Non-users are very concerned about potential problems with AFs, including lack of fueling stations, then conversion costs, vehicle reliability, and maintenance costs. Lack of objective, readily available information keeps non-users from overcoming their concerns to pursue AF use. Ten recommendations are discussed to overcome barriers and take advantage of niche market opportunities.

Keywords

Alternative fuels, commercial vehicles, commercial fleets, consumer opinion, biodiesel, LPG/propane, liquefied natural gas (LNG), compressed natural gas (CNG), electric vehicles, E-85, fleet size, industry.

EXECUTIVE SUMMARY

The primary objective of the Alternative Fuel Use among California Fleets survey project was to identify and describe niche opportunities for alternative fuel market penetration among California fleets by characterizing the attitudes of fleet operators likely to affect their alternative fuel decisions.

This report describes current alternative fuel use among private and government vehicle fleets in California, fleet operators' perceptions of the benefits and barriers to alternative fuel use, and specific opportunities to promote alternative fuel in particular fuel-industry niches. This report describes results from a survey of 1,330 California fleet operators, and focus groups involving nine survey respondents. The name of the survey was "What is the Future of Alternative Fuel in California?"

Results

Niche Market Penetration

Thirteen percent of fleet operators currently use alternative fuels (AF). Most current users (74 percent) use alternative fuels in only 1 to 20 percent of their vehicles; while less than 10 percent use alternative fuels in the majority of their vehicles. Propane (LPG) and biodiesel are currently the most commonly used alternative fuels among private fleets, followed by compressed natural gas and electric.

Vehicle and Infrastructure Performance

Current alternative fuel users are satisfied with vehicle performance and reliability. They are content with the cost of fuel, and willing to sacrifice some added cost in order to "be green"; however getting over the hurdle of incremental vehicle cost is problematic. The biggest problem for current users is supply: lack of infrastructure to support fuel availability and a lack of vehicle choice.

Customer Satisfaction

Current alternative fuel users are fairly satisfied with vehicle performance, a little less satisfied with fueling cost, and only somewhat satisfied with fueling infrastructure. The majority (72 percent) of current alternative fuel users plan to continue or increase their use of alternative fuels. Only 8 percent plan to decrease use, and 20 percent are undecided.

Customer Motivation

Sixty five percent of current non-users are interested in using alternative fuels in the future; 5 percent are not interested, and 30 percent are undecided. Survey respondents are most interested in biodiesel (58 percent of respondents), followed by E85 (41 percent), then Electric (23 percent). Current AF users began using AFs for the benefits to the environment. However, non-users would be motivated by 1) vehicle reliability, 2) fuel cost savings, 3) lower maintenance cost, 4) vehicle performance, and 5) environmental benefits.

Barriers to Alternative Fuel Use

Non-users are very concerned about the potential problems of using alternative fuels. Non-users perceive the biggest barriers to alternative fuel use as lack of access to fueling stations, followed by conversion costs, vehicle reliability, and maintenance costs. The lack of accurate, readily available information from a trusted source keeps non-users from overcoming their many concerns in order to pursue alternative fuel use. Vehicle choice and lack of access to fueling stations are the biggest barriers to expansion of alternative fuel use among current users.

Promoting Alternative Fuel Use

According to both users and non-users, the most helpful changes to promote alternative fuel demand among California fleets would be fuel use incentives, state tax rebates, and vehicle purchase incentives, followed by relaxation of conversion regulations, then outreach, education, and training for the public and private fleet operators. Fleet operators also want the government to address the *supply* of alternative fuels, as well as choice of alternative fuel vehicles.

Acceptance of Tax Increases

Some survey and focus group respondents see petroleum as a fuel monopoly that has thrived with government support to shut other fuels out of the market. Thus they see a legitimate role for the government to disincentivize gasoline/diesel use and incentivize use of alternative fuels.

Nice Market Opportunities

Three industries—construction/maintenance, agriculture, and good transportation-short haul—comprise 50 percent of California fleets represented by fleet operators who responded to the survey. Among these larger industries, approximately 60 percent of fleets would consider using alternative fuels; if survey respondents are representative of California fleets, this fact represents the opportunity to expand into 36 percent of *all* California fleets.

Most California fleets are small fleet; alternative fuel use among small fleets could be promoted by incentive programs to help businesses overcome the prohibitive start-up costs.

Government actions to increase the supply and availability of alternative fuels, the supply and selection of alternative fuel vehicles, and improvement of alternative fuel vehicle technology would promote expansion of alternative fuel use among current users.

Recommendations

In the long-term, alternative fuel use will be promoted among non-users by generating and disseminating accurate information on the costs and benefits of using alternative fuels. Based on this information, incentive plans could be developed to make alternative fuel costs comparable to petroleum. Monetary incentives should be transparent to fleet operators, particularly when a phase-out of incentives is planned.

Long-term plans for alternative fuel incentives and regulations should be consistent with federal guidelines and coordinate with county and city government agencies to be sure that businesses are not penalized for alternative fuel use.

In the short-term, collection and publication of all current information in one easily accessible government agency Web site will serve the immediate need for reliable information, even if current information is not complete.

State government should offer incentives to help small businesses overcome prohibitive start-up costs such as alternative fuel vehicle purchase or conversions.

The need for vehicle choice and performance can be addressed by facilitating conversations between manufacturers and fleet operators.

Businesses using alternative fuels should be publicly recognized and rewarded.

PREFACE: OBJECTIVES AND METHODS

Objectives

The primary goal of the Alternative Fuel Use Among California Fleets project was to identify and describe niche opportunities for alternative fuel (AF) market penetration among private California fleets by characterizing the attitudes of fleet operators likely to affect their alternative fuel decisions.

The Alternative Fuel Use among California Fleets project had eight specific objectives:¹

1. Determine niche market penetration.
2. Verify vehicle and infrastructure performance.
3. Measure customer satisfaction.
4. Understand customer motivation.
5. Identify barriers and verify progress to overcome existing market barriers.
6. Identify requirements for government subsidies or other incentives.
7. Determine the customers' likelihood of accepting tax increases in exchange for any benefits from alternative fuels.
8. Identify and describe niche market opportunities.

Methods

Overview

The results were generated through two methods: an online survey of 1,330 California fleet operators and two focus groups with nine survey respondents. First, an online survey was conducted among vehicle fleet owners and operators recruited through the California Department of Motor Vehicles (DMV) registration database and through the California Fleet News listserve. At the end of the survey, participants were asked if they were willing to participate in a focus group. Focus group participants were selected from among willing survey participants.

Survey

An online survey was conducted to gather information from a broad pool of California fleet owners and operators. The survey was designed by collaboration among the California Energy Commission staff, Zetetic Associates, and Katin Engineering. It was piloted with a group of 20 participants, revised, and then finalized for the total sample. See Appendix A for the final version of the survey.

¹ Objectives are from the project Scope of Work provided by the California Energy Commission.

Survey Participants and Recruitment

Invitations to the survey were mailed to 16,623 individuals listed in the 2005 California DMV registration database to whom 10 or more cars were registered, excluding those estimated to be government fleet operators (see Appendix B for a copy of the invitation). The same invitation was sent through email to a listserve of approximately 500 vehicle fleet owners and operators held by the California Fleet News which included a large portion of government fleet operators. Approximately 1,025 of the mailed invitations were returned due to incorrect address. Of those, 125 new addresses were found and letters re-sent. Thus, approximately 15,600 California fleet operators received an invitation to participate in the survey. A reminder mailing (see Appendix B) was sent by both letter and email.

Survey Responses

Because the invitation was sent to two potentially overlapping groups, participants were instructed to fill out the survey only once. The online survey format was set to allow only one response per computer to assure non-duplication. It was set to allow participants to stop the survey and re-enter it at a later time. As a result of this and possible sampling errors, not all of those who started the survey completed it. The numbers of participants from the different lists, as well as numbers of survey starters and survey completers are in Table 1 below.

Table 1: Survey Participants

	<i>Letter</i>	<i>Email</i>	<i>Both</i>	<i>TOTAL</i>
Began survey	1,208	110	12	1,330
Completed Fleet Profile through Question 4: Alternative Fuel Experience	1,105	80	10	1,195
Answered Section 7: Contact Information	1,035	70	10	1,115

Table 1. Source: 'What is the Future of Alternative Fuel in California?' survey data.

A total of 1,330 people began the survey; 1,195 filled out the fleet profile (through question 4), and 1,115 answered the last question regarding future participation in a focus group. Some questions were required while others were not; thus, after the Fleet Profile, between 1,115 and 1,195 people answered the required questions.

The response rate for the survey was approximately 9 percent. The reason for the relatively low response rate in this survey is likely because of the requirement that survey respondents transfer media in order to access the survey (from a hard-copy letter to a website).² The low response rate leaves room for response bias. Those who

² Potential survey respondents received an invitation by mail, and then had to enter the web address into their web-browsers by hand. This created some technical difficulties for users, making participation in the survey troublesome, even though there was technical assistance available.

did respond to the survey could be those most interested in using alternative fuels. Thus, generalization of the results to the total population of California fleet operators must be made cautiously.

Focus Groups

Focus groups were conducted to confirm and complement the survey results. Focus group questions were designed by collaboration among the California Energy Commission staff, Zetetic Associates, and Katin Engineering. The focus groups were facilitated by a consultant from Katin Engineering, hosted by a consultant from Zetetic Associates, and attended by staff from the California Energy Commission.

Focus Group Participants and Recruitment

Focus group participants were recruited through the online survey. At the end of the survey, respondents were asked if they were willing to participate in a focus group, and if so, they provided contact information. Potential focus group participants were selected from among willing survey respondents based on their location, their alternative fuel use, their industry type, and their availability and willingness to come to the focus group meeting at the specified time.

Focus Group Attendance

The Northern California focus group was held in Sacramento. Twenty-five fleet operators using AFs were identified from among fleets located north of Fresno, California and invited to attend. Five respondents agreed to come, and three attended.

The Southern California focus group was held in Los Angeles. Seventy-three fleet operators in the industries of agriculture, construction/maintenance, and goods transportation-short haul were identified from among fleets located south of Santa Maria, California and invited to the focus group. Eleven respondents agreed to come, and six attended.

CHAPTER 1: NICHE MARKET PENETRATION

The purpose of the first objective of the survey was to estimate the current percentage of California fleets that use alternative fuels within each industry surveyed and across industries in California.

Summary

Thirteen percent of those surveyed are currently using alternative fuels (AFs) in their fleets. Most current users (74 percent) are using AFs in only 1 to 20 percent of their vehicles; while only 9.5 percent are using AFs in the majority of their vehicles.

Who Uses Alternative Fuels?

Private fleets are much less likely to be using alternative fuels than government fleets; 12 percent of private fleets use AFs, while 62 percent of government fleets currently use AFs. But private fleets are more likely to use AFs in a larger percentage of their fleets.

Larger fleets are more likely to use at least some alternative fuels, but they are less likely to be using AFs in a majority of their vehicles.

Industries vary in their alternative fuel use. The industries with the highest percent of current AF users are the three public works industries, mostly comprised of government fleets. The industries with the most private AF users are bus transportation, fuel-related industries, refuse collection (public works), and taxi/limos. The industries with the least current AF users are construction/maintenance-based fleets, service fleets that are not easily generalized, those fleets used to transport people.

Within the three largest private industries, agriculture is the only one with substantial AF use, while fleets in construction/maintenance and goods transport-short haul have few AF users among them.

Which Alternative Fuels Are Used?

Propane (LPG) and biodiesel are currently the most commonly used alternative fuels among private fleets, followed by compressed natural gas (CNG) and electric. CNG is the most commonly used AF among government fleets.

Industries vary in the types of alternative fuels they use most. Agriculture fleets are more likely to use LPG and biodiesel; construction/maintenance fleets are more likely to use LPG and electric; and the public works fleets are all more likely to use CNG.

Who Uses Alternative Fuels?

Thirteen percent of those surveyed are currently using alternative fuels (AFs) in their fleets. As seen in Figure 1.1, most current users (74 percent) are using AFs in only 1 to 20 percent of their vehicles; while only 9.5 percent are using AFs in the majority of their vehicles.

Figure 1.1: Percent of Fleets Using Alternative Fuels

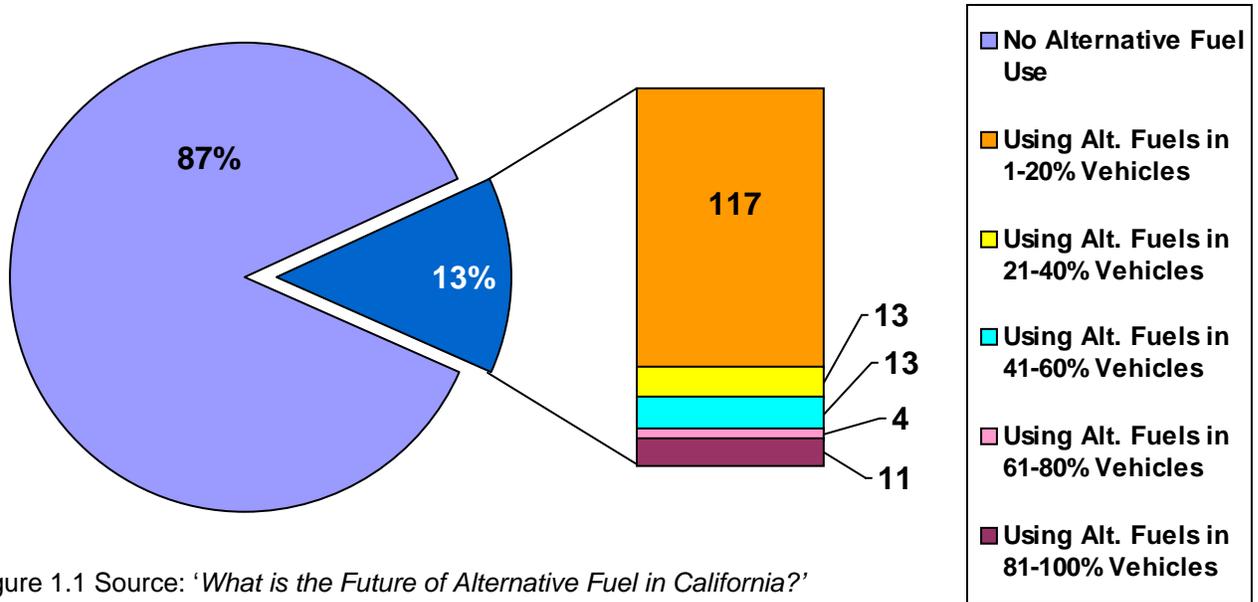


Figure 1.1 Source: 'What is the Future of Alternative Fuel in California?' survey data

Fuel Use by Fleet Size

As seen in Figure 1.2, larger fleets are more likely to use at least some alternative fuels, though they are less likely to be using AFs in a majority of their vehicles.

Figure 1.2: Percent of Fleets Using Alternative Fuels in Each Fleet Size Category

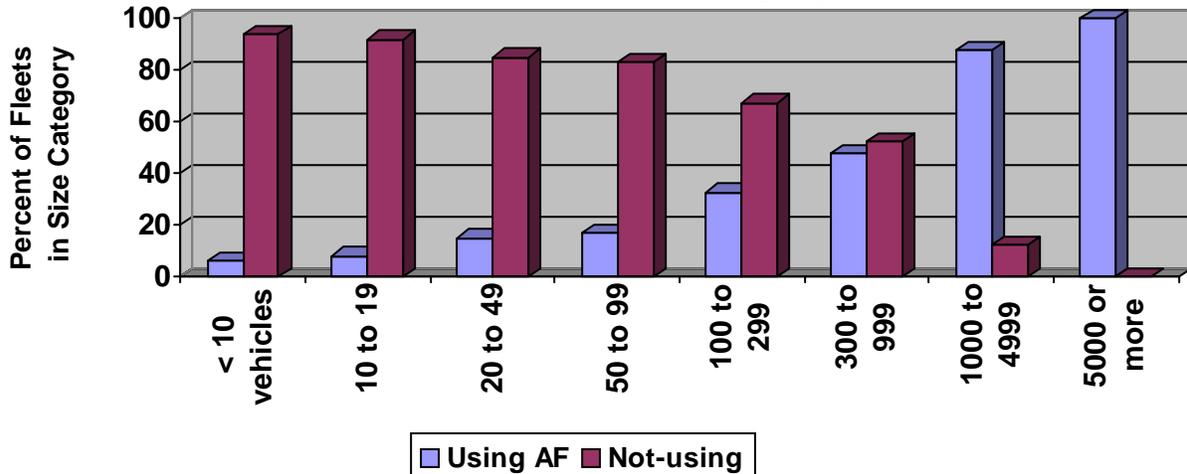


Figure 1.2 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Fuel Use by Private and Government Fleets

Private fleets are much less likely to use alternative fuels than government fleets; 12 percent of private fleets use alternative fuels, while 62 percent of government fleets currently use AFs. However, as seen in Figure 1.3, private fleets are more likely to use AFs in a larger percentage of their fleets; all government fleets use AFs in 1 to 59 percent of their vehicles, whereas 13 percent of private fleets use AFs in 60 to 100 percent of their vehicles.

Figure 1.3: Percent of Fleet Vehicles Using AFs in Private and Government Fleet

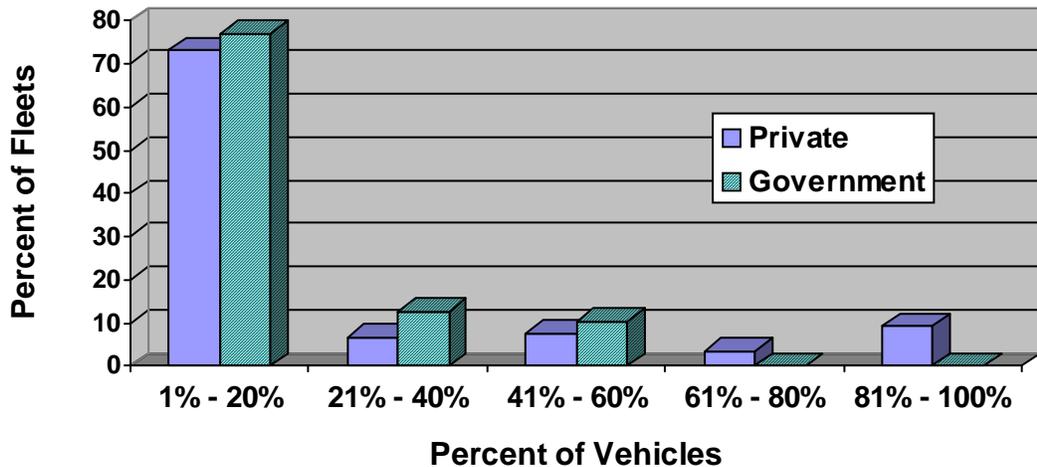


Figure 1.3 Source: 'What is the Future of Alternative Fuel in California?' survey data.

As displayed in Figure 1.4, there are large differences in the usage patterns of private compared to government fleets. Private fleets are far less likely to use AFs. At the average fleet size (18), the probability of a private fleet using alternative fuel is about 10 percent; whereas, it is about 44 percent for government fleets.

Figure 1.4: Probability of AF use by Fleet Size for Government and Private Fleet

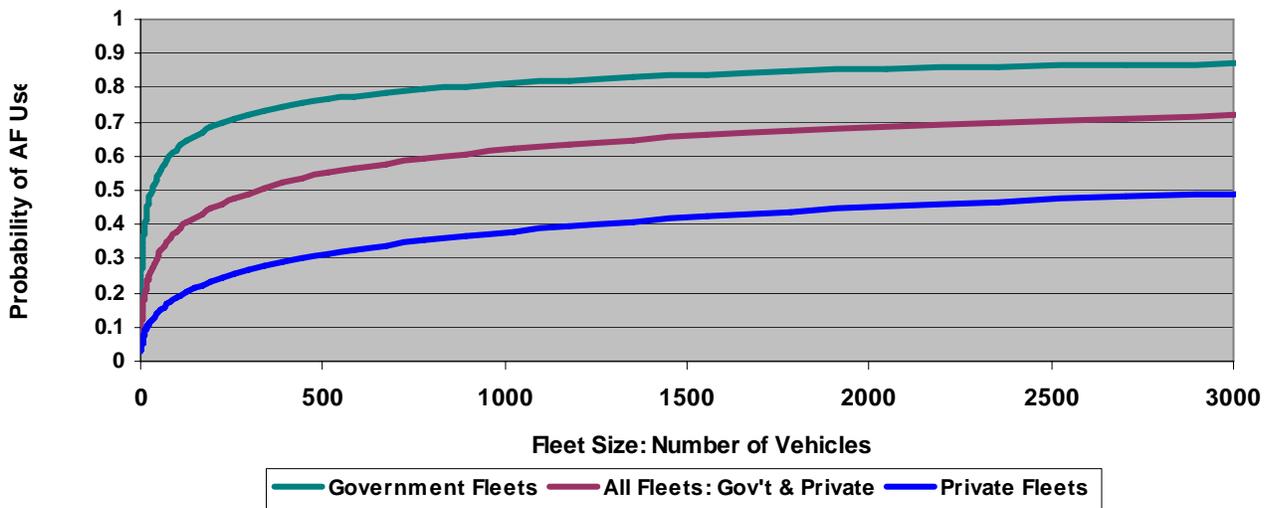


Figure 1.4 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Fuel Use by Industry

Industries vary in their alternative fuel use. Industries with the highest percent of AF users are the three public works industries, but these are mostly government fleets. Industries with the most private AF users are bus transportation, fuel-related industries (i.e. “LPG sales and service,” “oilfield service”), refuse collection (public works), and the taxi/limo industry. Within the three largest private industries, agriculture is the only one with substantial AF use, while fleets in the construction/maintenance and goods transport-short haul industries have few AF users among them. Figure 1.5 shows the percent of fleets in each industry that use AFs, by government and private fleets.

Figure 1.5: Alternative Fuel Use within Each Industry Type by Government and Private Fleets

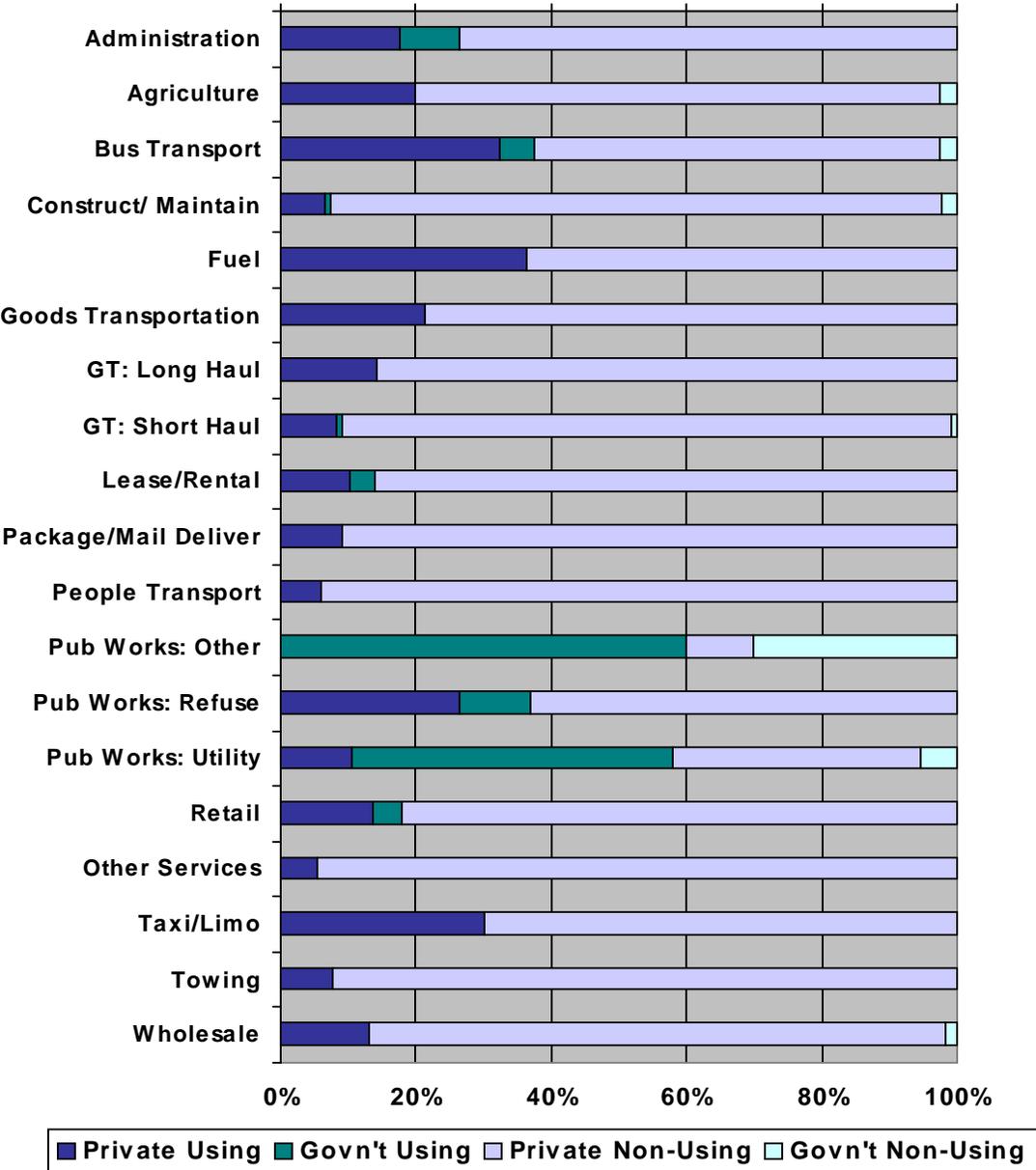


Figure 1.5 Source: ‘What is the Future of Alternative Fuel in California?’ survey data.

Fleet Characteristics Predict Alternative Fuel Use

Several fleet characteristics are predictive of alternative fuel use even when the other characteristics are accounted for. On average, larger fleets are more likely to use alternative fuels. The probability of using alternative ranges from close to zero for very small fleets to around 70 percent with very large fleets, as seen in Figure 1.6.³

There are substantial differences in alternative fuel use by industry. The industries fall into three categories: most, moderately, and least likely to use AF. The probability of AF use by industry and fleet size are shown in Figure 1.6. Industries that fall into each category are as follows:

Most likely to currently use alternative fuels:

- Fuel-related industries
- Busing
- Public works, including both refuse collection and utility
- Taxis, limousines, and charters
- Administration
- General good transportation
- Agriculture

Moderately likely to currently use alternative fuels:

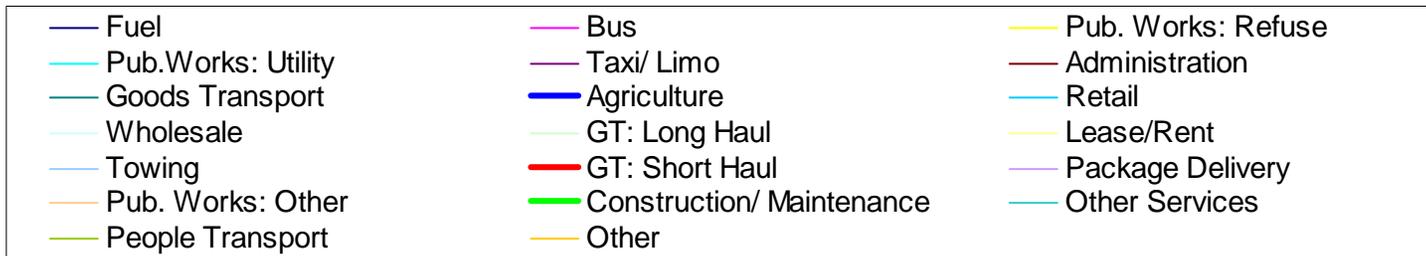
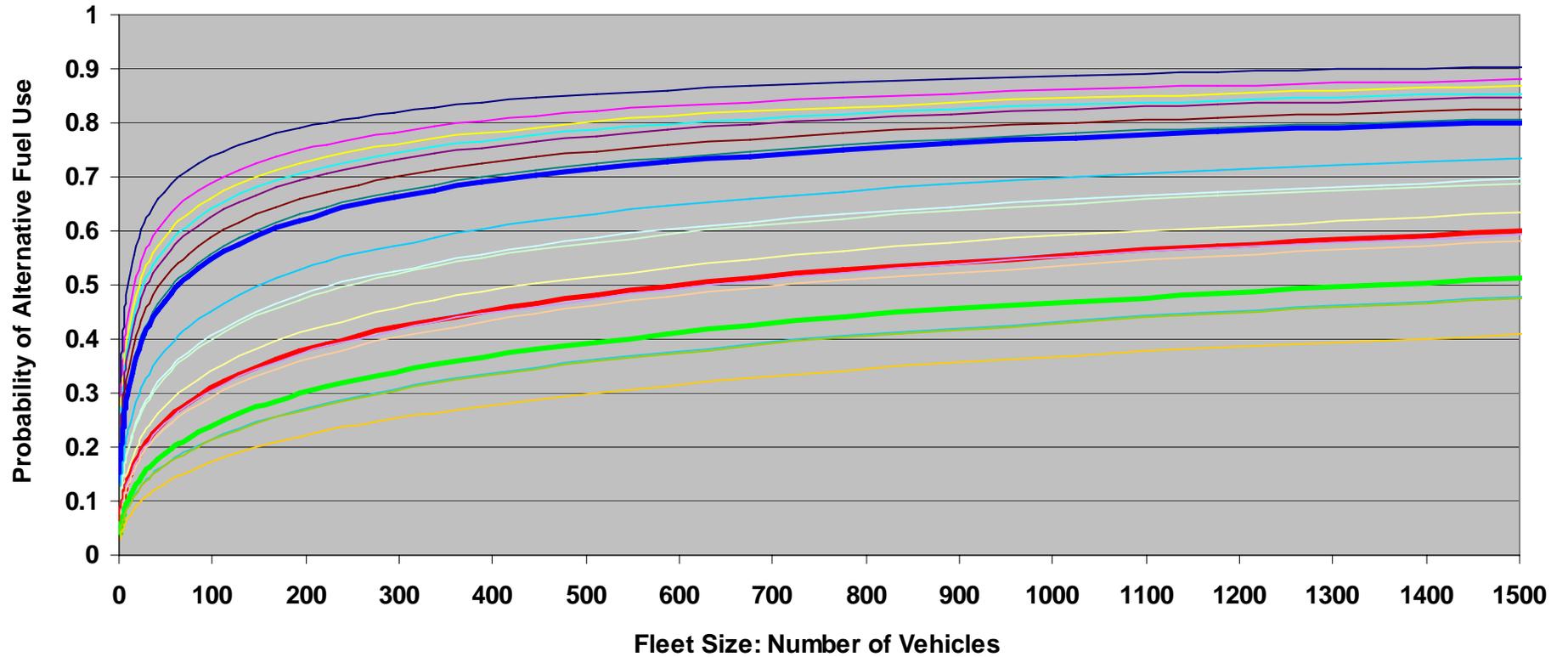
- Retail
- Wholesale
- Long- and short-haul goods transportation
- Vehicle leasing and rentals
- Towing
- Package and mail delivery
- Public works fleet other than utility/refuse, this includes general city or county fleets, police and emergency response vehicles

Least likely to currently use alternative fuels:

- Construction and maintenance
- Service fleets that are not easily generalized
- People transportation fleets (other than buses)
- “Other” fleets not easily categorized

³ Results are based on a logistic regression analysis. The effect of fleet size held when other possible explanations, such as private vs. government ownership and type of fleet were statistically controlled.

Figure 1.6: The Probability of Alternative Fuel Use by Fleet Size within Each Industry



NOTE: the lines representing the three largest industries are darkened.

Figure 1.6 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Which Alternative Fuels Are used?

Fuel Type by Government and Private Fleets

Compressed natural gas (CNG) is the most commonly used AF among all fleets, but its popularity varies between private and government fleets. As seen in Figure 1.7, CNG is the most commonly used AF among government fleets, but propane (LPG) and biodiesel are currently the most commonly used AFs among private fleets, followed by compressed natural gas (CNG) and electric.

Figure 1.7: Types of Fuels Used by Government and Private Fleets

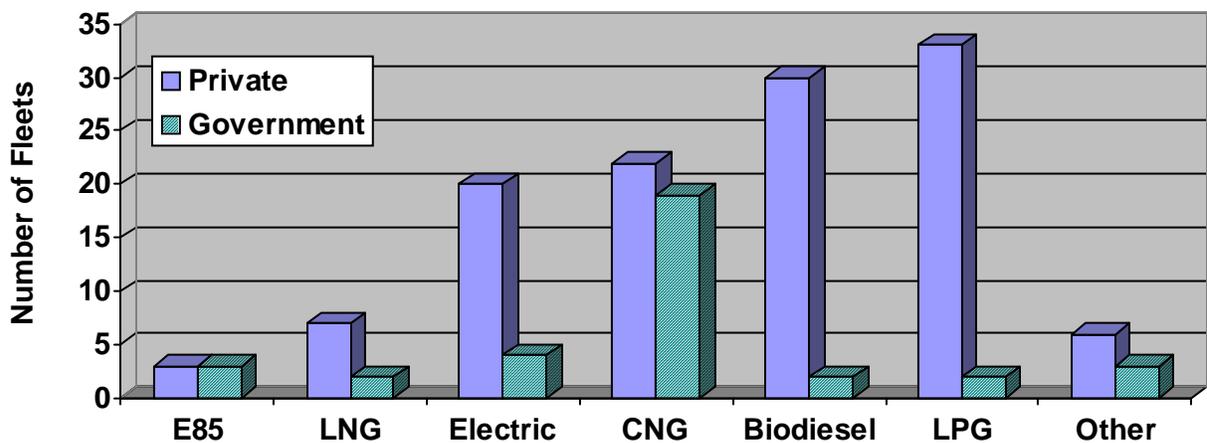


Figure 1.7 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Fuel Type by Industry

Industries vary in the types of alternative fuels they use most. Table 1.1 shows industry-fuel matches. In Table 1.1, **GREEN** cells represent matches between industry and fuel of interest; **RED** cells represent non-matches, industry-fuel type pairs that are less common. The **YELLOW** cells are pairs that are average or there is no detectable pattern.

Table 1.1: Match Between Industry Type and Alternative Fuel Type

	CNG	LNG	LPG	E85	Bio-diesel	Electric	Other
Administrative	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Agriculture	Red	Red	Green	Red	Green	Red	Red
Bus transportation	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Construction/Maintenance	Yellow	Red	Green	Red	Yellow	Green	Red
Fuel	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Goods Transportation	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Goods Transportation-Long Haul	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Goods Transportation-Short Haul	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Lease/Rental Cars & Trucks	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Package/Mail	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
People Transportation	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Public Works/Safety-Other	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Public Works/Safety- Refuse Collection	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Public Works/Safety- Utility	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Retail Sales	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Other Services	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Taxi/Limousine/Charter	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Wholesale	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
<p>Green = Industry is more likely using this fuel. Red = Industry is less likely using this fuel. Yellow = Not a detectable pattern for fuel x industry match.</p>							

Table 1.1 Source: 'What is the Future of Alternative Fuel in California?' survey data.

As seen in Table 1.1, Agriculture fleets are more likely to use LPG and biodiesel; construction/maintenance fleets are more likely to use LPG and electric; and the public works fleets are all more likely to use CNG.

Fuel Type by Fleet Composition

Fleet composition—the percentage of the fleet comprised of each vehicle type—varies among users of different alternative fuels. As seen in Figure 1.8, among those with more passenger cars, the most common fuel types are E85, electric, and “Other”; in this

case, “Other” responses are gas-electric hybrids. Among those with more vans and pickups, the most common fuel types are LPG, E85, biodiesel, and electric. And among those with more heavy-duty vehicles⁴, LNG is the most common, followed by LPG, biodiesel, and CNG.

However, because fleets do not use AFs in 100 percent of their vehicles, it is not possible to tell whether the dominant vehicle type is the one in which the AFs are used.

Figure 1.8: Average Fleet Composition among Users of Each Alternative Fuel

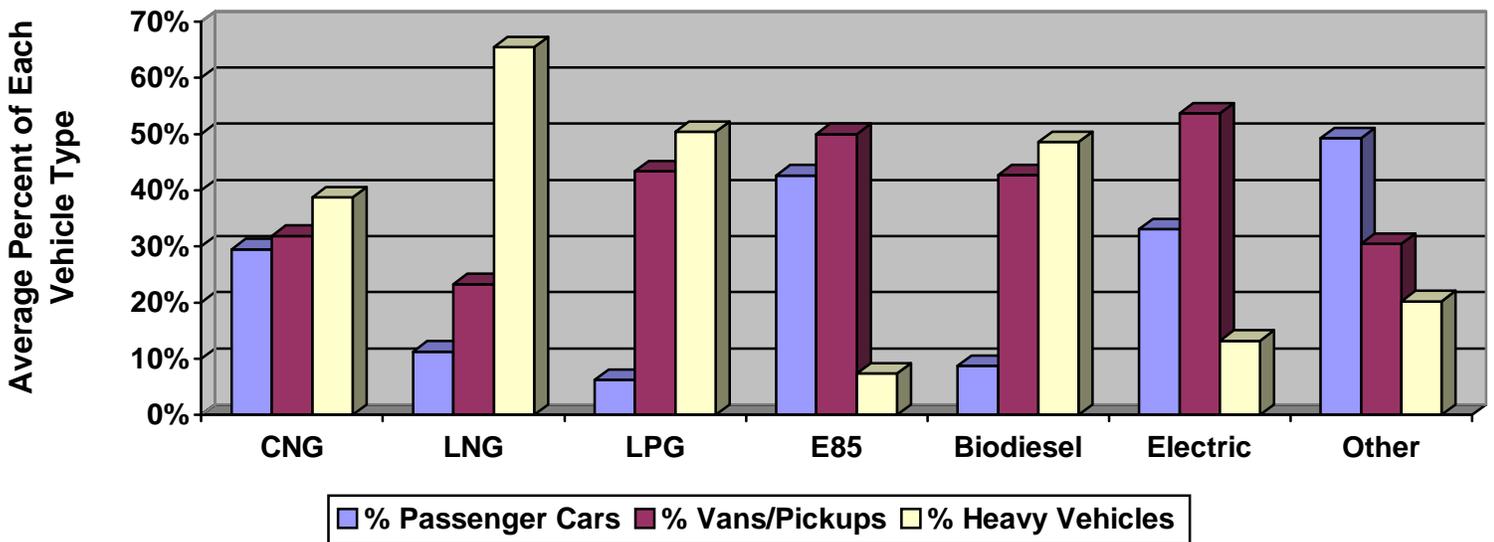


Figure 1.8 Source: ‘What is the Future of Alternative Fuel in California?’ survey data.

⁴ In this case, heavy-duty vehicles include vehicles ranging from medium duty to heavy-heavy-duty, including classes 3 through 8.

CHAPTER 2: VEHICLE AND INFRASTRUCTURE PERFORMANCE

The purpose of the second objective of this study was to identify the most important benefits and difficulties of using alternative fuels within and across fleet types.

Summary

Current alternative fuel (AF) users are satisfied with vehicle performance and reliability. They are content with the cost of fuel, and willing to sacrifice some added cost in order to “be green”; however, getting over the hurdle of vehicle incremental cost is problematic for many fleet operators. The biggest problem for current users is supply: there is a lack of infrastructure to support fuel availability and a lack of vehicle choice.

Benefits of Using Alternative Fuels

Current alternative fuel users are fairly satisfied with their AF experiences overall. Both government and private users are most consistently satisfied with the environmental benefits of AF use.

Private users are more satisfied than government users on most items. For private users, satisfaction with alternative fuel experiences is relatively high for various categories. They are somewhat satisfied with government and private incentives.

Overall, E85 users are less satisfied than most other fuel users, particularly with cost of fuel, access to fueling stations, and vehicle driving range. Qualitative comments suggest that problems with vehicle driving range are tied to the lack of fueling stations.

Cost

Satisfaction with fuel cost varies among private fleets, with CNG and electric users reporting their satisfaction higher than average while LNG, E85, and biodiesel users rate lower than average satisfaction. Private fleets vary in their satisfaction with both government and private incentives, with CNG incentives rated higher than average, electric incentives near average, and all other alternative fuels incentives rated lower.

Performance

Satisfaction with driving range differs by fuel type among both private and government fleets, with LNG, biodiesel, and electric users rating driving range higher than average, and CNG, LPG, and E85 users rating it lower.

Infrastructure

Private fleets differ by fuel type in their satisfaction with fuel availability; biodiesel and electric users are more satisfied with fuel availability, while CNG, LNG, and E85 users are less satisfied; notably, satisfaction for the availability of E85 is close to "Not At All Satisfied."

Public Relations

Private fleets vary in their satisfaction with the public relations benefits of using alternative fuels, with CNG, biodiesel, and electric users rating public relations benefits higher than average, and LPG users rating public relations benefits lower than average.

Challenges of Using Alternative Fuels

Overall, current users' experiences with alternative fuels are somewhat problematic. The most problematic challenges associated with alternative fuel use are access to fueling stations, vehicle choice, and conversion costs.

Private fleets find their experiences a little less problematic than government fleets. Private users find vehicle driving range, vehicle performance and reliability, and maintenance cost to be least problematic. Notably, fuel cost is rated the same for both private and government fleets.

Overall, users of E85 and biodiesel encounter fewer problems than the other alternative fuels, except for access to fueling stations for E85 users and for government biodiesel users; cost of fuel for private E85 users; and vehicle driving range for government biodiesel users.

Cost

Private fleets vary by fuel type in how problematic they find cost of vehicles. Fleet operators using CNG, LPG and E85 find vehicle cost more problematic than average, and users of biodiesel find it less problematic than average. Private fleet operators vary in their rating of maintenance cost, with users of CNG and LPG rating it more problematic, and users of E85 and biodiesel less problematic than average. Private fleet operators vary in their ratings of conversion costs, with users of LNG and LPG rating conversion costs as more problematic than average, and users of E85 and biodiesel rating it less problematic than average.

Performance

Private fleets vary in how problematic they find vehicle driving range, with CNG and LNG users rating it more problematic, and biodiesel users less problematic than average. Private fleets vary in their rating of vehicle performance, with CNG and LPG rating performance more problematic than average, and E85 and biodiesel rating it less problematic; this pattern is mirrored in vehicle reliability, but is not statistically significant.

Infrastructure

Private fleets vary in how problematic they find vehicle choice with users of CNG and LPG rating it more problematic and users of biodiesel rating it less problematic than average. Private fleets vary in their ratings of access to fueling stations, with users of CNG, LNG, and particularly E85 rating access as more problematic than average, and biodiesel and electric rating access to fuel less problematic. Notably, both private and government E85 users and government biodiesel find access to fuel between very problematic. There are large discrepancies between the ratings of government and private fleets for biodiesel and electric, with government fleets rating access to fuel much more problematic than private fleets.

Government Mandates

Private fleets vary how problematic they find compliance with government mandates, with users of LNG and LPG rating it more problematic, and biodiesel and electric less problematic than average.

Public Relations

Private fleets find the lack of perceptible public relations benefits variably problematic between fuels. LNG and LPG users find it more problematic, while users of E85, biodiesel and electric find it less problematic than average.

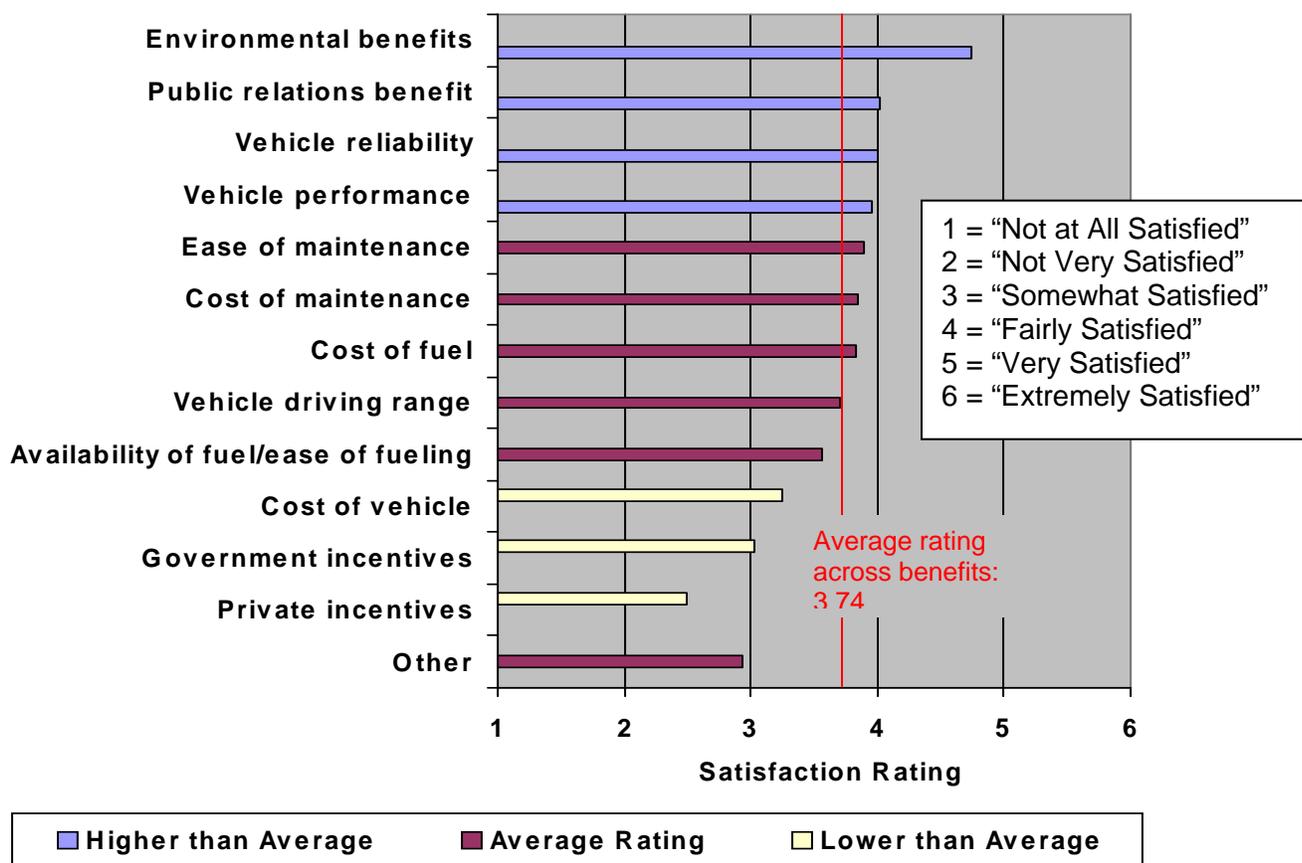
Overall Satisfaction and Challenges for Current Alternative Fuel Users

To provide a complete picture of their AF experiences, survey respondents were asked to rate their satisfaction with several elements of alternative fuel use from 1, “Not At All Satisfied” to 6, “Extremely Satisfied,” as well as their perception of the challenges of alternative fuel use from 1, “Not At All Problematic” to 6, “Extremely Problematic.”

Satisfaction

Figure 2.1 shows the average satisfaction ratings of fleet operators’ experiences with alternative fuels.

Figure 2.1: Satisfaction with Alternative Fuel Experiences Across All Users



NOTE: The colors in this graph and ones like it indicate information about whether the items are rated **above average (blue)**, **at the average (purple)**, or **below average (yellow)** according to a statistical test. Occasionally, a purple bar may appear bigger than a blue bar, but it is not judged to be significantly above average because the responses were either inconsistent, or there were too few responses to tell.

Figure 2.1 Source: ‘What is the Future of Alternative Fuel in California?’ survey data.

As seen in Figure 2.1, current alternative fuel users are “Fairly Satisfied” with their AF experiences. They are “Very Satisfied” with the environmental benefits of AF use, and “Fairly Satisfied” with public relations benefits, vehicle reliability and performance, the ease and cost of maintenance, and the cost of fuel. Vehicle driving range and access to fuel are rated between “Somewhat” and “Fairly” satisfying; cost of vehicle and government incentives are rated “Somewhat” satisfying; and private incentives are rated between “Not Very” and “Somewhat” satisfying.

Challenges

Current alternative fuel users find their AF experiences to be between “Somewhat Problematic” and “Not Very Problematic.” As seen in Figure 2.2, access to fueling stations, vehicle choice, and conversion costs are most problematic, each rated as “Somewhat Problematic.” Compliance with mandates, vehicle cost, driving range, and fuel cost are each rated around the average problem rating, and vehicle performance, maintenance, reliability, and no public relations benefits are each rated below the average, closer to “Not Very Problematic.”

Figure 2.2: Problems Experienced by Current Alternative Fuel Users

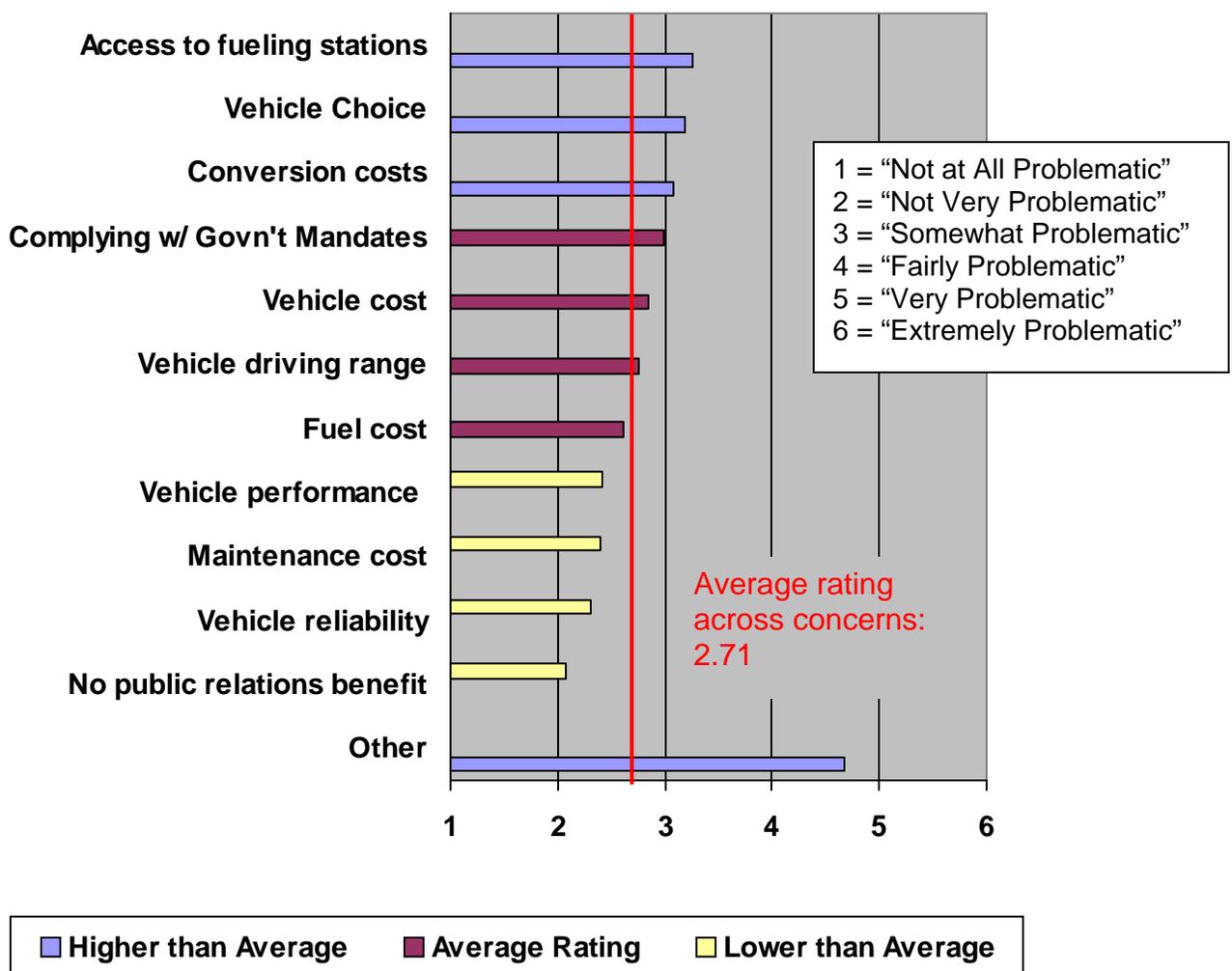


Figure 2.2 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Differences between Private and Government Fleets in Satisfaction and Challenges

Among alternative fuel users, government and private fleets differ in their satisfaction with alternative fuel experience. Figure 2.3 shows the average satisfaction ratings of private and government fleet operators. Overall, private users are more satisfied than government users. Specifically, private users are more satisfied with vehicle reliability and performance, the ease and cost of maintenance, vehicle driving range, availability of fuel, and cost of vehicle.⁵

Both government and private users rate environmental benefits highest of all reasons to be satisfied, followed by public relations benefits. Private users are fairly satisfied with experiences related to AF vehicles: reliability and performance, ease and cost of maintenance, and driving range. They are slightly less satisfied with experiences related to fuel: both cost and availability of fuel are rated just less than “Fairly” satisfying.

Figure 2.3: Satisfaction with AF Use for Government and Private Fleets.

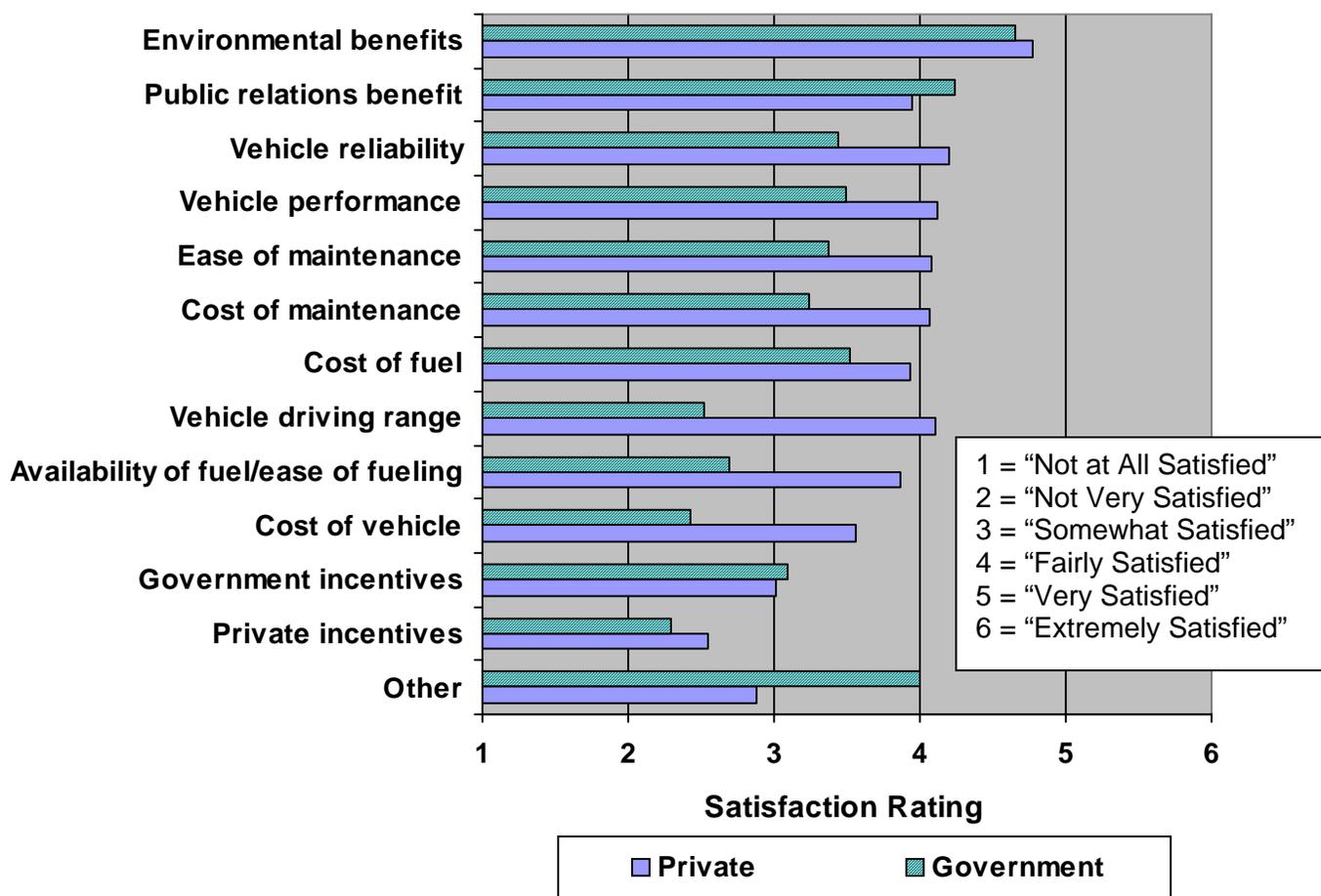


Figure 2.3 Source: ‘What is the Future of Alternative Fuel in California?’ survey data.

⁵ Results are based on an Independent-Samples t-test; criteria for significant difference is $p < .05$.

Government fleets tend to rate their alternative fuel experiences as more problematic than do private fleets, as seen in Figure 2.4. Specifically, government fleets rate as more problematic: access to fueling stations, conversion and vehicle costs, driving range, vehicle choice, performance, and reliability, and maintenance cost.⁶ Notably, fuel cost is rated the same for both groups—between “Not Very Problematic” and “Somewhat Problematic.” Overall, private users find vehicle driving range, vehicle performance and reliability, and maintenance cost to be “Not Very Problematic.”

Figure 2.4: Difficulties with AF Use for Government and Private Fleets

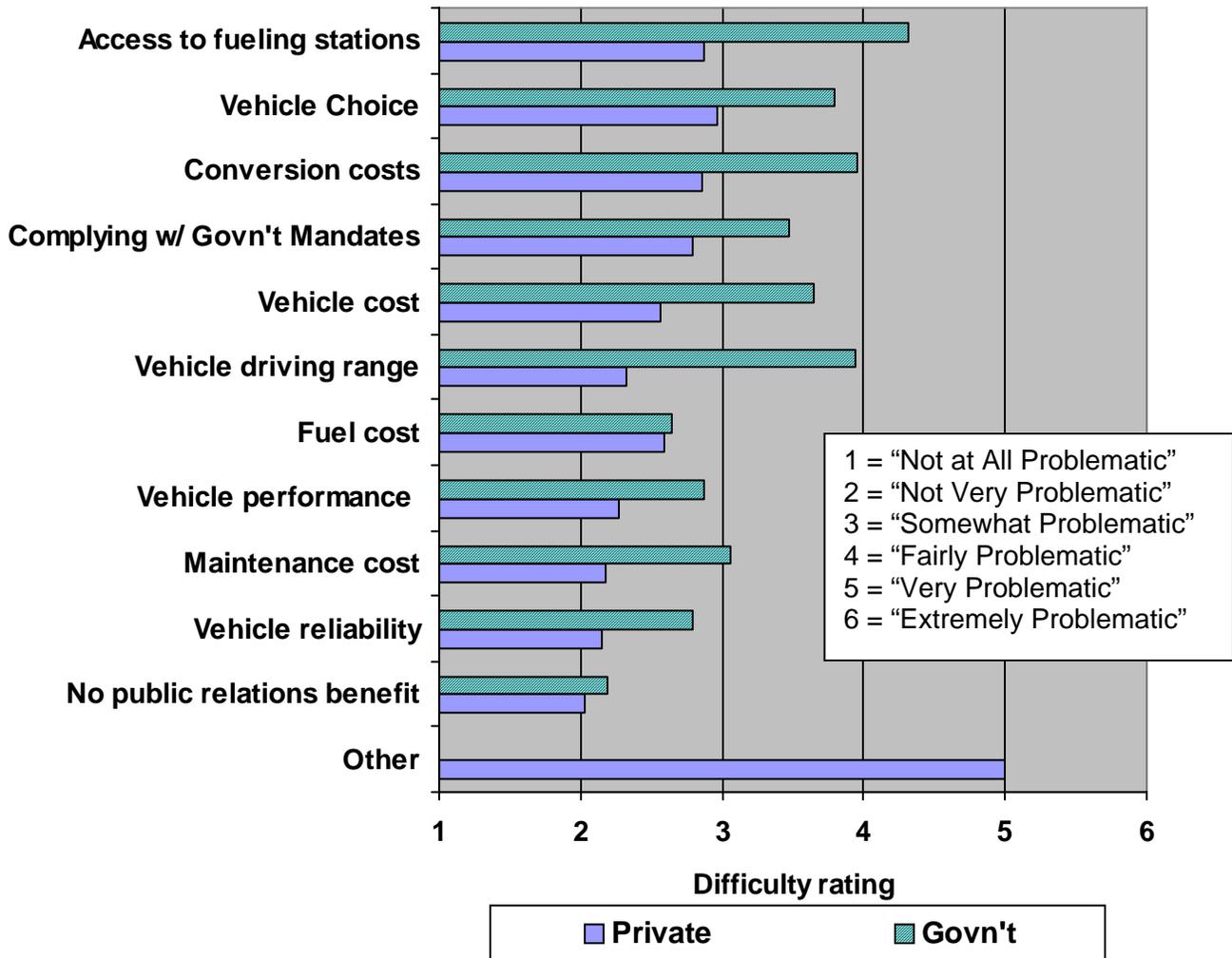


Figure 2.4 Source: 'What is the Future of Alternative Fuel in California?' survey data.

⁶ Results are based on an Independent-Samples t-test; criteria for significant difference is $p < .05$.

Differences between Alternative Fuel Types in Satisfaction and Challenges

As seen in Figure 2.5, overall satisfaction and problems encountered differs depending on which AF fleets are using most. Users of biodiesel and electric rate their experiences with combinations of high satisfaction (between “Somewhat” and “Fairly” Satisfied) and few problems (between “Not at All Problematic” and “Not Very Problematic”). Users of E85 have a low problem rating, but also have low satisfaction, primarily driven by lack of access to fueling stations.

Figure 2.5: Overall Satisfaction and Problems Across Alternative Fuel Types

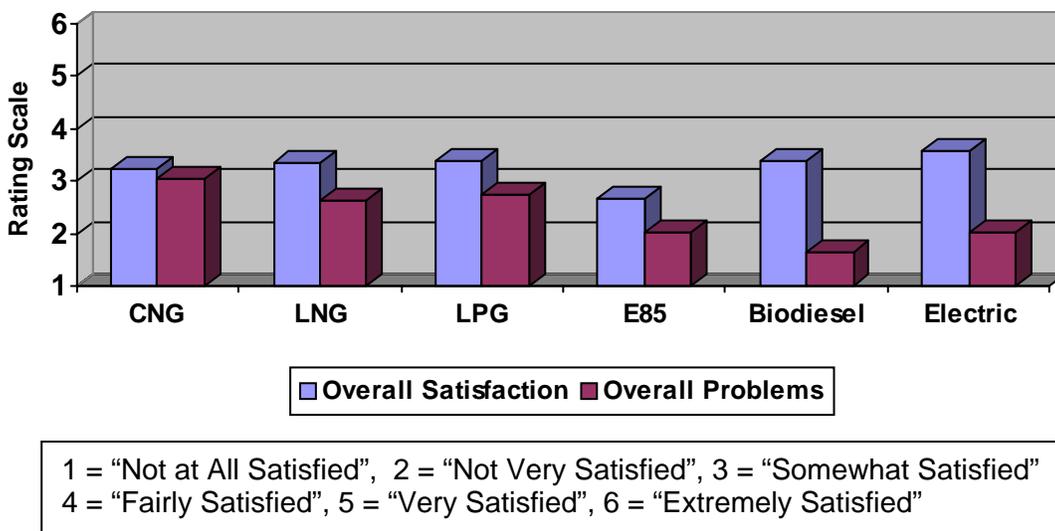


Figure 2.5 Source: ‘What is the Future of Alternative Fuel in California?’ survey data.

Differences in Satisfaction across Fuel Types

Cost

Private fleets vary in their satisfaction with fuel cost, with users of CNG and electric rating satisfaction higher than average, and users of LNG, E85, and biodiesel lower than average, as seen in Figure 2.6.

Figure 2.6: Satisfaction with Fuel Cost across Alternative Fuel Types

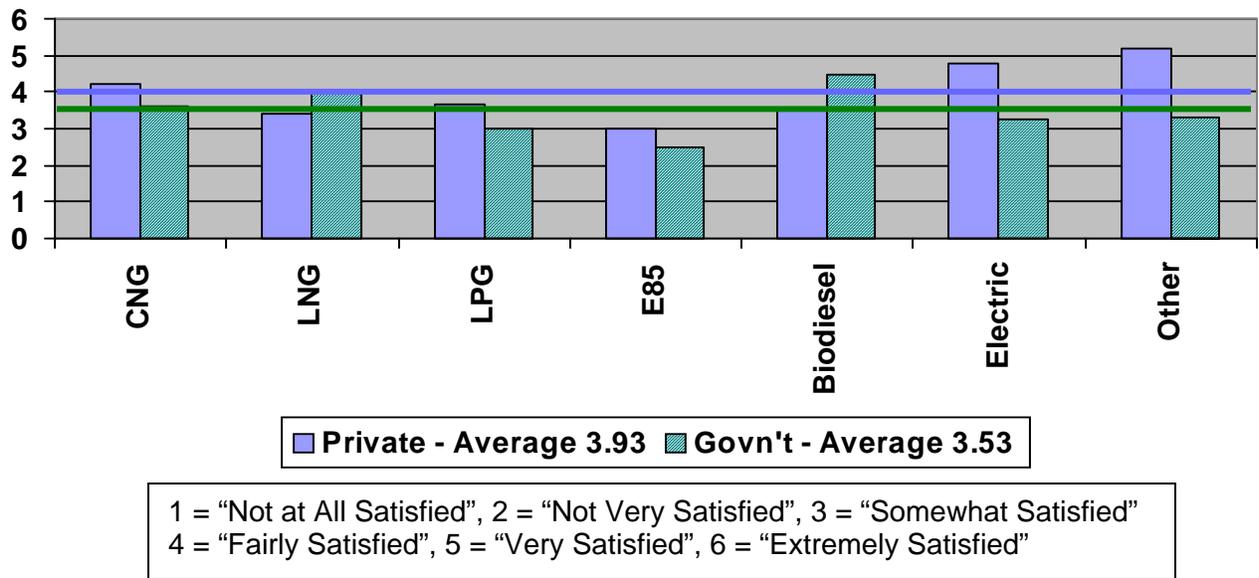


Figure 2.6 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Performance

Satisfaction with driving range differs by alternative fuel type among both private and government fleets as seen in Figure 2.7, with users of LNG, biodiesel, and electric rating their satisfaction with driving range higher than average, and users of CNG, LPG, and E85 rating it lower.

Figure 2.7: Satisfaction with Vehicle Driving Range Across Alternative Fuel Types

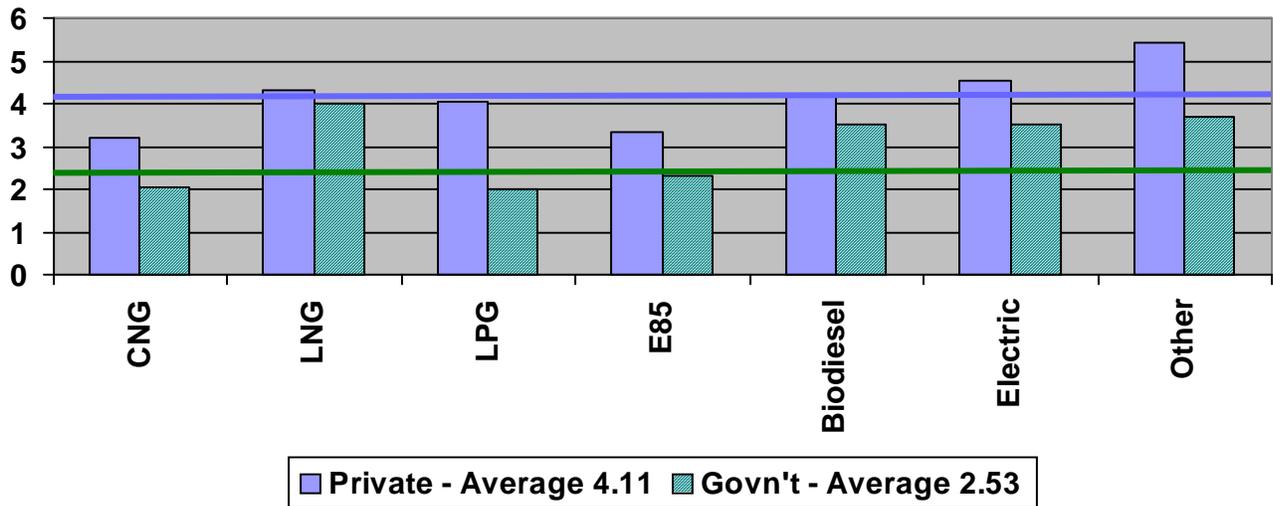


Figure 2.7 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Infrastructure

Private fleets differ by fuel type in their satisfaction with fuel availability as seen in Figure 2.8; users of biodiesel and electric are more satisfied with fuel availability, while users of CNG, LNG, and E85 are less satisfied; notably, satisfaction for the availability of E85 is close to "Not at All Satisfied."

Figure 2.8: Satisfaction with Fuel Availability Across Alternative Fuel Types

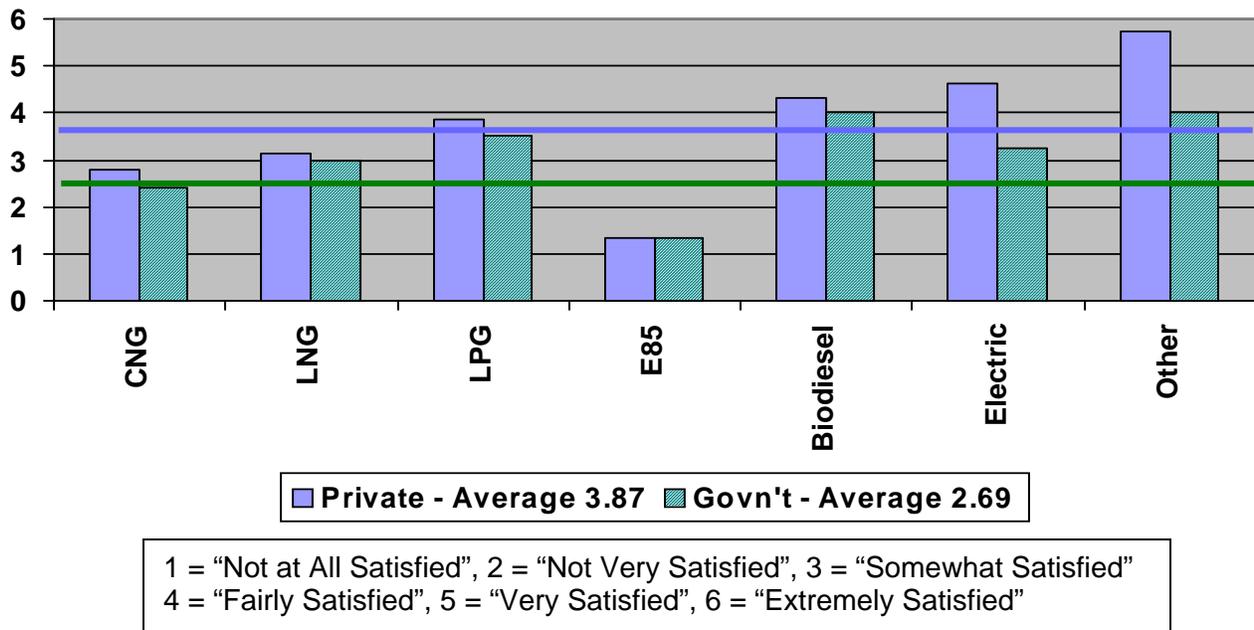


Figure 2.8 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Differences in Challenges Across Fuel Types

Overall, users of E85, biodiesel, and electric encounter fewer problems than users of the other alternative fuels, except for access to fueling stations for E85 users and for government biodiesel users, cost of fuel for private E85 users, and vehicle driving range for government biodiesel users.

The problems encountered by these three fuels are depicted in Figures 2.9 to 2.11.

Figure 2.9: Problems with Alternative Fuels for Fleets Using E85

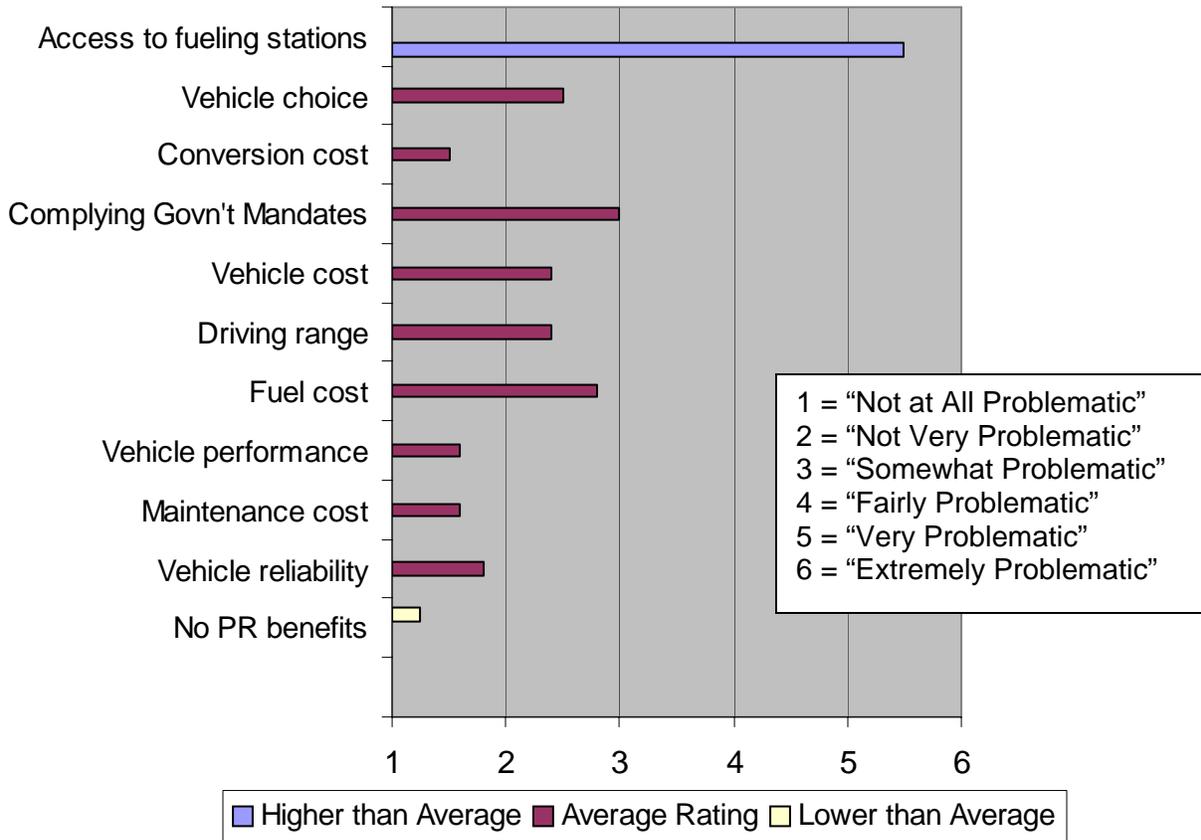


Figure 2.9 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Figure 2.10: Problems with Alternative Fuels for Fleets Using Biodiesel

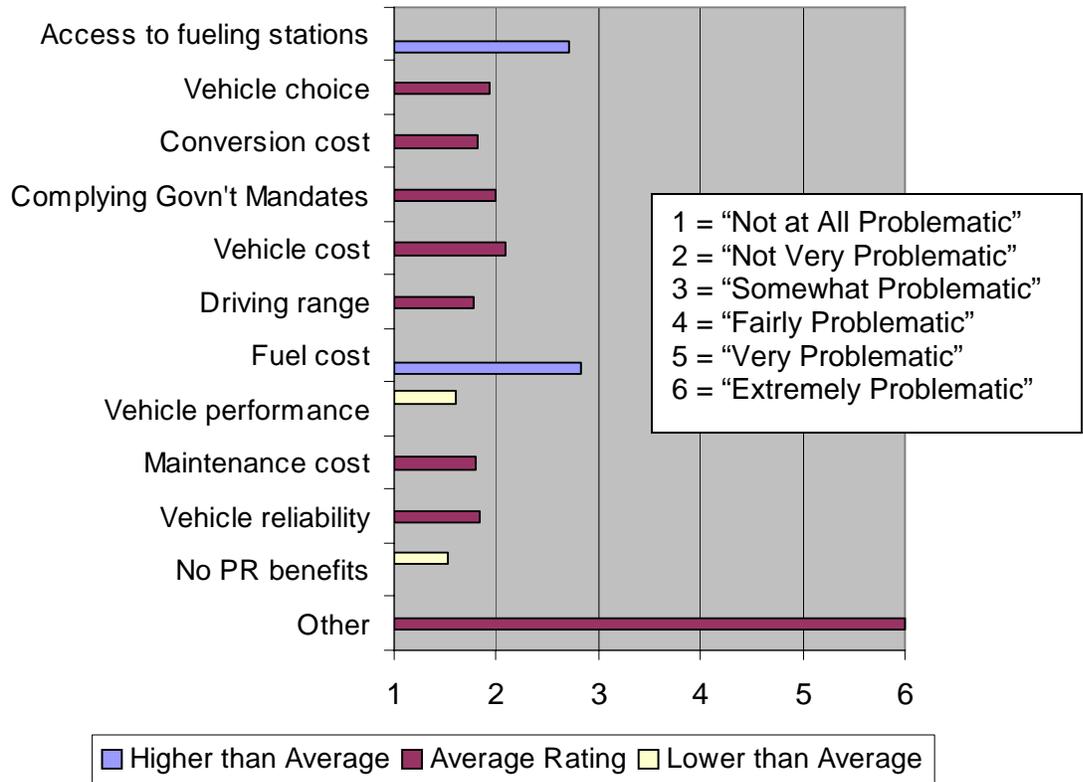


Figure 2.10 Source: 'What is the Future of Alternative Fuel in California?' survey data.

The "Other" problems encountered by biodiesel users are very problematic, but there were too few of them to make this item more problematic than average. "Other" responses were the following:

"Our local provider can't supply my demand to even 50% of the diesel I'm currently using now."

"I am disappointed that the State of California does not recognize biodiesel as an alternative fuel per the SCAQMD. This is a slap in the face to those of us that can empower ourselves to make our own fuel. The advantages to biodiesel are so many that I cannot believe more attention both monetary and legislative has not been given to this area."

Figure 2.11: Problems with Alternative Fuels for Fleets Using Electric

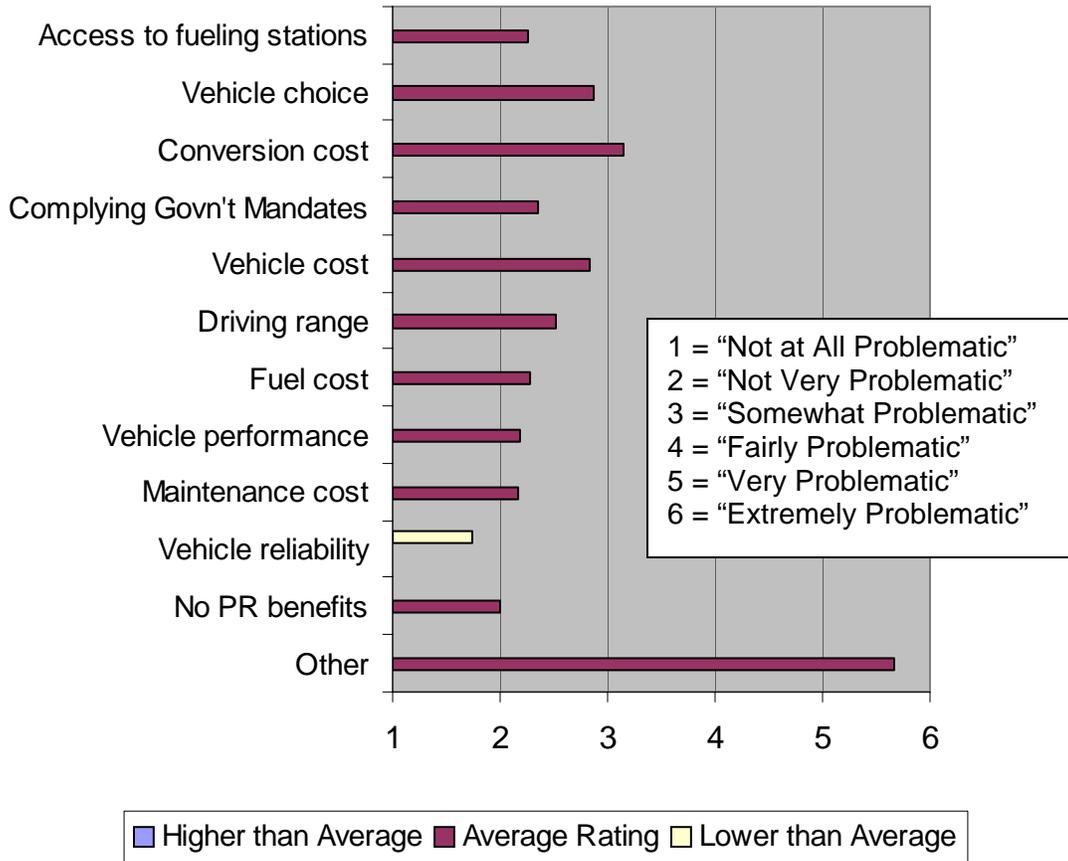


Figure 2.11 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Though the rating of the “Other” responses is high for electric users, but there are only two such responses. These are related to vehicle cost and choice:

“Cost of hybrid vehicles we use is high for the return but willing to pay to be green.”

“There are no alternative choices for work trucks to achieve the torque, towing and load capacity required in our industry.”

Differences between Industries in Satisfaction and Challenges

Satisfaction

Industries differ in their satisfaction with three elements of their AF experiences: driving range, availability of fuel, and government incentives. Figures 2.12 to 2.14 show the ratings of each of these experiences across industries.

Figure 2.12: Satisfaction with Alternative Fuel Vehicle Driving Range by Industry

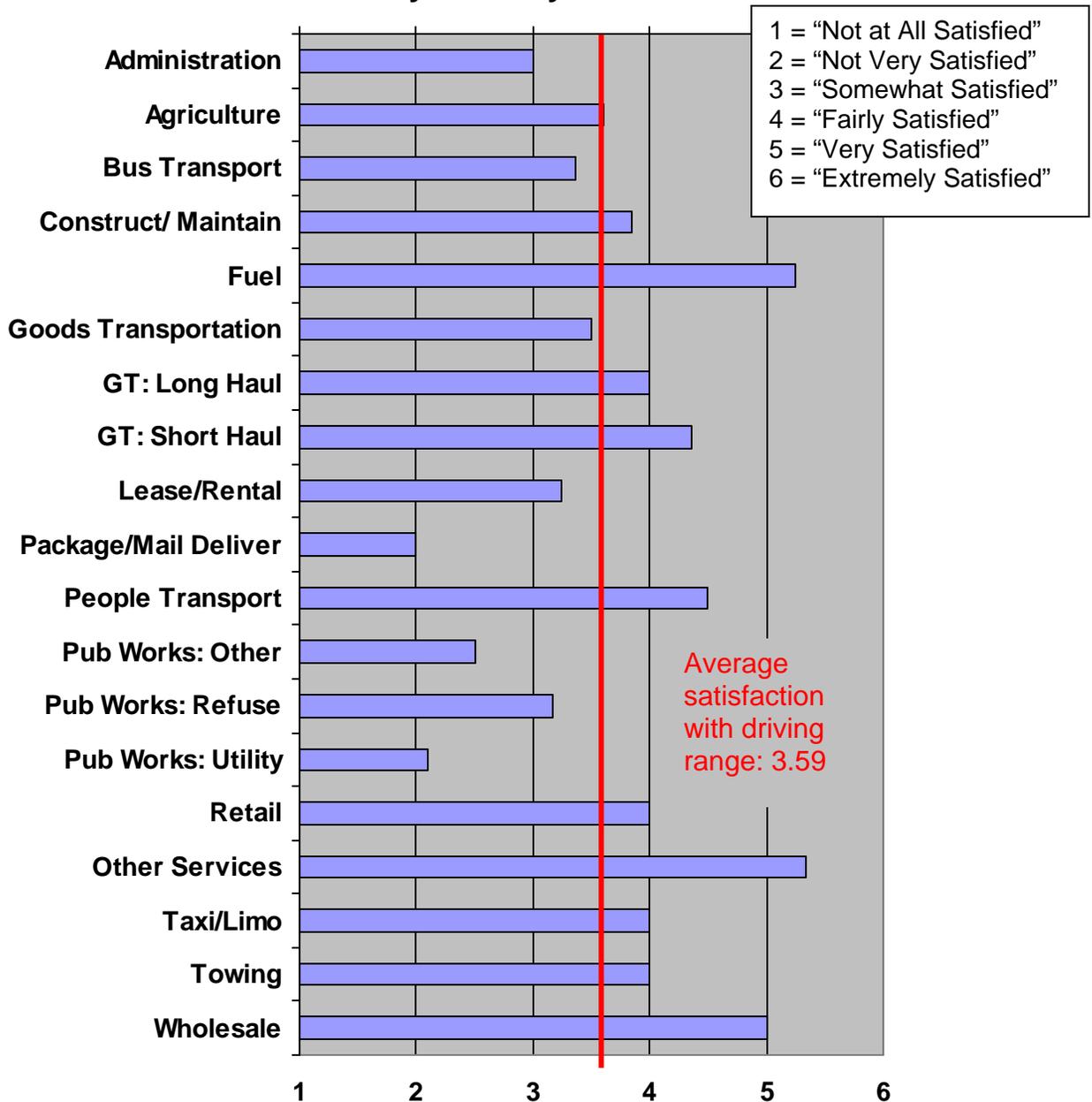


Figure 2.12 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Figure 2.13: Satisfaction with Availability/Ease of Fueling by Industry

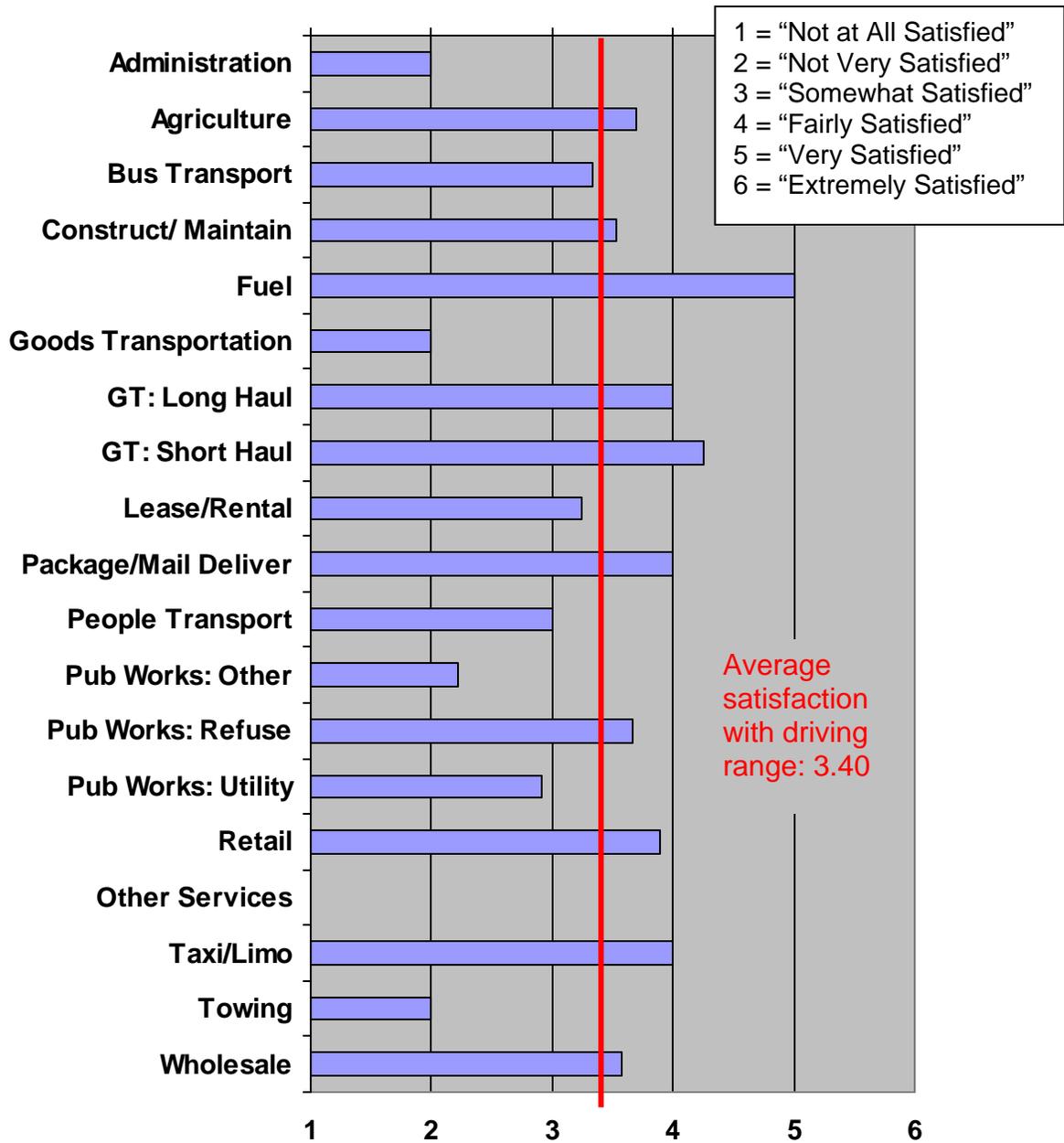


Figure 2.13 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Figure 2.14: Satisfaction with Government Incentives by Industry

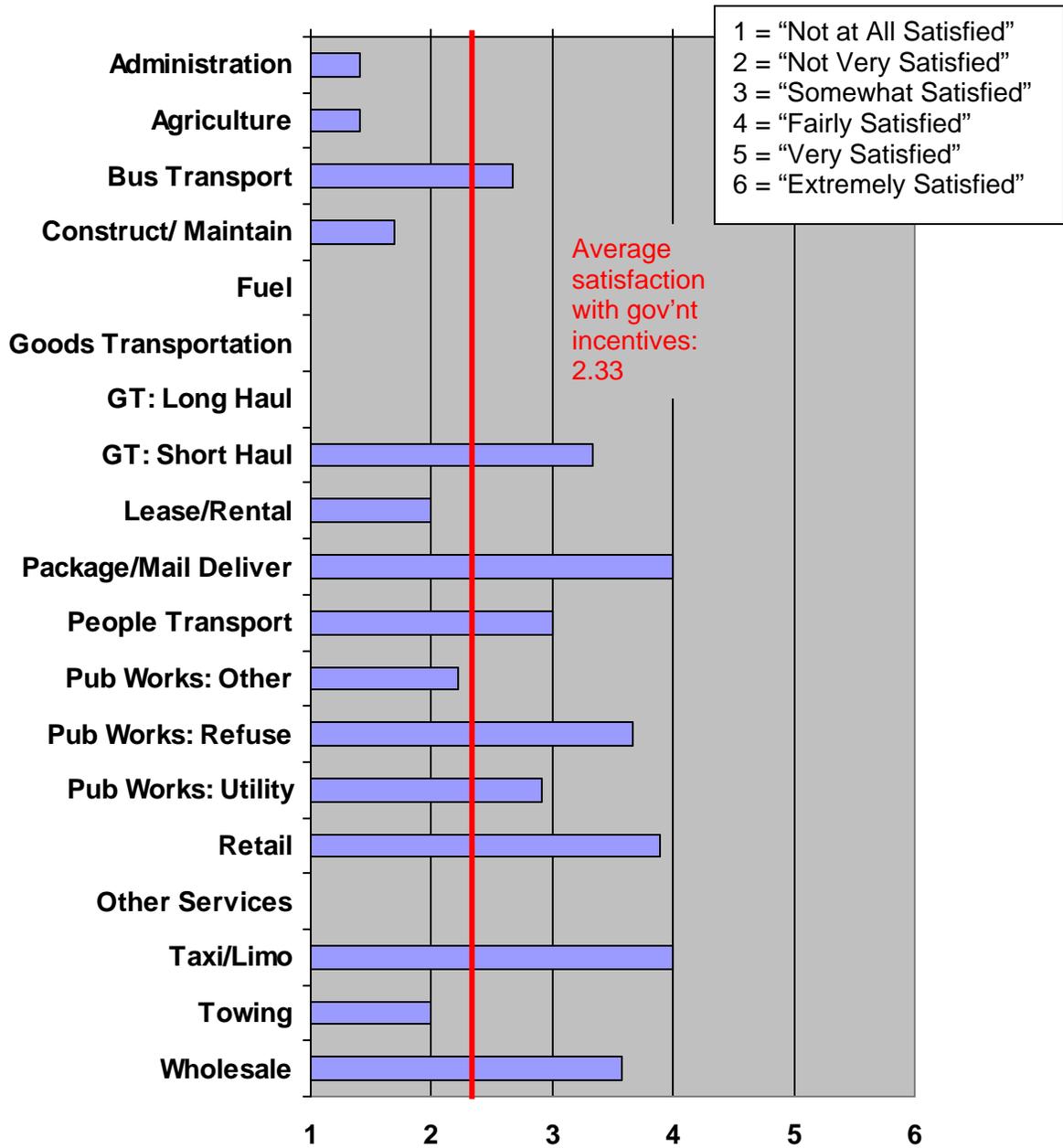


Figure 2.14 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Problems

Industries differ in the difficulty of four elements of their AF experiences: vehicle cost, driving range, access to fuel stations, and vehicle choice. Figure 2.15 shows the problem ratings for vehicle cost, choice, and driving range across industry types.

Figure 2.15: Problems Encountered by Different Industries using Alternative Fuels

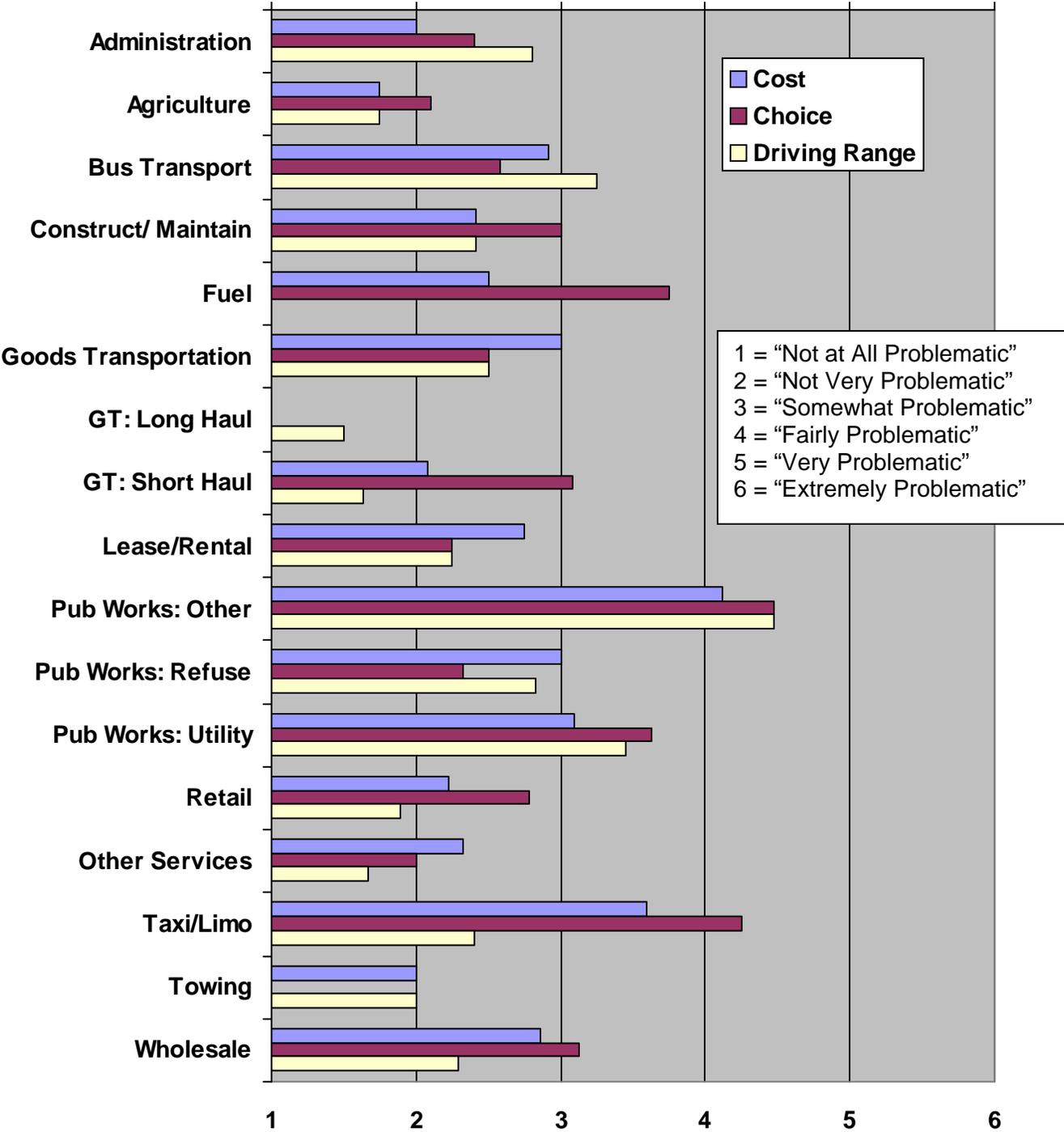


Figure 2.15 Source: 'What is the Future of Alternative Fuel in California?' survey data.

CHAPTER 3: CUSTOMER SATISFACTION

The purpose of objective three was to describe customer satisfaction with overall alternative fuel experience and to estimate the percentage of current AF users who plan to continue or increase their usage.

Summary

Satisfaction with Alternative Fuel Use among Current Users

Current AF users are fairly satisfied with vehicle performance, a little less satisfied with fueling cost, and only somewhat satisfied with fueling infrastructure. This mirrors the overall pattern of findings in the benefits and challenges of using alternative fuels described in the results of Objective 2.

Continuation of Alternative Fuel Use among Current Users

The majority (72 percent) of current fleet operators using alternative fuels plan to continue or increase their use of AFs. Only 8 percent plan to decrease their use, while 20 percent are undecided.

Access to fuel is the most consistent problem for those planning to decrease their alternative fuel use. Those planning to decrease use are less satisfied with availability of fueling, have more problematic experiences with access to fueling stations, and are less satisfied overall with fuel infrastructure.

Overall Satisfaction among Current Users

Alternative fuel users were asked to rate how satisfied they are overall with vehicle performance, fueling cost, and fuel infrastructure on a scale of 1, “Not At All Satisfied” to 6, “Extremely Satisfied.”

Figure 3.1: Overall Satisfaction with Alternative Fuel Experience

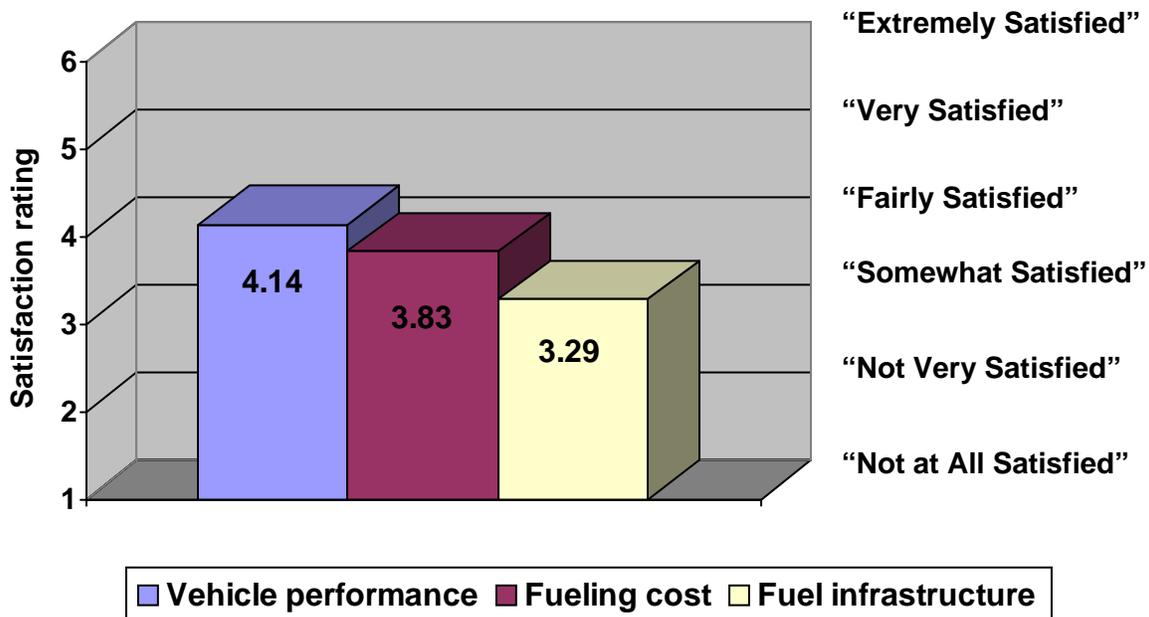


Figure 3.1 Source: ‘What is the Future of Alternative Fuel in California?’ survey data.

Though the differences between ratings in Figure 3.1 appear small, they are each meaningfully different from each other.⁷ Respondents find vehicle performance significantly more satisfying than fueling cost, and fuel infrastructure significantly less satisfying than fueling cost. This mirrors the overall pattern of findings in the benefits and challenges of using alternative fuels described in the results of Objective 2.

Survey participants were given an opportunity to elaborate on their satisfaction ratings. The most common themes in their comments were the following:

- Problems with fuel availability – 18 percent of respondents
- Fuel and vehicle costs are not competitive – 12 percent of respondents
- Lacking vehicle choice – 12 percent of respondents
- Benefit from having their own fuel supply – 5 percent of respondents

⁷ Though the means were relatively similar, the differences in these ratings were significant in a paired-samples t-test.

Many respondents commented on the benefits and challenges of specific fuels. Those comments were as follows:

CNG (6 respondents): Four qualitative responses from CNG users confirm that lack of fuel availability:

“Need more CNG stations in South Santa Clara County.”

One respondent comments on cost as a problem, and another comments on the need for incentives.

“CNG stations are very expensive to operate/maintain. Incentive costs should be made available from the gas supplier or the State.”

LPG (9 respondents): LPG users find both conversions and compliance with government regulations and fees difficult, and several survey respondents mentioned safety issues that kept them from wanting to have LPG fueling on-site. However, current users are satisfied with vehicle performance once vehicles are in place if fuel is available.

“When we could fuel at our fleet base site, fueling was tolerable. When the County decided they could squeeze more 'fees' out of us by defining the fueling operation as a trigger for their fee & added regulation we stopped fueling with propane.”

E85 (4 respondents): E85 users are satisfied with performance, but need better fuel availability:

“We have vehicles that will run with ethanol - can't find the fuel.”

Biodiesel (10 respondents): The qualitative responses from biodiesel users show that despite some challenges in cost, availability, and performance, biodiesel users are mostly satisfied with their fuel experience. Four (4) respondents comment on the need to offset the higher cost of biodiesel (compared to diesel) possibly through state tax rebates, but one comments on the availability of federal tax credits.

“The fuel cost is greater than regular diesel (I am not including the federal tax credit) when I use virgin soybean oil. The fuel cost is the same (I am not including the federal tax credit) when I use used vegetable oil.”

Three (3) respondents comment on the lack of biodiesel availability or the insufficiency of local supply, but three respondents also comment on the success of special arrangements they've made with suppliers.

“The fuel infrastructure could not be more perfect. A local small business owner delivers 2,000 gallons of used vegetable oil, I process it into Biodiesel and I pump into my bus; one - two and three.”

Two (2) respondents comment on performance problems in the cold, but three respondents comment on satisfaction with performance.

“The buses I run have performed perfectly. There have been a few buses that have had issues. For example, I have had injector issues that I have overcome. I have had filter clogging that I am overcoming. I have had cold temperature issues that I am trying to overcome.”

Electric/Electric-Hybrid (7 respondents): Though most electric users seem satisfied, two express skepticism about performance:

“Expected more electric driving time in Hybrid vehicle.”

“The only positive feedback we have received by staff who drive the vehicle are by persons with an 'environmental' political persuasion and are not based on informed views of performance, cost or availability of infrastructure.”

Summary

One respondent sums up some of the problems in performance and availability across fuels.

“CNG performance is lacking in higher HP trucks. Bio fuels are not readily available (B20 costs more than conventional by about \$0.20/gal and not really available to purchase at retail. E85 is not available). LPG is the best available fueling infrastructure, but most manufacturers are not supporting it anymore. CNG is a clean fuel, but the infrastructure is not in place to support it. Infrastructure exists for the Biodiesels, but not yet in retail (we will most likely implement at our own bulk fuel sites). E85 is not available commercially (although we have 2 bulk sites with E85). It would be good to see the same support and infrastructure put in E85 as M85 received 10 years ago.”

Future Alternative Fuel Use among Current Users

Alternative fuel users were asked whether they intended to decrease, continue, or increase their use of alternative fuels, or if they were undecided about their future AF use. As seen in Figure 3.2, the majority of current users plan to either continue or increase their use of AFs, however a significant minority (20 percent) are undecided.

Figure 3.2: Future Alternative Fuel Use among Current Users

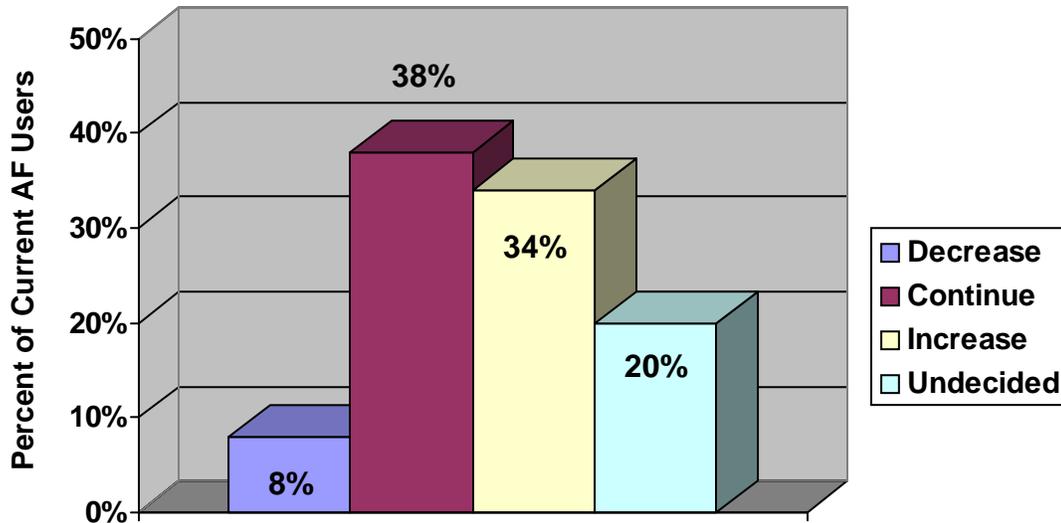


Figure 3.. Source: 'What is the Future of Alternative Fuel in California?' survey data.

Which Fleets Will Not Continue Using Alternative Fuels?

Decreasing Because of Dissatisfaction and Problems

Neither fleet characteristics (i.e. government/ private, fleet size) nor original motivations to use alternative fuels are related to fleet operators' plans to decrease their AF use.

Fleet operators who plan to discontinue use of AFs are less satisfied with AF benefits, have experienced more difficulties, and are less satisfied overall with fuel infrastructure. The average ratings of characteristics that differed in those planning to decrease compared to all other respondents (continue, increase, and undecided) are provided in Table 3.1.

Table 3.1: Differences⁸ among Those Planning to Decrease Alternative Fuel Use

	Continuing or Undecided	Decreasing Use	t-test result
Satisfaction Ratings of AF Benefits			
Driving range	3.81	2.50	2.936**
Availability of fueling	3.65	2.50	2.299*
Vehicle performance	4.06	2.67	3.793***
Vehicle reliability	4.12	2.67	3.871***
Ease of maintenance	4.04	2.33	4.411***
Cost of maintenance	3.96	2.54	3.493**
Environmental benefits	4.82	3.70	2.792**
Govn't incentives	3.13	2.00	3.064**
Public relations benefits	4.10	3.00	2.111*
Other	3.46	1.60	2.244*
Difficulties Ratings of AF Problems			
Access to fueling stations	3.18	4.18	-2.105~
Vehicle performance	2.28	4.18	-4.489***
Vehicle reliability	2.21	3.70	-3.279**
Cost of maintenance	2.31	3.55	-2.866**
Conversion costs	3.00	4.50	-1.919~
Overall Satisfaction Ratings			
Fuel infrastructure	3.35	2.25	1.877~

Table 3.1 Source: 'What is the Future of Alternative Fuel in California?' survey data.

As seen in Table 3.1, infrastructure related to fuel access is the most consistent problem for those planning to decrease their AF use. Those planning to decrease use rate their satisfaction lower on availability of fueling, rate their difficulties higher on access to fueling stations, and rate their overall satisfaction lower on fuel infrastructure. However, the other significant problems that keep users from wanting to continue their use include vehicle driving range, performance, and reliability, and the difficulty of maintenance on AF vehicles.

⁸ Differences are the results of a statistical test. The statistical significance is as follows: ~ p < .10, * p < .05, ** p < .01, *** p < .001

Plans to Increase or Decrease by Fuel Type

There were too few fleet operators planning to decrease their AF use to be able to tell whether they differ by AF type. However, some possible patterns are seen in Figure 3.3. Users of LNG, biodiesel, and electric are less likely to report planning to decrease their use, while users of LPG and E85 are more likely to plan decreasing use.

Users of LNG are the most uncertain about their future AF use, followed by LPG.

Almost 50 percent of CNG and biodiesel users plan to increase their use of AFs, followed by 30 percent of electric and E85 users.

Figure 3.3: Future Use of Alternative Fuels by Fuel Type

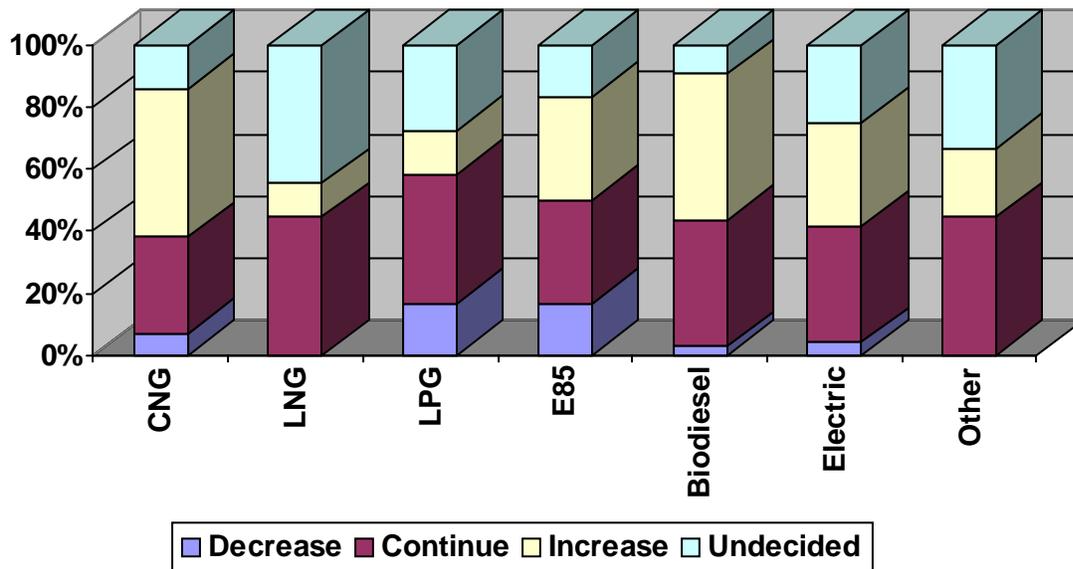


Figure 3.3 Source: 'What is the Future of Alternative Fuel in California?' survey data.

CHAPTER 4: CUSTOMER MOTIVATION

The purposes of objective four were to estimate the percent of fleet operators who are currently willing to consider using alternative fuels in the future, and to identify the most common motivations for using alternative fuels within and across fleet types.

Summary

Willingness to Use Alternative Fuels

Sixty five percent of current non-users are interested in using alternative fuels in the future; 5 percent are not interested, and 30 percent are undecided. Respondents are most interested in biodiesel (58 percent of respondents), followed by E85 (41 percent), then electric (23 percent).

Motivation to Use Alternative Fuels

Among current users, benefit to the environment was the most important motivation to begin using AFs. Private fleets were more motivated by vehicle performance and reliability, low cost of maintenance, and fuel cost savings. Government fleets were more motivated by government mandates and public relations benefits. Other motivations mentioned by current users are reduced health risks for their vehicle operators and a sense of patriotism that calls for reduction of dependence on foreign oil.

For private fleet operators not currently using alternative fuels, the most important motivations to begin using AFs are, in order: 1) vehicle reliability, 2) fuel cost savings, 3) lower maintenance cost, 4) vehicle performance, and 5) environmental benefits. Government mandates and public relations benefits are least important. For non-users, greater fuel availability would motivate them to use alternative fuels, along with cost *comparability*—rather than savings—taking into account vehicle-related start-up costs as well as ongoing fuel and maintenance costs.

Comparing the motivations of current users and non-users, both groups rank vehicle performance and reliability, maintenance cost, and fuel cost in the top 5 motivations; both groups rank public relations, and government incentives and mandates in the lowest 3 motivations. The difference between them is in their ranking of environmental benefits, which is 1st for current users and 5th for non-users.

Willingness to Use Alternative Fuels

Those respondents who said they are not currently using alternative fuels in their fleets were asked whether they would consider using AFs in the future. As seen in Figure 4.1, 65 percent responded that “Yes,” they are interested, 5 percent said “No,” they are not interested, and 30 percent said they are “Undecided” (total respondents = 979).

Figure 4.1: Non-Users’ Interest in Using Alternative Fuels

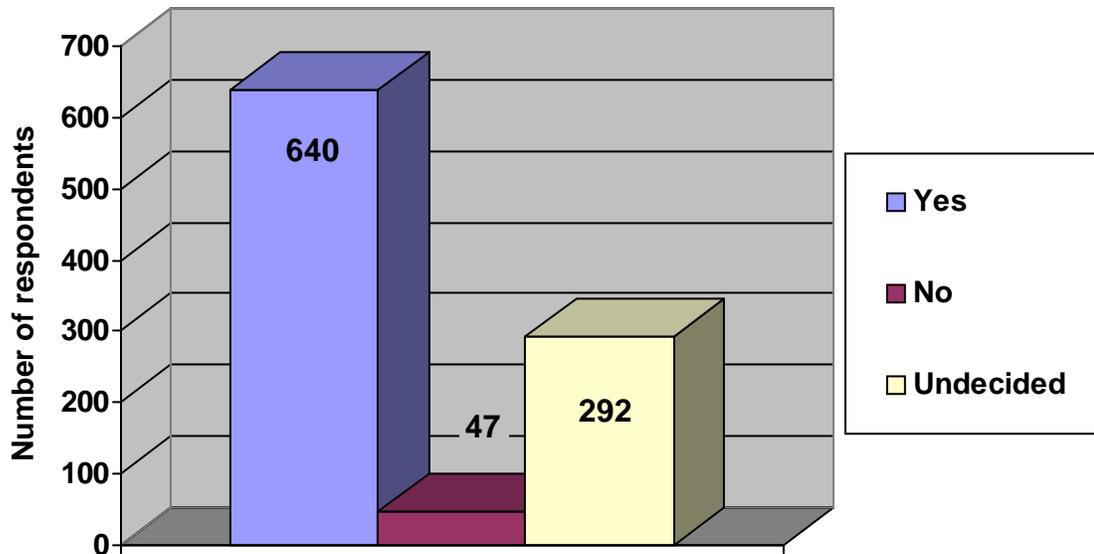


Figure 4.1 Source: ‘What is the Future of Alternative Fuel in California?’ survey data.

Fleet operators not using alternative fuels were asked which AFs they would be most interested in using in the future. They were asked to choose as many as applicable. Figure 4.2 displays the results for respondents who had said they are interested in or undecided about alternative fuel use in the future (total respondents = 932). Respondents are most interested in biodiesel (58 percent of respondents), followed by E85 (41 percent), then electric (23 percent). Fifteen percent are interested in CNG, and LPG, and 12 percent in LNG.

Figure 4.2: Alternative Fuels of Most Interest to Current Non-Users

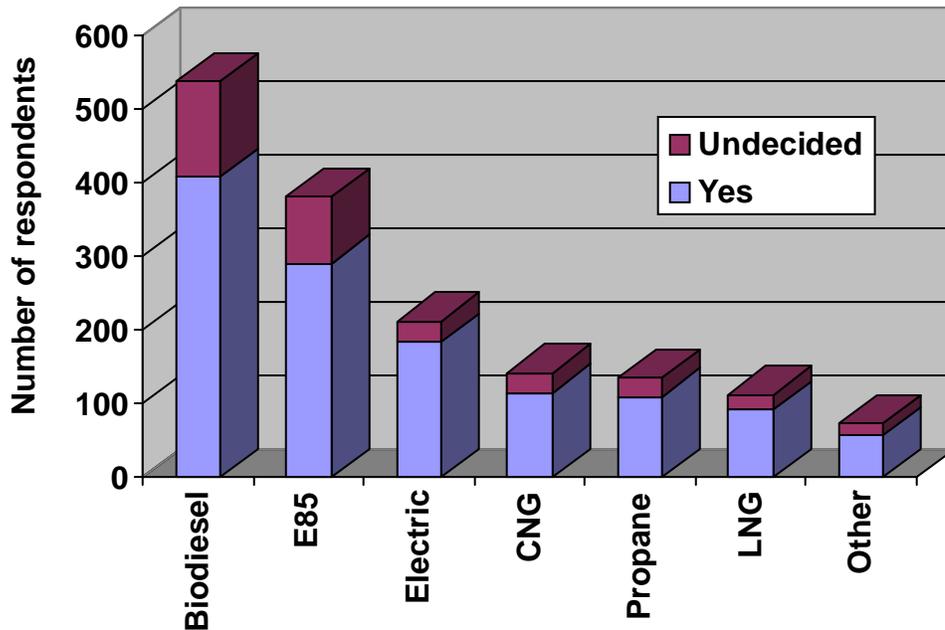


Figure 4.2. Source: 'What is the Future of Alternative Fuel in California?' survey data.

Seventy-two respondents report that they are interested in an "Other" alternative fuel. Many respondents who chose "Other" also filled in an open-ended description of the fuel they were interested in. The results are displayed in Figure 4.3.

Figure 4.3: Other Alternative Fuels of Interest to Current Non-Users

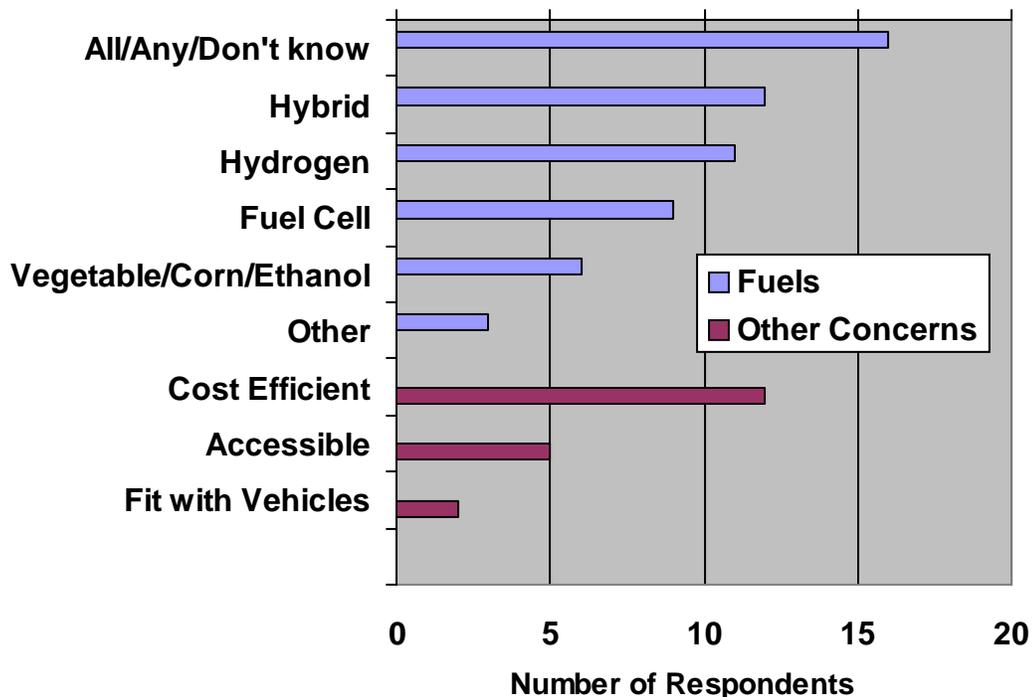


Figure 4.3 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Many respondents said they are interested in any or all fuels and need more information about which ones would be best for their fleets. Similarly, instead of naming a particular fuel, a number of respondents replied that they would like to use whatever is most cost efficient; others emphasize the need for accessibility, and two respondents say they would use whatever will work best with the vehicles they are already using.

Motivation to Use Alternative Fuels

Original Motivations of Current Alternative Fuel Users

Current alternative fuel users were asked what expectations originally motivated them to begin using AFs in their fleets. They rated each reason on a scale from 1, “Not At All Important” to 6, “Extremely Important.”

Figure 4.4 displays fleet operators’ original motivations for beginning AF use. Items with blue bars were rated more important than average, those in red were rated average, and those in yellow are less important than average.⁹

Figure 4.4: Importance of Original Motivations to Begin Using Alternative Fuels

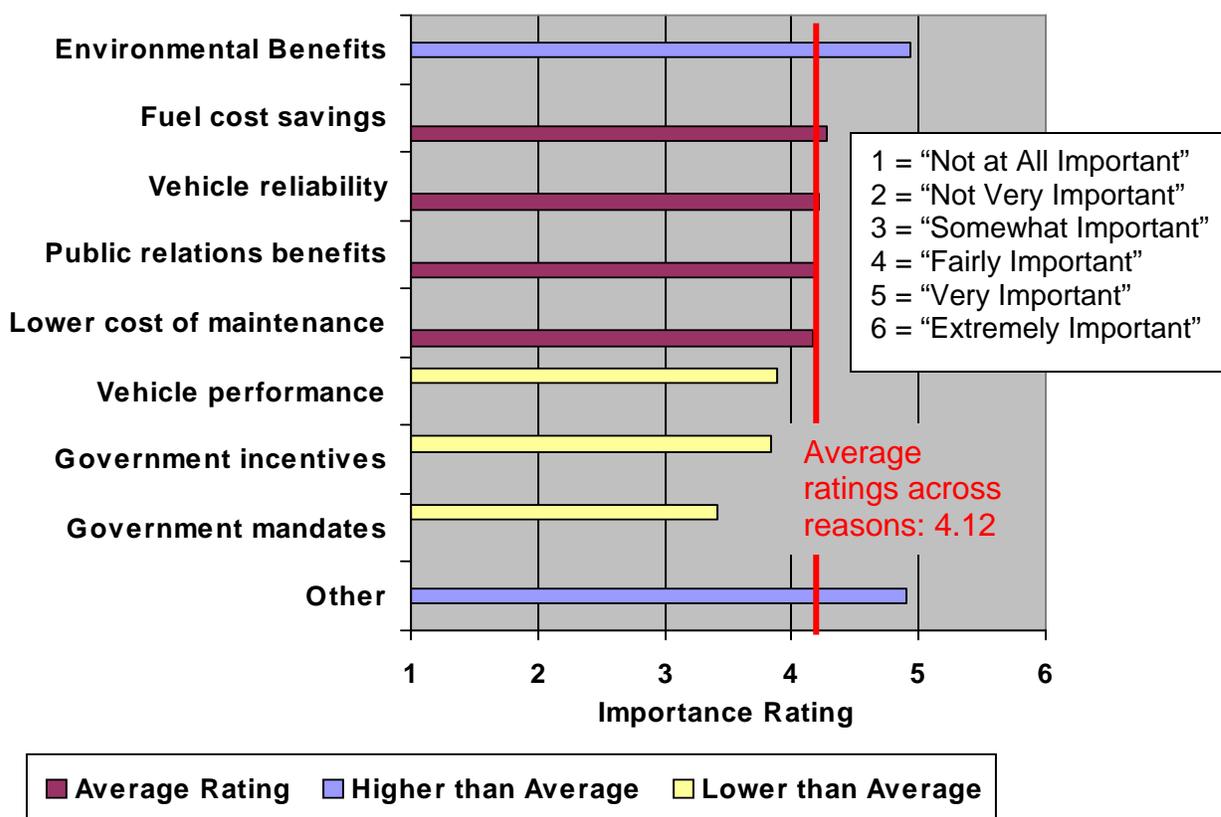


Figure 4.4 Source: ‘What is the Future of Alternative Fuel in California?’ survey data.

⁹ Colored bars represent the statistically significant results of a one-sample t-test.

Overall, current alternative fuel users report that benefit to the environment was their most important motivation for beginning AF use, while government mandates was least motivating. While the average importance rating was 4.12 (“Fairly Important”), environmental benefits were rated closer to 5 (“Very Important”) and government mandates were rated 3.5 (between “Somewhat” and “Fairly Important”). Fuel cost savings, vehicle reliability, public relations, and maintenance costs were all very similar and near the average rating, while vehicle performance, government incentives, and government mandates were less important than the other motivations.

Other motivations than the ones listed in the survey were important to current AF users. Four (4) respondents were motivated by particular incentives such as a government grant or driving in the HOV lanes. Four (4) respondents were motivated by their sense of patriotism; they use alternative fuels to reduce dependence on foreign oil. And 3 respondents were motivated by the reduced health risks to their vehicle operators.

Motivations of Private and Government Users

Among alternative fuel users, government and private fleets differ in some of the motivations to begin using AFs, as seen in Figure 4.5. The rating for environmental benefits was the highest across both groups, and the groups did not differ on the importance rating of environmental benefits. But private fleets were more motivated by vehicle performance and reliability, low cost of maintenance, and fuel cost savings. Government fleets were more motivated by government mandates and public relations benefits.¹⁰

Figure 4.5: Importance of Original Motivations for Government and Private Fleets

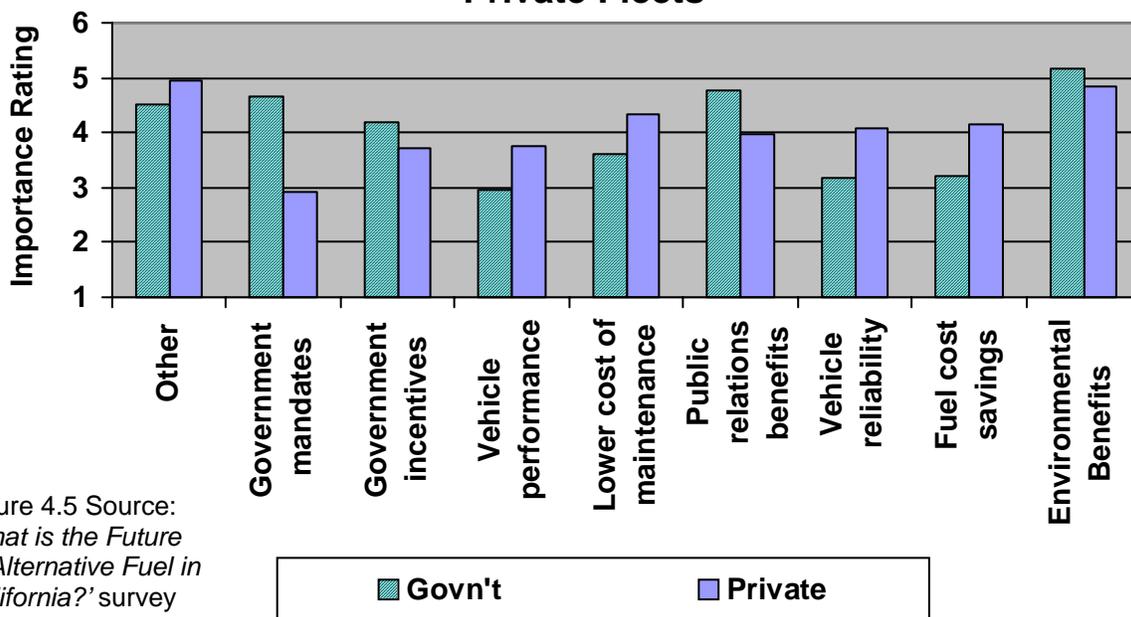


Figure 4.5 Source: ‘What is the Future of Alternative Fuel in California?’ survey data.

1 = “Not at All Important”, 2 = “Not Very Important”, 3 = “Somewhat Important”, 4 = “Fairly Important”, 5 = “Very Important”, 6 = “Extremely Important”

¹⁰ Differences were statistically significant at the $p < .05$ level according to an independent samples t-test.

Motivations by Fuel Type

Motivations differed across fuel types. In nearly all fuel types environmental benefit was the most important motivating factor while government mandates remained least motivating. For LNG and E85 users, the only motivation that stood out was environmental benefits; all of the others were rated similarly to one another. For CNG users, environmental benefits and public relations were the most important motivators to begin using, while maintenance, fuel cost, and vehicle reliability and performance were least motivating. For LPG users, cost of maintenance, fuel cost, and vehicle reliability were most important, while public relations and government mandates were least important; this is the only group for which environmental benefit was not rated above the other motivations. For biodiesel users, fuel cost was less important than average along with government mandates.

Motivations of Non-Users

Non-users were asked what would motivate them to begin using alternative fuels in their fleets. They rated each reason on a scale from 1, “Not at All Important” to 6, “Extremely Important.”

Figure 4.6 displays the average response to each potential motivator across respondents. Items with blue bars were rated significantly higher than the average rating across items in a one-sample t-test, those in purple were not different from the average, and those in yellow were significantly lower than average.

Figure 4.6: Importance of Expected Benefits to Motivate Non-Users to Begin Use

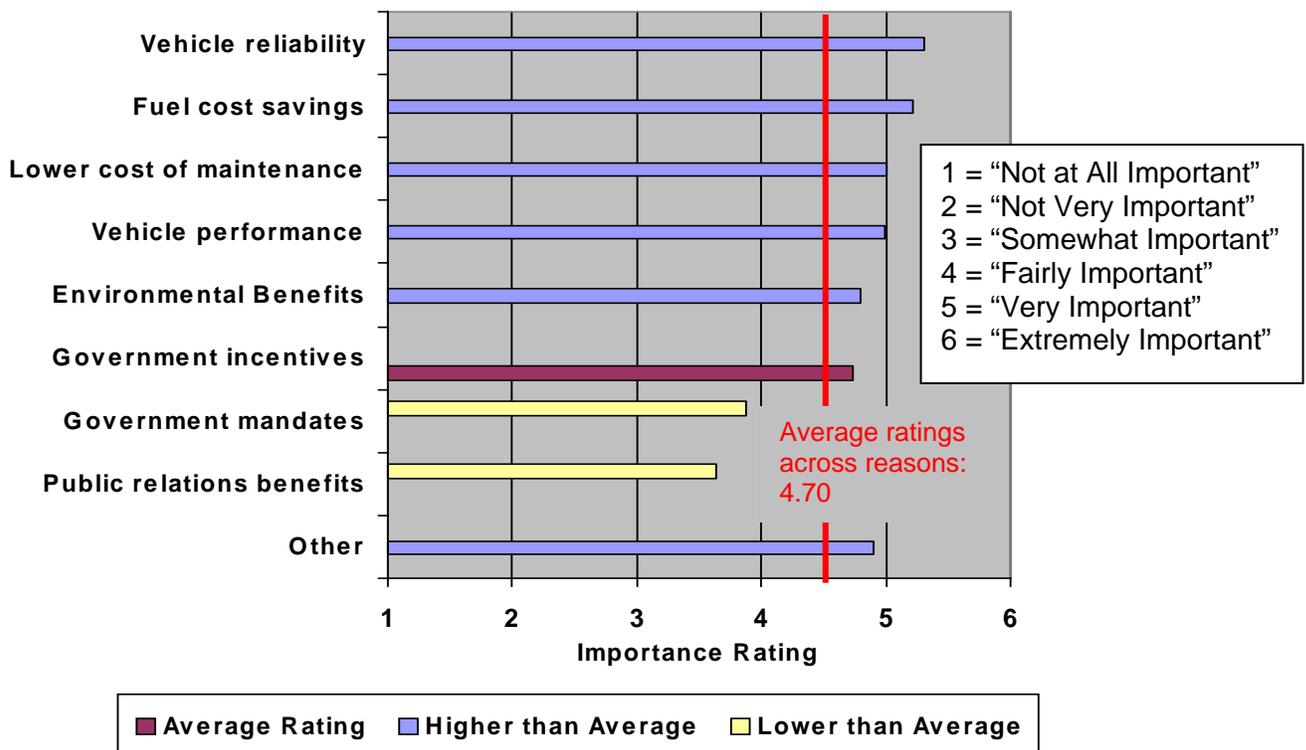


Figure 4.6 Source: ‘What is the Future of Alternative Fuel in California?’ survey data.

Across non-users, vehicle reliability and fuel cost savings are the top two potential motivators for using AFs, followed by lower maintenance costs and vehicle performance, then environmental benefits.

Non-users describe “Other” motivations to use alternative fuels. As seen in Figure 4.7, the most common “Other” motivation is alternative fuel availability. This is followed by cost, but the comments on cost reveal that many non-users are looking for AF costs to be comparable to gasoline or diesel, not necessarily lower.

“What’s important is that fuel costs, vehicle performance, vehicle reliability, and maintenance costs just need to be the SAME! They don’t need to be lower. The problem with CNG/LNG/Propane and most of the other alternative fuel technology so far is that is all costs MORE - fuel costs are higher, vehicle performance and reliability are lower, and maintenance costs are higher. So the goal is not to save but just to have technology that’s comparable.”

Figure 4.7: Other Motivations to Use Alternative Fuels among Non-Users

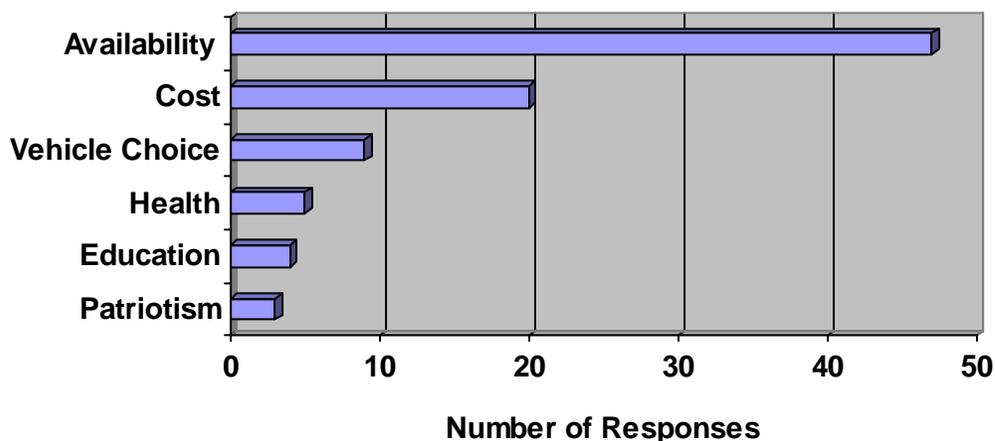


Figure 4.7 Source: ‘What is the Future of Alternative Fuel in California?’ survey data.

Motivations by Industry

There are some differences in motivations between industries. Fleets in agriculture, construction and maintenance, goods transportation, goods transport-short haul, retail, other services, and wholesale mirror the priorities of the whole group. The other industry types vary somewhat from this pattern. Fleets in administration mirror the whole group except that environmental benefits rank more highly. Goods transport-long haul fleets are more motivated by government incentives, and less by vehicle performance, lower maintenance cost, and environmental benefits. Fleets used for people transportation (other than buses) are less motivated by vehicle performance and more by government incentives.

For some industry types, the small number of respondents makes it difficult to distinguish between motivations using statistical significance as the criterion. For these groups, we can describe trends. Both taxi/limo and towing fleets appear to mirror the whole group; however, for both groups vehicle reliability stands out as the top motivation, and government mandates as least motivating. Bus transportation fleets are more consistently motivated by lower maintenance cost. Fuel-related fleets appear more motivated by government incentives and public relations than most other fleets. Public works fleets other than utility and refuse appear to be motivated more by government mandates, government incentives, and public relations benefits than other fleets. Rental fleets are more motivated by environmental benefits than other fleets. Package delivery fleets appear to mirror the whole group, but fuel cost savings stands out as the most important motivation. Public works utility fleets do not have any notable distinctions between motivations.

Comparing Motivations of Users and Non-Users

Current AF users and non-users differ somewhat in the importance of different motivations to prompt AF use.

Figure 4.8: Motivations of Private Fleets to Begin Using Alternative Fuels for Users and Non-Users

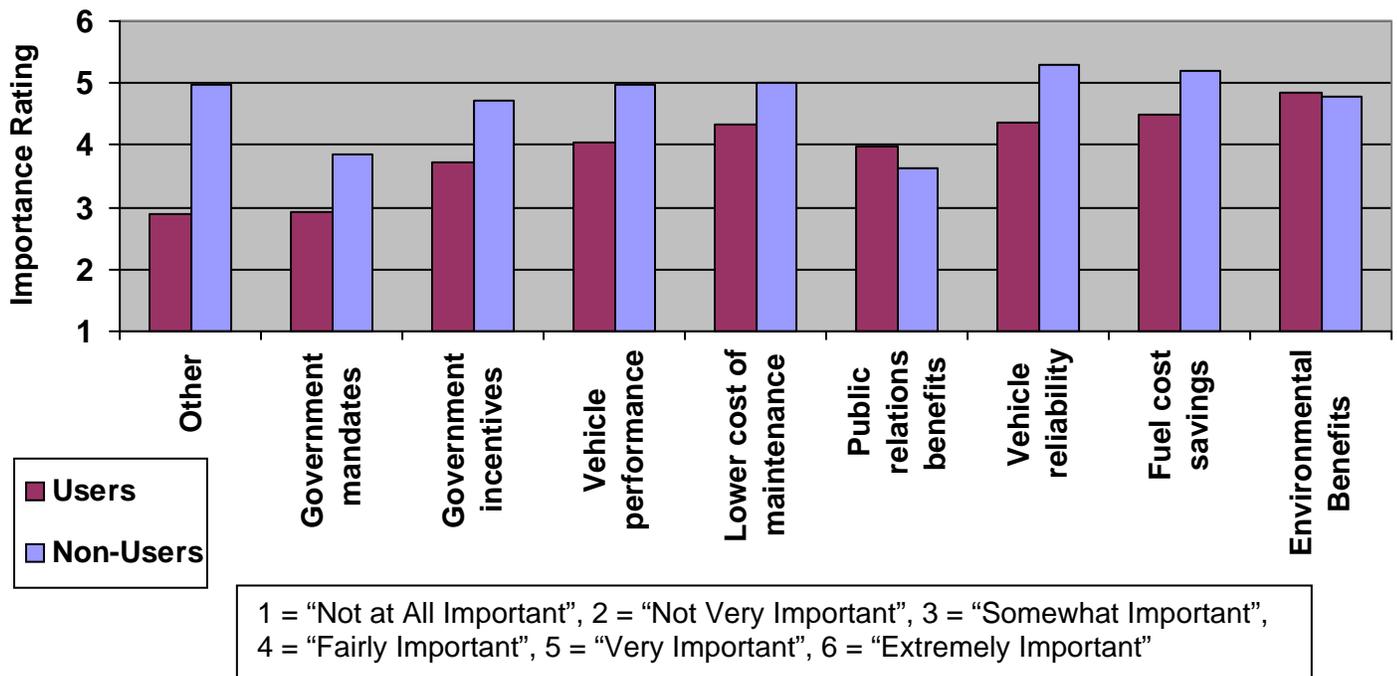


Figure 4.8 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Comparing users and non-users average ratings of motivations¹¹ among private fleets, each set of average scores shown in Figure 4.8 was significantly different except

¹¹ Users and non-users responses were compared with an independent-samples t-test.

environmental benefits and public relations benefits. However, because non-users have a higher average rating across all items, these differences are not as meaningful as comparing the ranking of the motivations for each group, as shown in Table 4.2.

Table 4.2: Ranking of Motivations to Begin Using Alternative Fuels for Current Users and Non-Users among Private Fleets

Rank	Motivations for Alternative Fuel Users		Motivations for Non-Users	
	Reason	Mean	Reason	Mean
1	Environmental benefits ^H	4.84	Vehicle reliability ^H	5.31
2	Fuel cost savings	4.50	Fuel cost savings ^H	5.21
3	Vehicle reliability	4.39	Lower cost of maintenance ^H	5.00
4	Lower cost of maintenance	4.33	Vehicle performance ^H	4.99
5	Vehicle performance _L	4.05	Environmental benefits ^H	4.79
6	Public relations benefits	3.97	Government incentives	4.73
7	Government incentives _L	3.71	Government mandates _L	3.84
8	Government mandates _L	2.92	Public relations benefits _L	3.61

^H = Higher than average within group, _L = Lower than average within group

Table 4.2 Source: 'What is the Future of Alternative Fuel in California?' survey data.

The differences in ranking seen in Table 4.2. may indicate a real and important difference in motivations between those fleet operators who have already chosen to begin using AFs and those who have not. It is notable that while environmental benefits is the only motivation which is above average for current users, it ranks 5th among current non-users, and is rated lowest among those items above average for the group. Further, the top 5 motivations and bottom 3 motivations were the same across groups.

CHAPTER 5: BARRIERS TO ALTERNATIVE FUEL USE

The purpose of objective five was to identify current barriers to the use of alternative fuels within and across fleet types.

Summary

Barriers for Non-Users

Fleet operators not currently using alternative fuels are very concerned about the potential problems of using AFs. The biggest barriers to AF use as perceived by non-users are lack of access to fueling stations, conversion costs, vehicle reliability, and maintenance costs. These are followed by vehicle performance, choice, and cost, then fuel cost, and driving range.

Some of non-users' concerns are mirrored in the problems experienced by AF users, particularly access to fueling stations. However, many of their concerns may be less problematic than they anticipate according to the problems actually experienced by current AF users. The discrepancy between problems anticipated by non-users and those actually experienced by AF users highlights the lack of information readily available to non-users.

The lack of accurate, readily available information from a trusted source keeps non-users from overcoming the many concerns they have to pursue AF use. Fleet operators are skeptical of the available information on alternative fuels, particularly because the information they find is often inconsistent when comparing the fuel efficiency of AFs to gasoline or diesel. They need trusted information on "bottom dollar" impacts in order to convince them selves or upper management to convert¹² to AF use.

One survey respondent commented:

"There are no real incentives and not a lot of information... If we don't have any information about why we should change, why would we think about it?"

Barriers for Current Users

The biggest barrier to expansion of alternative fuel use among current users is vehicle choice in combination with access to fueling stations. AF users have multiple classes and functions of vehicles in their fleets but do not want to use multiple AFs, particularly for those that fuel on-site. Thus the lack of vehicle choices within any one AF keeps current users from expanding their use within their fleets.

There are also some technology lags that make the performance of some AF-powered vehicles insufficient, and keep AF users from expanding. These include the driving range of electric vehicles, insufficient hauling power in LPG vehicles, and cold-start problems in biodiesel vehicles.

¹² The word "convert" here is being used in a general sense to describe switching from using petroleum to using alternative fuels in the fleet as a whole, rather than the specific sense of mechanically converting a vehicle to use an alternative fuel rather than petroleum.

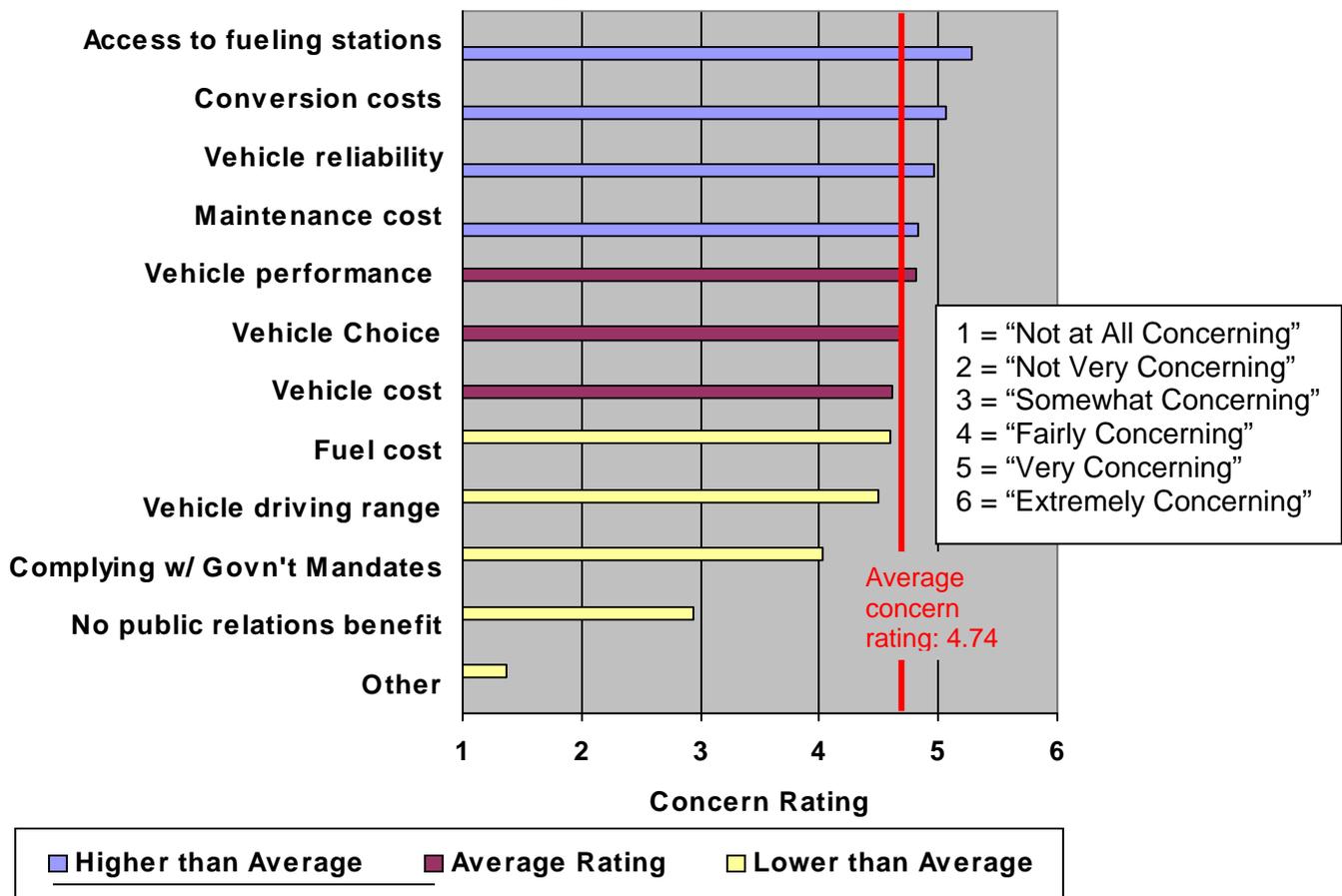
Finally, withdrawal of incentives once offered to promote AF use has produced a lack of trust in the government agencies regulating or promoting AF use; fleet operators doubt the sustained value of switching to alternative fuels.

Anticipated Problems of Non-Users

Non-users were asked what keeps them from using alternative fuels in their fleets. They rated each reason according to how concerning it is, from 1, “Not At All Concerning” to 6, “Extremely Concerning.” Figure 5.1 displays the average response to each barrier. Items with blue bars were rated significantly higher than the average rating,¹³ those in red were average, and those in yellow were lower than average.

Non-users are “Very” concerned on average with the problems they anticipate in using alternative fuels. They are most concerned about access to re-fueling stations, conversion costs, vehicle reliability, and maintenance costs. They are “Fairly” to “Very” concerned about vehicle performance, choice, and cost, followed by fuel cost, and vehicle driving range. They are “Fairly” concerned about the ability to comply with government mandates, and “Somewhat” concerned about having no perceptible public relations benefits from using alternative fuels.

Figure 5.1: Non-users’ Concerns about Anticipated Problems with Using Alternative Fuels



¹³ Comparisons across items were made using a one-sample t-test.
 Figure 5.1 Source: “What is the Future of Alternative Fuel in California?” survey data.

Figure 5.2 shows the common responses in the “Other” category. In these responses, non-users reiterate the need for fuel availability (22 responses), including both fuel station access and sufficient supply of AFs to meet their demand. This concern is followed by vehicle choice and the need for unbiased information about alternative fuels and AF vehicles.

Figure 5.2: Other Barriers to Using Alternative Fuels

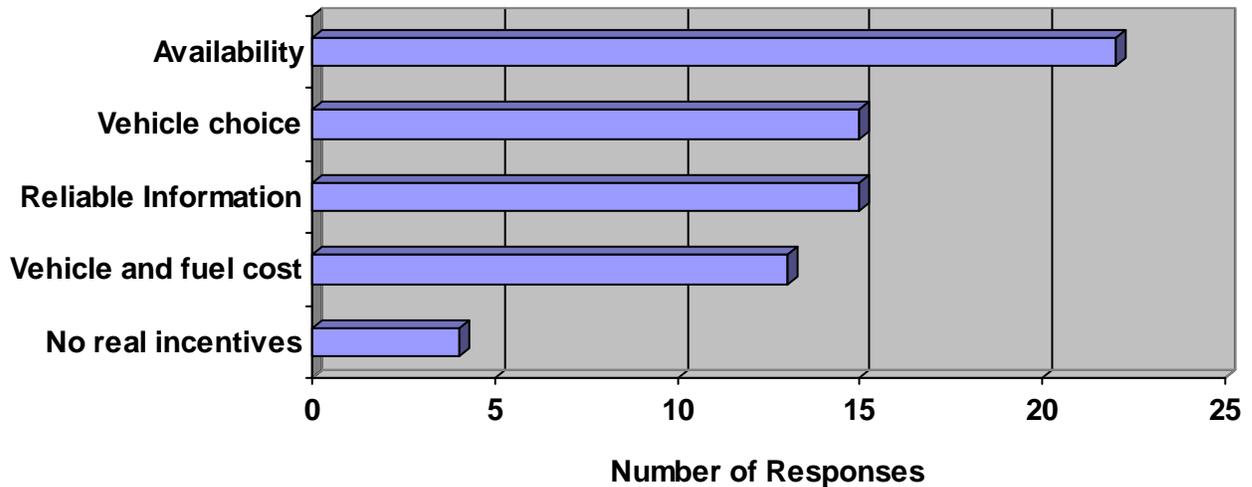


Figure 5.2 Source: ‘What is the Future of Alternative Fuel in California?’ survey data.

One respondent comments on lack of information and incentives:

“We just never really checked into it. There are no real incentives and not a lot of information that is handed out as to the pros and cons of alternatives. If we don't have any information about why we should change, why would we think about it? Don't fix it if it isn't broken.”

Anticipated Problems by Industry Type

The concerns of most industries follow the pattern shown in Figure 5.1; however, some industries find particular items more concerning. These differences are as follows:

- **Fuel-related** fleets are more concerned about the cost of fuel.
- **Goods Transport** fleets of all kinds are more concerned about cost of fuel, and long haul fleets are also more concerned about vehicle driving range.
- **Rental/Lease** fleets are more concerned about conversion costs and vehicle reliability.
- **People transport** fleets are more concerned about vehicle choice and vehicle cost.
- **Public Works-Other** fleets are more concerned about vehicle performance and vehicle choice. This category includes police, fire, and emergency vehicles, as well as county and city fleets that have a range of vehicle types.

- **Public Works-Refuse Collection** fleets are more concerned about vehicle performance and less about access to fueling stations.
- **Retail** fleets are more concerned about vehicle and fuel cost.
- **Other Services** fleets are more concerned about vehicle performance and choice.
- **Taxi/Limo** fleets are more concerned about vehicle driving range, and less about cost of maintenance.
- **Towing** fleets are more concerned about vehicle choice and driving range.
- **Wholesale** fleets are more concerned about vehicle choice, cost, and driving range.

Barriers to Expansion in Alternative Fuel Users

According to the survey results, the biggest barrier to expansion of alternative fuel use among current users is vehicle choice in combination with access to fueling stations. The focus group results also reveal that AF users have multiple classes and functions of vehicles in their fleets but do not want to use multiple AFs, particularly for those that fuel on-site. Thus the lack of vehicle choices within any one alternative fuel keeps current users from expanding their use of alternative fuels within their fleets.

Both the survey and focus group responses described some technology lags where the performance of an alternative fuel vehicle is insufficient, and keeps the fleet operator from purchasing additional alternative fueled vehicles. These include the driving range of electric vehicles, insufficient hauling power in LPG vehicles, and cold-start problems in biodiesel vehicles.

Finally, inconsistent government incentive programs have produced a lack of trust in the government agencies regulating or promoting alternative fuel use and in the value of switching to AF use among some users. Several survey respondents describe converting their fleets to AFs when offered incentives, then having the incentives withdrawn. One user comments:

“You gave us a good deal for using Propane and when we had all of the gas vehicles converted you took away the benefit. You gave a good deal to get a small car with whatever so you can use the diamond lane and then you took that away. Why should we even trust you now???”

Comparing Barriers for Users and Non-Users

While non-users were asked what concerns keep them from using alternative fuels, current users were asked what difficulties they encounter while using AFs. Though these questions are not precisely the same, contrasting them can provide a way to look at fleet operators’ perceptions of barriers to AF use.

As described in Chapter 2, current alternative fuel users rate their experiences with AFs as 2.71 on average—between 2, “Not Very Problematic” and 3, “Somewhat

Problematic.” Amongst the most problematic experiences are access to fueling stations, vehicle choice, and conversion costs, while maintenance cost, lack of public relations benefits, and vehicle performance and reliability are each rated closer to “Not Very Problematic.” By contrast, as seen in Figure 5.2, non-users are “Very” concerned on average (average rating = 4.74) with the problems they anticipate in using alternative fuels. They are most consistently concerned about access to fueling stations, conversion costs, vehicle reliability, and maintenance costs.

Figure 5.2: Concerns about Using Alternative Fuels for Current Users and Non-Users among Private Fleets

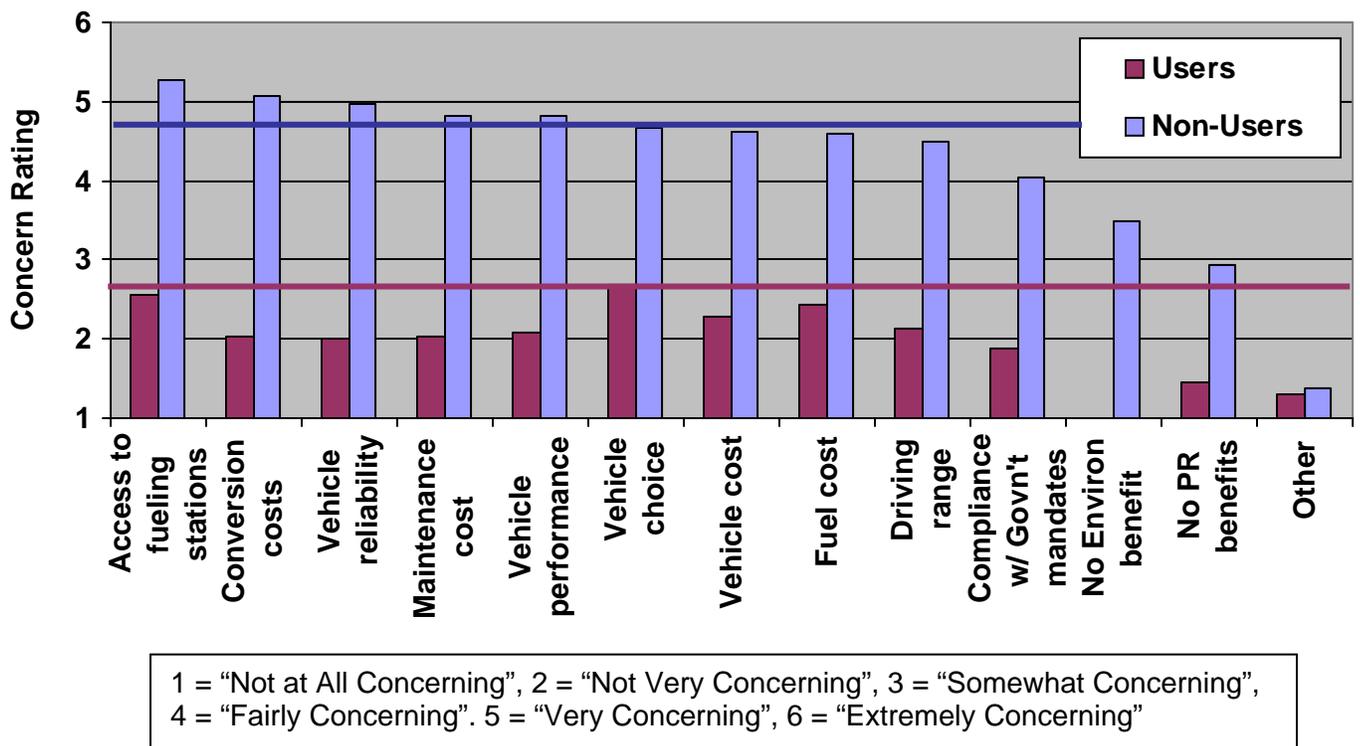


Figure 5.2 Source: 'What is the Future of Alternative Fuel in California?' survey data.

When the concerns of non-users are compared to the problems of AF users among private fleets, non-users are significantly more concerned than users on every item except “Other.”¹⁴ However, because non-users had a higher average rating across items, these differences may not be particularly meaningful. What is more meaningful is the differential ranking of items. The ranking of barriers for each group are compared in Table 5.1.

¹⁴ Comparison of users and non-users was made using an independent-samples t-test.

Table 5.1: Ranking of Barriers to Using Alternative Fuels for Current Users and Non-Users

Rank	Difficulties for Alternative Fuel Users		Concerns for Non-Users	
	Reason	Mean	Reason	Mean
1	Vehicle choice	2.69	Access to fueling stations ^H	5.28
2	Access to fueling stations	2.56	Conversion costs ^H	5.06
3	Vehicle cost	2.29	Vehicle reliability ^H	4.96
4	Fuel cost _L	2.42	Maintenance cost ^H	4.83
5	Driving range	2.13	Vehicle performance ^H	4.81
6	Vehicle performance _L	2.09	Vehicle choice	4.68
7	Maintenance cost _L	2.03	Vehicle cost _L	4.63
8	Conversion costs _L	2.03	Fuel cost _L	4.60
9	Vehicle reliability _L	2.00	Driving range _L	4.49
10	Difficulty w/ Gov mandates _L	1.89	Difficulty w/ Gov mandates _L	4.03
11	No PR benefits _L	1.46	No Environ benefits _L	3.49
12	No Environ benefits	--	No PR benefits _L	2.93

^H = Higher than average within group, _L = Lower than average within group

Table 5.1 Source: 'What is the Future of Alternative Fuel in California?' survey data.

The differences in ranking may indicate a real and important difference in barriers between those fleet operators who have already begun using alternative fuels and those who have not. It is notable that access to fueling stations ranks very high in both groups, and that difficulty with government mandates and lack of public relations benefit rank the lowest for both groups.¹⁵ Cost of conversion, vehicle reliability, and maintenance costs rank 2nd, 3rd, and 4th for non-users while they are much lower on the list for current users. Whereas the 1st and 3rd most difficult barriers for current users are vehicle choice and vehicle cost, these items are 6th and 7th for non-users. These differences in concerns may indicate that users and non-users have substantially different needs and thus very different concerns. However, it is more likely that these discrepancies are due to non-users' misperceptions about the difficulties they will encounter in using alternative fuels.

The lack of readily available and reliable information about the benefits and challenges of using alternative fuels is most likely the cause of this discrepancy between users' experiences and non-users concerns about AFs. Focus group participants comment that it is difficult to find information on switching to AFs. In particular, fleet operators

¹⁵ The current users were not asked about problems with No Environmental benefits.

need to have the “bottom dollar” impact in order to convince them selves or upper management to use alternative fuels. They are skeptical of the available information on alternative fuels, particularly because the information they find is often inconsistent when comparing the fuel efficiency of AFs to gasoline or diesel.

CHAPTER 6: REQUIREMENTS FOR GOVERNMENT SUBSIDIES OR OTHER INCENTIVES

The purposes of objective six was to identify the most promising potential incentives and regulation changes for encouraging fleet owners/operators to use more alternative fuels within and across fleet types.

Summary

The survey asked respondents about seven potential changes that could be made, each of which focused on increasing the *demand* for alternative fuels. Both users and non-users would find each of these changes fairly to very helpful, but also describe the need to increase the *supply* of alternative fuels, as well as the choice of AF vehicles.

Promoting Expansion Among Current Users

Current users would find *all* of the proposed changes fairly to very helpful; the most helpful changes would be fuel use incentives, state tax rebates, and vehicle purchase incentives, followed by relaxation of conversion regulations, then outreach, education, and training for the public and fleet operators.

Current users are constrained from expanding their AF use by lack of supply in both vehicle choice and fuel availability. Both shortages keep prices of vehicles and fuels high compared to gasoline and diesel. There are also technology lags that make the performance of some AF-powered vehicles insufficient, and keep AF users from expanding. Thus, current users suggest that government agencies act to strengthen and expand the fueling infrastructure to assure availability, and work with vehicle manufacturers to increase vehicle choice with an emphasis on improved technology to meet the needs of fleet vehicle users, particularly for vehicles powered by electricity, LPG, and biodiesel.

Encouraging Use of Alternative Fuels among Non-Users

Like AF users, non-users would find *all* proposed changes fairly to very helpful, and rank the helpfulness of changes in approximately the same order as users. Non-users would find vehicle purchase incentives, relaxation of conversion regulations, and training and education for fleet organizations as slightly more helpful than would current users.

Fleet operators are prohibited from using AFs by the lack of AF availability, and many believe it will take government intervention to strengthen the infrastructure in order to support a steady supply of alternative fuels.

Conversion costs are too high for small businesses which are at greater risk of losing revenue if technology is insufficient, associated costs (such as maintenance) are too high, or fuel use incentives are withdrawn. Thus substantial start-up incentives—for vehicle purchase or conversion—are likely necessary to enable most small businesses to begin using AFs, as well as assurance that ongoing incentives will not be withdrawn.

Reliable information, which is not currently available, on the costs, benefits, challenges, and availability of alternative fuels is a precursor to a fleet operators' decision to use alternative fuels. Fleet operators would trust a government-based source of this information more than trade magazines, their peers, or advocates.

Changes to Promote Expansion of Alternative Fuel Use among Users

Across all current alternative fuel users, the average helpfulness rating across potential changes to promote AF use was 4.48, half way between "Fairly Helpful" and "Very Helpful." As seen in Figure 6.1, fuel use incentives, state tax rebates, and vehicle purchase incentives are rated as the most helpful, each nearing a score of 5 "Very Helpful." Outreach to fleet organizations, public outreach, and training and education are each rated lower than average, at 4 "Fairly Helpful."

Figure 6.1: Helpfulness of Changes to Increase Alternative Fuel Use among Current Users

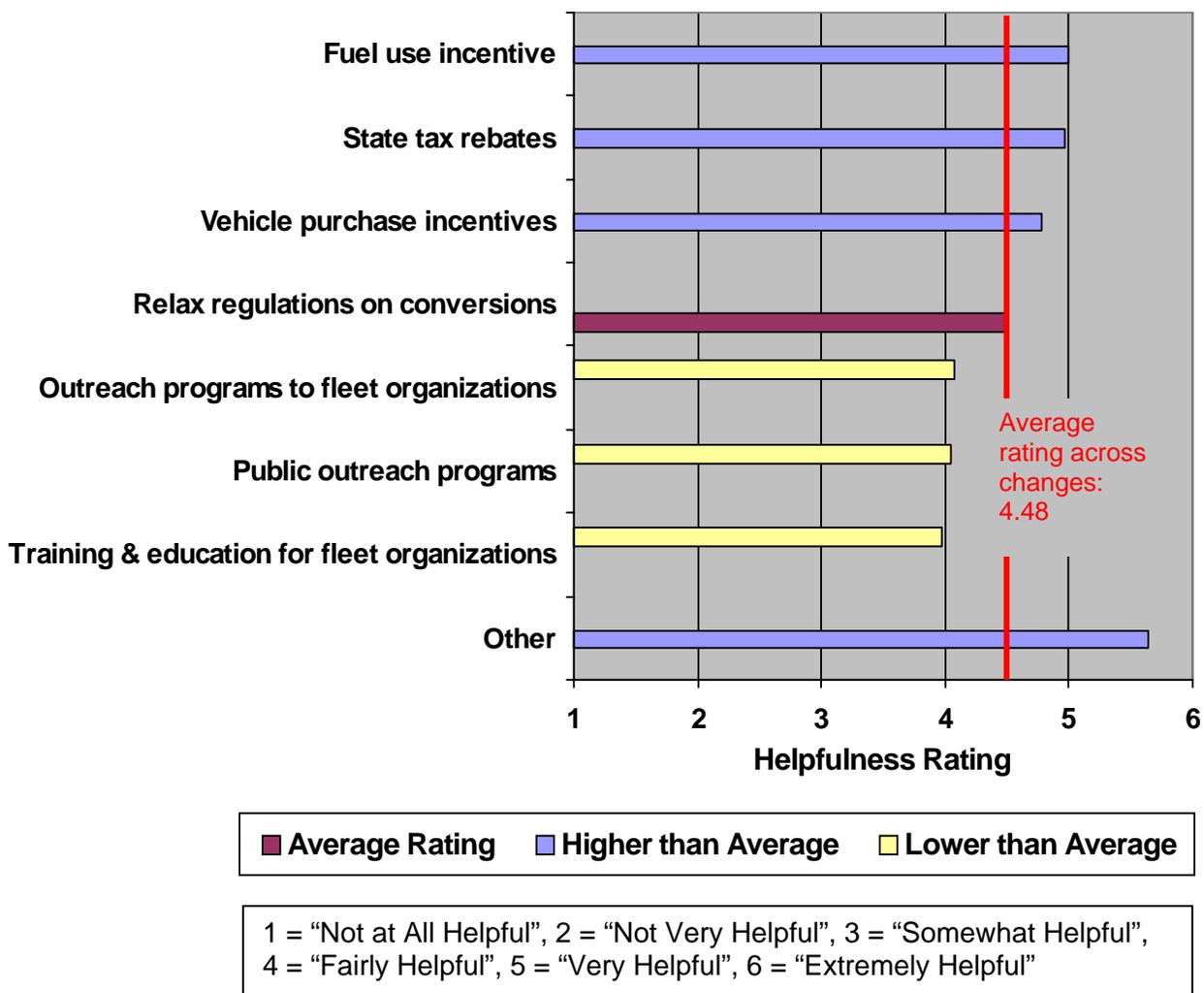


Figure 6.1 Source: 'What is the Future of Alternative Fuel in California?' survey data.

The “Other” responses reveal further changes in which fleet operators want government to play a role. These are the expansion of fueling infrastructure to assure availability, and an increase in vehicle choice with an emphasis on improved technology, particularly for vehicles powered by electricity, LPG, and biodiesel.

Helpfulness for Private and Government Fleets

Government and private fleets do not vary much in which changes would be most helpful. However, private fleets rate state tax rebates and relaxation of conversion regulations as more helpful than did government fleets.

Helpfulness by Fuel Type

Helpfulness of changes also vary somewhat by fuel type. Overall CNG, LNG, LPG, biodiesel, and electric users follow the pattern of the whole group. However, CNG and electric users’ rate state tax rebates as somewhat less helpful than users of other fuels. E85 users rate changes as less helpful overall; the only changes more than “Fairly Helpful” are fuel use incentives and “Other.”

The “Other” responses reveal some differences between fuel types in the particular struggles fleet operators want government agencies to address. Quotes from users of different fuels are provided below:

E85 – Availability:

“We have vehicles that will run with ethanol - can't find the fuel.”

Biodiesel – Availability At a Competitive Price:

“We have not been able to find the Biodiesel at good prices, because there is not enough of it around.”

“The actual building and use of Biodiesel plants, which could be soy derived and renewed.”

Electric – Technology:

“Extend the driving range of all alternate fueled vehicles to be comparable to gasoline or diesel fueled units with out compromising useful truck bed or trunk space. Electric vehicles would be very useful in our operation if they had better range on each battery charge.”

CNG – Vehicle Choice and Fuel Availability:

“The lack of availability of CNG powered, domestic vehicles for use in a municipal maintenance fleet makes it difficult to map out long range alternative fuel strategies.”

“There are no viable trucks out there with factory backed programs and ease of service.”

“Make filling stations available. CNG availability limits us to the areas we can operate in.”

LNG – Start-Up Cost and Regulations:

“We have investigated LNG for our Solid Waste fleet and the conversion and beginning and intermediate transition of fuel supplies is cost prohibitive for a small organization.”

“Relax the CARB laws in Calif. Propane can not be used on engine families not approved by CARB. Biodiesel does not have these requirements.”

LPG – Vehicle Choice and Technology:

“The availability and choices of propane powered units is preventing my business from expanding our fleet of alt. fueled vehicles.”

“Development of engines that will handle our delivery needs. We have found that currently there trucks with the chassis size required for our deliveries are underpowered.”

General Comments:

To promote AF use, we need “1) fueling infrastructure and availability 2) purchase costs in line w/ conventional fuel (i.e. E85 vehicle costs are good, CNG is horrible) and 3) maintenance support and training by manufacturers.”

“Prevent local governments from imposing or maintaining programs of regulation/ taxation that discourage fueling facilities at fleet bases. Fleet base site fuel reserves can cushion fuel shortages.”

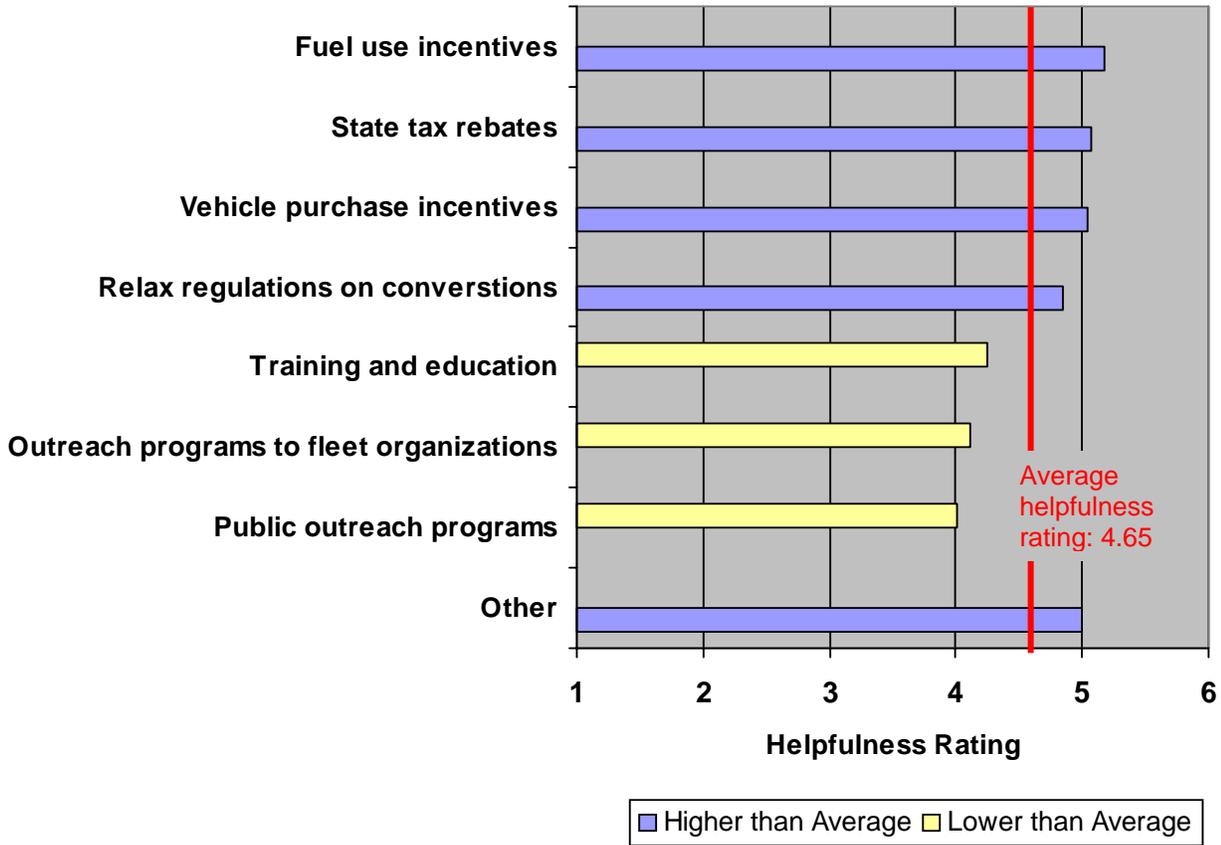
“There needs to be an expansion of Alt Fuel fueling stations.”

“Get me some information and a reliable supplier. I’ll be in the loop...”

Changes to Encourage Non-Users to Begin Using Alternative Fuels

Non-users were asked what changes would help them to begin using alternative fuels. They rated each change from 1, “Not At All Helpful” to 6, “Extremely Helpful.” In this section, Figure 6.2 shows the average helpfulness rating across all fleet types. In each graph, those bars in purple are the items not rated differently from the average for that group, the bars in yellow are those rated significantly higher than average in a paired samples t-test, and those in blue are significantly higher than average.

Figure 6.2: Helpfulness of Changes to Encourage Non-Users to Use Alternative Fuels



1 = "Not at All Helpful", 2 = "Not Very Helpful", 3 = "Somewhat Helpful", 4 = "Fairly Helpful", 5 = "Very Helpful", 6 = "Extremely Helpful"

Figure 6.2 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Many respondents describe "Other" changes that would encourage them to begin using alternative fuels. These "Other" responses are summarized in Figure 6.3, followed by quotes from survey responses exemplifying each "Other" response.

Figure 6.3: Other Changes to Encourage Non-Users to Begin Alternative Fuel Use

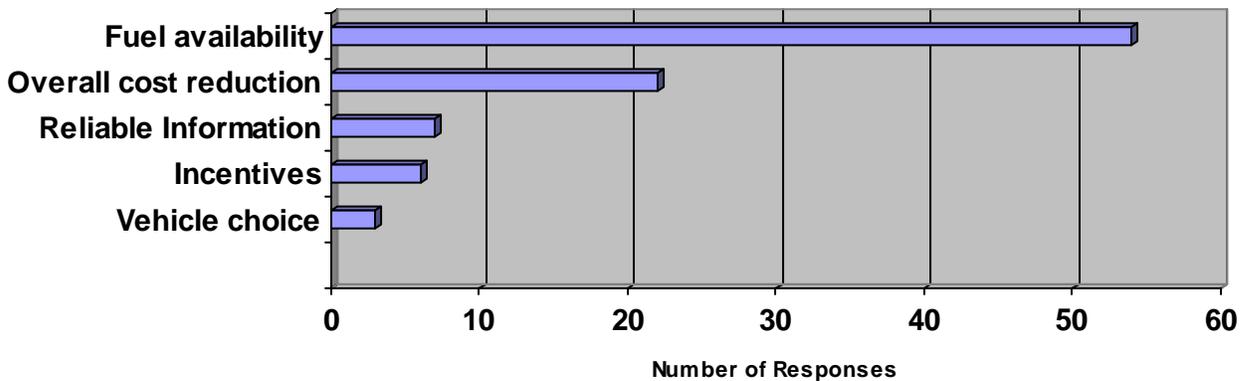


Figure 6.3 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Availability:

"I would switch my Diesel trucks to Biodiesel if it were more readily available. We currently get our fuel delivered to my facility by a fuel company. If they (or others in my area) had Biodiesel available for delivery, I would probably switch - or at least look very closely at switching. I use enough fuel that I don't want my drivers driving around and filling up their own vehicles on their own."

Cost:

"The endgame has to be cost, when alternative fuels = same cost or lower than 'standard' fuels then people will make real change. As long as gas and diesel are cheaper then thats what the market will buy."

"Would have to win the lottery to re-invest in new equipment. Due to the states strangling of small business through taxes, DMV, EPA, Workers Comp., Health care, etc. It is impossible to make enough to upgrade equipment."

Reliable Information:

"Available online information in plain English explaining full process and databases of all information is not readily available. For example: Obtaining non-standard information from manufacturers is extremely burdensome, but could easily be gathered by the government to be placed on an online database."

"Proof that Alternative Fuels would not decrease vehicle and/or equipment efficiency i.e. power and fuel usage, reliability, and, longevity. Will using Alternative Fuels void engine manufacturer's warranties?"

Incentives:

"Biodiesels should be tax free, both state and federal, so that there's a financial incentive to use them."

"Pay me to convert."

Changes by Industry Type

All potential changes listed in the survey are rated as at least "Somewhat Helpful" on average by fleets in every industry. Thus, the only differences between industries are in the degree or ranking of the helpfulness of each potential change. While most industries follow the overall average pattern in Figure 6.2, there are small but meaningful variations in their responses. Table 6.1 summarizes the variations in responses across industry types; **BLUE** cells represent changes that are little more helpful than average for the industry, **PURPLE** cells represent changes that are of average helpfulness for the industry, and **YELLOW** cells represent changes that are less helpful than average for the industry.

Table 6.1: Industry Differences in the Helpfulness of Potential Changes to Encourage Alternative Fuel Use among Non-Users

	Fuel use incentives	State tax rebates	Vehicle purchase incentives	Relax conversion regulations	Training & education for fleet organizations	Outreach programs for fleet organizations	Public outreach programs
Administrative	Purple	Purple	Purple	Yellow	Purple	Purple	Purple
Agriculture	Purple	Purple	Purple	Purple	Purple	Purple	Purple
Bus transportation	Purple	Purple	Purple	Yellow	Blue	Purple	Purple
Construction/Maintenance	Purple	Purple	Purple	Purple	Purple	Purple	Purple
Fuel-Related	Purple	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Goods Transportation	Purple	Purple	Purple	Purple	Purple	Purple	Purple
Goods Transportation-Long Haul	Purple	Purple	Purple	Purple	Purple	Purple	Purple
Goods Transportation-Short Haul	Purple	Purple	Purple	Purple	Purple	Purple	Purple
Lease/Rental Cars & Trucks	Yellow	Purple	Purple	Yellow	Purple	Purple	Purple
Package/Mail Delivery	Purple	Yellow	Purple	Yellow	Purple	Blue	Purple
People Transportation	Purple	Yellow	Purple	Purple	Blue	Blue	Purple
Public Works/Safety-Other	Purple	Yellow	Purple	Purple	Blue	Blue	Purple
Public Works/Safety- Refuse Collection	Purple	Purple	Purple	Purple	Blue	Blue	Blue
Public Works/Safety- Utility	Purple	Purple	Purple	Purple	Purple	Blue	Purple
Retail Sales	Purple	Purple	Purple	Purple	Purple	Purple	Purple
Other Services	Purple	Purple	Purple	Purple	Purple	Purple	Purple
Taxi/Limousine/Charter	Purple	Purple	Purple	Yellow	Blue	Purple	Purple
Towing	Purple	Purple	Purple	Purple	Blue	Blue	Blue
Wholesale	Purple	Purple	Purple	Yellow	Purple	Purple	Purple

Blue = Change is a little more helpful than average for this industry.
Purple = Change is as helpful as average for this industry.
Yellow = change is a little less helpful than average for this industry.

Table 6.1 Source: 'What is the Future of Alternative Fuel in California?' survey data.

CHAPTER 7: CUSTOMERS' LIKELIHOOD OF ACCEPTING TAX INCREASES IN EXCHANGE FOR AF BENEFITS

The purpose of objective seven was to assess the attitudes of vehicle owners about trade-offs between increased taxation and alternative fuel promotion.

Summary

Participants were not asked directly about the trade-off between taxation and alternative fuel promotion. However, their attitudes about accepting additional taxation can be inferred from their motivations to use alternative fuels and the changes that would induce them to use AFs.

Some survey and focus group respondents see petroleum as a fuel monopoly that has thrived with government support to shut other fuels out of the market. Thus they see a legitimate role for the government to disincentivize gasoline/diesel use and incentivize use of alternative fuels.

Though current alternative fuel users are motivated by the environmental benefits of AF use, most fleet owners and operators are primarily motivated by bottom dollar cost. Thus, any action that reduces the cost of using alternative fuels, or conversely increases the cost of using gasoline or diesel, will affect their choices to use AFs.

Fleet operators comment that alternative fuels will become more popular when they are equal to or less than the cost of gasoline and diesel. Some comment that this can be achieved by reducing the price of alternative fuels, or by increasing the price of gasoline. However, fuel cost is not the sole driving force in choice of fuels. Alternative fuels must first be available, AF vehicles must be sufficient for fleet tasks, and the cost of converting¹⁶ a fleet from gasoline/diesel to AF use must be overcome, which is a particular challenge for small businesses.

¹⁶ The word "converting" here is used to describe the process of switching from petroleum use to AF use, which may involve mechanical vehicle conversions, locating or setting up fueling sites, and purchasing new vehicles.

CHAPTER 8: NICHE MARKET OPPORTUNITIES

The purpose of objective eight was to identify and describe the types of fleets that are ready or willing to use more alternative fuels and which fuels they are interested in using.

Summary

Fleets Willing to Use Alternative Fuels among Non-Users

As reported in Chapter 4, 65 percent of non-users are interested in using AFs in the future, and 30 percent are undecided. Willingness to use AFs is not influenced by fleet size, nor by private/government ownership; but it is influenced by fleet composition and industry. Fleets with a higher percentage of vans and pickups are slightly more willing to use AFs, and those with a higher percentage of heavy-duty vehicles are less willing to use AFs. Industries with a high percentage of fleets willing to use AFs are forestry (100 percent), package delivery (90 percent), recreation (80 percent), taxi/limo (79 percent), public works-utility (75 percent), wholesale (74 percent), administration (72 percent), and people transportation (71 percent). With the exception of wholesale, these are smaller industries, each representing less than 5 percent of respondents.

Among the larger industries, 63 percent of construction/maintenance fleets are willing to consider using alternative fuels, along with 64 percent of goods transport-short haul fleets, and 54 percent of agriculture fleets. Together, the fleets willing to use AFs in these three industries represent the opportunity to expand into 36 percent of *all* California fleets.

Most California fleets are small fleets. Expansion of AF use could be made in small fleets if there were incentive programs that helped them overcome the risk of trying a new technology and the obstacle of initial vehicle purchase and conversion costs.

Industry-Fuel Match

As reported in Chapter 4, non-users are most interested in biodiesel (58 percent of respondents), followed by E85 (41 percent), then electric (23 percent). Fifteen percent are interested in CNG, and LPG, and 12 percent in LNG.

There are a number of matches between industries and alternative fuels of most interest to fleet operators. Industries most interested in E85 are construction/maintenance, people transport, other services, and taxi/limo fleets. Industries most interested in biodiesel are the three biggest industries represented in the survey: agriculture, construction/maintenance, and goods transport-short haul. Industries most interested in electric are administration, bus transport, lease/rental, other services, and wholesale.

Expansion Among Alternative Fuel Users

Though 13 percent of fleets use alternative fuels, most of these are using AFs in only 1 to 20 percent of their fleet vehicles. Thus, promotion of alternative fuel use among current users represents a sizeable expansion opportunity. As described in Chapter 6, expansion of AF use among current users could be promoted by government actions to

increase the supply and availability of alternative fuels, the supply and selection of AF Vehicles, and improvement of AF vehicle technology.

Fleets Willing to Use Alternative Fuels

As reported in Chapter 4, 65 percent of non-users are interested in using alternative fuels in the future, and 30 percent are undecided.

Fleet Size

Even though larger fleets and government fleets are more likely to be currently using alternative fuels, willingness to use AFs in the future is not influenced by fleet size nor private/government ownership. However, business size may influence the ease with which fleets integrate alternative fuels.

Most California fleets are small fleets, likely belonging to relatively small businesses. Fifty percent of fleets in the survey have fewer than 20 vehicles, and 77 percent have fewer than 50 vehicles. Small fleets are the least likely to be currently using AFs. They find it more difficult to overcome the initial cost of switching to AFs. One survey respondent summarizes the problem:

“I would have to win the lottery to re-invest in new equipment. Due to the states strangling of small business through taxes, DMV, EPA, Workers Comp., Health care, etc. It is impossible to make enough to upgrade equipment.”

Small businesses also have a harder time managing the risks of testing new technologies. However, the fueling and vehicle decisions of smaller business—usually made by a single owner—make them more flexible and responsive to potential incentive programs¹⁷. Thus, expansion of AF use could be made in small fleets if there were incentive programs to help them overcome the risk of trying a new technology and the obstacle of initial vehicle purchase and conversion costs. There should also be either an assurance that the incentives will not be withdrawn, or a transparent phase-out plan.

Fleet Composition

Willingness to use alternative fuels is influenced by fleet composition. Fleets with a higher percentage of vans and pickups are slightly more willing to use AFs, and those with a higher percentage of heavy-duty vehicles are less willing to use AFs¹⁸.

Fleet Industry

Willingness to use AFs varies somewhat by industry. Though less than 5 percent of respondents said they would not consider using AFs in the future, 30 percent said they are uncertain. Thus there is some variation in industries' willingness to use alternative fuels. Figure 8.1 shows the willingness of fleets in each industry to use alternative fuels.

¹⁷ Business characteristics influencing Alternative Fuel Vehicle purchasing decisions are described in Nesbitt, K., & Sperling, D. (2001). Fleet purchase behavior: Decision processes and implications for new vehicle technologies and fuels. *Transportation Research Part C*, 9, 297-318.

¹⁸ These result is based on bivariate correlations between fleet characteristics and willingness to use Alternative Fuels in the future, coded as Yes = 1, Undecided = 0.5, and No = 0.

Figure 8.1. Percentage of Fleets in Each Industry Willing to Consider Using Alternative Fuels

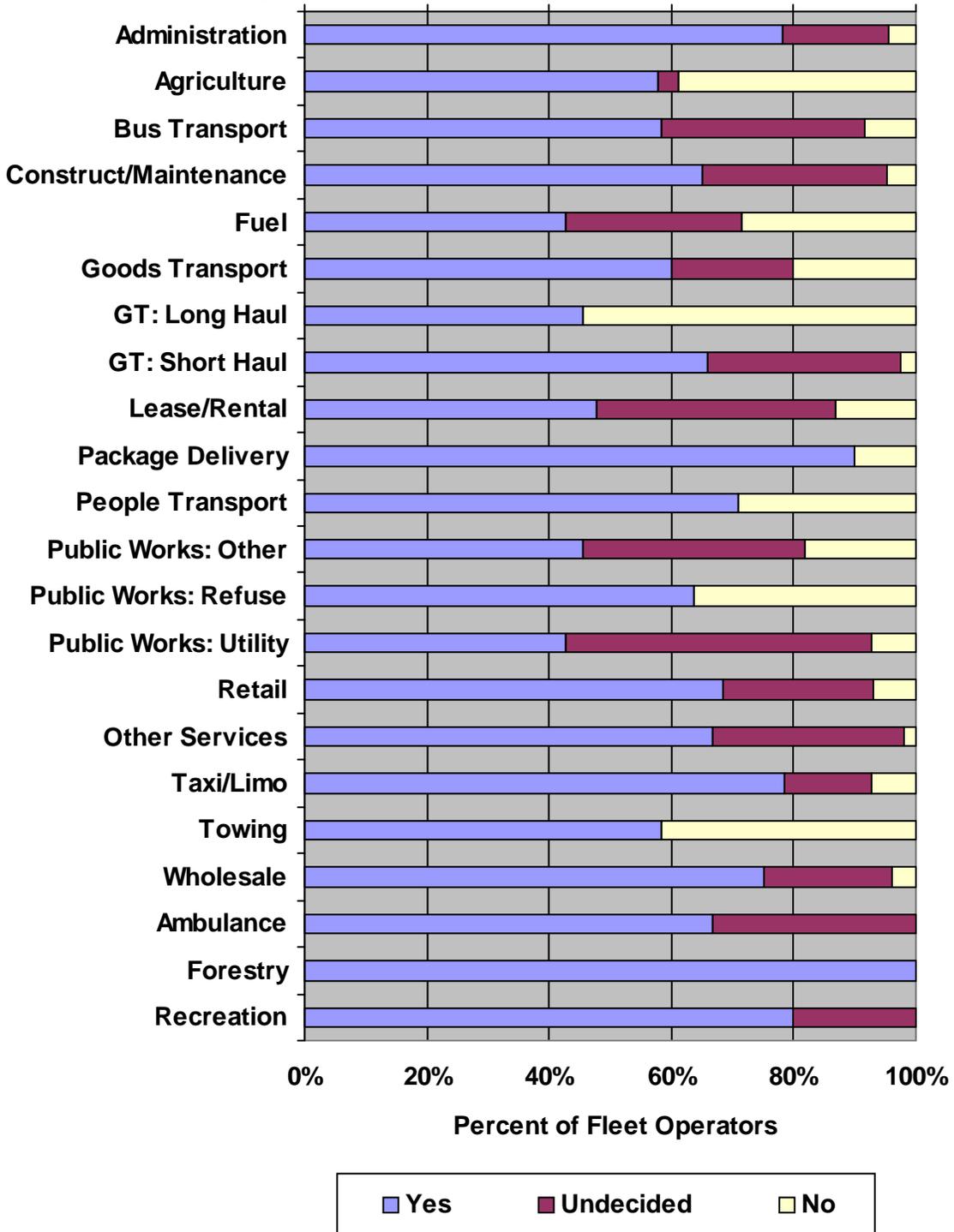


Figure 8.1 Source: 'What is the Future of Alternative Fuel in California?' survey data.

Industries with a higher percentage of fleet operators willing to consider using alternative fuels are forestry (100 percent), package delivery (90 percent), recreation

(80 percentage), taxi/limo (79 percent), public works-utility (75 percent), wholesale (74 percent), administration (72 percent), and people transport (71 percent). With the exception of wholesale, these are smaller industries, each representing less than 5 percent of respondents.

Promoting alternative fuel use among the larger industries may be the quickest way to expand AF use overall. Among construction/maintenance fleets—which represent 37 percent of the survey respondents—63 percent of fleets are willing to consider AF use. Among goods transport-short haul fleets (11 percent of respondents), 64 percent will consider using AFs. Among agriculture fleets (10.3 percent of respondents), 54 percent will consider using AFs.

Industry – Fuel Match

For some alternative fuels—E85, biodiesel, electric, and “Other”—there are systematic differences in the industries that are more and less interested in the fuel type. In Table 8.1,¹⁹ **GREEN** cells represent matches between industry and fuel of interest; **RED** cells represent non-matches, industry-fuel type pairs that are less common. The **YELLOW** cells are pairs that are average or there is no detectable pattern.

There are a number of matches between industries and alternative fuels of most interest to fleet operators. Industries most interested in E85 are construction/ maintenance, people transportation, other services, and taxi/limo/charter fleets. Industries most interested in biodiesel are the three biggest industries represented in the survey: agriculture, construction/maintenance, and goods transport-short haul. Industries most interested in electric are administration, bus transportation, lease/ rental, other services, and wholesale.

¹⁹Table 8.1 shows the results of a Cross-Tabulation of Fleet Types by Alternative Fuel of interest. Statistically significant differences according to a Chi Square distribution ($p < .05$) are shown by colored cells.

Table 8.1: Alternative Fuel of Interest by Business Type

	CNG	LNG	LPG	E85	Bio-diesel	Electric	Other
Administrative	Yellow	Yellow	Yellow	Yellow	Red	Green	Yellow
Agriculture	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Bus transportation	Yellow	Yellow	Yellow	Red	Yellow	Green	Yellow
Construction/ Maintenance	Yellow	Yellow	Yellow	Green	Green	Red	Red
Fuel	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Goods Transportation	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Goods Transportation- Long Haul	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Goods Transportation-Short Haul	Yellow	Yellow	Yellow	Red	Green	Red	Yellow
Lease/Rental Cars & Trucks	Yellow	Yellow	Yellow	Red	Yellow	Green	Yellow
Package/Mail/Goods Delivery	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
People Transportation	Yellow	Yellow	Yellow	Green	Red	Yellow	Green
Public Works- Other	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Public Works- Refuse Collection	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Yellow
Public Works- Utility	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Retail Sales	Yellow	Yellow	Yellow	Yellow	Red	Yellow	Yellow
Other Services	Yellow	Yellow	Yellow	Green	Red	Green	Green
Taxi/Limousine/ Charter	Yellow	Yellow	Yellow	Green	Red	Yellow	Yellow
Towing	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Wholesale	Yellow	Yellow	Yellow	Red	Red	Green	Yellow

Green = Industry is more likely using this fuel.
Red = Industry is less likely using this fuel.
Yellow = Not a detectable pattern for fuel x industry match.

Table 8.1 Source: 'What is the Future of Alternative Fuel in California?' survey data.

CHAPTER 9: RECOMMENDATIONS

Summary

- I. Disseminate all current information on alternative fuel use in an easily accessible format from a trusted source such as a government agency Web site.
- II. Generate accurate information on the costs and benefits of alternative fuel use for businesses.
- III. Develop common alternative fuel agenda with county and city government bodies.
- IV. Address the supply of alternative fuel vehicles – including choice and performance – by facilitating conversations between manufacturers and fleet operators.
- V. Incentivize alternative fuel costs to make them comparable to gasoline and diesel.
- VI. Do not remove non-monetary incentives once they are offered; make the phase-out of plan for monetary incentives transparent.
- VII. Help small businesses afford the start-up costs involved in alternative fuel vehicle purchase or conversion.
- VIII. Recognize businesses for alternative fuel use and exemplary alternative fuel practices.
- IX. Address alternative fuel supply and accessibility.

Organize and Disseminate Accurate Information on Alternative Fuel Use

Develop a definitive, accessible, and frequently updated source of accurate information on:

1. Known costs and benefits of alternative fuel use
2. Current availability of each alternative fuel statewide
3. Current monetary and non-monetary incentives from state and federal government
4. How to convert vehicles for alternative fuel use
5. Current regulations on alternative fuels, alternative fuel vehicles, and vehicle conversions; including any planned changes in regulations
6. Maintenance tips and training for alternative fuel vehicles
7. Manufacturers warranties for vehicles converted for alternative fuel use
8. Common problems and possible solutions of current alternative fuel technology

Publicize the alternative fuel information in multiple formats. The primary distribution format should be a Web site which is easily accessed and navigated, and frequently updated. The Web site should be advertised directly to businesses and possibly through more public media. Outreach education should be conducted to businesses in all industries in fleets of all sizes, beginning with those about whom the most is known.

Generate Accurate Knowledge of the Costs and Benefits of Alternative Fuel Use

Generate accurate, unbiased information of the costs and benefits to businesses of using alternative fuels. Fund an experimental study conducted by impartial experts in partnership with private businesses that have small to midsize vehicle fleets. The study should determine the following:

1. Costs of converting to alternative fuels
2. Fuel cost and efficacy (work performed per fuel unit) of alternative fuels compared to gasoline and diesel
3. Costs and requirements of maintenance relative to gasoline and diesel
4. Problems encountered and solutions identified for current fuel accessibility and vehicle conversions

The effects of E85, biodiesel, and electric should be prioritized because they are of most interest to current non-users, and both biodiesel and electric scored high in satisfaction among users.

The effects of alternative fuel use in the industries of construction/maintenance, goods transport-short haul, and agriculture should be prioritized because together they comprise over half of California fleets. Retail and wholesale fleets should also be included if possible. If small fleets are included, other services fleets should be among the group studied; this would be an opportunity to test electric use among small fleets.

Fuel-industry matches suggested by the survey results are biodiesel use in agriculture and goods transport-short haul fleets, E85 and biodiesel use in construction/maintenance fleets, electric use in wholesale fleets, and E85 and electric use among small other services fleets.

Develop Common Alternative Fuel Agenda with County and City Governments

City and county governing bodies can discourage alternative fuel use by taxing businesses' use or storage of AFs. On-site storage of AFs is necessary for many fleets because fueling infrastructure does not assure wide and consistent availability. Thus, some AF users are penalized for their AF use through taxes imposed by local governments.

The state should work with county and city government bodies to develop a common agenda for AF promotion, and assure that businesses are not penalized for AF use.

Address the Supply of Alternative Fuel Vehicles

There is a lack of alternative fuel vehicle choice, particularly for light-duty vans and pickup-trucks, which are the most common fleet vehicles.

The state could address the supply of sufficient AF vehicles by facilitating conversations between manufacturers and fleet operators (both current AF users and non-users) so that vehicle choices are designed with a "bottom up" approach.

There are some performance concerns that should also be addressed in vehicle technology and design. These include the driving range of electric vehicles, insufficient hauling power in LPG vehicles, and cold-start problems in biodiesel vehicles. The state could facilitate conversations between manufacturers and current users of biodiesel, electric, and LPG.

Make Alternative Fuel Costs Comparable to Gasoline and Diesel

Though most current users were motivated to begin using alternative fuels because of environmental benefits, current non-users are motivated more by cost and performance. Thus promotion of alternative fuel use among non-users will require making alternative fuels and AF vehicles comparable in cost of gasoline and diesel. If AF performance and cost are comparable to gasoline and diesel, fleets will likely need conversion costs to be supplemented in order switch to AF use. If AF performance is higher and fuel cost is lower, then large businesses may not need vehicle purchase and conversion costs to be

supplemented, though small businesses will still likely need the assistance with start-up costs.

Do Not Remove Incentives Once They Are Offered

Among users, a number of fleets that began using alternative fuels based on monetary and non-monetary incentives only to have those incentives removed. This produced mistrust in agencies promoting AF use and anger toward the government.

To maintain the trust and cooperation of businesses, non-monetary incentives—such as driving in HOV lanes—should not be removed once they are offered.

If monetary incentives are offered to enable start-up of AF use and are to be withdrawn after a certain period, there should be a transparent phase-out plan made known to all fleets that use the incentive.

Help Small Businesses Afford the Start-Up Costs

Most California fleets are small fleets and likely belong to small businesses. Small businesses find the start-up costs of using alternative fuels to be prohibitive, but they have a decision-making structure that could respond quickly to incentive programs.

Expansion of AF use could be made in small fleets if there were incentive programs to help them overcome the risk of trying a new technology and the obstacle of initial vehicle purchase and conversion costs.

Some suggestions for helping with start-up costs include:

- No-interest or low-interest vehicle loans for alternative fuel vehicles
- Removal of DMV registration fees on alternative fuel vehicles
- Government-business partnerships to study the costs and benefits of alternative fuel use in small fleets
- State tax rebates
- Share the capitol costs through a grant program

Recognize Businesses for Alternative Fuel

In order to foster a professional pride in alternative fuel use and to help businesses capitalize on the public relations benefits of using AFs, the state or federal government should publicly recognize and reward companies that are taking steps to use alternative fuel and those business that are particularly innovative in their strategies. This could be done through a publicly visible stamp that identifies businesses as alternative fuel users or innovators.

Address Alternative Fuel Supply and Accessibility

Fuel supply and accessibility is a pervasive and prohibitive barrier to promoting alternative fuel use in California. Survey and focus group respondents believe that intervention by the state government is necessary to overcome what they perceive to be the “fuel monopoly” of petroleum. Fleet operators want the state to address supply by encouraging or forcing vehicle manufacturers and fuel suppliers to make AFs more accessible. One suggestion from participants was to require gasoline and diesel suppliers to supply AFs as well. Another suggestion was to develop a 3 to 5 year governmental incentive plan to increase the supply and statewide accessibility of alternative fuels.

APPENDIX A: SURVEY

WHAT IS THE FUTURE OF ALTERNATIVE FUEL IN CALIFORNIA?

INTRODUCTION

WE NEED YOUR OPINION!

The California Energy Commission and/or your colleagues have identified you as an owner or operator of one or more vehicle fleets in California. As such, we invite you to fill out the following survey to help the California Energy Commission determine how best to facilitate market penetration of alternative fuels and technologies in vehicle fleets operating in California.

This survey is 14 questions long, and will take you less than 15 minutes to complete

CONFIDENTIALITY: In this survey we collect all data confidentially and report all data anonymously. You need not disclose your name or any other identifying information if you choose not to. The California Public Records Act (Government Code §6250 et seq.) could require us, upon request, to disclose the data collected. However, to protect the identity of survey respondents, any record of names and contact information will be deleted after all survey responses are collected.

By completing this survey, you are granting us permission to include the confidential data you provide in summaries of survey responses, which will be reported publicly.

If you have already completed this survey, please DO NOT complete it a second time. Thank you.

METHOD OF CONTACT

How were you informed about this survey?

The California Energy Commission requested my participation via:

- Email
- A Paper letter delivered via Traditional Mail
- Both
- Other (Please Specify) _____

FLEET PROFILE

Please select the answers that best describe the fleet and business in which you work.

1. Please specify the type of business or organization for which you own/operate your vehicle fleet.

Check only one:

- Federal Fleet
- State Government Fleet
- City Fleet
- County Fleet
- Private Fleet (including Non-Profit)

2. Please identify the category that BEST DESCRIBES your fleet's operation.

Check only one:

- Administrative
- Agriculture
- Ambulance
- Bus Transportation
- Construction / Maintenance
- Forestry
- Goods Transportation: Short Haul
- Goods Transportation: Long Haul
- Lease/Rental Cars & Trucks
- Package/Mail/Goods Delivery
- Public Works/Safety: Refuse Collection
- Public Works/Safety: Utility
- Public Works/Safety: Police
- Public Works/Safety: Fire
- Public Works/Safety: Other
- Retail Sales
- Taxi/Limousine/Charter
- Wholesale
- Other (Please Specify) _____

FLEET PROFILE (Continued)

3. How many vehicles are in your fleet?

Check only one:

- Less than 10
- 10-19
- 20-49
- 50-99
- 100-299
- 300 – 999
- 1000 – 4999
- 5000 or more

4a. Do you have PASSENGER CARS in your fleet? Please approximate the number of PASSENGER CARS that you manage. If none, indicate 0.

Compact car _____

Midsize car _____

Full size car _____

4b. Do you have LIGHT DUTY TRUCKS in your fleet? Please approximate the number of LIGHT DUTY TRUCKS that you manage. If none, indicate 0.

Van _____

Pickup _____

4c. Do you have MEDIUM/HEAVY DUTY TRUCKS in your fleet? Please approximate the number of MEDIUM/HEAVY DUTY TRUCKS that you manage. If none, indicate 0.

Class 3 through 5: 10,000 GVW to 19,500 GVW _____

Class 6: 19,501 GVW to 26,000 GVW _____

Class 7 26,001 GVW to 33,000 GVW _____

Class 8 33,001 GVW to 80,000 GVW _____

ALTERNATIVE FUEL EXPERIENCE

Please select the answers that best describe your experience with Alternative Fuels. Alternative fuels include Compressed Natural Gas (CNG), Liquefied Natural Gas (LNG), Propane (LPG), E85 (85% Ethanol and 15% Gasoline), Biodiesel (Blends or B100), and Electric.

5. Do you currently use alternative fuels in ANY vehicles that make up your fleet?

- Yes
- No

****NOTE SKIP PATTERN: IF YES, CONTINUE; IF NO, SKIP TO QUESTION 6 ON PAGE 9****

6. What PERCENTAGE of vehicles in your fleet use alternative fuel?

- 1%-20%
- 21%-40%
- 41%-60%
- 61%-80%
- 81%-100%

7. Which alternative fuel are you CURRENTLY using the MOST in your fleet vehicles?

Check only one:

- Compressed Natural Gas (CNG)
- Liquefied Natural Gas (LNG)
- Propane (LPG)
- E85 (85% Ethanol and 15% Gasoline)
- Biodiesel
- Electric
- Other (Please Specify) _____

ALTERNATIVE FUEL EXPERIENCE (Continued)

8. Why did you originally decide to use alternative fuel vehicles in your fleet?

Please rate each of the following reasons according to their importance in your choice to use alternative fuels, from 1 NOT AT ALL important, to EXTREMELY important.

	Not at All Important	Not Very Important	Somewhat Important	Fairly Important	Very Important	Extremely Important	N/A
Expected fuel cost savings	<input type="checkbox"/>						
Expected vehicle performance	<input type="checkbox"/>						
Expected vehicle Reliability	<input type="checkbox"/>						
Expected lower cost of maintenance	<input type="checkbox"/>						
Expected environmental benefits	<input type="checkbox"/>						
Government Mandates	<input type="checkbox"/>						
Government Incentives	<input type="checkbox"/>						
Expected public relations benefits	<input type="checkbox"/>						
Other: please rate here and describe in question 8b	<input type="checkbox"/>						

8b. If you rated an "Other" reason for choosing alternative fuels in Question 8, please describe it here:

9. How satisfied are you with your experience of alternative fuels in your fleet?

Rate each of the following aspects of your experience from 1 NOT AT ALL satisfied with alternative fuel, to 6 EXTREMELY satisfied with alternative fuel.

	Not At All Satisfied	Not Very Satisfied	Somewhat Satisfied	Fairly Satisfied	Very Satisfied	Extremely Satisfied	N/A
Cost of fuel	<input type="checkbox"/>						
Vehicle driving range	<input type="checkbox"/>						
Availability of fuel/ ease of fueling	<input type="checkbox"/>						
Cost of vehicle	<input type="checkbox"/>						
Vehicle performance	<input type="checkbox"/>						
Vehicle reliability	<input type="checkbox"/>						
Ease of maintenance	<input type="checkbox"/>						
Cost of maintenance	<input type="checkbox"/>						
Environmental benefits	<input type="checkbox"/>						
Government incentives (i.e. tax rebates, special parking,)	<input type="checkbox"/>						
Private incentives (i.e. purchase rebates)	<input type="checkbox"/>						
Public relations benefits	<input type="checkbox"/>						
Other: please rate here and describe in question 9b	<input type="checkbox"/>						

ALTERNATIVE FUEL EXPERIENCE (Continued)

9b. If you rated an "Other" benefit of using alternative fuels in Question 9, please describe it here:

10. What difficulties have you encountered in using alternative fuels in your fleet? Please rate each difficulty according to how problematic it has been, from 1 NOT AT ALL problematic, to 6 EXTREMELY problematic.

	Not At All Problematic	Not Very Problematic	Somewhat Problematic	Fairly Problematic	Very Problematic	Extremely Problematic	N/A
Cost of vehicle	<input type="checkbox"/>						
Cost of fuel	<input type="checkbox"/>						
Vehicle driving Range	<input type="checkbox"/>						
Access to Fueling stations	<input type="checkbox"/>						
Vehicle choice	<input type="checkbox"/>						
Vehicle performance	<input type="checkbox"/>						
Vehicle reliability	<input type="checkbox"/>						
Cost of maintenance	<input type="checkbox"/>						
Conversion costs	<input type="checkbox"/>						
Complying with government mandates	<input type="checkbox"/>						
No perceptible public relations benefits	<input type="checkbox"/>						
Other: please rate here and describe in question 10b	<input type="checkbox"/>						

10b. If you rated an "Other" problem in Question 10 please describe it here:

11. Do you plan to continue using alternative fuels in your fleet or purchase additional alternative fuel fleet vehicles?

Check only one:

- No, I will NOT CONTINUE to use or WILL DECREASE use of alternative fuels
- Yes, I will CONTINUE to use alternative fuels
- Yes, I will INCREASE use of alternative fuels
- I am UNDECIDED about my alternative fuel use

ALTERNATIVE FUEL EXPERIENCE (Continued)

12. What needs to occur for you to continue or expand your use of alternative fuels? Rate how helpful each change would be in allowing you to use more alternative fuels, from 1 NOT AT ALL helpful to 6 EXTREMELY helpful.

	Not At All Helpful	Not Very Helpful	Somewhat Helpful	Fairly Helpful	Very Helpful	Extremely Helpful	N/A
Vehicle purchase incentives	<input type="checkbox"/>						
Fuel use incentives	<input type="checkbox"/>						
Relax regulations on conversions	<input type="checkbox"/>						
Training and education on alternative fuels and alternative fuel vehicles	<input type="checkbox"/>						
State tax rebates	<input type="checkbox"/>						
Outreach programs to fleet organizations describing benefits of alt. fuel use	<input type="checkbox"/>						
Public outreach programs explaining the fuel and technology choices available	<input type="checkbox"/>						
Other: please rate here and describe in question 12b	<input type="checkbox"/>						

12b. If you rated an "Other" change that would help you use more alternative fuels in Question 12, please describe it here:

13. How satisfied are you with your overall experience of alternative fuels in your fleet? Please rate your satisfaction with your overall experience of alternative fuels, from 1 NOT AT ALL satisfied, to 6 EXTREMELY satisfied.

	Not At All Satisfied	Not Very Satisfied	Somewhat Satisfied	Fairly Satisfied	Very Satisfied	Extremely Satisfied	N/A
Vehicle performance?	<input type="checkbox"/>						
Fueling cost?	<input type="checkbox"/>						
Fuel infrastructure?	<input type="checkbox"/>						

ALTERNATIVE FUEL EXPERIENCE (Continued)

Finally, the California Energy Commission would like to know how to promote the use of alternative fuels (biodiesel, compressed natural gas, liquefied natural gas, ethanol, propane, and electricity) among vehicle fleets most effectively. Please take the time to answer this optional question.

- 14. Describe which alternative fuel you are most likely to use and what changes (i.e., incentives, mandates, or resources such as enhanced technology or infrastructure) it would take to get you to use more alternative fuels in your fleet:

****NOTE SKIP PATTERN: SKIP TO "CONTACT INFORMATION" ON PAGE 11****

****NOTE SKIP PATTERN: IF NO ON QUESTION 5, CONTINUE HERE****

ALTERNATIVE FUEL EXPERIENCE

6. Would you consider using alternative fuels in your fleet vehicles in the future?

- Yes
- No
- Undecided

7. If you were to use an alternative fuel, which one/s are you most interested in?
Check all that apply:

- N/A
- Compressed Natural Gas (CNG)
- Liquefied Natural Gas (LNG)
- Propane (LPG)
- E85 (85% Ethanol and 15% Gasoline)
- Biodiesel
- Electric
- Other (Please Specify) _____

8. What would motivate you to start using alternative fuels in your fleet? Please rate the importance of each reason, from 1 NOT AT ALL important, to 6 EXTREMELY important.

	Not At All Important	Not Very Important	Somewhat Important	Fairly Important	Very Important	Extremely Important	N/A
Expected fuel cost savings	<input type="checkbox"/>						
Expected vehicle performance	<input type="checkbox"/>						
Expected vehicle reliability	<input type="checkbox"/>						
Expected lower cost of maintenance	<input type="checkbox"/>						
Expected environmental benefits	<input type="checkbox"/>						
Government mandates	<input type="checkbox"/>						
Government incentives	<input type="checkbox"/>						
Expected public relations benefits	<input type="checkbox"/>						
Other: please rate here and describe in 8b	<input type="checkbox"/>						

8b. If you rated an "Other" reason for choosing alternative fuels in Question 8, please describe it here:

ALTERNATIVE FUEL EXPERIENCE (Continued)

9. What keeps you from using alternative fuels in your fleet? Please rate each of the following reasons according to how concerning it is.

	Not At All a Concern	Not Very Concerning	Somewhat Concerning	Fairly Concerning	Very Concerning	Extremely Concerning	N/A
Cost of vehicle	<input type="checkbox"/>						
Cost of fuel	<input type="checkbox"/>						
Vehicle driving range	<input type="checkbox"/>						
Access to fueling stations	<input type="checkbox"/>						
Vehicle choice	<input type="checkbox"/>						
Vehicle performance	<input type="checkbox"/>						
Vehicle reliability	<input type="checkbox"/>						
Cost of maintenance	<input type="checkbox"/>						
Conversion costs	<input type="checkbox"/>						
No perceptible environmental benefits	<input type="checkbox"/>						
Difficulty complying with government mandates	<input type="checkbox"/>						
No perceptible public relations benefits	<input type="checkbox"/>						
Other: please rate here and describe in 9b	<input type="checkbox"/>						

9b. If you rated an "Other" problem in Question 9, please describe it here:

10. What would need to occur for you to begin using alternative fuels? Rate how helpful each change would be, from 1 NOT AT ALL helpful to 6 EXTREMELY helpful.

	Not At All Helpful	Not Very Helpful	Somewhat Helpful	Fairly Helpful	Very Helpful	Extremely Helpful	N/A
Vehicle purchase incentives	<input type="checkbox"/>						
Fuel use incentives	<input type="checkbox"/>						
Relax regulations on conversions	<input type="checkbox"/>						
Training and education on alternative fuels and alternative fuel vehicles	<input type="checkbox"/>						
State tax rebates	<input type="checkbox"/>						
Outreach programs to fleet organizations describing benefits of alt. fuel use.	<input type="checkbox"/>						
Public outreach programs explaining the fuel and technology choices available.	<input type="checkbox"/>						
Other: please rate here and describe in 10b	<input type="checkbox"/>						

ALTERNATIVE FUEL EXPERIENCE (Continued)

10b. If you rated an "Other" change that would help you use more alternative fuels in Question 10, please describe it here:

Finally, the California Energy Commission would like to know how to promote the use of alternative fuels (biodiesel, compressed natural gas, liquefied natural gas, ethanol, propane, and electricity) among vehicle fleets most effectively. Please take the time to answer this optional question?

11. Describe which alternative fuel you are most likely to use and what changes (i.e., incentives, mandates, or resources such as enhanced technology or infrastructure) it would take to get you to use alternative fuels in your fleet:

CONTACT INFORMATION

Help us determine what specific kinds of actions to recommend!

Would you like to be involved in a Focus Group to help the California Energy Commission determine what specific actions and changes to recommend in their plan to promote alternative fuel use?

Focus Group participants will receive \$50.00 each.

Would you be willing to participate in a Focus Group on alternative fuel use among California fleets?

- Yes, you may use the information to contact me regarding a focus group.
- No, you may not contact me regarding a focus group.

Please enter your name and contact information below to receive an invitation to the Focus Group.

Name: _____

Phone: _____

Email: _____

Mailing Address: _____

THANK YOU FOR COMPLETING THIS SURVEY

APPENDIX B: INVITATION

CALIFORNIA ENERGY COMMISSION

1516 Ninth Street
Sacramento, California 95814

Website: www.energy.ca.gov
Children's Website: www.energyquest.ca.gov
Consumer Information: www.ConsumerEnergyCenter.org



WHAT IS THE FUTURE OF ALTERNATIVE FUEL IN CALIFORNIA? WE NEED YOUR OPINION

Dear Fleet Operator:

The California Energy Commission (CEC) has identified you as an owner or operator of a fleet in California. **We need to know what you think about using alternative fuels and technologies in your fleet so that we can develop a plan to help California increase alternative fuel use and decrease dependence on petroleum.**

Please help us by filling out a short survey. **Your participation in this online survey will remain confidential and take less than 15 minutes.** The link to the survey is:

<http://www.surveymonkey.com/s.asp?u=178033153323>

Please enter this address directly into your web browser, then press the Enter button to be taken to the survey website. If you have to pause while taking the survey, your answers will be saved and you may resume the survey where you left off by returning to the same web address. Alternatively, you may request that the survey link be emailed to you by emailing Dr. Claire Vallotton at clairedv@gmail.com.

BACKGROUND INFORMATION:

The CEC is conducting a survey as part of the AB 1007 report to increase alternative fuel use in California's transportation sector. This report will be coordinated with Governor Arnold Schwarzenegger's Executive Order S-01-07 which is to establish a Low Carbon Fuel Standard to reduce greenhouse gas emissions.

For more information on the AB 1007 legislation and Governor Schwarzenegger's Executive Order, please visit the following links:

AB 1007: <http://www.energy.ca.gov/ab1007/index.html>

Executive Order S-01-07: <http://gov.ca.gov/executive-order/5172/>

Your help is needed to characterize the current use of alternative fuels. California's fleets are diverse but primarily operate on petroleum fuel. The CEC needs your help to identify the barriers impeding alternative fuel use and the solutions to these barriers. The results of this survey will assist the CEC to develop programs and new initiatives to promote the use of alternative fuels and inform the California Legislature about the current use of alternative fuels in the state, the barriers facing alternative fuel users, and solutions to these barriers.

Your assistance in completing this survey is of paramount importance. To facilitate this process efficiently, the CEC has decided to host the survey using an online survey website. If you encounter any technical difficulties, please contact Dr. Claire Vallotton of Zetetic Associates at clairedv@gmail.com or (530) 304-7403.

Thank you for your time and assistance in this important process,

Tim Olson
California Energy Commission
1516 9th Street MS 23
Sacramento, CA 95814
(916) 654-4528

CALIFORNIA ENERGY COMMISSION

1516 Ninth Street
Sacramento, California 95814

Website: www.energy.ca.gov
Children's Website: www.energyquest.ca.gov
Consumer Information: www.ConsumerEnergyCenter.org



**WHAT IS THE FUTURE OF ALTERNATIVE FUELS IN CALIFORNIA?
WE NEED YOUR OPINION**

Dear Fleet Operator:

The California Energy Commission (CEC) identified you as an operator of a fleet in California and sent you an invitation to participate in a survey. If you already completed this survey, THANK YOU!

If you have not completed the survey, please do so now by going to the website listed below. **This survey will close on February 23, 2007.**

Your participation in this online survey will remain confidential and take less than 15 minutes. The link to the survey is:

<http://www.surveymonkey.com/s.asp?u=178033153323>

Alternatively, you may request that the survey link be emailed to you by emailing Dr. Claire Vallotton at clairedv@gmail.com.

Thank you for your time and assistance in this important process,

Tim Olson
California Energy Commission

Thank you for your time and assistance in this important process,

Tim Olson
California Energy Commission
1516 9th Street
Sacramento, CA 95814
(916) 654-4528