

**TRANSPORTATION ENERGY SURVEY  
DATA BOOK 1.1**

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## FOREWORD

This report has been assembled to provide the Office of Transportation Technologies (OTT) with an idea of how the American public views various transportation and environmental issues. Some of the findings are presented below to illustrate the type of information in the report.

This is how respondents have answered some of the questions in the report:

1. 86% **strongly or somewhat agree** that decreasing our dependence on foreign oil is important to our national security. [11/01, Table 2.1.2]
2. 86% are **very or somewhat concerned** the U.S. is dependent on imported oil. [4/01, Table 2.1.3]
3. Strong support for mandating more fuel efficient new vehicles:
  - a. 85% [5/01, Table 2.4.7]
  - b. 87% [6/01, Table 2.4.8]
  - c. 89% [4/01, Table 2.4.9]
4. But, if more efficient vehicles cost more, about a third of the respondents **unwilling** to pay more for higher efficiency [11/01, Table 5.2.5]
5. If we had to reduce dependence on imported oil using four options,
  - a. 48% favor making personal vehicles more efficient
  - b. 24% favor tax refunds for higher efficiency vehicles
  - c. 11% favor higher taxes on less efficient vehicles
  - d. 6% favor higher taxes on gasoline and diesel fuel
  - e. 11% had no answer [5/01, Table 2.4.11]
6. When ranking the **most important problem** (of the five provided) for the U.S. in the year 2020:
  - a. 34% chose traffic congestion
  - b. 28% chose availability and/or price of gasoline
  - c. 14% chose global warming
  - d. 12% chose local air pollution
  - e. 7% chose traffic deaths and injuries
  - f. 4% had no answer [12/00, Table 3.1.4]
7. When provided with two options **to reduce transportation greenhouse gases** (that would have about equal overall costs),
  - a. 70% chose 3% tax for new vehicles
  - b. 17% chose 25-cent tax per gallon of gasoline
  - c. 13% had no answer [2/98, Table 3.2.2]
8. **What fuel will replace gasoline** and diesel when they become too expensive?
  - a. 33% said electricity
  - b. 12% said solar
  - c. 11% said ethanol or methanol
  - d. 6% said natural gas
  - e. 3% said hydrogen
  - f. 35% said other fuels or had no answer [8/98, Table 4.1.2]
9. Of the three options, which would be best (or worst) **to replace gasoline** :
  - a. 52% said electricity was best, 15% said it would be the worst choice
  - b. 21% said ethanol was best, 28% said it would be the worst choice

- c. 15% said hydrogen was best, 27% said it would be the worst choice [12/00, Tables 4.1.3 and 4.1.7]
- 10. When **fuel economy** is provided as one choice to be rated as the most important attribute in the choice of a new vehicle, it was selected by 42% of the respondents in 1980 (when gasoline prices were very high). It was chosen by only 4% of the respondents in 1987 and 1988. It rose to 10% in 2000 and 2001. [Various years, Table 5.1.5]
- 11. Have seen a copy of the government's *Fuel Economy Guide*:
  - a. 16% in a showroom
  - b. 2% on the Internet
  - c. 6% anywhere else [2/99, Table 5.2.7]
- 12. Able to name a hybrid vehicle for sale in the U.S.
  - a. Honda 15% [8/00] and 24% [11/01]
  - b. Toyota 4% [8/00] and 11% [11/01, Tables 5.3.1 and 5.3.4]

The issue that might need the most attention from OTT is the finding that the public tends to have a fairly negative and ill-informed attitude concerning ethanol and hydrogen, two fuels that hold promise for the future.

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# 1. INTRODUCTION

The transportation sector is the major consumer of oil in the United States. In 2000, the transportation sector's share of U.S. oil consumption was 68 percent (U.S. DOE/EIA, 2001a, Table 2.5, p. 33, Table 1.4, p.7). As a result, the transportation sector is one of the major producers of greenhouse gases. In 2000, the transportation sector accounted for one-third (33 percent) of carbon emissions (U.S. DOE/EIA, 2000b, Table 5, p.28). In comparison, the industrial sector accounted for 32 percent and residential and commercial sector for 35 percent of carbon emissions in 2000. Carbon emissions, together with other gases, constitute greenhouse gases that are believed to cause global warming. Because that the transportation sector is a major oil consumer and producer of greenhouse gases, the work of the Analytic Team of the Office of Transportation Technologies (OTT) focuses on two main objectives: (1) reduction of U.S. oil dependence and (2) reduction of carbon emissions from vehicles.

There are two major factors that contribute to the problem of U.S. oil dependence. First, compared to the rest of the world, the United States does not have a large oil reserve. The United States accounts for only 9 percent of oil production (U.S. DOE/EIA, 2001c, Table 4.1C). In comparison, the Organization for Petroleum Exporting Countries (OPEC) produces 42 percent of oil, and the Persian Gulf accounts for 28 percent. (U.S. DOE/EIA, 2001c, Table 1.1A). More than half (54 percent) of oil consumed in the United States is imported (U.S. DOE/EIA, 2001a, Table 1.8, p. 15). Second, it is estimated that the world is approaching the point at which half of the total resources of conventional oil believed to exist on earth will have been used up (Birky et al., 2001, p. 2).

Given that the United States is highly dependent on imported oil and that half of the world's conventional oil reserves will have been used up in the near future, the OTT's goal is to ensure an adequate supply of fuel for vehicles. There are three ways to achieve this goal: efficiency, substitution, or less travel. A reduction in oil usage will result in a reduction of carbon emissions.

Successful transition to alternative types of fuel and advanced technology vehicles may depend on awareness of U.S. dependence on imported oil and the U.S. energy situation. Successful transition may also depend on knowledge of alternative types of fuels and advanced technologies. The *Transportation Energy Survey Data Book 1.1* examines the public's knowledge, beliefs and expectations of the energy situation in the United States and transportation energy-related issues.

The data presented in the report have been drawn from multiple sources: surveys conducted by the Opinion Research Corporation International (ORCI) for National Renewable Energy Laboratory (NREL) that are commissioned and funded by OTT, Gallup polls, ABC News/*Washington Post* polls, NBC News/*Wall Street Journal* polls, polls conducted by the Ipsos-Reid Corporation, as well articles from *The Washington Post* (2001) and other sources. All surveys are telephone interviews conducted with randomly selected national samples of adults 18 years of age and older. Almost all surveys were conducted before the September 11, 2001 terrorist attacks, with the only exceptions being the November 2001 ORCI survey and the November 2001 survey conducted by the Ipsos-Reid Corporation.

The *Transportation Energy Survey Data Book 1.1* consists of four sections. Section 2 examines public concern about U.S. dependence on imported oil, public assessment of the energy situation in the United States, and perceived effects of gasoline prices on individuals and households. In addition, this section focuses on public expectations and Federal Government actions that can be undertaken to deal with the energy situation and reduce dependence on imported oil.

Section 3 examines public awareness of global warming issues and perceived strategies of the United States and other lesser-developed countries to combat global warming. Section 4 analyzes what Americans think about alternative fuels such as electricity, ethanol, hydrogen and other fuel types.

Section 5 focuses on conventional and advanced technology vehicles. In this report, advanced technology vehicles include hybrid electric and diesel vehicles. The section examines the decisions vehicle owners make about their vehicles, as well as decisions about replacing vehicles. Section 5 also analyzes owners' decisions about purchasing more fuel-efficient vehicles and advanced technology vehicles.

Most of the tables presented in the report are the results of survey questions that required respondents to choose among specific answers. When this type of question is asked, the interviewer rotates the order in which the choices are given in order to reduce bias. Some survey questions allowed the respondent to provide any response; these questions are referred to as open-ended questions. Some tables present results of questions in which respondents are allowed to provide more than one answer. Because of a possibility of multiple responses to the same question, results of these tables will not sum to 100 percent.

The *Transportation Energy Survey Data Book 1.1* is a continuation of a joint effort of the OTT analytic team. It builds upon the *Data Book on Vehicle Consumer Characteristics and Trends* that started in 1997 as a working report to inform OTT project managers of important vehicle market characteristics to ensure that OTT-supported technologies meet the needs and desires of consumers.

## 2. ENERGY, OIL AND POLICY

Public opinion polls reveal that the U.S. public perceives the country's oil dependence as a serious threat to jobs and economy, the U.S. standard of living, national security and the environment (Table 2.1.1). After the terrorist attacks on September 11, 2001, an overwhelming majority of Americans believe that decreasing U.S. dependence on foreign oil is important to national security (Table 2.1.2). Because of this perception, U.S. adults are concerned about dependence on imported oil (Table 2.1.3), but many do not have an accurate idea of how much oil is imported (Table 2.1.4).

Concern about oil dependence leads to the public's assessment of the energy situation in the country as serious (Table 2.2.1). Americans are likely to change their evaluation of the seriousness of the energy situation based on recent events. U.S. adults are more likely to evaluate the United States as not just vulnerable to, but heading into and already in, an energy crisis as the economic situation deteriorates over time (Tables 2.2.2, 2.2.3).

U.S. dependence on imported oil manifests itself in volatile gasoline prices. A number of surveys researched the U.S. public's driving expectations when gasoline prices have gone up and down. When gasoline prices go up, a majority of the adult population tend to say it would not reduce the amount of driving because of the increase (Table 2.3.3). However, when asked later whether they actually drove or planned on driving as much as they did when gasoline prices were lower, Americans reported a decrease in the amount of their driving (Table 2.3.4). This finding is consistent with the graph shown in Figure 1. The graph illustrates that Americans actually drive less when gasoline prices increase. A majority of U.S. adults report that gasoline price increases have not caused financial hardship for them or their households (Table 2.3.5). (Only the May 2001 Gallup survey revealed that almost one out of two Americans has suffered financial hardship because of gasoline price increase.) However, when asked about actions they undertook or planned to undertake in the near future to reduce gasoline expenditures, an overwhelming majority of Americans reported a change in lifestyle due to a gasoline price increase (Table 2.3.4).

When gasoline prices go down, the U.S. public is not likely to report that they would drive more because of the decrease (Table 2.3.6). However, the fact is that they do drive more when gasoline prices are low (Table 2.3.7). This finding is consistent with the relationship between vehicle miles traveled (VMT) and gasoline price shown in Figure 1.

Surveys have revealed that U.S. adults are likely to change their views on the nature of gasoline price changes based on their assessment of the seriousness of the energy situation in the country (Table 2.3.8). According to surveys, Americans are likely to evaluate gas price increases as a more permanent change than temporary fluctuations in prices when they evaluate the energy situation in the country as heading into, or already in, an energy crisis. When they think of gasoline price increases as of a more permanent change than temporary fluctuations in prices, Americans are more likely to believe that prices will go up in the future (Table 2.3.9). In addition, U.S. adults are likely to be concerned about gasoline prices in the future when they believe price increases are of a more permanent nature (Table 2.3.10).

In order to reduce U.S. oil dependence and deal with the energy situation, the U.S. public favors energy conservation over energy production (Table 2.4.1, 1.4.7, 1.4.8). One out four U.S. adults

said he/ she purchased or planned on purchasing a more fuel-efficient vehicle as an action to reduce oil dependence (Table 2.4.2). Besides that, they mentioned reduction of the amount of driving and greater use of mass transit and carpool as a way of saving fuel (Tables 2.4.3, 2.4.4).

A number of surveys addressed mandatory improvements of vehicle fuel economy. According to these surveys, the U.S public showed strong support of a requirement for automakers to improve vehicle fuel efficiency. Mandates on more fuel-efficient cars received consistent support in all surveys. (Tables 2.4.5 - 2.4.7). A survey that asked people to compare four different policies on oil dependence reduction found that a regulation to make personal vehicles more efficient received most support. This policy received much higher approval than higher fuel taxes or less-efficient vehicles (Table 2.4.9). However, none of the surveys discussed the fuel economy level that should be mandated.

## 2.1 PUBLIC CONCERN ABOUT U.S. DEPENDENCE ON IMPORTED OIL

**Q2.1.1:** Some people believe that depending on this much foreign oil threatens various aspects of our society while others do not believe depending on this much foreign oil threatens us in any way. Please tell me how serious a threat you think our dependence on foreign oil is to each of the following: very serious, somewhat serious, not too serious, or not at all serious.

- A. Our national security
- B. Jobs and economy
- C. The environment
- D. Our standard of living

**Table 2.1.1.** Public Perception of Aspects of U.S. Society That Are Threatened by Dependence on Foreign Oil

<b>Aspects of Society to which Dependence on Foreign Oil Represents a “Very Serious” or “Somewhat Serious” Threat</b>	<b>Number</b>	<b>Percent</b>
Jobs and the economy	858	86
U.S. standard of living	828	83
U.S. national security	769	77
The environment	702	70

**Source:** Research/Strategy/Management, Inc., October 21, 1998, N=1,003.



**Q2.1.2:** Do you strongly agree, somewhat agree, somewhat disagree, or strongly agree with the following statements?

**Table 2.1.2.** Public Approval of Statements on Dependence on Imported Oil and National Energy Policy

<b>Statements</b>	<b>Strongly Agree (%)</b>	<b>Some-what Agree (%)</b>	<b>Some-what Disagree (%)</b>	<b>Strongly Disagree (%)</b>	<b>No Opinion (%)</b>	<b>Total (%)</b>
Decreasing our dependence on foreign oil and gas is important to our national security. <sup>1</sup>	49	37	7	5	2	100
Increasing domestic production of oil, gas is important to our national security. <sup>1</sup>	38	40	10	8	4	100
New technologies have made it possible to explore for oil and gas in environmentally friendly ways.	29	46	12	5	8	100
The introduction of a national energy policy will help to boost energy conservation efforts.	18	54	15	6	7	100
Passing a national energy policy will improve the economy and put people back to work.	19	45	21	7	8	100

**Source:** Ipsos-Reid Inc., November 14, 2001, N=532

<sup>1</sup> Half sample

**Q2.1.3:** The United States now imports 54 percent of its oil supplies. This fraction is growing. How concerned are you about the fact that the United States is dependent on imported oil?

**Table 2.1.3.** Public Concern About U.S. Dependence on Imported Oil

Degree of Public Concern	Number	Percent
Very concerned	472	50
Somewhat concerned	343	36
Not at all concerned	120	13
Don't know	6	1
<b>Total</b>	<b>941</b>	<b>100</b>

**Source:** ORCI for NREL (2001a), Study #710148, N=941.

**Q2.1.4:** An energy crisis occurred 25 years ago, in 1973, when the United States imported about one-third of its oil from foreign sources and that oil was shut off. Today, what percentage, from zero to one hundred, of its oil do you think the United States imports from foreign sources?

**Table 2.1.4.** Public Perception of Imported Oil Share

Percent of Oil Used in U.S. that is Imported	Number	Percent
0% to 20%	52	5
21% to 40%	152	15
41% to 50%	237	24
51% to 60%	120	12
61% to 70%	134	13
71% to 80%	215	21
81% to 100%	77	8
Don't Know	16	2
<b>Total</b>	<b>1,003</b>	<b>100</b>

**Source:** Research/Strategy/Management, Inc., (1998), N=1,003.

## 2.2 PUBLIC ASSESSMENT OF THE ENERGY SITUATION

**Q2.2.1:** In fact, the United States imports about half of its oil from foreign sources—more than it did 25 years ago. Based on this fact, how vulnerable do you believe the United States is to an energy crisis that would be caused by foreign nations shutting off their supply of oil to the United States: very, somewhat, not too, not at all?

**Table 2.2.1.** Public Perception of U.S. Vulnerability to Energy Crisis

Categories of Responses	Number	Percent
Very vulnerable	471	47
Somewhat vulnerable	364	36
Not too vulnerable	118	12
Not at all vulnerable	35	3.5
Don't know/refused	15	1.5
<b>Total</b>	<b>1,003</b>	<b>100</b>

**Source:** Research/Strategy/Management, Inc., (1998), N=1,003.

**Q2.2.2:** How serious would you say the energy situation is in the United States: very serious, fairly serious, or not at all serious?

**Table 2.2.2.** Public Perception of the Energy Situation in the Year 2001

The Energy Situation in the U.S. is:	2001 March 5-7 (%)	2001 May 7-9 (%)	2001 June 28 – July 1 (%)
Very serious	31	58	47
Fairly serious	59	36	43
Not at all serious	9	4	8
No opinion	1	2	2
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Sources:** Gallup Poll (2001a, N=1,014; 2001b, N=1,005; 2001c, N=1,060).

**Q2.2.3:** Do you think the United States is heading into an energy crisis? Do you think the United States is in an energy crisis now?

**Table 2.2.3.** Public Perception of the Energy Crisis

<b>The United States Is</b>	<b>Yes (%)</b>	<b>No (%)</b>	<b>Total (%)</b>
Heading into an energy crisis	61	36	97
In an energy crisis	39	60	99

**Source:** ABC News/*Washington Post*, (2001), N=1,004.

## 2.3 PERCEIVED EFFECTS OF GASOLINE PRICES

**Table 2.3.1.** Retail Unleaded Regular Gasoline Price in 2000  
(Cents Per Gallon, Including Taxes)

<b>Jan 2000</b>	<b>Feb 2000</b>	<b>March 2000</b>	<b>April 2000</b>	<b>May 2000</b>	<b>June 2000</b>	<b>July 2000</b>	<b>Aug 2000</b>	<b>Sept 2000</b>	<b>Oct 2000</b>	<b>Nov 2000</b>	<b>Dec 2000</b>
130.1	136.9	154.1	150.6	149.8	161.7	159.3	151.0	158.2	155.9	155.5	148.9

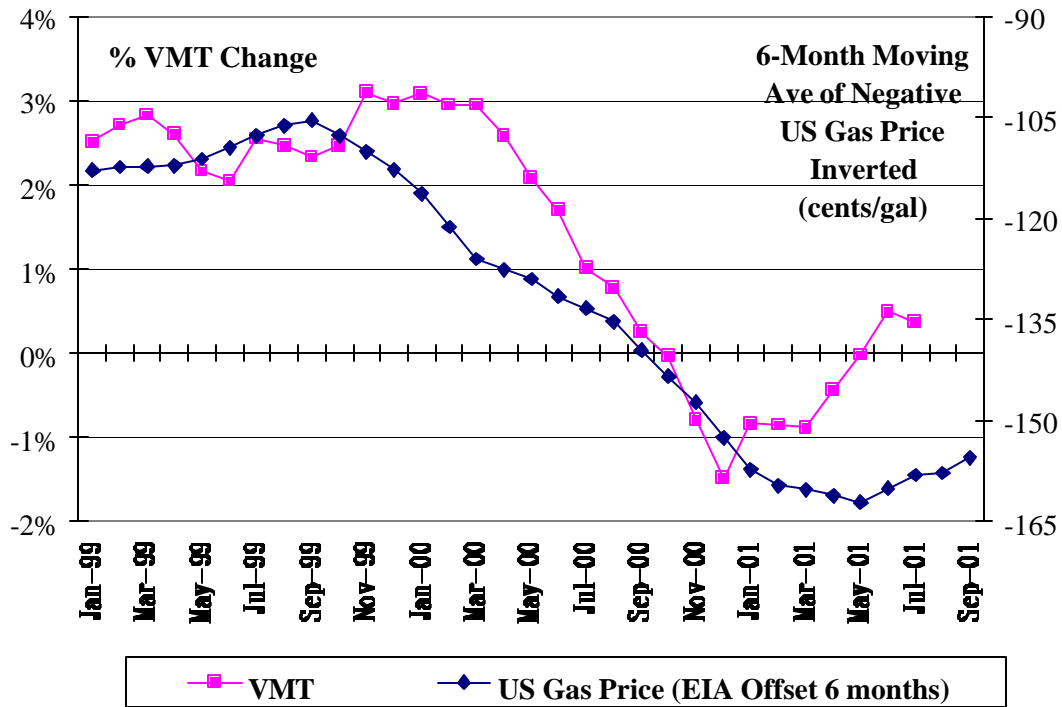
**Source:** U.S. DOE/EIA (2001a), Table 9.4.

**Table 2.3.2.** Retail Unleaded Regular Gasoline Price in 2001  
(Cents Per Gallon, Including Taxes)

<b>Jan 2001</b>	<b>Feb 2001</b>	<b>March 2001</b>	<b>April 2001</b>	<b>May 2001</b>	<b>June 2001</b>	<b>July 2001</b>	<b>Aug 2001</b>
147.2	148.4	144.7	156.4	172.9	164.0	148.2	142.7

**Source:** U.S. DOE/EIA (2001a), Table 9.4.

**Figure 1.** VMT and Gasoline Price Change from Same Period Previous Year



VMT, Vehicles Miles Traveled; Ave, average.

**Q2.3.3:** Will the price of gas cause you to drive less than you might have otherwise this summer, or not?

**Table 2.3.3.** Perceived Effects of Gasoline Price Increases on Driving – Summer 2001

Driving Expectations	2000	2000	2001
	May 23-24 (%)	June 22-25 (%)	May 7-9 (%)
The price of gas will cause me to drive less than I might have otherwise this summer.	41	50	58
The price of gas will <b>not</b> cause me to drive less than I might have otherwise this summer.	57	49	41
No opinion	2	1	1
<b>Total</b>	100	100	100

Sources: Gallup Poll (2000a; 2000b; 2001b), N=1,005.

**Q2.3.4:** Which, if any, of the following have you done in the last 6 months, or do you plan on doing in the near future, to reduce gasoline expenditures? (Multiple answers allowed.)

**Table 2.3.4.** Actions to Reduce Gasoline Expenditures in the Last Six Months (February–August 2000) or Planned for the Near Future

<b>Actions To Reduce Gasoline Expenditures</b>	<b>Number</b>	<b>Percent</b>
Any (net)	718	76
Drive less	424	45
Walk or bike	267	28
Purchase more fuel-efficient vehicle	239	25
Carpool	198	21
Drive a different vehicle than usual	162	17
Begin or increase telecommuting	137	15
Use mass transit more often	123	13
Cancel a vacation trip	94	10
Other	19	2
Nothing	203	22
Don't know	20	2
<b>Total</b>	<b>941</b>	<b>100</b>

**Source:** ORCI for NREL (2000a), Study #709318, N=941.

**Q2.3.5:** Have recent price increases in gasoline caused any financial hardship for you or your household?

**Table 2.3.5.** Perceived Effects of Recent Gasoline Price Increases

<b>Effects of Recent Price Increase In Gasoline</b>	<b>2000 May 23-24 (%)</b>	<b>2000 June 22-25 (%)</b>	<b>2001 May 7-9 (%)</b>
Recent price increases in gasoline have caused financial hardship for my household or me.	36	44	47
Recent price increases in gasoline have <b>not</b> caused financial hardship for my household or me.	64	56	53
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Sources:** Gallup Poll (2000a; 2000b), N=1,014; (2001b), N=1,005.

**Q2.3.6:** Do you now drive your vehicle more because of the current low price of gasoline?

**Table 2.3.6.** Effects of Low Gasoline Prices on Driving – Winter 1999

<b>Effects of Low Price of Gasoline On Driving</b>	<b>Number</b>	<b>Percent</b>
Drive my vehicle more now because of the current low price of gasoline	130	13
Do <b>not</b> drive my vehicle more now because of the current low price of gasoline	815	82
Don't know/don't own vehicle	54	5
<b>Total</b>	<b>999</b>	<b>100</b>

**Source:** ORCI for NREL (1999a), Study #70809, N=1,000.

**Q2.3.7:** On average, how many miles **extra** are you driving your vehicle per year (record number)?

**Table 2.3.7.** Average Number of Additional Miles Driven per Year Due to Low Gasoline Prices – Winter 1999

<b>Average Number of Additional Miles</b>	<b>Number</b>	<b>Percent</b>
1–500	33	25
501–1,000	14	11
1,001–2,000	21	16
2,001–5,000	26	20
More than 5,000	16	12
Don't know	21	16
<b>Total</b>	<b>131</b>	<b>100</b>
<b>Mean<sup>1</sup></b>	<b>3,535</b>	
<b>Standard deviation<sup>1</sup></b>	<b>5,251</b>	

**Source:** ORCI for NREL (1999), Study #70809, N=130.

<sup>1</sup> In this report, calculation of means, medians and standard deviations are based on raw numbers. “Don't know” responses are not part of the calculations.

**Q2.3.8:** Do you think the current rise in gasoline prices represents a temporary fluctuation in prices or a more permanent change in prices?

**Table 2.3.8.** Public Assessment of Nature of Current Rise in Gasoline Prices

Current Rise in Gasoline Prices Represents	2000	2000	2000	2000	2001
	Mar 10–12 (%)	Mar 30–Apr 2 (%)	May 23-24 (%)	June 22–25 (%)	May 7–9 (%)
Temporary fluctuation in prices	63	60	45	57	40
More permanent change in prices	34	37	50	39	56
No opinion	3	3	5	4	4
<b>Total</b>	100	100	100	100	100

**Sources:** Gallup Poll (2000d), N=500; (2000c), N=500; (2000b), N=500; (2000a), N=500; (2001b), N=500).

**Q2.3.9:** Looking ahead to one month from now, do you think gas prices at that time will be: higher than they are today, about the same, or lower than they are today?

Looking ahead to six months from now, do you think gas prices at that time will be: higher than they are today, about the same, or lower than they are today?

**Table 2.3.9.** Public Perception of Gas Prices One to Six Months from Today

Looking Ahead From Now, Gas Prices Will Be	One Month From Now, Do You Think Gas Prices Will Be (%)				Six Months From Now, Do You Think Gas Prices Will Be (%)			
	2000	2000	2000	2001	2000	2000	2000	2001
	March 10-12	May 23-24	June 22-25	May 7-9	March 10-12	May 23-24	June 22-25	May 7-9
Higher than they are today	74	51	38	83	37	24	20	38
About the same	16	33	39	13	26	25	28	37
Lower than they are today	9	14	22	3	34	49	50	24
No opinion	1	2	1	1	3	2	2	1
<b>Total</b>	100	100	100	100	100	100	100	100

**Sources:** Gallup Poll (2000d), N=505; (2000b), N=505; (2000a), N=505; (2001b), N=505.



**Q2.3.10:** How concerned are you about the price you will pay for gasoline over the next year? Would you say: very concerned, somewhat concerned, or not at all concerned?

**Table 2.3.10.** Public Concern About the Price of Gasoline in 2002

Degree of Public Concern	Number	Percent
Very concerned	462	49
Somewhat concerned	334	36
Not at all concerned	142	15
Don't know	3	small base
<b>Total</b>	<b>941</b>	<b>100</b>

**Source:** ORCI for NREL (2001a). Study #710148, N=941.

## 2.4 PUBLIC BELIEFS ABOUT ACTIONS TO ADDRESS THE ENERGY PROBLEMS

**Q2.4.1:** Which of the following approaches to solving the nation's energy problems do you think the United States should follow right now: emphasize production of more oil, gas and coal supplies, or emphasize more conservation by consumers of existing energy supplies?

**Table 2.4.1.** Public Preference for Solving the Nation's Energy Problems

Approaches to Solving the Nation's Energy Problems the US Should Follow Now	2001 March 5-7 (%)	2001 May 7-9 (%)
Emphasize production of more oil, gas, and coal supplies	33	35
Emphasize more conservation by consumers of existing energy supplies	56	47
Both/equally	8	14
Neither/other	1	2
No opinion	2	2
<b>Total</b>	<b>100</b>	<b>100</b>

**Sources:** Gallup Poll (2001c), N=505; (2001b), N=505.

**Q2.4.2:** If it became more important for the United States to reduce dependence on imported oil, what actions do you think should be taken by individuals, government, and/or business? (open-ended)

**Table 2.4.2.** Public Perception of Actions that Should Be Taken by Individuals, Government, and/or Business to Reduce Dependence on Imported Oil

<b>Actions that Should Be Taken By Individuals, Government, and/or Business' To Reduce Dependence on Imported Oil</b>		<b>Number</b>	<b>Percent</b>
Conservation/reduce consumption (net)		229	24
	Conservation/reduce consumption (unspecified)	129	14
	Research/use more fuel-efficient cars	34	4
	Carpool	25	3
	Provide/use public transportation	24	3
	Drive less/walk/bike more/ration gas	31	3
	All other conservation/reduce consumption mentions	22	2
Other sources of oil	Drilling, use U.S. oil reserves	195	21
Alternative energy sources (net)		167	18
	Research/use alternative energy sources (unspecified)	93	10
	Research/ Use our own natural resources	16	2
	Research/use electric cars	16	2
	Research/use cars that don't use gas but use solar energy, nuclear power, wind power, other alternative energy sources	55	5
Change prices		39	4
Government involvement	Government/Government's responsibility	38	4
Environmental concerns		23	2
Other		107	12
Nothing		48	5
Don't know		206	22
Total		941	112

**Source:** ORCI for NREL (2001a), Study #710148, N=941.

**Q2.4.3:** Which, if any, of the following have you done in the last 6 months, or do you plan on doing in the near future, to reduce gasoline expenditures?

**Table 2.4.3.** Actions Taken to Reduce Oil Dependence in the Last Six Months (February–August 2000) or Planned to Be Taken in the Near Future

<b>Actions To Reduce Gasoline Expenditures</b>	<b>Number</b>	<b>Percent</b>
Any (net)	718	76
Drive less	424	45
Walk or bike	267	28
Purchase more fuel-efficient vehicle	239	25
Carpool	198	21
Drive a different vehicle than usual	162	17
Begin or increase telecommuting	137	15
Use mass transit more often	123	13
Cancel a vacation trip	94	10
Other	19	2
Nothing	203	22
Don't know	20	2
<b>Total</b>	<b>941</b>	<b>100</b>

**Source:** ORCI for NREL (2000a), Study #709318, N=941.

**Q2.4.4:** In order to make our country less dependent on oil from insecure regions in the world, citizens like you could help by reducing the amount of fuel your vehicle consumes by one gallon per week. Which one of the following would you **most** likely do to save one gallon of fuel per week?

**Table 2.4.4.** Public Preference for Saving One Gallon of Fuel per Week

<b>Actions to Save One Gallon of Fuel Per Week</b>	<b>Number</b>	<b>Percent</b>
Any (net)	569	57
Use mass transit or carpool to get to work	283	28
Purchase a vehicle that gets ten percent better fuel economy than the one you currently drive	180	18
Work at home one or two days per week by telecommuting	106	11
Would do something else to reduce fuel consumption	283	28
Not interested in saving one gallon of fuel per week	33	3
Don't drive/don't have a car	60	6
Don't know	55	5
<b>Total</b>	<b>1,000</b>	<b>99</b>

**Source:** ORCI for NREL (2001b), Study #710449, N=1,000.

**Q2.4.5:** What would you do to save fuel? (open-ended)

**Table 2.4.5.** Possible Actions Taken by Individuals to Reduce Fuel Consumption

Possible Actions by to Reduce Fuel Consumption	Number	Percent
Drive less (net)	126	45
Drive less	38	13
Consolidate trips	24	8
Run fewer errands/trips	19	7
Drive only when necessary/reduce needless travel	10	3
Travel less	10	3
Less weekend/pleasure driving	14	4
All other drive less mentions	12	4
Walk (net)	46	16
Walk (unspecified)	33	12
Walk to work	8	3
All other walk mentions	5	2
Stay home (net)	24	8
Stay home more often	10	3
All other stay home mentions	14	5
Ride bike	11	4
Keep car tuned up/maintained properly	8	3
Other	34	12
Don't know	34	12
Total	283	100

**Source:** ORCI for NREL (2001b), Study #710449, N=283.

**Q2.4.6:** Here are some things that can be done to deal with the energy situation. For each one, please say whether you generally favor or oppose it. How about...?

**Table 2.4.6.** Public Perception of Ways to Deal with the Energy Situation (Gallup Poll)

<b>Ways to Deal with the Energy Situation</b>	<b>Favor (%)</b>	<b>Oppose (%)</b>	<b>No Opinion (%)</b>	<b>Total (%)</b>
Investments in new sources of energy such as solar, wind and fuel cells	91	6	3	100
Mandating more energy-efficient appliances such as air conditioning, clothes dryers, water heaters	87	12	1	100
Mandating more energy-efficient new buildings	86	12	2	100
<b>Mandating more energy-efficient cars</b>	<b>85</b>	<b>14</b>	<b>1</b>	<b>100</b>
Investing in new power generating plants	83	13	4	100
Federal government partnership with auto industry working toward energy-efficient cars	76	22	2	100
Investing in more electrical transmission lines	69	23	8	100
Investing in more gas pipelines	64	29	7	100
Drilling for natural gas on federal lands	63	33	4	100
Increasing the use of nuclear power as a major source of power	48	44	8	100
Opening up the Alaskan Arctic Wildlife Refuge for oil exploration	38	57	5	100

**Source:** Gallup Poll (2001b), N=505.

**Q2.4.7:** Here are several proposals that have been made to help solve America's energy problems. Do you favor or oppose each one?

**Table 2.4.7.** Public Perception of Ways to Deal with the Energy Situation (NBC/WSJ)

<b>Ways to Deal with the Energy Situation</b>	<b>Favor (%)</b>	<b>Oppose (%)</b>	<b>No Opinion (%)</b>	<b>Total (%)</b>
<b>Require automakers to produce more fuel-efficient cars</b>	<b>87</b>	<b>10</b>	<b>3</b>	<b>100</b>
Financial incentives for business, consumers to conserve energy	85	12	3	100
Make permitting and building new power plants easier	69	24	7	100
Place federal price controls on gasoline	56	38	6	100
Place federal price controls on electricity and natural gas	54	41	5	100
Place mandatory conservation regulations on businesses and consumers	53	42	5	100
Allow drilling for oil, gas in Alaskan Arctic National Wildlife Refuge	43	50	7	100
Relax clean air, environmental standards	30	65	5	100

**Source:** NBC/*Wall Street Journal*, June 23–25, 2001, N=806.

**Q2.4.8:** For U.S. energy needs, do you support or oppose Federal Government action to...?

**Table 2.4.8.** Public Support of Federal Government Actions for U.S. Energy Needs

<b>Federal Government Actions For U.S. Energy Needs</b>	<b>Support (%)</b>	<b>Oppose (%)</b>	<b>No Opinion (%)</b>	<b>Total (%)</b>
Develop more solar and wind power	90	8	2	100
Encourage more energy conservation by businesses and industries	90	8	2	100
Encourage more energy conservation by consumers like yourself	90	8	2	100
<b>Require car manufacturers to improve fuel efficiency of vehicles sold in the United States</b>	<b>89</b>	<b>10</b>	<b>1</b>	<b>100</b>
Increase oil and gas drilling	67	29	4	100
Build more power plants that burn oil, coal or natural gas	62	31	7	100
Increase coal mining	54	39	7	100
Build more nuclear power plants	46	51	3	100

**Source:** ABC News/*Washington Post*, May 31–June 3, 2001, N=1,004.

**Q2.4.9:** Which one should be the Federal Government highest priority?

**Table 2.4.9.** Public Perception of the Federal Government’s Highest Priority

<b>Federal Government Highest Priority</b>	<b>Percent</b>
Develop more solar and wind power	23
<b>Require car manufacturers to improve fuel efficiency of vehicles sold in the United States</b>	<b>19</b>
Encourage more energy conservation by businesses and industries	17
Increase oil and gas drilling	11
Build more power plants that burn oil, coal or natural gas	10
Encourage more energy conservation by consumers like yourself	8
Build more nuclear power plants	8
Increase coal mining	1
<b>Total</b>	<b>97</b>

**Source:** ABC News/*Washington Post*, May 31–June 3, 2001, N=1,004.



**Q2.4.10:** If it became important for the United States to reduce dependence on imported oil, which of the following policies would you **most** support?

If it became important for the United States to reduce dependence on imported oil, which of the following policies would you **least** support?

**Table 2.4.10.** Policies the Public Would Most/Least Support to Reduce Dependence on Imported Oil

Policies To Reduce Dependence On Imported Oil	Most Support		Least Support	
	Number	Percent	Number	Percent
<b>Regulation to make personal vehicles more efficient</b>	<b>455</b>	<b>48</b>	<b>145</b>	<b>15</b>
Tax refunds for higher efficiency vehicles	223	24	134	14
Higher taxes on less efficient vehicles	101	11	174	19
Higher taxes on gasoline and diesel	58	6	418	44
Don't know/none of these	104	11	69	7
<b>Total</b>	<b>941</b>	<b>100</b>	<b>940</b>	<b>99</b>

**Source:** ORCI for NREL (2001a), Study #710148, N=941.



### 3. GLOBAL WARMING

A number of surveys<sup>1</sup> researched the U.S. population's awareness of global warming. In general, the public is well aware of global warming. In 1998, a majority of the population had heard about global warming (Table 3.1.1). However, they were not so aware of the Kyoto<sup>2</sup> conference on global warming. Almost three quarters of Americans said they had heard "not very much" or "nothing at all" about the Kyoto Conference (Table 3.1.2).

A majority of the public believes that global warming is a real problem. Two-thirds of the adult population perceived the global warming threat as serious in 1997 (Table 3.1.3). U.S. adults assess global warming as the third (of the five given choices) most important transportation problem to the United States in the year of 2020, following traffic congestion and availability and/or price of gasoline (Table 3.1.4).

An overwhelming majority of Americans support taking actions that incur costs in order to combat global warming. However, in 1998 the public believed that the problem of global warming could be dealt with gradually by taking steps which were low in cost (Table 3.2.1). When asked about a policy to reduce greenhouse gas emissions from vehicles, an overwhelming majority of U.S. adults would prefer a 3 percent tax for new vehicles rather than a 25-cent per gallon tax on gasoline (Table 3.2.2).

Americans believe that the United States should join other countries in setting standards to improve the global environment (Table 3.2.3). In 1998, the public expected that less-developed countries should be required to limit their emissions (Table 3.2.4). Americans favored limits in increases in emissions in less-developed countries rather than cuts in these countries' emissions (Table 3.2.5).

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<sup>1</sup> The surveys were conducted by the Pew Research Center for the People & the Press (1997), the Sustainable Energy Budget Coalition (1996), the World Wildlife Fund National Survey (1997), the New York Times (November 23-24, 1997), and the Program on International Policy Attitudes (PIPA, 1998a; 1998b).

<sup>2</sup> The Kyoto conference on global warming took place in Japan in December 1997. At the conference the United States and Europe agreed to cut their greenhouse gas emissions by 7–8 percent below the 1990 level by about the year 2010.

### 3.1 PUBLIC AWARENESS AND PERCEIVED SERIOUSNESS OF THE GLOBAL WARMING ISSUE

**Q3.1.1:** WWF: How much, if anything, have you heard or read about the issue of global warming? Would you say you have heard a great deal, some, not too much or nothing at all about global warming?

PIPA: As you may know in the next few weeks there will be a world conference in Buenos Aires on the problem of global warming caused by greenhouse gas emissions, which are released by the burning coal, gasoline, and other fossil fuels. How much have you heard about global warming: a great deal, some, not very much or nothing at all?

**Table 3.1.1.** Level of Public Awareness of Global Warming

Degree of Awareness	WWF (%)	PIPA (%)
A lot	25	32
Some	46	39
Not much/nothing	29	29
<b>Total</b>	100	100

**Sources:** World Wildlife Fund National Survey (1997), and PIPA (1998b), N=800.

**Q3.1.2:** As you may know recently there was a world conference in Kyoto on the problem of global warming. How much have you heard about this conference?

**Table 3.1.2.** Level of Public Awareness of the Kyoto Conference

Degree of Awareness	Percent
A great deal	5
Some	20
Not very much	39
Nothing	35
<b>Total</b>	99

**Source:** PIPA (1998a), N=648, margin of error +/- 3.5-4%.

**Q3.1.3:** SEBC: In your mind, how serious a threat do you think global climate change, also known as global warming, caused by emissions from the combustion of oil, gasoline, and coal is?

WWF: Generally speaking, how serious of a threat do you think global warming is today: very serious, somewhat serious, not too serious, or not serious at all or don't you have an opinion on this?

**Table 3.1.3.** Perceived Seriousness of Global Warming Threat

Degree of Seriousness	SEBC (%)	WWF (%)
Very serious	36	24
Somewhat serious	35	42
Not too serious	16	12
Not serious at all	9	7
Don't know	4	14
<b>Total</b>	<b>100</b>	<b>99</b>

**Sources:** Sustainable Energy Budget Coalition (1996), and World Wildlife Fund National Survey (1997).

**Q3.1.4:** Thinking about the future, which of the following transportation problems will be **most** important to the United States in the year 2020?

**Table 3.1.4.** Public Ranking of the Most Important Transportation Problem for the United States in the Year 2020

Most Important Transportation Problem	Number	Percent
Traffic congestion	339	34
Availability and/or price of gasoline	282	28
Global warming or climate change caused by vehicles	140	14
Local air pollution from vehicles	122	12
Deaths and serious injuries in vehicle accidents	74	7
Don't know	42	4
<b>Total</b>	<b>999</b>	<b>99</b>

**Source:** ORCI for NREL, (2000b), Study #709489, N=1,000.

### 3.2 PERCEIVED ACTIONS TO ADDRESS GLOBAL WARMING

**Q3.2.1:** There is a controversy over what the countries of the world, including the United States, should do about the problem of global warming. I am going to read you three statements. Please, tell me which statement comes closest to your point of view.

**Table 3.2.1.** Public Support for Actions to Address Global Warming

<b>Action to Address Global Warming</b>	<b>February–April 1998 (%)</b>	<b>October 1998 (%)</b>
Until we are sure that global warming is really a problem, we should not take any steps that would have economic costs.	15	15
The problem of global warming should be addressed, but its effects will be gradual, so we can deal with the problem gradually by taking steps that are low in cost.	44	42
Global warming is a serious and pressing problem. We should begin taking steps now even if this involves significant costs.	39	41
Don't know/refused	2	2
<b>Total</b>	<b>100</b>	<b>100</b>

**Source:** PIPA (1998a), N=600 and PIPA (1998b), N=800.

**Q3.2.2:** If the nation determines that it is important to reduce greenhouse gas emissions from vehicles, which of the following policies would you prefer?

**Table 3.2.2.** Public Preference for Policy to Reduce Greenhouse Gas Emissions from Vehicles

<b>Policy to Reduce Greenhouse Gas Emissions from Vehicles</b>	<b>Number</b>	<b>Percent</b>
25-cent per gallon tax on gasoline	171	17
3% tax for new vehicles	700	70
Don't know/none of these	129	13
<b>Total</b>	<b>1,000</b>	<b>100</b>

**Source:** ORCI for NREL (1998a), Study #707089, N=1,000.

**Q3.2.3:** Do you think the United States should join other countries in setting standards to improve the global environment, or should the United States set its own environmental standards independently?

**Table 3.2.3.** Preferred Strategies for Combating Global Warming

<b>U.S. Strategies</b>	<b>Percent</b>
Join other countries	55
Set standards independently	41
Don't know/refused	4
<b>Total</b>	<b>100</b>

**Source:** Pew Research Center for the People & the Press (1997).

**Q3.2.4:** Another controversy is whether the less economically developed countries should also be expected to cut their emissions of the greenhouse gasses that cause global warming. Please tell me which of the following positions comes closest to yours?

**Table 3.2.4.** Perceived Contribution by Less-Developed Countries Toward Production of Greenhouse Gas Emissions

<b>Positions on Less-Developed Countries</b>	<b>Percent</b>
On a per person basis, less-developed countries produce far less greenhouse gases than developed countries. Therefore, the less-developed countries should not be required to limit their emissions until they develop their economies more.	38
The less-developed countries produce a substantial and growing amount of greenhouse gasses. Therefore they should be required to limit their emissions.	55
Don't know	5
<b>Total</b>	<b>98</b>

**Source:** PIPA (1998a), N=600.

**Q3.2.5:** Another controversy is whether the less developed countries should also be expected to limit or reduce their greenhouse gas emissions. Please tell me which of the following positions comes closest to yours.

**Table 3.2.5.** Public Perception of Actions Which Should Be Required of Less-Developed Countries to Reduce Greenhouse Gas Emissions

<b>Actions which Should Be Required of Less-Developed Countries</b>	<b>Percent</b>
The more-developed countries produce far more greenhouse gas emissions and have not begun to make meaningful reductions. So the less-developed countries should <b>not</b> be required to limit their emissions <b>until</b> the more-developed countries reduce theirs.	19
The less-developed countries produce a substantial and growing amount of greenhouse gas emissions. Therefore they should be required to <b>cut</b> their emissions.	31
Because the less-developed countries are poorer and produce far lower emissions, they should not be required to cut back. But they should be required to <b>minimize</b> the increase of their emissions through greater energy efficiency.	45
None of these.	2
<b>Total</b>	<b>97</b>

**Source:** PIPA (1998b), N=800.



## 4. ALTERNATIVE FUELS

A number of surveys researched the U.S. adult population knowledge and opinions about alternative types of fuel such as electricity, ethanol, and hydrogen. On average, Americans believed in 1998 that gasoline and diesel will become too expensive to use in cars and trucks by the year 2010. In 1998, U.S. adults thought that electricity followed by solar energy would most likely replace gasoline and diesel in the future (Table 4.1.2). Similar to this finding, in 2000, Americans chose electricity over ethanol and hydrogen as the best fuel to use in personal vehicles when gasoline is no longer available (Table 4.1.3). They chose electricity because of environmental concerns (such as electricity being cleaner and less polluting), and its availability (Table 4.1.4).

Those Americans who preferred ethanol to electricity and hydrogen as the best fuel to use when gasoline is no longer available referred to its availability as one of the primary reasons (Table 4.1.5). Those who selected hydrogen as the best fuel to use in personal vehicles in the future also explained their choice by hydrogen's availability, along with environmental concerns (Table 4.1.6).

The same survey addressed the issue of the worst fuel to use in personal vehicles when gasoline is no longer available. Almost three in ten Americans chose ethanol over electricity and hydrogen as the worst fuel for use in the future because of environmental concerns (Tables 4.1.7, 4.1.8). People who rated hydrogen as the worst fuel to use when gasoline is no longer available did so mainly because of safety concerns, such as hydrogen being explosive, flammable/combustible and dangerous/not safe (Table 4.1.9). Those who selected electricity as the worst fuel to use in the future cited electricity being expensive, and environmental concerns (Table 4.1.10). In addition, the U.S. public complained that electric vehicles could not hold a charge for long and, therefore, could not travel long distances.

**Q4.1.1:** In what year in the future do you think gasoline and diesel will become too expensive in cars and trucks?

**Table 4.1.1.** Public Perception of When Gasoline and Diesel Will Become Too Expensive

<b>Year</b>	<b>Number</b>	<b>Percent</b>
1999	59	6
2000	87	9
2001-2005	142	14
2006-2010	109	11
2011-2015	27	3
2016-2020	71	7
2021-2025	39	4
2026-2050	70	7
2051 or later	52	5
Don't know	343	34
<b>Total</b>	<b>1,000</b>	<b>100</b>

**Source:** ORCI for NREL (1998b), Study #707349\*, N=1,000.

\* Survey responses may have been biased because the question was asked within a week of the U.S. missile attack on terrorists in Sudan and Afghanistan.

**Q4.1.2:** What fuel will most likely replace gasoline and diesel when they become too expensive to use in cars and trucks? Any others? (open-ended)

**Table 4.1.2.** Public Perception of Which Fuel Will Replace Gasoline and Diesel

<b>Fuel</b>	<b>Number</b>	<b>Percent</b>
Electricity/battery	332	33
Solar	123	12
Alcohol/ethanol/methanol	102	11
Natural gas/CNG/LNG	61	6
Hydrogen	26	3
Propane (LPG)	23	2
Water, nuclear	25	3
Other	54	4
Don't know/none	253	25
<b>Total</b>	<b>1,000</b>	<b>99</b>

**Source:** ORCI for NREL (1998b), Study #707349, N=1,000. CNG, Compressed Natural Gas; LNG, Liquefied Natural Gas; LPG, Liquid Propane Gas.

*Public Perceptions of Best Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available*

**Q4.1.3:** Consider a future date when gasoline is no longer available. Which of the following do you think would be the **best** fuel for use in personal vehicles: electricity, ethanol, or hydrogen?

**Table 4.1.3.** Public Perception of Best Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available

<b>Best Fuel for Use in Personal Vehicles</b>	<b>Number</b>	<b>Percent</b>
Electricity	522	52
Ethanol	206	21
Hydrogen	151	15
Don't know	121	12
<b>Total</b>	<b>1,000</b>	<b>100</b>

**Source:** ORCI for NREL (2000b), Study #709489\*, N=1,000.

\* The ORCI study # 709489 was conducted before the electricity problems in California

**Q4.1.4:** Why did you say **electricity** would be the **best** fuel for use in personal vehicles when gasoline is no longer available? (open-ended)

**Table 4.1.4.** Reasons **Electricity** Would Be the **Best** Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available

Reasons	Total		Region							
	n	%	NE <sup>1</sup>		NC <sup>1</sup>		S <sup>1</sup>		W <sup>1</sup>	
			n	%	n	%	n	%	n	%
Environmental concerns (net)	153	29	36	32	29	28	48	25	40	35
Cleaner	73	14	19	17	16	15	20	10	18	16
Does not pollute/less pollution	50	10	9	8	10	9	20	10	11	10
Less air pollution/cleaner air	24	5	8	7	1	1	7	4	8	7
All other environmental concerns mentions	24	5	4	3	6	6	6	4	8	8
Availability (net)	117	22	28	25	25	24	40	21	23	20
Common/readily available/abundant	64	12	13	11	15	14	23	12	14	12
Renewable/inexhaustible	25	5	7	6	6	6	9	5	3	3
Easy to produce/manufacture/can generate our own fuel/not dependent on foreign sources	18	3	7	6	1	1	7	3	3	2
All other availability mentions	15	3	3	3	4	3	5	2	4	3
Existing/developing technology (net)	88	17	21	19	19	18	30	16	18	16
This technology is already being developed/used	34	6	8	7	7	7	12	6	6	6
Electric cars are already being developed	33	6	8	7	7	7	11	6	7	6

Reasons	Total		Region							
	n	%	NE <sup>1</sup>		NC <sup>1</sup>		S <sup>1</sup>		W <sup>1</sup>	
			n	%	n	%	n	%	n	%
Many/more and more things are powered by electric/all other existing/ developing technology mentions	21	4	4	4	4	4	7	4	5	5
Economical/affordable	58	11	11	10	11	11	24	12	12	11
Methods of generating (net)	38	7	5	4	8	8	16	8	10	8
Can be solar generated/powered	26	5	2	2	6	5	10	5	8	7
All other methods of generating mentions	12	3	2	2	2	2	6	3	1	1
Most familiar with it/not familiar with others	38	7	9	8	10	10	12	6	7	6
Safety concerns (net)	26	5	8	7	3	3	10	5	4	4
Best source (unspecified)	19	4	7	6	2	2	6	3	4	3
More efficient	17	3	3	3	4	4	4	2	6	5
Easier/convenient (unspecified)	16	3	6	6	2	2	7	4	small base	small base
Others not practical /performance concerns	15	3	3	3	small base	small base	6	3	5	5
Other	24	5	4	4	4	3	10	5	7	6
Don't know	34	6	4	4	10	10	15	8	4	3

**Source:** ORCI for NREL (2000b), Study #709489, N=522.

<sup>1</sup>In this report the following abbreviations stand for:

- NE – Northeast region
- NC – North-Central region
- S – South Region
- W – West Region

**Q4.1.5:** Why did you say **ethanol** would be the **best** fuel for use in personal vehicles when gasoline is no longer available? (open-ended)

**Table 4.1.5.** Reasons **Ethanol** Would Be the **Best** Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available

Reasons	Total		Region							
	n	%	NE		NC		S		W	
			n	%	n	%	n	%	n	%
Availability (net)	55	27	8	27	20	28	15	22	12	30
Common/readily available/abundant	23	11	2	6	10	14	10	15	2	5
Renewable/inexhaustible	14	7	3	10	3	4	4	6	4	10
Easy to produce/manufacture	11	5	3	10	4	5	2	3	3	7
Can generate our own fuel/not dependent on foreign sources	6	3	1	2	3	4	1	1	1	3
All other availability mentions	3	2	0	0	small base	1	1	1	2	5
Methods of generating (net)	38	18	3	10	17	24	11	17	7	17
Made from corn/grain	34	16	2	7	17	24	9	14	6	14
All other methods of generation mentions	4	2	1	3	0	0	2	3	1	3
Economical/affordable	32	15	6	21	9	12	9	13	9	21
Environmental concerns (net)	31	15	7	23	11	15	8	13	5	13
Cleaner	19	9	6	20	7	10	3	5	3	6
Does not pollute/less pollution	6	3	0	0	3	4	1	2	3	7
All other environmental concerns mentions	7	4	0	0	2	3	4	6	0	0
Others not practical/performance concerns	21	10	1	3	6	8	9	14	5	13
Better for/helps farmers/farming industry	16	8	0	0	9	14	4	7	2	5
Existing/developing technology (net)	16	8	0	0	6	9	6	10	3	7
This technology is already being developed/used	16	8	0	0	6	9	6	10	3	7

Reasons	Total		Region							
	n	%	NE		NC		S		W	
			n	%	n	%	n	%	n	%
Best source (unspecified)	11	5	2	5	4	6	1	2	4	10
More similar to gasoline	10	5	3	9	3	4	2	3	2	5
Other	25	12	8	24	4	6	8	13	5	13
Don't know	15	7	0	0	5	7	8	13	1	3

**Source:** ORCI for NREL (2000b), Study #709489, N=206.

**Q4.1.6:** Why did you say **hydrogen** would be the **best** fuel for use in personal vehicles when gasoline is no longer available?  
(open-ended)

**Table 4.1.6.** Reasons **Hydrogen** Would Be the **Best** Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available

Reasons	Total		Region							
	n	%	NE		NC		S		W	
			n	%	n	%	n	%	n	%
Availability (net)	56	37	9	35	14	40	19	38	14	35
Common/readily available/abundant	41	27	8	30	10	31	14	28	9	21
Easy to produce/manufacture	10	7	2	6	5	14	2	4	2	5
Renewable/inexhaustible	7	5	0	0	0	0	4	8	3	8
All other availability mentions	5	3	1	5	2	4	0	0	3	5
Environmental concerns (net)	40	27	7	26	10	29	15	30	9	22
Cleaner	26	17	4	14	5	15	10	20	7	18
Does not pollute/less pollution	10	7	2	9	3	9	2	5	2	6
All other environmental concerns mentions	5	4	1	3	2	4	2	5	0	0
Methods of generating (net)	21	14	5	21	6	17	8	17	1	3
Can be generated by/derived from water	20	13	5	17	6	17	8	17	1	3
Economical/affordable	18	12	3	12	5	15	6	12	4	10
Others not practical/performance concerns	17	11	5	19	4	13	4	8	3	8
Existing/developing technology (net)	10	7	2	7	2	4	3	6	4	9
This technology is already being developed/used	10	7	2	7	2	4	3	6	4	9



More efficient	8	5	1	5	0	0	3	7	3	8
Safety concerns	8	5	1	5	1	2	1	3	4	10
Best source (unspecified)	4	3	1	4	small base	1	1	2	2	4
Other	13	9	1	5	4	13	2	4	6	14
Don't know	13	9	1	4	1	3	8	15	4	9

**Source:** ORCI for NREL (2000b), Study #709489, N=151.

*Public Perceptions of Worst Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available*

**Q4.1.7:** Consider a future date when gasoline is no longer available. Which of the following do you think would be the **worst** fuel for use in personal vehicles: ethanol, hydrogen, or electricity?

**Table 4.1.7.** Public Perception of Worst Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available

<b>Worst Fuel for Use in Personal Vehicles</b>	<b>Number</b>	<b>Percent</b>
Ethanol	281	28
Hydrogen	274	27
Electricity	150	15
Don't know	295	30
<b>Total</b>	<b>1,000</b>	<b>100</b>

**Source:** ORCI for NREL (2000b), Study #709489, N=1,000.

**Q4.1.8:** Why did you say **ethanol** would be the **worst** fuel for use in personal vehicles when gasoline is no longer available? (open-ended)

**Table 4.1.8.** Reasons **Ethanol** Would Be the **Worst** Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available

Reasons	Total		Region							
	n	%	NE		NC		S		W	
			n	%	n	%	n	%	n	%
Environmental concerns (net)	106	38	21	41	25	43	35	33	26	38
Pollution (subnet)	84	30	16	32	20	34	28	26	21	31
Produces pollution	46	16	9	18	9	16	21	20	7	10
Causes air pollution	27	10	5	10	7	12	5	5	9	14
All other pollution mentions	14	5	4	8	3	6	1	1	5	7
Creates environmental problems	9	3	1	2	2	4	4	4	1	1
All other environmental concerns mentions	17	6	3	7	4	6	5	5	6	8
Safety concerns (net)	56	20	17	34	12	21	17	17	10	14
Flammable/combustible	11	4	3	6	1	2	4	4	3	4
Explosive	7	3	2	4	1	2	4	4	0	0
Contains chemicals	7	3	3	7	1	2	1	1	2	3
All other safety concerns mentions	32	12	9	17	9	16	8	8	5	8
Expense (net)	17	6	0	0	6	10	4	4	6	10
Too expensive	16	6	0	0	6	10	4	4	6	8
Lack of availability	10	4	2	5	3	4	3	3	2	3
Finite/exhaustible resource	8	3	2	4	0	0	2	2	3	5
Difficult to produce	8	3	1	2	2	3	3	3	1	2
Causes engine trouble	7	3	0	0	3	6	3	3	1	2
Other	38	13	4	10	9	16	11	11	12	20
Don't know	58	20	10	21	7	12	31	29	10	15

**Source:** ORCI for NREL (2000b), Study #709489, N=281.

**Q4.1.9:** Why did you say **hydrogen** would be the **worst** fuel for use in personal vehicles when gasoline is no longer available?  
(open-ended)

**Table 4.1.9.** Reasons **Hydrogen** Would Be the **Worst** Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available

Reasons	Total		Region							
	n	%	NE		NC		S		W	
			n	%	n	%	n	%	n	%
Safety concerns (net)	137	50	30	59	31	44	49	48	26	53
Explosive	39	14	9	17	6	9	17	17	7	15
Flammable/combustible	38	14	9	18	8	12	13	13	7	14
Dangerous/not safe (unspecified)	28	10	5	10	6	9	12	11	5	10
Unstable	14	5	4	8	3	5	2	2	4	8
Think of bombs	8	3	2	4	2	3	3	2	1	2
All other safety concerns mentions	24	9	2	4	10	14	5	5	5	11
Pollution and environmental concerns (net)	21	8	4	8	3	4	10	10	4	9
Not enough is known about it	10	4	1	2	3	5	3	3	3	6
Difficult to produce	10	4	2	5	3	4	5	5	0	0
Too expensive	8	3	0	0	2	2	4	4	2	4
Other	41	15	8	15	11	16	18	17	5	10
Don't know	57	21	9	17	20	28	19	19	9	18

**Source:** ORCI for NREL (2000b), Study #709489, N=274.

**Q4.1.10:** Why did you say **electricity** would be the **worst** fuel for use in personal vehicles when gasoline is no longer available?  
(open-ended)

**Table 4.1.10.** Reasons **Electricity** Would Be the **Worst** Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available

Reasons	Total		Region							
	n	%	NE		NC		S		W	
			n	%	n	%	n	%	n	%
Too Expensive	42	28	13	37	12	31	8	17	10	30
Electric vehicles can't hold charge for long/can't travel long distances	30	20	4	11	9	23	11	25	6	19
Environmental concerns (net)	29	19	7	21	7	18	7	16	8	24
Must burn coal/fossil fuels to generate electricity	18	12	4	12	6	15	4	8	5	14
Pollution	8	6	4	11	2	6	2	6	0	0
All other environmental concerns mentions	9	6	1	4	0	0	5	10	3	10
Not enough electricity now	17	12	6	16	3	7	6	14	3	8
Safety concerns	8	5	1	3	2	5	3	6	2	7
Other	21	15	4	12	7	17	7	16	2	12
Don't know	15	10	3	8	4	10	6	13	3	8

**Source:** ORCI for NREL (2000b), Study #709489, N=150.



## 5. CONVENTIONAL, MORE FUEL-EFFICIENT, AND ADVANCED TECHNOLOGY VEHICLES

Section 4 focuses on vehicle owners and the decisions they make about their vehicles. It consists of three sections that encompass survey data on owners' decisions about their conventional (i.e., gasoline) vehicles, as well as more fuel-efficient and advanced technology vehicles.

### 5.1 VEHICLE OWNERS' DECISIONS ABOUT CONVENTIONAL VEHICLES

Surveys revealed that one out of five of adults plan to keep his/her vehicle for 5 years (Table 5.1.1). On average, Americans expect to keep their vehicles for almost 7 years (Table 5.1.2). An overwhelming majority of Americans bought, rather than leased, their current vehicles, and almost one in two adults purchased their vehicles used. Only 7 percent of respondents reported leasing their current vehicles. Adults who leased vehicles tended to lease them new (Table 5.1.2). More than one out of four U.S. adults purchased their current vehicles in order to replace vehicles that had a lot of mileage, or ones that required expensive or frequent repairs (Table 5.1.3).

In 2001, Americans value vehicle safety as much as dependability, followed by vehicle quality, fuel economy, and low vehicle price (Table 5.1.4). In the year 2000, the public valued dependability more than safety, followed by quality. Over the years since 1981, the population reported dependability as the most important attribute in their choice of a new vehicle. Americans valued vehicle price after dependability from 1981 until 1987. Since 1996 safety became the second most important attribute (after dependability) when buying a new vehicle. With respect to safety, an overwhelming majority do not believe that a lighter vehicle is as safe in traffic accidents as a heavier one of the same size (Table 5.1.5).

In line with the fact that lately Americans consider safety one of the most valuable vehicle attributes and that the larger the vehicle the safer it is expected to be, is the fact that the highest-selling vehicles in the United States currently are large vehicles such as pickup trucks, minivans, and sport utility vehicles (*The Washington Post*, 2001). In 1998, almost half of those vehicle owners who were likely to purchase the above-mentioned large vehicles planned on buying a towing package for the new vehicle (Table 5.1.6). In addition, about one-third of these vehicle owners planned on using their new pickup truck, minivan, standard van, or sport utility vehicle off-road (Table 5.1.7).

Despite the rising popularity of pickup trucks, vans, minivans, or sport utility vehicles, cars are also popular. In fact, according to the ORCI surveys, a majority of vehicle owners would most likely purchase cars rather than pickup trucks, vans, minivans or sport utility vehicles if they were to buy a new vehicle (Table 5.1.9). The vehicle owners who were likely to buy a car reported features and styles (such as comfort, smoothness and quietness of ride) that come with cars as a major reason of their preference of the car over the other vehicle types (Table 5.1.8).

When they dispose of their current vehicles, almost one out of two Americans will buy a new vehicle, and two out of five will buy a used vehicle (Table 5.1.9). This finding is consistent with survey results from 1998 when almost as many reported a preference for buying new vehicles as

those who would rather purchase used ones (Table 5.1.10). In 1998, a majority of those Americans who were likely to purchase a new vehicle would plan on spending \$10,000 – \$25,000 on this new vehicle. More than one in four U.S. adults planned to spend \$15,000 – \$20,000 (Table 5.1.8). When asked about a dollar amount increase in new vehicle prices that would make them purchase a used vehicle instead of the new one, almost one in two adults mentioned more than \$2,000 (Table 5.1.10).

**Q5.1.1:** From the day you acquired the vehicle you currently drive, how many years total do you plan on keeping it (record number)?

**Table 5.1.1.** Total Number of Years Individuals Plan to Keep Their Vehicle

Number of Years	Number	Percent
1–5 years (net)	461	50
1	35	4
2	78	8
3	97	11
4	68	7
5	182	20
6–10	267	29
11–15	51	6
16–20	51	6
Don't know	91	10
<b>Total</b>	920	101
<b>Mean<sup>1</sup></b>	6.9	

**Source:** ORCI for NREL (2000c), Study #709089, N=920.

<sup>1</sup> In this report, calculation of means, medians and standard deviations are based on raw numbers. “Don't know” responses are not part of the calculations.



**Q5.1.2:** How did you acquire the vehicle you currently drive: purchase, lease, gift?

**Table 5.1.2.** Vehicle Acquisition Data

<b>Acquisition Method</b>	<b>Number</b>	<b>Percent</b>
Purchased (net)	783	85
Purchased new	333	36
Purchased used	449	49
Leased (net)	66	7
Leased new	54	6
Leased used	12	1
Gift	60	7
Other/don't know	12	1
<b>Total</b>	<b>920</b>	<b>100</b>

**Source:** ORCI for NREL (2000c), Study #709089, N=920.

**Q5.1.3:** What was the primary reason you acquired the vehicle that you currently drive?

**Table 5.1.3.** Primary Reason for Acquiring Current Vehicle

<b>Primary Reason</b>	<b>Number</b>	<b>Percent</b>
Replaced a vehicle that had a lot of mileage on it or one that required expensive or frequent repairs	247	27
Wanted a newer vehicle	209	23
Wanted/needed a different size or type of vehicle	200	22
Replaced a vehicle that was damaged in an accident or was stolen	79	9
First vehicle	63	7
Reached end of previous lease	25	3
Other/don't know	97	11
<b>Total</b>	<b>920</b>	<b>102</b>

**Source:** ORCI for NREL (2000c), Study #709089, N=920.

**Q5.1.4:** Which of the following attributes would be MOST important to you in your choice of your next vehicle?

**Table 5.1.4.** Trends in Vehicle Attribute Preference, Selected Years 1980–2001

Attributes	1980	1981	1983	1985	1987	1996	1998		2000		2001	
	(%)	(%)	(%)	(%)	(%)	(%)	n	%	n	%	n	%
Fuel economy	42	20	13	8	4	7	44	4	98	10	102	10
Dependability	31	40	38	41	44	34	359	36	300	32	288	29
Low price	14	21	30	29	31	11	53	5	104	11	81	8
Quality	4	7	11	12	8	19	197	20	199	21	220	22
Safety	9	12	9	10	14	29	334	34	222	24	291	29
Don't know/ none of these							12	1	18	2	6	1
<b>Total</b>	100	100	100	100	101	100	999	100	941	100	988	99

**Sources:** For 1980s: J. D. Power (data based on new car buyers). For 1996: ORCI for NREL. For 1998: ORCI for NREL (1998a), N = 1,000. For 2000: ORCI for NREL (2000a), N = 941. For 2001: ORCI for NREL (2001c), N = 989.

**Q5.1.5:** Do you think that a lighter vehicle is as safe in traffic accidents as a heavier one of the same size?

**Table 5.1.5.** Public Perception of Vehicle Size vs. Safety

Vehicle Size as a Safety Issue	Total		Type of New Vehicle Will Purchase Next									
	n	%	Small Car		Large Car		Minivan		SUV		Pickup truck/van	
			n	%	n	%	n	%	n	%	n	%
Believe that a lighter vehicle is as safe in traffic accidents as a heavier one of the same size.	119	12	23	15	16	7	13	19	27	15	24	13
Do not believe that a lighter vehicle is as safe in traffic accidents as a heavier one of the same size	824	82	127	81	193	89	52	75	136	78	156	82
Don't know	57	6	8	5	7	3	4	6	11	6	10	5
<b>Total</b>	<b>1000</b>	<b>100</b>	<b>158</b>	<b>101</b>	<b>216</b>	<b>99</b>	<b>69</b>	<b>100</b>	<b>174</b>	<b>99</b>	<b>190</b>	<b>100</b>

**Source:** ORCI for NREL (1999b), Study #70844, N=1,000.

**Q5.1.6:** You mentioned that you would plan to buy a pickup truck, minivan, standard van, or sport utility vehicle. Would you plan to purchase a towing package for this new vehicle?

**Table 5.1.6.** Towing Package Preference for a New Vehicle

Plans on Purchasing or Not Purchasing a Towing Package	Total		Type of New Vehicle Most Likely to Buy													
	n	%	Small Car		Midsized Car		Large Car		Pickup truck		Standard Van		Minivan		SUV	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%
Plan on buying a towing package	208	47	0	0	0	0	0	0	85	52	6	33	25	32	91	51
Do not plan on buying a towing package	225	51	0	0	0	0	0	0	77	47	13	67	52	66	83	47
Don't know	6	1	0	0	0	0	0	0	2	1	0	0	1	2	3	2
<b>Total</b>	<b>439</b>	<b>99</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>164</b>	<b>100</b>	<b>19</b>	<b>100</b>	<b>78</b>	<b>100</b>	<b>177</b>	<b>100</b>

**Source:** ORCI for NREL (1998a), Study #707089, N=439.

**Q5.1.7:** You mentioned that you would plan to buy a pickup truck, minivan, standard van, or sport utility vehicle. Would you plan to use it off road?

**Table 5.1.7.** Expected Off-Road Use of a New Vehicle

Plans on Using Or Not Using Off-Road	Total		Type of New Vehicle Most Likely to Buy													
	n	%	Small Car		Midsized Car		Large Car		Pickup truck		Standard Van		Minivan		SUV	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%
Plan on using off road	163	37	0	0	0	0	0	0	77	47	3	16	6	8	76	43
Do not plan on using off road	270	62	0	0	0	0	0	0	85	52	16	84	71	91	97	55
Don't know	6	1	0	0	0	0	0	0	2	1	0	0	1	1	4	2
<b>Total</b>	<b>439</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>164</b>	<b>100</b>	<b>18</b>	<b>100</b>	<b>78</b>	<b>100</b>	<b>177</b>	<b>100</b>

**Source:** ORCI for NREL (1998a), Study #707089, N=439.

**Q5.1.8:** How much would you plan on paying for a new vehicle?

**Table 5.1.8.** Expected Expenditure for a New Vehicle

Expected Expenditure for a New Vehicle	Total		Type of New Vehicle Most likely to Buy													
	n	%	Small Car		Midsized Car		Large Car		Pickup truck		Standard Van		Minivan		SUV	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%
\$5,000 or less	35	4	5	5	13	4	4	4	4	3	1	6	4	6	3	1
\$5,001–\$10,000	61	6	17	18	28	8	5	5	5	3	1	6	3	4	1	1
\$10,001–\$15,000	179	19	36	39	89	27	1	1	30	19	3	16	10	12	10	6
\$15,001–\$20,000	259	27	21	23	102	31	11	12	56	34	7	35	30	38	32	18
\$20,001–\$25,000	178	19	5	5	49	15	23	24	34	21	2	11	16	20	50	28
\$25,001–\$30,000	127	13	2	2	19	6	20	21	22	13	2	13	11	14	52	30
More than \$30,000	70	7	1	1	11	3	26	27	7	4	3	13	2	2	21	12
Don't know	50	5	7	7	23	7	4	4	5	3	0	0	3	4	8	4
<b>Total</b>	959	100	94	100	334	101	94	98	163	100	19	100	79	100	177	100
<b>Mean<sup>1</sup></b>	20,650		14,494		18,022		27,513		20,427		21,003		19,487		25,662	

**Source:** ORCI for NREL (1998a), Study #707089, N=959.

<sup>1</sup> In this report, calculation of means, medians and standard deviations are based on raw numbers. “Don’t know” responses are not part of the calculations.

**Q5.1.9:** If you were to buy a car, what is the major reason you prefer a car to a pickup truck, minivan, standard van, or sport utility vehicle? (open-ended)

**Table 5.1.9.** Major Reasons for Preferring a Car to Other Vehicle Types

Reasons	Total		Next Vehicle Purchase						Type of New Vehicle Most Likely to Buy											
	n	%	New		Used		Small Car		Midsized Car		Large Car		Pickup Truck		Standard Van		Mini van		SUV	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Features/styles/options (net)	376	72	180	74	157	70	68	73	238	71	70	75	0	0	0	0	0	0	0	0
Performance (subnet)	170	33	81	33	71	31	46	49	103	31	21	23	0	0	0	0	0	0	0	0
Size options/car smaller/larger	91	18	46	19	34	15	30	33	49	15	12	13	0	0	0	0	0	0	0	0
Easy to handle/ease of maneuverability	76	15	33	14	36	16	23	25	49	15	3	4	0	0	0	0	0	0	0	0
Smooth/quiet ride	22	4	8	3	11	5	1	1	14	4	7	7	0	0	0	0	0	0	0	0
Stronger horsepower/faster/better acceleration	10	2	5	2	4	2	3	4	6	2	1	1	0	0	0	0	0	0	0	0
Interior (subet)	140	27	66	27	62	28	13	14	88	26	39	42	0	0	0	0	0	0	0	0
Comfort	82	16	45	18	34	15	8	8	41	12	33	36	0	0	0	0	0	0	0	0
Roomier/capacity to hold more passengers	51	10	19	8	28	12	4	5	38	11	8	9			0	0	0	0	0	0
Easier to get into	23	4	7	3	11	5	1	1	19	6	3	3			0	0	0	0	0	0
Don't need/use features/styles/options offered on pickup truck/minivan/ standard van/sport utility vehicle	67	13	26	11	27	12	7	7	48	14	13	13			0	0	0	0	0	0

Reasons	Total		Next Vehicle Purchase						Type of New Vehicle Most Likely to Buy											
	n	%	New		Used		Small Car		Midsize Car		Large Car		Pickup Truck		Standard Van		Mini van		SUV	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Safety features/better safety record	30	6	17	7	12	5	2	2	14	4	14	14			0	0	0	0	0	0
Prefer car for other features/styles/options	43	8	26	11	13	6	8	8	26	7	8	10			0	0	0	0	0	0
Need a "family car"	29	6	11	4	17	7	3	3	22	7	4	4	0	0	0	0	0	0	0	0
Cost savings (net)	98	19	41	17	49	22	36	39	56	17	7	7	0	0	0	0	0	0	0	0
Better gas mileage/fuel efficiency	70	13	28	12	34	15	28	31	38	11	3	3	0	0	0	0	0	0	0	0
Lower sticker price	16	3	5	2	11	5	4	4	12	4	0	0	0	0	0	0	0	0	0	0
Less expensive to operate/ lower maintenance costs	20	3	9	3	10	4	6	7	8	2	4	5	0	0	0	0	0	0	0	0
Own a truck/minivan/standard van/sport utility vehicle	38	7	20	8	15	7	5	5	23	7	10	11	0	0	0	0	0	0	0	0
Prefer car/just don't like/want pickup truck/minivan/standard van/sport utility vehicle	31	6	14	6	14	6	2	2	22	7	7	8	0	0	0	0	0	0	0	0
Car is more convenient	15	3	5	2	7	3	5	5	8	2	2	2	0	0	0	0	0	0	0	0
More experience with driving a car	13	3	4	2	7	3	2	2	7	2	2	2	0	0	0	0	0	0	0	0
Other	14	3	6	2	6	3	5	5	6	2	3	3	0	0	0	0	0	0	0	0
Don't know/no reason	14	3	6	2	6	3	1	1	12	4	1	2	0	0	0	0	0	0	0	0

Source: ORCI for NREL (1998a), Study #707089, N=520



**Q5.1.10:** When you dispose of your current vehicle, how will you most likely replace it: buy a new vehicle, buy a used vehicle, lease a new vehicle, or lease a used vehicle?

**Table 5.1.10.** Current Vehicle Replacement Methods

<b>Method to Replace Vehicle</b>	<b>Number</b>	<b>Percent</b>
Any (net)	819	89
Buy (subnet)	773	84
Buy a new vehicle	422	46
Buy a used vehicle	351	38
Lease (subnet)	46	5
Lease a new vehicle	42	5
Lease a used vehicle	4	small base
Won't replace It	57	6
Receive a donated vehicle/gift/other/ don't know	45	4
<b>Total</b>	<b>921</b>	<b>99</b>

**Source:** ORCI for NREL (2000c), Study #709089, N=920

**Q5.1.11:** Will the next vehicle you purchase be new or used?

**Table 5.1.11.** Public Preference for Purchasing New or Used Vehicles

Type of Vehicle	Total		Type of New Vehicle Most likely to Buy													
	n	%	Small Car		Midsized Car		Large Car		Pickup truck		Standard Van		Minivan		SUV	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%
New vehicle	452	45	41	44	158	47	45	48	64	39	9	46	37	46	98	55
Used vehicle	456	46	43	46	147	44	35	38	92	56	10	54	39	50	68	39
Don't plan to purchase vehicle	49	5	6	6	19	6	9	10	3	2	0	0	2	3	1	1
Don't know	43	4	3	4	10	3	5	5	6	3	0	0	1	1	9	5
<b>Total</b>	<b>1,000</b>	<b>100</b>	<b>93</b>	<b>100</b>	<b>334</b>	<b>100</b>	<b>94</b>	<b>101</b>	<b>165</b>	<b>100</b>	<b>19</b>	<b>100</b>	<b>79</b>	<b>100</b>	<b>176</b>	<b>100</b>

**Source:** ORCI for NREL (1998a), Study #707089, N=1,000.

**Q5.1.12:** Assuming energy or environmental concerns cause new vehicle prices to increase, how much would new vehicle prices have to increase for you to decide to buy a used vehicle instead of a new vehicle? (open-ended)

**Table 5.1.12.** Public Perception of the Effect of New Vehicle Price Increases on Purchasing Decisions

<b>Amount Vehicle Prices Would Have to Increase Before Decision is Made to Buy a Used Vehicle Instead of a New Vehicle</b>	<b>Number</b>	<b>Percent</b>
\$500 or less	38	4
\$501–\$1,000	45	5
\$1,001–\$2,000	84	8
\$2,001–\$5,000	270	27
More than \$5,000	214	21
None	164	16
Don't Know	185	19
<b>Total</b>	<b>1,000</b>	<b>100</b>
<b>Mean<sup>1</sup></b> (including none)	<b>4,109</b>	
<b>Mean<sup>1</sup></b> (excluding none)	<b>5,142</b>	

**Source:** ORCI for NREL (1998a), Study #707089, N=1,000.

<sup>1</sup> In this report, calculation of means, medians and standard deviations are based on raw numbers. “Don’t know” responses are not part of the calculations.

## 5.2 VEHICLE OWNERS’ DECISIONS ABOUT MORE FUEL-EFFICIENT VEHICLES

Though one out of four Americans did not consider fuel economy an important issue when purchasing his/her current vehicle (Table 5.2.1), the ORCI surveys revealed that one out of two Americans is interested in having more information about the environmental impacts of new light vehicles (Table 5.2.2).

A relatively high percentage of the U.S. population who does not consider fuel economy an important issue is consistent with relatively low willingness to purchase a car with better fuel economy. When buying a new vehicle, slightly more than one in four Americans would most likely purchase a lighter car with average acceleration and better fuel economy rather than an average car, i.e., a car with average weight, average acceleration and average fuel economy (Table 5.2.3). However, respondents gave their highest preference to the lighter car with average acceleration and better fuel economy over four other choices.

Among the things that would motivate purchasing a more fuel-efficient vehicle, American adults mentioned cost, features and performance, and gas mileage (Table 5.2.4). With cost being a critical factor in motivating them to purchase a more fuel-efficient vehicle, on average, Americans say they would pay more than \$2,100 additional for a vehicle that gets 10 percent better fuel economy (Table 5.2.5).

Consistent with the finding that one out of two U.S. adults is interested in having more information on the environmental impacts of new light vehicles, the other ORCI survey found that slightly more than half of Americans would rather purchase a new vehicle with a more fuel-efficient ‘optional’ engine, given that fuel supply can be conveniently purchased. The survey defined an ‘optional’ engine as the engine requiring new fuel that costs the same as gasoline and is just as good as gasoline. According to the survey, the U.S. public would purchase the more fuel-efficient engine if fuel supply were available at one in three stations (Table 5.2.6).

Though Americans would make their decisions on purchasing or not purchasing more fuel-efficient vehicles based on cost, performance, and other considerations rather than on reports presenting proof of fuel efficiency, more than half of U.S. adults had some information or paid some attention to the information on fuel economy when purchasing their current vehicle. They reported finding this information on window stickers, in dealer brochures, magazines, and consumer guides. Though Americans were more likely to get information on fuel economy from sources other than the Government’s *Fuel Economy Guide*, more than one in five respondents mentioned seeing a copy of it. Most of them had seen it in a showroom (Table 5.2.7).

**Q5.2.1:** If fuel economy was a factor you considered in your last vehicle purchase, where did you find information on fuel economy?

**Table 5.2.1.** Location of Fuel Economy Data Used for Last Vehicle Purchase

Location of Fuel Economy Information	Number	Percent
Any (net)	561	56
Window sticker	222	22
Dealer brochures	116	12
Magazines, consumer guide	113	11
Word of mouth	50	5
On the Internet	39	4
Television	23	2
Government’s Fuel Economy Guide	6	1
Other	79	8
Fuel economy not an important issue	262	26
Don’t know/don’t own vehicle	177	18
Total	1,000	100

**Source:** ORCI for NREL (1999a), Study #70809, N=1,000.

**Q5.2.2:** On a scale of 1 to 5, where 1 is not interested and 5 is very interested, please indicate your interest in having more information about the environmental impacts of new cars and light trucks?

**Table 5.2.2.** Public Interest for Additional Information on the Environmental Impacts of New Light Vehicles

Level of Interest	Number	Percent
Very interested	230	23
Moderately interested	143	14
Somewhat interested	254	25
Little interested	92	9
Not interested	265	27
Don't know	16	2
<b>Total</b>	<b>1,000</b>	<b>100</b>

**Source:** ORCI for NREL (1999a), Study #70809, N=1,000.

**Q5.2.3:** Some of the things that are important in choosing a new car are power, acceleration time, and fuel economy. Let me tell you a little about the average car and then I will describe some options and ask you to choose the one you are most likely to purchase. I will read all the options first, then will summarize them and ask you to pick one.

The average car accelerates from 0 to 60 miles per hour in about 10.5 seconds and achieves an EPA fuel economy rating of 27.3 miles per gallon. Your options are:

1. The average car.
2. A car that is 10 percent **lighter** with the **same acceleration** performance but a 2 miles per gallon **better fuel economy**, saving about \$4 per month in fuel.
3. A car that is 10 percent **lighter** with the **same fuel economy** but 1.5 seconds **quicker acceleration** time.
4. A car that is 10 percent **heavier** with the **same fuel economy** but about 1.5 seconds **slower acceleration** time.
5. A car that is 10 percent **heavier** with the **same acceleration** performance but a 2 miles per gallon **lower fuel economy**, costing about \$4 more per month in fuel.

Which of these would you most likely purchase?

**Table 5.2.3.** Public Preference Toward Purchase of Cars with Different Weight, Acceleration and Fuel Economy Parameters

<b>Car</b>	<b>Number</b>	<b>Percent</b>
The average car	55	15
The lighter car with average acceleration and better fuel economy	102	27
The lighter car with average fuel economy and quicker acceleration	63	17
The heavier car with average fuel economy and slower acceleration	76	20
The heavier car with average acceleration and lower fuel economy	59	16
Don't know	18	5
<b>Total</b>	<b>373</b>	<b>100</b>

**Source:** ORCI for NREL (1999b), Study #70844, N=373

**Q5.2.4:** For your next vehicle purchase, what would motivate you to purchase a more fuel-efficient vehicle? (open-ended)

**Table 5.2.4.** Public Perception of Motivation Required to Purchase a More Fuel Efficient Vehicle

Motivation for Purchase of a More Fuel-Efficient Vehicle	Total		Type of New Vehicle Most Likely to Buy													
	n	%	Small Car		Midsized Car		Large Car		Pickup Truck		Standard Van		Minivan		SUV	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%
Cost/savings (net)	428	45	40	43	143	43	42	45	71	43	10	52	31	39	91	52
Sticker price of vehicle	159	17	7	7	55	16	17	18	24	15	4	20	15	19	37	21
Lower cost/saves money (general mentions)	130	14	19	20	43	13	11	12	22	13	4	21	11	14	20	11
Lower cost of fuel	121	13	13	14	40	12	13	14	21	13	2	10	3	4	29	16
Operating/maintenance costs	25	3	1	1	7	2	3	3	6	4	0	0	3	4	4	2
All other cost mentions	18	1	3	4	5	1	3	3	1	1	0	0	1	1	5	2
Features/performance (net)	219	23	2	24	77	23	21	22	41	25	4	21	15	19	38	21
Acceptable emissions control/less pollution	104	11	9	10	37	11	13	14	20	12	0	0	7	8	18	10
Horsepower/speed	33	3	1	1	8	2	3	3	13	8	0	0	3	4	5	3
Other features/styles/options offered	99	11	16	16	41	14	7	7	14	9	5	26	8	10	17	11
Gas mileage/fuel efficiency	167	17	16	17	61	18	16	17	33	20	1	7	16	21	24	14
Fuel Availability of type of fuel needed	46	5	2	2	13	4	5	5	6	4	1	5	5	6	13	8
Other	105	10	14	15	36	10	12	12	20	13	1	4	10	11	15	8
Nothing/not interested	74	8	6	6	27	8	8	8	15	9	2	13	5	6	11	6
Don't know	87	9	8	9	28	9	9	9	13	8	3	14	10	12	16	9

Source: ORCI for NREL (1998a), Study #707089, N=961

**Q5.2.5:** How much **more** would you be willing to pay for the vehicle that gets ten percent better fuel economy than for the vehicle you currently drive? (open-ended)

**Table 5.2.5.** Additional Amount the Public is Willing to Pay for a Vehicle with a 10 Percent Increase in Fuel Economy

<b>Dollar Amount</b>	<b>Number</b>	<b>Percent</b>
Less than \$500	13	7
\$500–\$1,000	27	15
\$1,001–\$2,500	31	17
\$2,501–\$5,000	26	15
More than \$5,000	10	5
None	33	18
Don't know	41	23
<b>Total</b>	181	100
<b>Mean<sup>1</sup></b> (including none)	2,143	
<b>Mean<sup>1</sup></b> (excluding none)	2,799	

**Source:** ORCI for NREL (2001b), Study #710449, N=180.

<sup>1</sup> In this report, calculation of means, medians and standard deviations are based on raw numbers. “Don't know” responses are not part of the calculations.

**Q5.2.6:** Suppose you have decided to buy a new vehicle and have a choice of an optional engine that requires a new fuel that costs the same as gasoline and is just as good as gasoline.

**Version A:** The optional engine costs the same as the conventional one but gets 50 percent more miles per gallon. However, the fuel it requires is sold only at 1 in 10 stations. Which would you most likely buy?

**Version B:** The optional engine costs the same as the conventional one but gets 50 percent more miles per gallon. However, the fuel it requires is sold only at 1 in 5 stations. Which would you most likely buy?

**Version C:** The optional engine costs the same as the conventional one but gets 50 percent more miles per gallon. However, the fuel it requires is sold only at 1 in 3 stations. Which would you most likely buy?



**Table 5.2.6.** Public Preference Toward Purchasing a More Fuel-Efficient Engine with Different Fuel Availability Options

Fuel Availability Options	The Conventional Engine		The Optional Engine		Don't Know/Refused	
	n	%	n	%	n	%
The optional engine costs the same as the conventional one, but gets 50% more miles per gallon. However, the fuel it requires is sold only at 1 in 10 stations.	74	66	33	30	4	4
The optional engine costs the same as the conventional one, but gets 50% more miles per gallon. However, the fuel it requires is sold only at 1 in 5 stations.	69	62	40	36	3	3
The optional engine costs the same as the conventional one, but gets 50% more miles per gallon. However, the fuel it requires is sold only at 1 in 3 stations.	48	43	59	53	4	4

**Source:** ORCI for NREL (2000d), Study #70920, N=111.

**Q5.2.7:** Have you ever seen a copy of the Government's *Fuel Economy Guide* in the showroom, on the Internet, or anywhere else?

**Table 5.2.7.** Site of Review of the Government's *Fuel Economy Guide*

Place	Number	Percent
Any (net)	222	22
In a showroom	163	16
On the Internet	24	2
Anywhere else	64	6
Don't know/none of these	778	78
<b>Total</b>	<b>1,000</b>	<b>100</b>

**Source:** ORCI for NREL (1999a), Study #70809, N=1,000.

## 5.3 VEHICLE OWNERS' DECISIONS ABOUT ADVANCED TECHNOLOGY VEHICLES

### Hybrid Electric Vehicles

Currently two hybrid electric vehicles are available in the United States: the Toyota Prius, roughly the size of a Corolla, and the Honda Insight, a two-seat vehicle about the size of a Civic. The Insight has Environmental Protection Agency ratings of 61 and 68 miles per gallon in city and highway driving, respectively. The Prius is rated at 52 miles per gallon in the city and 45 on the highway. Both cars can achieve speeds of more than 100 miles per hour (*The Washington Post*, 2001).

According to surveys, American drivers are aware of hybrid electric vehicles (Tables 5.3.1, 5.3.2). But, a majority of them could not name or did not know any of the hybrid electric vehicles (Tables 5.3.3, 5.3.4). In addition, when given a choice between a conventional vehicle and a hybrid vehicle that has the same total range on a single tank of fuel and battery charge, but can travel 50 percent more miles on a gallon of fuel than a conventional vehicle, more Americans would purchase the conventional vehicle than the hybrid one (Table 5.3.5).

Surveys reveal that U.S. drivers tend to have heard more about a Toyota hybrid than about a Honda one (Table 5.3.1). Nonetheless, when asked to provide specific names of hybrid electric vehicles, U.S. drivers tend to mention the name of Honda more frequently than the name of Toyota (Tables 5.3.3, 5.3.4).

According to Honda, buyers of hybrid electric vehicles tend to be technology enthusiasts who want to be the first in their neighborhood to get the car. They are also more likely to be environmentalists who want cars that conserve gasoline and pollute less. In addition, they tend to be young people who just think it is a fun car. Toyota's profile of a Prius buyer is different. Seventy-one percent of Prius buyers are men. Buyers have an average age of 53, a college education and a median income of \$85,900 a year (*The Washington Post*, 2001).

**Q5.3.1:** There are some cars in the U.S. market today that have advanced hybrid-electric powertrains that combine a small electric motor and a small gasoline engine to achieve a higher fuel economy than similar cars. How much have you heard about this technology: a great deal, some, very little, or nothing?

**Table 5.3.1.** Amount of Information Heard Pertaining to Advanced Hybrid-Electric Powertrains

	August 3, 2000	November 6, 2001
A Great Deal	13%	10%
Some	33%	33%
Very Little	34%	30%
Nothing	20%	26%
Don't Know	0%	2%

**Q5.3.2:** Please name one of these hybrid-electric cars if you can. (open-ended)

**Table 5.3.2.** Names of Advanced Hybrid-Electric Vehicles Known by the Public

	August 3, 2000	November 6, 2001
Any	36%	44%
Honda	15%	24%
Insight	1%	2%
Toyota	4%	11%
Prius	1%	2%
Other	14%	6%
Don't Know	64%	56%

### Diesel Vehicles

In 1997, one in five U.S. drivers would consider buying a diesel engine that got 40 percent better fuel economy and cost \$1,500 additional (Table 5.3.6). In 1998, on average, Americans said they would be willing to pay \$837 extra for a diesel engine that gets 30 miles per gallon compared to a gasoline engine that gets 20 miles per gallon<sup>3</sup> (Table 5.3.7). In 2001, slightly more than one in four drivers would rather purchase a new diesel vehicle that gets 40 percent more miles per gallon but costs additional \$2,000 than a gasoline one<sup>3</sup> (Table 5.3.8).

When asked about reasons for choosing a diesel over a gasoline vehicle, almost one in two U.S. adults mentioned fuel economy and the advantage of getting 40 percent more miles per gallon, in particular (Table 5.3.9). Those who preferred a gasoline to a diesel vehicle referred to environmental concerns, such as diesel engines being loud or noisy and having an odor or smell. A few American drivers mentioned engine problems including difficult starting in winter and slow acceleration as a reason for rejecting the diesel vehicle. Some reported negative experiences with diesel (Table 5.3.10).

<sup>3</sup> Gasoline and diesel engines were defined as equally clean, dependable, powerful, odorless, and smooth running.

**Q5.3.3:** Would you consider buying a diesel engine version that got 40 percent better fuel economy and costs an additional \$1,500?

**Table 5.3.3.** Public's Willingness to Consider the Purchase of a Diesel Engine With a 40 Percent Increase in Fuel Economy and Additional Costs of \$1,500

<b>Considerations of Diesel Engine Options</b>	<b>Percent</b>
Would consider buying a diesel engine version that got 40% better fuel economy and costs an additional \$1,500.	21
Would not consider buying a diesel engine version that got 40% better fuel economy and costs an additional \$1,500.	75
Don't know	4
<b>Total</b>	<b>100</b>

**Source:** ORCI for NREL (1997, Study #70627), N=1010

**Q5.3.4:** If you had a choice between two engines for your next vehicle, both engines equally clean, powerful, odorless, and smooth running, one using gasoline and getting 20 miles per gallon, and one using diesel fuel and getting 30 miles per gallon, how much **extra** would you be willing to pay for the diesel one? (open-ended)

**Table 5.3.4.** Additional Amount the Public is Willing to Pay for a Diesel Engine Getting 30 Miles per Gallon Compared to a Gasoline Engine Getting 20 Miles per Gallon

Dollar Amount	Total		Type of New Vehicle Most Likely to Buy													
	n	%	Small Car		Midsized Car		Large Car		Pickup Truck		Standard Van		Minivan		SUV	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%
\$500 or less	63	7	9	10	16	5	3	3	15	9	1	4	9	12	11	6
\$501–\$1,000	79	8	11	12	24	7	2	3	18	11	1	6	10	13	11	6
\$1,001–\$2,000	81	8	7	7	29	9	9	10	12	7	1	6	7	8	16	9
\$2,001–\$5,000	71	7	5	6	16	5	9	9	22	14	1	6	3	3	16	9
More than \$5,000	20	2	1	2	8	2	0	0	4	3	0	0	1	2	5	3
None	533	55	48	51	197	59	59	62	76	47	14	73	41	52	96	54
Don't know	114	12	11	12	43	13	12	13	16	10	1	5	8	10	22	13
<b>Mean<sup>1</sup></b> (including none)	837		723		730		707		1,116		507		692		1,106	
<b>Mean<sup>1</sup></b> (excluding none)	2,255		1,740		2,273		2,507		2,299		2,264		1,635		2,688	

**Source:** ORCI for NREL (1998a), Study #707089, N=961.

<sup>1</sup> In this report, calculation of means, medians and standard deviations are based on raw numbers. “Don’t know” responses are not part of the calculations.

**Q5.3.5:** Assume that a new vehicle you want to buy has two engine options that are equally clean, dependable, powerful, odorless, and smooth running. One uses gasoline and the other uses diesel fuel and gets 40 percent more miles per gallon but costs \$2,000 more. Which engine option would you buy?

**Table 5.3.5.** Purchase Preference Between Diesel and Gasoline Vehicles by Vehicle Type

Vehicles	Vehicle Type												Don't Know Which Type of Vehicle to Buy	
	Total		Small Car		Large Car		Minivan		SUV		Pickup/Van			
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Gasoline	703	71	178	75	186	81	73	71	126	62	124	65	15	60
Diesel	266	27	50	21	41	18	28	27	75	37	65	34	7	28
Don't know	20	2	9	4	3	1	2	2	2	1	1	1	3	12
<b>Total</b>	<b>989</b>	<b>100</b>	<b>237</b>	<b>100</b>	<b>230</b>	<b>100</b>	<b>103</b>	<b>100</b>	<b>203</b>	<b>100</b>	<b>190</b>	<b>100</b>	<b>25</b>	<b>100</b>

Source: ORCI for NREL (2001c), Study #710288, N=989.

If chose diesel, ask:

**Q5.3.6:** Why did you choose the diesel option? (open-ended)

**Table 5.3.6.** Reasons for Choosing a Diesel Option

Reasons	Total	
	n	%
Fuel economy (net)	121	46
Better gas mileage/fuel economy	100	38
40% better mileage/miles per gallon	22	8
Cost (net)	90	34
Saves money/pays for itself over time/in the long run	45	17
Less expensive/cheaper than gasoline	32	12
Economy/economical	18	7
Dependability (net)	33	12
Diesel engine lasts longer	19	7
Diesel engine more reliable/dependable	18	7
Environmental (net)	26	10
Cleaner/burns cleaner	18	7
All other environmental mentions	9	3
I have/drive vehicle with diesel engine	11	4
More power/horsepower	8	3
Previous positive experience/satisfied with diesel	7	3
Other /don't know	26	10

**Source:** ORCI for NREL (2001c), Study #710288, N=266.

If did not choose diesel, ask:

**Q5.3.7:** Why did you reject the diesel option? (open-ended)

**Table 5.3.7.** Reasons for Rejecting a Diesel Option

Reasons	Total	
	n	%
Environmental (net)	282	39
Loud/noisy/too much noise	140	19
Odor/smell/stink	119	16
Pollutes the air	32	4
All other environmental mentions	53	8
Cost (net)	135	19
Cost /expense (unspecified)	71	10
The initial cost /\$2000 more	34	5
All other cost mentions	37	5
Lack of fuel availability	123	17
Don't know enough/know nothing about it/never owned one	78	11
Engine problems (net)	57	8
Difficult to start in winter	37	5
All other engine problems mentions	21	3
Just don't like diesel/husband doesn't like diesel	48	7
Prefer/used to/satisfied with gasoline	34	5
Negative experience	28	4
Previous negative experience and Heard of others' bad experiences		
Difficult to maintain/repair	22	3
Other	28	4
Don't know	28	4

**Source:** ORCI for NREL (2001c), Study #710288, N=723.



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