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RESULTS OF THE 2008/2009 KNOWLEDGE AND OPINIONS SURVEYS CONDUCTED FOR THE U.S. DEPARTMENT OF ENERGY HYDROGEN PROGRAM

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ACRONYMS

AAPOR	American Association for Public Opinion Research
BTS	Bureau of Transportation Statistics
CASRO	Council of American Survey Research Organizations
CATI	Computer assisted telephone interview
CD	Compact disk
D&B	Dun & Bradstreet
DEP	Department of Environmental Protection
DOE	Department of Energy
DOT	Department of Transportation
FCT	Fuel Cell Technologies
HFCIT	Hydrogen, Fuel Cells, and Infrastructure Technologies
IAFC	International Association of State Fire Chiefs
ICC	International Code Council
ID	Identification
OMB	Office of Management and Budget
ORC	Opinion Research Corporation
ORNL	Oak Ridge National Laboratory
NAICS	North American Industry Classifications System
NASFM	National Association of State Fire Marshalls
NFPA	National Fire Protection Association
RDD	Random digit dialing
SAS	Statistical Analysis System
SEO	State Energy Office
URL	Uniform Resource Locator

EXECUTIVE SUMMARY

Background. The U.S. Department of Energy (DOE) Fuel Cell Technologies Program (FCT)[1] conducts comprehensive efforts to enable the widespread commercialization of fuel cells in diverse sectors of the economy—with emphasis on applications that will most effectively strengthen our nation's energy security and improve our stewardship of the environment.

Expanding the use of fuel cells requires a sustained education effort to lay the foundation for future commercial market introduction. The FCT education subprogram seeks to facilitate fuel cell demonstrations and support future commercialization by providing technically accurate and objective information to key target audiences both directly and indirectly involved in the use of fuel cells today. These key target audiences include a public that is familiar and comfortable with using a new fuel, state and local government officials who understand the near-term realities and long-term potential of the technology, an educated business and industry component, and trained safety and codes officials. With this in mind, the DOE FCT program established an education key activity to address the training and informational needs of target audiences that have a role in the near-term transition and the long-term development of a hydrogen economy.

Whether or not changes can be attributed to the program, designing and maintaining an effective education program entails measuring baseline awareness and periodically measuring what has been learned. The purpose of this report is to document the data and results of statistical surveys undertaken in 2008 and 2009 to measure and establish changes in understanding and awareness about hydrogen and fuel cell technologies since a baseline survey was conducted in 2004. This report is essentially a data book, a digest of the survey data and an exposition of changes in knowledge of and opinions about hydrogen and fuel cell technology since 2004. Many conclusions can be made from the survey data. However, the purpose here is not to draw the conclusions, but rather to summarize the data in a way that facilitates drawing them. It is envisioned that the same statistical surveys will be fielded again in approximately three years

Methods. Scientific sampling was used to survey five populations: (1) the general public, ages 18 and over; (2) students, ages 12-17; (3) state and local government officials from state departments of transportation and environmental protection, state energy offices, and functionally similar personnel from cities and counties; (4) potential hydrogen end users in three business categories: transportation, businesses requiring uninterrupted power supplies, and industries with large power requirements; and (5) safety and codes officials in four organizations: International Association of State Fire Chiefs (IAFC), International Code Council (ICC), National Association of State Fire Marshalls (NASFM), and National Fire Protection Association (NFPA).[2] The surveys were designed to obtain 1,000 sample responses from each of the general public and student categories, and to sample 246 state and local officials, 600 large-scale end users, and 200 safety and codes officials.

The survey questions were designed to accomplish specific objectives. Technical questions were posed to measure technical understanding and awareness of hydrogen technology. Opinion

[1] Previously the Hydrogen, Fuel Cells, and Infrastructure Technologies Program.
[2] In 2004, the population of safety and codes officials was not surveyed.

questions measured attitudes about the relative importance of safety, cost, the environment, performance, and convenience for a vehicle fuel or power supply for a home or business. Questions were posed to assess visions about the likelihood of various future applications of hydrogen technology. For most of the questions, "I don't know" or "I have no opinion" were perfectly acceptable answers. Questions about information sources (teachers, friends, government, etc.) and media (radio, Internet, magazines, etc.) were posed to assess how energy technology information is received.

At various stages in their development the survey questionnaires were reviewed by National Hydrogen Association and U.S. Fuel Cell Council personnel and by management at the DOE FCT office. *Federal Register* notices were published, and Office of Management and Budget approval to conduct the surveys was obtained, per the Paperwork Reduction Act of 1995.

The general public and student survey samples were selected by random digit dialing. Potential large-scale end users were selected by random sampling. Surveys of state and local government officials and safety and codes officials were of their entire target populations (i.e., except for nonresponse, they are complete samples). All five surveys were administered by computer-assisted telephone interviewing (CATI). The general public and student surveys were administered in either English or Spanish, at the option of the respondents. For all populations except the safety and codes officials, the length of the survey was less than 15 minutes, including the introduction, screening process, and general information and demographic questions. The average interview length of safety and codes officials was 17 minutes.

Limitations. The biggest data quality limitation of the hydrogen survey data is nonresponse bias. Table ES.1 shows 2004 and 2008/2009 response rates (percentages) by survey component population. Response rates were for the most part very slightly lower for the 2008/2009 surveys. This is consistent with trends toward cell-phone-only households and increasing use of caller ID.

Table ES.1. Response Rates by Population, 2004 and 2008/2009 Surveys

Population	2004	2008/2009
General public	24.8%	23.0%
Students	27.5%	29.5%
Government agencies	95.9%	89.4%
End Users	29.1%	17.0%
Safety and codes officials	NA*	77.2%
* In 2004, the population of safety and codes officials was not surveyed.		

We are willing to accept nonresponse bias because we believe that it is not severe enough to invalidate the survey and because all reasonable measures were taken to minimize it (careful and aggressive callbacks, adjustments to sampling weights). We also expect that changes in response rates will not obscure measurements of changes in knowledge of, awareness of, and attitudes toward hydrogen. An issue involving telephone surveys is the possibility of undercoverage because of cell-phone-only households. While sampling weights provide a partial correction, it was not feasible to fully address the cell-phone-only issue in the 2008/2009 hydrogen surveys.
Results. The data analysis focuses on the main data endpoints and survey objectives. Answers to the technical questions are compiled into technical knowledge scores. Opinions about safety

are summarized as proportions of target population individuals responding in the various possible ways. Preference rankings are summarized as mean ranks. Relationships between endpoints such as technology acceptance and technical awareness are tested with chi-square tests. The likelihood of future use of hydrogen and fuel cell technologies, sources of energy information, interest in training are summarized as class proportions. Changes in the 2008/2009 results relative to the 2004 baseline are estimated (when applicable). The following questions were addressed in comparisons with the baseline:

- For each population group, how have the average numbers of correct, incorrect, and don't know responses to the technical questions changed?
- For each population group, have opinions about the safety of hydrogen and fuel cell technologies changed? If so, how? Is the change statistically significant?
- Have there been changes in the media sources used by respondents to obtain energy information?
- How have respondent concepts of time frames for implementing hydrogen technologies changed? (state and local government agencies and end user populations only)
- Have response rates for the surveys changed?

The data analysis incorporates necessary adjustments for the sampling design (sampling probabilities and stratification) and sampling weights, which are used to adjust for a priori unequal sampling probabilities as well as nonresponse. Otherwise the data analysis mostly involves straightforward estimation of proportions of the respondents providing various answers to the questions. However, sample-weight-adjusted contingency table chi-square tests were also computed to further identify differences between demographic groups.

Several of the more significant results of the 2008/2009 hydrogen knowledge and opinions survey are as follows:

- The average technical knowledge scores for each of the populations surveyed in both 2004 and 2008/2009 increased slightly, although, except for students, the increases were not statistically significant. For students, the average technical score increased 4.5 percentage points, a difference that is statistically significant ($p<0.0001$)[3]. As in the 2004 survey, state and local government officials had the highest average score on the technical knowledge questions (Table ES.2).

- When choosing a vehicle fuel or power source, the general public, on average, consider the following in decreasing order of importance: cost, safety, environmental impact, performance, convenience. State and local officials had exactly the same preferences. Safety and codes officials had the same preferences also with the exception that environmental impact was ranked as least important. (Preference ranking questions were not asked of end users or students.)

[3] Significance levels (p) are expressed in this report either as "p=value," or, for values less than 0.0001, "p<0.0001."

Table ES.2. Average Technical Scores by Population for the 2004 and 2008/2009 Surveys					
Population	Sample size		Average technical score (% correct)		Score difference (percentage points)
	2004	2008-09	2004	2008-09	
General public	889	1,000	35.2	35.2	+0.0
Students	1,000	1,004	35.3	39.8	+4.5
Government agencies	236	220	66.6	66.6	+0.1
End users	99	601	46.3	47.9	+1.6
Safety and codes officials	NA	193	NA	51.5	NA

- For the general public, students, and end users, hydrogen technology acceptance is strongly associated with hydrogen technical awareness (chi-square test; p <.0001). This relationship, which was evident in both the 2004 and 2008/2009 surveys, is shown in Figure ES.1 for the general public. For state and local government officials and safety and codes officials, this relationship was not statistically significant.

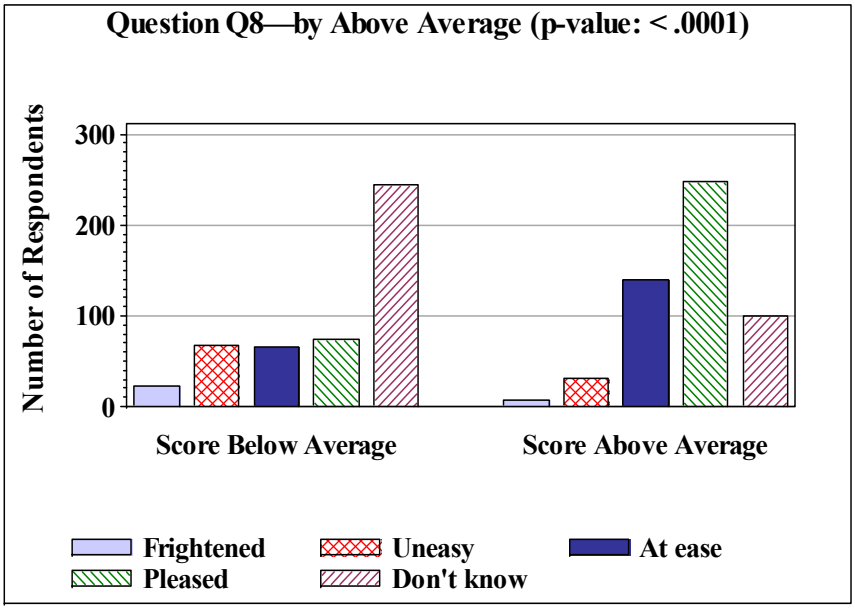

Figure ES.1. Responses by technical score above/below average to Question 8, "How would you feel if your local gas station also sold hydrogen," general public survey.

- Despite having only small increases in average technical scores, all four populations surveyed in both 2004 and 2008/2009 expressed greater confidence in the safety of hydrogen technologies in 2008/2009 than in 2004. Figure ES.2 shows that in 2008 fewer students indicated that they would be "Frightened" or "Uneasy" with the availability of hydrogen at a local gas station and that more students indicated that they would be "At ease" or "Pleased." Similar trends are evident for the general public, state and local officials, and end users. For state and local government officials and end users, the proportions of respondents who indicated they would be "Pleased" if hydrogen were available at their local gas station increased by over 15 percentage points.

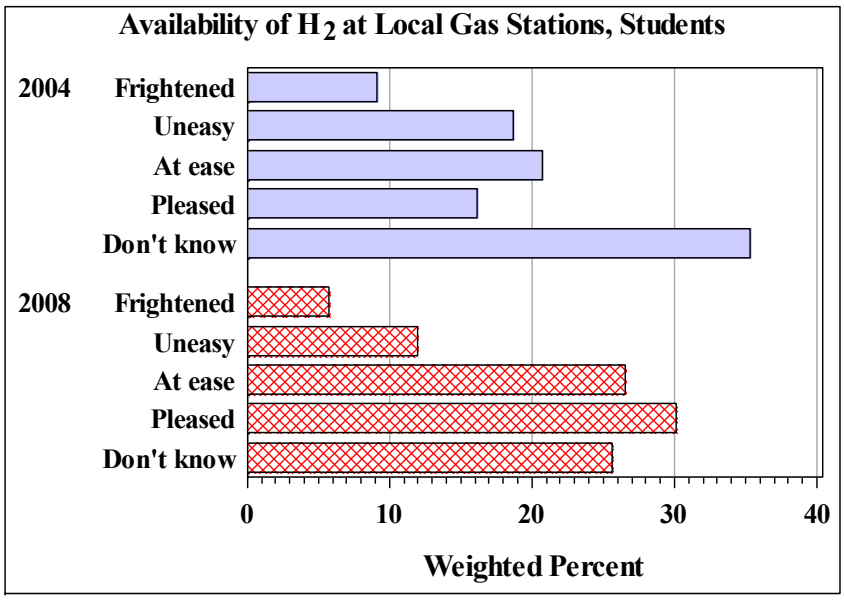

Figure ES.2. Comparison of results of the 2004 and 2008/2009 surveys regarding opinions about the availability of hydrogen at a local gas station, Question 8, student survey.

- All five survey groups agreed that the use of hydrogen as a vehicle fuel would reduce U.S. dependence on foreign oil and would reduce emissions and improve air quality (Figure ES.3)

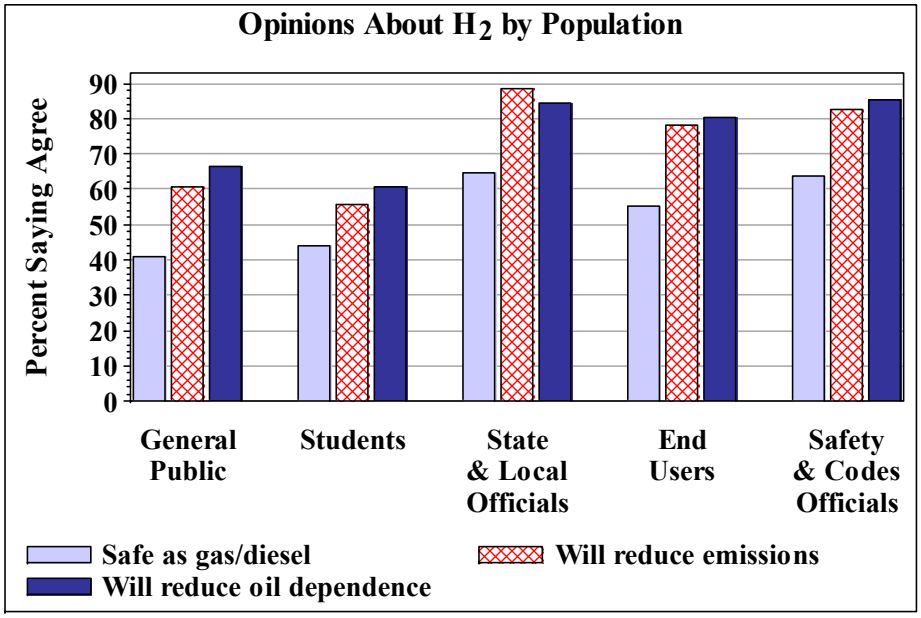

Figure ES.3. The percentage of respondents in each population who agreed with statements about the advantages and safety of hydrogen as a vehicle fuel, 2008/2009 surveys.

- Over 60% of the government officials, over 60% of the safety and codes officials, and over 50% of end user respondents believe that hydrogen is as safe as gasoline or diesel fuel. Corresponding percentages for the general public and students, though lower, have increased since 2004. In all five populations, greater proportions feel that hydrogen is not too dangerous for everyday use by the general public (Figure ES.4).

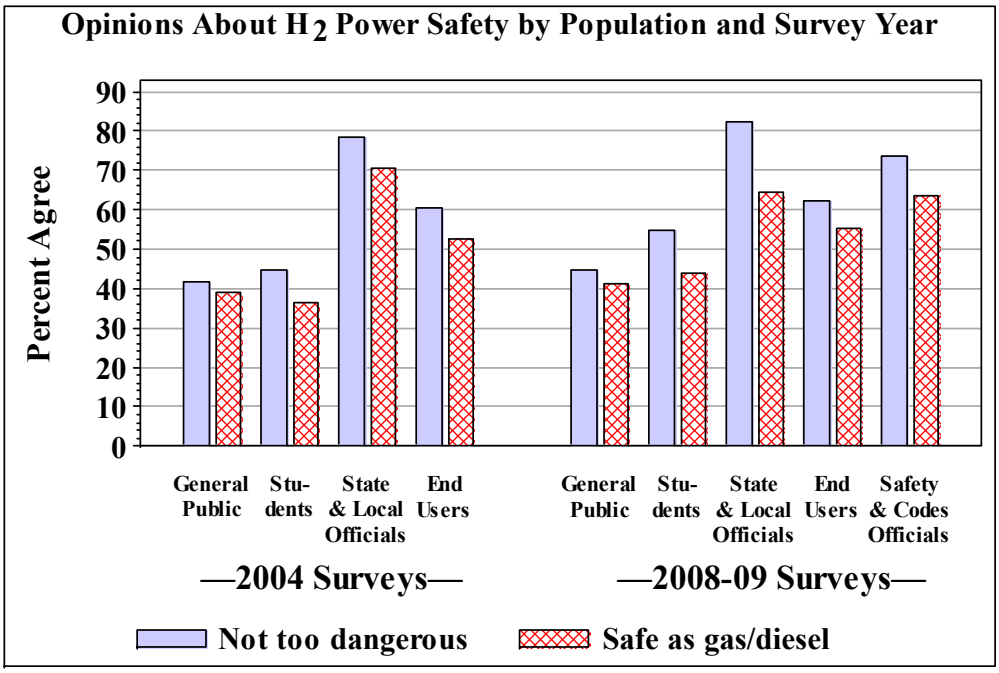

Figure ES.4. Percentages of negative responses to "Hydrogen is too dangerous for everyday use by the general public" and positive responses to "Hydrogen is as safe to use in my car as gasoline and diesel fuels."

- About 21% of the state and local agencies surveyed in 2008 have plans to use hydrogen and fuel cell technologies within the next five years (Figure ES.5). This is essentially the same as in 2004.

- When asked about implementing hydrogen and fuel cell technologies to meet their organizations' energy needs, almost half (48.8%) of end users stated their position as "wait and see how the market develops," and 30% stated their position as "considering it but need more information." State and local government officials expressed similar opinions.

- According to the 2008/2009 surveys, the Internet is an important source for obtaining energy information for state and local officials, end users, and safety and codes officials; television is the primary source of energy information for the general public and students (Figure ES.6). These results are very similar to findings in 2004.

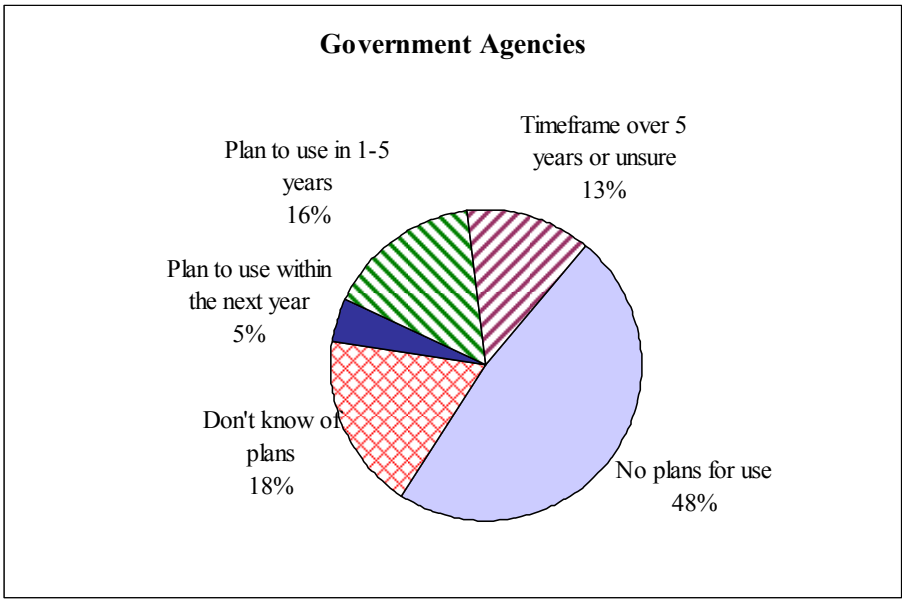

Figure ES.5. Responses to Questions 24-25 concerning plans to use hydrogen and fuel cell technologies, state and local government survey.

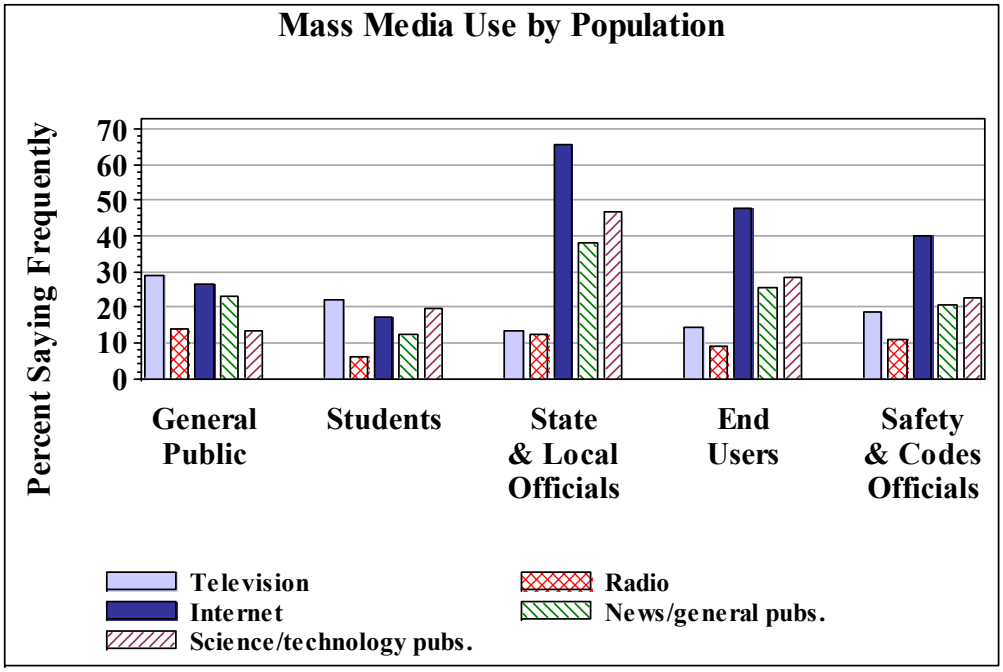

Figure ES.6. The use of mass media for obtaining energy information, by population group, 2008/2009 surveys.

- When asked about training, 69% of state and local agency officials, 71% of end users, and 78% of safety and codes officials said they would like to participate in a class on hydrogen or fuel cell technologies.

- State and local officials were most likely to rate themselves as either "Familiar" or "Very familiar" with hydrogen and fuel cell technologies, followed by safety and codes officials (41.8% for state and local officials; 22.8% for by safety and codes officials. See Figure ES.7).

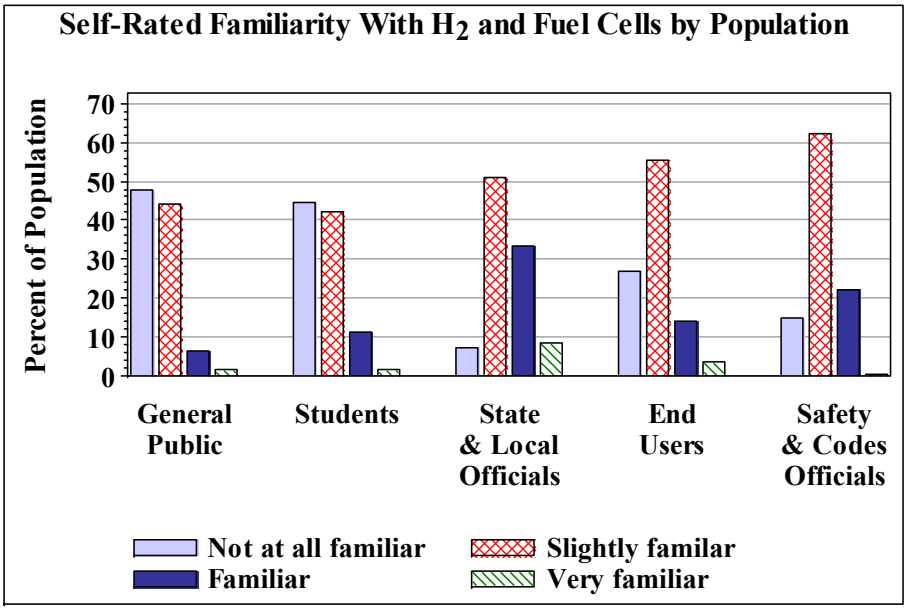

Figure ES.7. The self-rated levels of familiarity with hydrogen and fuel cell technologies for each of the five population groups, 2008/2009 surveys.

- Statistically significance differences between genders were observed in responses to several of the opinion questions about safety and technology acceptance, in the general public, student, and end user populations. Males tended to be more positive, whereas females were more likely to respond that they don't know. For example, Figure ES.8 shows differences between the sexes in responses (agree/disagree/are neutral/don't know) to the statement "Hydrogen is as safe to use in my car as gasoline and diesel fuels."

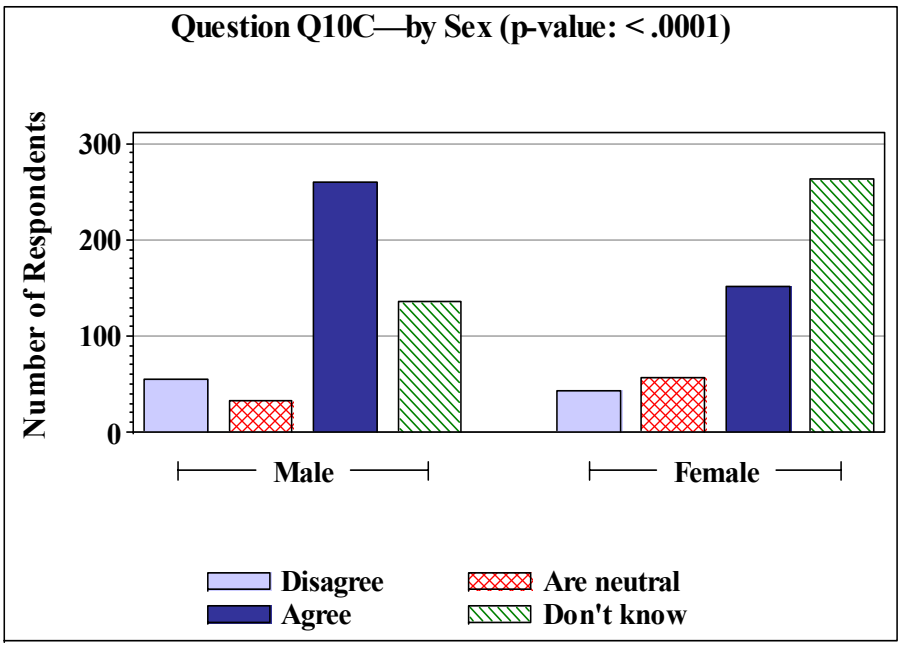

Figure ES.8. Responses by gender to Question 10C, "Hydrogen is as safe to use in my car as gasoline and diesel fuels," general public survey.

In summary, when the 2008/2009 findings are compared with the 2004 survey results, the following conclusions are evident:

- For each population group surveyed in both 2004 and 2009/2009, average technical knowledge scores increased slightly, but, except for student, not significantly. For students the average score increased 4.5 percentage points, a statistically significant change ($p<0.0001$).
- Opinions about the safety of hydrogen and fuel cell technologies have become more positive, and respondents expressed greater confidence in the safety of hydrogen technologies in 2008/2009 than in 2004.
- Statistically significance differences between genders were observed in responses to several of the questions about safety and technology acceptance, in the general public, student, and end user populations.
- There have been no statistically significant changes in the media sources used by respondents to obtain energy information.
- No statistically significant changes since 2004 were observed in respondent concepts (state and local government agencies and end user populations only) of time frames for implementing hydrogen technologies.
- Response rates were slightly lower in 2008/2009 than they were in 2004 for all except the student population.

1. INTRODUCTION

The U.S. Department of Energy (DOE) Fuel Cell Technologies Program (FCT)[4] conducts comprehensive efforts to overcome the technological, economic, and institutional obstacles to the widespread commercialization of fuel cells and related technologies. The program works with partners in industry, academia, non-profit institutions, and the national labs, and coordinates closely with other programs in four DOE offices – Energy Efficiency and Renewable Energy, Science, Fossil Energy, and Nuclear Energy. The mission of the program is to enable the widespread commercialization of fuel cells in diverse sectors of the economy – with emphasis on applications that will most effectively strengthen our nation's energy security and improve our stewardship of the environment.

Expanding the use of fuel cells requires a sustained education effort to lay the foundation for future commercial market introduction. The FCT education subprogram seeks to facilitate fuel cell demonstrations and support future commercialization by providing technically accurate and objective information to key target audiences both directly and indirectly involved in the use of fuel cells today.

1.1. BACKGROUND AND THE 2004 BASELINE ASSESSMENT

For DOE's hydrogen education program to be effective, it needs a well-defined starting point – a characterization, at a particular point in time, of knowledge and opinions about hydrogen and fuel cell technology and safety. Thus, in the early stages of developing the education program, a literature review was conducted to attempt to characterize this knowledge level.[5, 6] The literature review concluded, however, that very few scientific surveys had been conducted to ascertain knowledge levels about hydrogen.

In response to the above finding, statistically designed surveys of four different populations in the United States – the general public, students, state and local government agencies, and potential end users – were conducted in 2004 to measure the level of awareness and understanding of hydrogen and fuel cell technologies.[7] The results of these surveys provided a baseline that described the level of knowledge and opinions about hydrogen and fuel cells in 2004. An analysis of the results was documented in a technical report,[8] and plans were made to use the baseline for comparison with future knowledge and opinions surveys.

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[4] Previously the Hydrogen, Fuel Cells, and Infrastructure Technologies Program.

[5] Truett, Tykey, *Literature Review for the Baseline Knowledge Assessment of the Hydrogen, Fuel Cells, and Infrastructure Technologies Program,* ORNL/TM-2003/258, http://cta.ornl.gov/cta/Publications/Reports/ORNL_TM_2003_258.pdf, October 2003.

[6] The literature review was updated during 2008; the current citation is Truett, Tykey, Rick Schmoyer, and Christy Cooper, *Compendium: Surveys Evaluating Knowledge and Opinions of Hydrogen and Fuel Cell Technologies,* ORNL/TM-2008/151, http://www-cta.ornl.gov/cta/Publications/Reports/ORNL_TM_2008_151.pdf, October 2008.

[7] Approval to conduct the surveys was obtained from the Office of Management and Budget (OMB).

[8] Schmoyer, R. L., Tykey Truett, and Christy Cooper, *Results of the 2004 Knowledge and Opinions Surveys for the Baseline Knowledge Assessment of the U.S. Department of Energy Hydrogen Program,* ORNL/TM-2006/417, http://cta.ornl.gov/cta/Publications/Reports/ORNL_TM_2006_417.pdf, April 2006.

Table 1.1 shows the number of respondents in each population group in the 2004 survey. The table also shows the composite average percentage of correct responses to eleven technical questions that were asked as part of each of the four surveys. The highest average score was for state and local government officials.

Table 1.1. Number of Responses and Average Score for Each of the Four Survey Populations Included in the 2004 Hydrogen Survey

Population	Total completed interviews	Average % correct on technical questions
General public	889	32.8
Students	1,000	32.2
State and local government officials	246	65.8
Potential end users	99	44.4

Analysis of the 2004 survey showed that, for every population group, technical understanding appeared to influence opinions about safety. For the general public, student, and end user surveys, respondents with above-average scores on the eleven technical questions were more likely to have an opinion about hydrogen technology safety, and for those respondents who expressed an opinion, their opinion was more likely to be positive. These differences were statistically significant. The 2004 survey findings also indicated that all four of the populations knew more about hydrogen than about fuel cells.

1.2. SURVEY OBJECTIVES, 2008/2009 SURVEY

The 2008/2009 Knowledge and Opinions Survey is intended to measure the levels of awareness and understanding of hydrogen and fuel cell technologies in the same four populations that were surveyed during 2004, plus one additional population group. The four original populations were (1) the general public, (2) students, (3) personnel in state and local governments, and (4) potential end users of hydrogen and fuel cell technologies in business and industry; the additional group, which was not surveyed in 2004, is (5) safety and code officials. The ultimate goal of the hydrogen surveys is a statistically valid, nationally based assessment of awareness and understanding of hydrogen and fuel cells for each of these target populations. The same processes used for data collection in 2004 were used for the 2008/2009 surveys, and the same methods were used for the data analysis of individual surveys. In addition, the 2008/2009 findings were also compared with the 2004 findings to assess changes in knowledge levels and opinions from the 2004 baseline. The information from the current assessment will be used to decide whether hydrogen education strategies should be modified and, if so, how.

1.3. TIMELINE OF EVENTS OF 2008/2009 SURVEY

The Paperwork Reduction Act (44 United States Code 3501 et seq.) requires approval by the Office of Management and Budget (OMB) to conduct the surveys. *Federal Register* notices were published in November 2006 and March 2007 to announce the information collections of the first four surveys; these were the same populations that were surveyed in 2004. Copies of these

notices are included in Appendix B. OMB approval for conducting the follow-on surveys of these four populations was received on July 11, 2007.

A contract was let with Opinion Research Corporation (ORC, a public opinion research firm) in December 2007. The first survey was initiated in January 2008, and the first four surveys (general public, students, government agencies, and end users) were completed by the end of July 2008.

In January and April 2008, *Federal Register* notices were published concerning the information collection request for the survey of safety and codes officials. Copies of these notices are included in Appendix B. Application was made to OMB to conduct this survey in June 2008. Additional information was requested by and submitted to OMB in November 2008. OMB approved this survey on March 23, 2009. ORC completed the telephone surveys on June 26, 2009.

A draft report including a draft analysis of the first four surveys was submitted to DOE in January 2009. This report (September 2009) provides an analysis of the results of all five surveys.

1.4. 2008/2009 SURVEY AND REPORT STRUCTURE

Section 2 of this report is about the general approach taken in conducting the four surveys, including definitions of the four populations, questionnaire design, and survey methodology. Methods used for analysis of the data are discussed in Section 3. In addition to technical knowledge questions, the surveys include questions about sources of information and opinions of interviewees about the safety of hydrogen and fuel cell technologies. Some questions varied by the population being interviewed; for example, the general public, state and local officials, and safety and codes officials` (but not students or end users) were asked to rank the importance of safety, cost, the environment, performance, and convenience for a vehicle fuel or power supply for a home or business; students were asked about experience with science activities; government agency personnel were asked to predict future usage of hydrogen or fuel cell technologies in their respective geographic jurisdiction; end users were asked about power usage at the place of business; safety and codes officials were asked about their experiences in reviewing hydrogen or fuel cell permitting applications. Demographic questions were also included for statistical purposes (e.g., weighting).

Because measuring changes is one of the most important purposes of the 2008 surveys, an attempt was made to keep the survey questions and methods as consistent as possible with the questions and methods used in 2004. In a few case, however, hindsight suggested revisions. In particular, three of the eleven technical questions asked in the 2004 surveys were dropped in 2008. Comparisons of the 2008 technical score results with the 2004 baseline are therefore based on the 2004 results for eight questions only.

Sections 4-8 of the report contain the results of the analyses of the survey of each population, including comparisons with the 2004 results for each population. Charts are provided for “one-

way" statistics; that is, summaries defined in terms of one survey variable, for example sex or response to a specific question. Weighted frequencies and weighted means are used for the summaries (to adjust for possible under-coverage or nonresponse), and standard deviations and confidence bounds (that account for the sampling weights) are also given to quantify the statistical variability of the frequencies and means.

Obviously there are also myriad relationships and interactions between the survey variables that could be investigated (for example, whether a respondent's sex or geographic region affects his/her responses to a particular question). Although no such interactions were of particular interest a priori, a few of the more statistically significant interactions are investigated in Sections 4-8.

Sections 4-8 also include discussions of outcome rates—particularly, response rates. Response rates are of interest in all sample surveys, because low response rates suggest the possibility of nonresponse bias. Response rates are also of interest in the sense that interest in and awareness of hydrogen can affect response rates in this and future hydrogen surveys.

Finally, Sections 4-8 also include discussions of changes seen in the 2008/2009 survey results, relative to the 2004 baseline. These include changes in technical knowledge as well as opinions.

Section 9 focuses on comparisons across the five populations, including, in a few cases, comparisons of cross-populations over time. Section 10 is an overall summary of the results.

For the sake of simplicity, several variables are reduced to a simpler form in some analyses in Sections 4-9. The thirteen age categories are sometimes also considered in terms of just two categories: 18-44 and 45+ (divides population in approximate halves). "Degree" is defined as associate degree or higher. A variable "Above Average?" indicates whether respondents scored above or below the mean for all respondents on the eight technical knowledge questions.

Appendix A contains copies of the survey instruments. The eight technical questions that are common to all surveys are provided below (Figure 1.1), based on the question numbers from Appendix A.1 (the general public survey). The specific question numbers may differ among the survey instruments; however, the questions are the same.

Appendix C contains the main data summary tables. Both weighted and unweighted frequencies of the various responses (called response values) to the various questions are provided. Unweighted frequencies are raw respondent counts. Weighted frequencies are adjusted (because of possible under-coverage or nonresponse) to more accurately reflect actual U.S. demographic characteristics. A standard deviation of the weighted frequency measures the statistical variability of the frequency. (The range defined by taking plus or minus two standard deviations from the frequency is an approximate 95% confidence interval for the expected frequency.) The weighted frequencies are also expressed as percentages, with standard errors similarly reflecting statistical variability.

Appendix D contains copies of notification letters that were sent to state and local government agencies or to safety and codes officials.

True or false questions (Responses include "true," "false," or "don't know/no opinion.")

Q2A. Hydrogen gas is toxic (false)

Q2B. Fuel cells produce electricity through hydrogen combustion (false)

Q2C. Hydrogen is lighter than air (true)

Q2D. Hydrogen has a distinct odor (false)

Q12. Hydrogen is too dangerous for everyday use by the general public (false)

Multiple choice questions

Q4. In which state or condition can hydrogen be stored?

- Chemical compound
- Liquid
- Both of these (correct answer)
- Or, neither of these
- Don't know/No opinion

Q5. When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else?

- Carbon dioxide
- Nitrous oxides
- Heat (correct answer)
- Or, all of these
- Don't know/No opinion

Q6. Hydrogen can be produced using which of the following sources of energy?

- Natural gas
- Sunlight
- Organic matter
- All of these (correct answer)
- Don't know

Figure 1.1. List of eight technical knowledge questions used in the 2008/2009 hydrogen surveys.

2. SURVEY APPROACH

This section is about the general approach to conducting the five surveys. How the survey populations are defined is considered in Section 2.1. Questionnaire design is discussed in Section 2.2. Data collection methodology is considered in Section 2.3. Distinct information collections were employed for each of the five target populations. All questions were in a closed-end format, and all collections were conducted using computer-assisted telephone interviews (CATI). Copies of the survey questionnaires are included in Appendix A. In 2011/2012, each population group will be surveyed again using the same survey instrument and methodology.

2.1. RESPONDENT POPULATION

2.1.1. Types of respondents

As in 2004, all 2008 surveys were conducted by telephone interviewing. The general public was surveyed first. The general public survey was a random digit dialing (RDD) survey of adults, age 18 and over. The student sample (students ages 12-17) was also selected by RDD. The third population, state and local government agencies, consisted of three state-level offices in all 50 states, plus government officials in the twelve largest cities and counties in each of the four Census regions. The population of state and local government agencies was also surveyed by telephone interview, but completely rather than by statistical sampling. Potential end users of hydrogen and fuel cells (the fourth population) were also interviewed by telephone. End users were sampled randomly from three strata based on usage characteristics: transportation agencies, users needing uninterrupted power, and potential hydrogen and fuel cell users. The population of safety and codes officials was chosen from four organizations (see Section 2.3.1).

2.1.2. Estimated number of respondents

The number of desired respondents differed for each of the populations. The general public survey consisted of interviews with 1,000 adults; the student survey included 1,000 students; the total number of contacts with state and local agencies was approximately 250; about 600 interviews with end users and about 200 interviews with safety and codes officials were planned. The number of respondents in each population group is shown in Table 2.1; the rationale for these sample sizes is discussed in Section 2.3.

Table 2.1. Number of Responses Expected for Each of the Five Survey Populations in the 2008/2009 Hydrogen Survey

Population	Total planned responses
General public	1,000
Students	1,000
State and local government officials	246
Potential end users	600
Safety and code officials	193

2.1.3. Coverage and Response Rates

In recent studies about hydrogen knowledge and opinions, methodologies for collecting data have included CATI surveys, face-to-face interviews, computer-based questionnaires completed electronically, and focus groups.[9] The CATI RDD survey methodology used to conduct the DOE hydrogen knowledge assessment surveys has been employed for many years. Its strengths and weaknesses have been studied, and telephone survey researchers (and OMB) are aware of them. For example, over the last thirty years, coverage rates (the proportion of the target populations from which samples are drawn) have been high in CATI RDD surveys because nearly all of the target populations have had landline telephones. On the other hand, response rates in CATI surveys have often been low (e.g., less than 25%). Despite low response rates, however, because of inherent efficiency and low costs, CATI surveys have been a popular method used in survey research.

In the last few years, however, there has been a sudden decline in the coverage rate in landline telephone surveys because of steep increases in the proportion of "cell-phone-only" individuals. This issue is discussed in several recent publications.[10, 11, 12, 13] In fact, the Associated Press reported in December 2008 that more than one-sixth of all households have cell phones only.[14] The cell-phone-only problem is thus becoming substantial.

Coverage and response rates are discussed further in Sections 2.3.3 and 2.3.4, respectively.

2.2. FORMAT AND DESIGN OF THE QUESTIONNAIRES

Copies of the survey instruments (questionnaires) in their final format are found in Appendix A. To facilitate data analysis, the survey questionnaires were prepared in closed-end format. For every question, answer options were read to the interviewee, who was asked to choose one of the options. In every case, one of the options was "I don't know" or "I have no opinion." Prior to asking any questions, respondents were assured that there were no trick questions and that an "I don't know" response was perfectly acceptable.

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[9] See Truett, Tykey, Rick Schmoyer, and Christy Cooper, *Compendium: Surveys Evaluating Knowledge and Opinions Concerning Hydrogen and Fuel Cell Technologies*, Oak Ridge National Laboratory Technical Report, ORNL/TM-2008/151, http://www-cta.ornl.gov/cta/Publications/Reports/ORNL_TM_2008_151.pdf, October 2008.
[10] Blumberg, Stephen J., Julian V. Luke, and Marcie L. Cynamon, "Telephone Coverage and Health Survey Estimates: Evaluating the Need for Concern About Wireless Substitution," *American Journal of Public Health*, 96(5), May 2006.
[11] Lavrakas, Paul J., Charles D. Shuttles, Charlotte Steeh, and Howard Fienberg, "The State of Surveying Cell Phone Numbers in the United States, 2007 and Beyond," *Public Opinion Quarterly*, 71(5), 840-854, 2007.
[12] Link, Michael W., et al. "Practicability of Including Cell Phone Numbers in Random Digit Dialed Surveys: Pilot Study Results from the Behavioral Risk Factor Surveillance System," http://www.fcsm.gov/07papers/Link.II-C.pdf, accessed 2008.
[13] ZuWallack, Randal S. "Piloting Data Collection via Cellular Phones: Results, Experiences, and Lessons Learned," Macro International Inc. (white paper), http://www.orcmacro.com/Survey/CellPhone/Cell%20phone%20white%20paper.pdf, September 2007.
[14] Associated Press, "More Than One-Sixth of Households Have Only Cell Phones," http://www.ohio.com/business/36313319.html, Posted 01:28 p.m. EST, Dec 17, 2008.

Two sections of each of the survey questionnaires contain technical knowledge questions. These include questions about general properties of hydrogen as well as questions about fuel cells. One of the technical knowledge sections is a true-false section, the other, a multiple choice section. Another section contains opinion questions ("How do you feel about …?"). This section is also common to all of the surveys. Questions about the relative safety of hydrogen and fuel cells are included in every section of the survey. In each survey, one section is specific to the population being surveyed.

The questionnaires for the public and student surveys were translated into Spanish prior to the start of each survey period. The Spanish version was coded into the computer system of the opinion research firm conducting the interviews. Respondents to these two surveys had the option of completing the interview in either English or Spanish.

For all populations except safety and codes officials, the length of each of the surveys was under 15 minutes (averaging 10-15 minutes), including the introduction, screening process, and demographic questions (age, etc.). The average interview length for safety and codes officials was 17 minutes.

2.3. DATA COLLECTION AND QUALITY ASSURANCE

This section deals with statistical and quality assurance procedures implemented to ensure correctness in data collection and analysis.

2.3.1. Sample Selection

The respondent universe for the general public survey was non-institutionalized U.S. adults (ages 18 and over), slightly under 230 million people.[15] The sampling method was RDD using the Genesys system for generating samples.[16] This approach to public opinion surveys is standard and widely used. For example, it was used by the Bureau of Transportation Statistics for their Omnibus Household Survey.[17] Genesys samples are implicitly stratified by Census Division and Metropolitan Statistical Area size (i.e., they are sorted by these variables before systematic sampling). The samples include both listed and unlisted residential telephone numbers. The system is updated twice a year. For purposes involving statistical sampling, the general public population is essentially infinite.[18]

Households for the general public survey were contacted using CATI methods. Random selection of adults within a given household was according to most recent birthday. One thousand completed interviews was the target sample size for the public survey.

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[15] U.S. Census Bureau, "Projected Population by Single Year of Age, Sex, Race, and Hispanic Origin for the United States: July 1, 2000 to July 1, 2050," http://www.census.gov/population/www/projections/downloadablefiles.html, released 2008 .

[16] Marketing Systems Group, "GENESYS," http://www.m-s-g.com/genesys/genesyshme.htm .

[17] Bureau of Transportation Statistics, "Omnibus Survey, Household Survey Results," http://www.bts.gov/omnibus/household/general_methodology.html.

[18] That is, there is no need for making *finite population corrections*.

For students, a national sample of telephone numbers was randomly generated as described for the general public survey. A much lower proportion of these numbers was eligible, however, because only students age 12-17 were eligible for interviewing. If a household contained multiple teenagers, random selection of the interviewee within the household was according to most recent birthday. The sample size for the student survey was also 1,000 completed interviews. An OMB requirement of the student surveys was that parental permission had to be obtained before interviews with students. This requirement was a serious obstacle in conducting the student survey because it increased the nonresponse rate.

The targeted sample size for the state and local government agencies was 246 completed interviews. The state agencies were State Energy Offices (SEOs), Departments of Environmental Protection (DEPs),[19] and Departments of Transportation (DOTs) for a total of 150 state responses (one per state for each of the three state agencies).

Functionally similar personnel working for cities or counties (local governments) were interviewed. Because small cities or counties were not expected to be able to respond to the survey now or in the near future, the target population was taken as the 12 largest cities and 12 largest counties in each of the Northeast, Midwest, South, and West Census Regions. For each Census Region, all 12 of the largest cities and counties were sampled. A total of 96 local responses was expected. If county and city governments were combined into a single government entity, only one call was made to that office, and the next largest county in that census region was selected for interviewing. Contact lists were generated by examination of the website of each of the largest city and county entities to identify an appropriate person to interview in each office.

Potential hydrogen end users were defined as businesses and industries with potential commercial uses of hydrogen and/or fuel cells. However, respondents to the end user survey did not need to be using hydrogen or fuel cells at the time of the survey interview. Although respondents could have global corporate operations, it was required that they have facilities in the United States, and only personnel in the United States were interviewed. Potential persons to be interviewed included chief executive officers, chief financial officers, facility managers, energy managers, fleet managers, and information/security managers.

As in the 2004 survey, eligible businesses were identified according to the North American Industry Classification System (NAICS) and stratified into three sectors of hydrogen usage or potential hydrogen usage:

- Transportation. Examples include private and public fleets that use trucks, buses, or other ground-based vehicle types; these are the end users (not developers) of hydrogen-powered vehicles.

[19]For the purposes of this document, state environmental offices are called Departments of Environmental Protection. The agency name, however, varies by state. Equivalent agency names include Department of Environmental Quality, Department of Environment, or Department of Natural Resources.

- Business types for which energy usage is primarily for facility heating/cooling and localized power requirements and for which on-site power generation is important because of the need for an uninterrupted power supply. These business types include large agricultural productions, hospitals and other healthcare institutions, education institutions, financial institutions, and others.

- Industrial sectors that have large power requirements. Examples include processing, manufacturing, and fabrication plants; mills and refineries; and industrial machinery and equipment plants.

Component population numbers for each of these three categories are shown in Table 2.2. Lists of businesses meeting the above criteria were purchased from Dun & Bradstreet.[20] In addition to NAICS code, the lists included numbers of employees and revenues for each listed business. The purchased lists were the most recent available for this type of data.

For each NAICS category, businesses in the compiled lists were ranked by either number of employees or revenue, depending on which was considered more appropriate for the category. For the transportation stratum and for the stratum of businesses needing uninterrupted power supplies, the number of employees was used primarily as the ranking criterion for NAICS categories (revenue was used for a few subcategories); for the stratum of industrial businesses with large power requirements, revenue was used for all categories. The largest 0.3% of businesses were then selected from each category and used as the sampling frames from which interviewees were chosen. The largest businesses were selected because they represent the greatest potential for hydrogen usage. For each stratum, these largest businesses were then sampled randomly to obtain 200 respondents, as indicated in Table 2.2.

In the 2004 study, 488 phone numbers were used to get 99 respondents, for an overall response rate of approximately 20% (response totals were not identified by sector). For the 2008 survey, the target was 600 respondents, 200 in each of the three sectors. Under the assumption that the response rate would be the same in 2008 as in 2004, approximately 1,000 interviews would have to be attempted in each sector to get the required number of completions. Given the number of businesses in the top 0.3% of each component population (see Table 2.2), there would be just enough (i.e., 1,001) in transportation and extras in the other two sectors. As a precaution, reserve pools consisting of the next largest 0.3% of businesses in each component population were also identified, to be used in the event that the top 0.3% was exhausted before the 200 interviews were completed. (The reserve pool was in fact used. See Section 7.4.)

The population of safety and codes officials to be surveyed was derived from memberships in four groups: International Association of State Fire Chiefs (IAFC), 50 contacts; International Code Council (ICC), 49 contacts; National Association of State Fire Marshalls (NASFM), 50 contacts; and National Fire Protection Association (NFPA), 44 contacts. There were, therefore, a total of 193 contacts on the master list.

[20] Specifically the D&B Market Place database.

Table 2.2. Populations and Interview Plans for the Three Sectors in the End User Population Group				
Hydrogen usage sector	**Number in component population***	**Number in top 0.3% of population**	**Desired number of completed interviews**	**Expected number of attempted interviews****
Transportation	333,623	1,001	200	≈ 1,000
Businesses needing uninterrupted power supplies	877,549	2,633	200	≈ 1,000
Industrial sectors with large power requirements	657,810	1,973	200	≈ 1,000
Total	**1,518,871**	**5,607**	**600**	**≈ 3,000**
*Based on the Census Bureau's 2002 Economic Census. Note that sampling will be restricted to the largest 0.3% of these populations, if possible. **Expected number based on 20% response rate obtained in 2004 survey. The actual response rate was slightly lower, and the actual number of attempts was higher (see Section 7.4).				

2.3.2. Required Accuracy

Although RDD methods are complex, the general public and student surveys are simple enough that a reasonable approximation in reckoning necessary sample sizes (given the more complicated development needed to account exactly for the stratification and probability sampling) is to treat the sampling as simple random sampling.[21] A standard approximation in deciding necessary simple random sample sizes is the normal approximation to the binomial, under which confidence limits for an observed proportion $\hat{p}$ are approximately $\hat{p} \pm Z\times[\hat{p}(1-\hat{p})/n]^{1/2}$, where n is the number of respondents and Z is a quantile of the standard normal distribution. This approximation is known to be good when n is large (e.g., n > 100), and $\hat{p}$ is between 0.1 and 0.9. Under these conditions, a sample size of 1,000 respondents leads to the ± three percentage point margin of error with 95% confidence (i.e., when Z=1.96), which is the often-quoted margin of error for surveys with respondents numbering around 1,000.[22]

The state and local government survey was a census (i.e., not a random sample). However some nonresponse did occur and was modeled (in the data analysis) as random. As the sample was thus not complete, estimates computed for this survey does have statistical error, though the error is generally smaller than for the other survey components.

[21] The actual data analysis properly accounted for stratification and the sample weights.

[22] An unusual feature of the hydrogen surveys is the possibility of high frequencies of responses such as "Don't know" or "Have no opinion" on some of the survey questions. For example, if 95% of responses are in the "Don't know" category, then the usual confidence limits based on the normal approximation to the binomial distribution are most likely not a good approximation. In these cases, exact confidence limits based on the binomial distribution can be used, rather than the normal approximation to the binomial. For example, suppose every response in a sample of 1,000 is a "Don't know." Then a 97.5% exact lower confidence bound (i.e., lower 95% two-sided confidence bound) for the true proportion of "Don't know" responses is 0.996 (as opposed to 1.0 on the basis of the normal approximation). If, instead, 950 responses are "Don't know," then the lower confidence bound is 0.935. If 900 responses are "Don't know," then the lower confidence bound is 0.880. This approach also demonstrates that a sample size of 1,000 is adequate in these extreme cases.

The end user survey was a smaller sample (600 total respondents) than either the student or general public surveys. Using the approximation discussed above, but with a sample size of 600 (rather than 1,000), the margin of error is ±4%. Although this is slightly larger than the margins for the general public and student surveys, it was still considered adequate.

The survey of safety and codes officials was also a census, similar to the survey of state and local government officials. Analysis and modeling was similar to that of the government agencies.

2.3.3. Coverage

For the general public and student surveys, coverage (i.e., the proportion of the population included in the sampling frame) is imperfect because not every individual in the target populations can be reached by telephone. As discussed in Section 2.1.3, however, coverage has not been considered an important issue in most traditional RDD surveys conducted in the last thirty years, because, in fact, only a small proportion of individuals could not be reached by traditional landline telephone. Recently, however, the advent of individuals who have a cell phone but no traditional landline telephone has begun to threaten the good coverage of traditional RDD surveys.

According to the sources listed in Section 2.1.3, cell-phone-only individuals are most frequently in the 20-35 age bracket. For the general public and student surveys, corrections for under-sampling this age bracket are made in the survey data analysis by assigning higher post-stratification weights (a weighting adjustment in the data analysis) to individuals in this age group. However, age-based weighting corrections cannot be used to properly adjust for inherent differences (e.g., in awareness or opinions about hydrogen) between cell-phone-only and landline individuals of the same age. It is reasonable to speculate that cell-phone-only individuals could be more aware of technology in general (and thus hydrogen technology in particular) than individuals with landline phones only or even both landline and cell phones. Failure to address the cell-phone-only coverage deficiency in traditional landline surveys could thus be a concern in the DOE hydrogen technology awareness survey, particularly the RDD surveys of the general public and students.

An obvious remedy to the cell-phone-only coverage issue would be to supplement traditional CATI RDD landline phone surveys with cell-phone components. However, obstacles to cell-phone supplements include (1) imposition on respondents, who bear cell phone usage costs in "minutes," (2) laws such as the federal Telephone Consumer Protection Act, which requires that unsolicited calls to cell phones have to be dialed by hand rather than a computer, and (3) the administrative difficulty of obtaining OMB approval for a supplemented. How to properly weight cell-phone-only, cell-and-landline, and landline-only respondents in a combined survey is also the subject of current research.

These issues are being addressed by survey research firms and in big survey studies such as the Behavioral Risk Factor Surveillance System,[23] which is the world's largest ongoing public health telephone survey. Sampling weights provide a partial correction. It is not feasible, however, to

[23] Link, Michael W., et al., op cit.

fully address the cell-phone-only issue in the 2008 DOE Hydrogen Knowledge and Opinion Surveys. It is very likely, however, that methods for dealing with this problem will have been developed by 2011. Because of continued increases in the number of cell-phone-only individuals, the issue will have to be addressed for the 2011/2012 DOE surveys.

2.3.4. Response Rates

Definition of nonresponse

Various outcome rates are of interest in characterizing survey data results. The *response rate* is the proportion of sampled eligible subjects for whom complete survey interview information was obtained. The *refusal rate* is the proportion of sampled eligible subjects who refused to be interviewed or who terminated their interviews before completion. The *contact rate* is the proportion of sampled eligible subjects that were contacted at all. In general the number of eligible subjects must be estimated, and there are various ways to estimate this number and to define, in turn, estimates of the rates. The American Association for Public Opinion Research (AAPOR) gives various definitions for the rates and provides a spreadsheet calculator for computing them.[24] In this report we focus on response rates according to just one of the AAPOR definitions. The response category frequencies will all be archived, however, should a need arise to analyze refusal or contact rates or response rates according to one of the other definitions.

The Council of American Survey Research Organizations (CASRO) definition of response rate[25] is as follows:

Response Rate =

$$\frac{\textit{Number of Complete Interviews}}{(\textit{Number Sampled Eligible}) + [(\textit{Number Sampled but Eligibility Undetermined}) * e]}$$

where e = (*Number Known Eligible*)÷(*Number Known Eligible* + *Number Known Ineligible*).

This is the "RR3" definition of response rate used by AAPOR.[26] AAPOR has also extended this definition to allow for partially completed interviews. However, because nearly all of the survey questions could be answered with a simple "Don't know" or "No opinion" response, partially complete interviews were not counted as responses in the hydrogen surveys. Thus we have used the AAPOR RR3 response rate definition. These adjustments were used to calculate response rates for all survey components except the surveys of state and local government agencies and

[24] AAPOR, *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys,* The American Association for Public Opinion Research, Lenexa, Kansas, http://www.aapor.org/uploads/Standard_Definitions_07_08_Final.pdf, revised 2008.
[25] Frankel, Lester R. "The Report of the CASRO Task Force on Response Rates," in *Improving Data Quality in a Sample Survey,* 1983.
[26] AAPOR, *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*, The American Association for Public Opinion Research, Lenexa, Kansas, http://www.aapor.org/uploads/Standard_Definitions_07_08_Final.pdf, revised 2008.

safety and codes officials. For these two populations, the nonresponse rate was minimal and was estimated simply as (*Number of Complete Interviews*) ÷ (*Number of Interviews Targeted*).

Methods for estimating nonresponse rates and call disposition frequencies were the same for both the 2004 and the 2008/2009 surveys. Thus, nonresponse rates can be compared, as they are themselves relevant in the context of public interest in hydrogen, as well as survey sampling.

Nonresponse bias

The approach to dealing with nonresponse in the hydrogen surveys is similar to approaches taken in similar surveys, for example, the Omnibus Household Survey (see Section 2.3.1). Nonresponse was minimized through careful and aggressive callbacks. Sampling weights (general public and student surveys) were used to adjust for nonresponse (in the sense that undersampled demographic groups are given more weight in the analyses). However, further follow-ups, for example by mail or in-person interviews, were not made. Although following up a sample of "first-stage" nonresponders (those who do not complete the survey despite repeated call-backs) with an aggressive second-stage (via mail or in-person visits) does allow survey estimates to be computed for the first-stage nonresponders, such approaches are expensive and were considered beyond the scope of the hydrogen surveys.

In lieu of statistical estimates for first-stage nonresponders (or other assumptions), some nonresponse bias must be tolerated, and nonresponse bias is probably the major data quality limitation of the hydrogen survey data. Because the 2008/2009 fielding of the survey was implemented with exactly the same methods as those used in 2004, some of the nonresponse or coverage bias is accounted for (i.e., subtracts out) in the cross-time differences. Nevertheless, even the cross-time comparisons could be biased:

- Changes among responders could be different from changes among nonresponders.
- Changes in telephone technology because of the frequency of use of call blocking and caller ID technologies could affect comparisons over time. (Note that unlisted numbers are, in fact, sampled in RDD surveys.)
- Changes over time in general attitudes, such as willingness to participate in phone surveys, could adversely affect comparison over time.

These issues are important; however, their importance should not be overestimated. A study of increasing nonresponse rates in telephone surveys reports "more numbers out of scope (including mobile phones, fax/modems/ pagers) … 27.4 percent in 1995 versus 35.1 percent in 2000 pretest," and "more numbers with the scope not determined … 6.8 percent of the numbers in sample had scope not determined in 1995 versus 8.6 percent in 2000."[27] Although these changes are substantial, they do not appear to be overwhelming. Furthermore, because of the relatively recent introduction of state and federal telemarketer no-call lists, which will reduce the number of nuisance phone calls, it is possible that response rates might even be increasing. (Note that firms conducting survey research are exempt from no-call lists.)

[27] McGuckin, Nancy, Mary Ann Keyes, and Susan Liss, "Hang-ups – Looking at Nonresponse in Telephone Surveys," International Conference on Travel Survey Methods, http://www.fhwa.dot.gov/ohim/hang_ups.htm, 2002.

Considering the expense of the alternatives (e.g., mail or in-person follow-up surveys), all reasonable measures (CATI methods for scheduled call backs, adjustment of sampling weights to account for nonresponse, etc.) were taken to minimize nonresponse bias in the hydrogen surveys.

Maximizing response rates

"CATI" refers to methodology by which telephone numbers are dialed (e.g., using the Genesys system) and by which responses are recorded using programmed computer formats. In the hydrogen surveys, the actual interviews are conducted by individuals who have been well-trained in interviewing techniques[28] to avoid "hang-ups" and otherwise minimize nonresponse.

Procedures used in the hydrogen surveys for maximizing response rates exceeded usual standards for CATI surveys. Interviewers made a minimum of 15 attempts before giving up trying to reach eligible households. Each call attempt used a minimum of five rings. For the general public and student surveys, the CATI software cycled the attempts in the following order: weekday day, weekday evening, Saturday day, and Sunday evening to maximize coverage of the residential population. Sample allocation and scheduling of interview sessions assured a minimum of three attempts in each day part (e.g., weekday day, weekday evening, weekend). For surveys of government agencies, end users, and safety and codes officials, calls were made during normal business hours for the time zone being called.

For all surveys, lines that were busy were called back a minimum of five times at 10-minute intervals. If the line was still busy after the fifth attempt, the number was attempted again on different calling occasions. If the line was still busy after the fifth calling occasion, the CATI system attempted to contact the phone company to ascertain whether the number was actually in service.

The 2004 baseline general public survey was conducted to accommodate the special feature that relatively large proportions of "Don't know" and "No opinion" responses were expected. Respondents were assured that "Don't know" and "No opinion" were perfectly acceptable answers to the survey questions. This helped to minimize item nonresponse rates for the 2004 survey. The same assurances were provided to interviewees in 2008/2009.

CATI surveys accurately handle large numbers of scheduled call back appointments. When a scheduled appointment time arrives, the CATI system finds the next available station and delivers the appropriate phone number for the next call. Ensuring that appointments are kept helps to maximize response rates (and to minimize imposition on study participants). The CATI system also allows for callbacks to rescheduled interviews and to restart interrupted interviews (for example, if a respondent wants to finish an interview later). Scheduled call backs can be either casual (general time) or definite (exact time) depending on the respondent's request. The CATI system also automatically handles callbacks for no-answer, busy, and answering machines. Call backs for busy signals are retried at several minute intervals; callbacks for no-answer and answering machines are scheduled to ensure coverage at different times of day.

[28] AAPOR, "Best Practices for Survey and Public Opinion Research," http://www.aapor.org/bestpractices .

Another step that was taken to maximize response rates was to route each initial refusal to special survey staff trained and experienced at converting initial refusals to responses. How initial refusals were handled was decided on the basis of each particular case and the experience by the special staff member. One technique that was used when appropriate was to switch from an English to a Spanish-speaking interviewer.

Statistical adjustments for nonresponse

For the general public and student surveys, sampling weights were computed to adjust for variable selection probabilities in the random sampling. These weights were further adjusted to account for households with multiple phones (including transfers), number of eligible household members, and for response rate (and coverage rate) differences over various demographic subgroups. (Weights were adjusted upwards for groups with lower response rates.) Surveys of state and local government agencies, end users, and safety and codes officials were not weighted, because, for these surveys, selection probabilities were uniform across the target populations. Weights are discussed further in Section 3.

2.3.5. Pretesting

For the 2004 general public survey, a formal pilot study of 50 respondents was conducted as a part of the OMB-approved information collection. This pilot study was used as a basis for final adjustments to the questions, served as a check on response rate estimates and the CATI system, and served as a quality assurance check for the methods of data analysis. Results of these 50 respondents in the pretest were not included in the analysis of the general public survey since changes had been made to the survey instrument. As the surveys of the other populations were similar to the general public survey, pretests were not used for those surveys.

Similarly, because the 2008/2009 surveys are nearly the same as their 2004 counterpart, the 2004 surveys serve as pretests, and additional pretesting of the 2008/2009 surveys was unnecessary.

2.3.6. Quality Assurance in the Data Analysis

CATI technology and the multiple-choice nature of the survey questions precluded out-of range data entries. As with the 2004 surveys, 2008 survey data and all programs written to analyze the results for the 2008 surveys were carefully logic-checked and "sanity-checked" through examination of the output (tables, charts, etc.).

While performing the data analysis, all project materials, including survey design documentation, results of the survey, and data analysis programs and results were backed up to secondary storage media. After the analysis of the 2008 surveys and issue of the final report, this information will also be archived to compact disks (CDs) and stored at multiple locations.

3. DATA ANALYSIS METHODS

3.1. OBJECTIVES OF DATA ANALYSIS

At any point in time, for each possible response to each survey question, there is a proportion of individuals in the survey target population who would give that response. The primary endpoints of the statistical analysis of the 2008/2009 survey data were estimates of these proportions for the survey questions (except for the standard demographic questions used to weight the results) in 2008 and 2009, and standard errors and confidence limits for these estimates. Certain composite results, such as the average proportion of correct answers to the survey technical questions, are also of primary interest, as are the ***changes*** in these endpoints relative to the 2004 baseline.

In addition to the primary findings, the survey results were also analyzed for secondary information, including differences in the primary endpoints across ages, genders, and geographic regions, and cross tabulations of pairs of primary endpoints. (These demographic variables were not recorded for the state and local government agencies nor for the safety and codes officials surveys.) Cross tabulations of interest are of knowledge levels with attitudes and opinions; knowledge levels with sources of energy information; and attitudes and opinions with sources of energy information.[29] Though secondary, much of this information is of great interest and relevance to the hydrogen education program.

3.2. DATA TYPES

Responses to the survey questions will be of several different data types. Responses to the multiple choice questions as well as true/false/don't know questions are simple (unordered) multinomial data. With the exception of a "Don't know/no opinion" response, responses to the rating questions are ordinal (ordered) multinomial data. Because of the "Don't know/no opinion" category, however, responses to the rating questions are only partially ordered. Finally, for the general public, government agencies, and safety and codes officials surveys, there is also a ranking question, in which five items are ranked in importance (in the context of a hydrogen economy) by the respondent. The items are (a) safety, (b) cost, (c) the environment, (d) convenience, and (e) performance.

3.3. ESTIMATES AND TESTS

In addition to data types, another important consideration in the data analysis is the application of sampling weights (general public and student surveys only), which are used to adjust estimates and tests for variable selection probabilities as well as nonresponse and under-coverage. Proper adjustment with sampling weights is necessary but restricts the set of appropriate software

[29] See also Schmoyer, R. L., Tykey Truett, and Susan Diegel, *Data Collection, Quality Assurance, and Analysis Plan for the 2008/2009 Hydrogen and Fuel Cells Knowledge and Opinions Surveys,* ORNL/TM-2008/113, http://cta.ornl.gov/cta/Publications/Reports/ORNL_TM_2008_113.pdf , September 2008.

available for the data analysis. Estimates and tests computed for the data analysis account for survey stratification as well as sampling weights. Sampling weights were computed from selection probabilities adjusted for nonresponse, households with multiple telephone numbers, and (by iterative proportional fitting) post-stratification by age, sex, and region. Weights were computed for the general public and student surveys only; surveys of state and local government agencies, end users, and safety and codes officials were stratified but not weighted (or, equivalently, they were analyzed with weights, but all of them equal).

The following general approach was taken in the data analysis. Results for each of the survey questions were analyzed with the Statistical Analysis System (SAS) Surveyfreq procedure to produce one-way (i.e., specific by exactly one classification variable) summary tables of frequencies, percentages, and standard errors for the various response categories. These statistics are weighted (as appropriate) and account for the design stratification. The one-way statistics were explored by examining charts for each survey question, and additional charts were computed to illustrate various features of interest observed for multiple questions in the one-way tables.

Results for the survey technical questions were combined to form overall scores. In the overall scores, "credit" was given only for correct answers; no credit was given for either incorrect answers or "Don't knows." Percentages of "Don't knows" were also of interest and were analyzed separately. The overall scores were charted and analyzed with the SAS Surveymeans procedures, which handles continuous (as opposed to categorical) data such as the test scores. The preference ranking results for safety, cost, environment, convenience, and performance were analyzed with the Surveymeans procedure. (The pairwise preference results, components of the ranking, were also analyzed as part of the one-way analyses.) Like the Surveyfreq procedure for categorical data, the Surveymeans procedure also properly accounts for sampling weights and stratification.

Relationships were explored between the question responses and various demographic variables such as sex, census region, age category, educational degree, and whether the respondent's overall technical question score is above or below average. The SAS Surveyfreq procedure (also used to compute the one-way tables) was used to compute statistical significance levels for the association between question responses and the demographic variables.[30]

Response rates were determined using the formula in Section 2.3.4 and compared with the rates computed for the 2004 survey results

3.4. COMPARISON OF 2008/2009 RESULTS WITH THE 2004 BASELINE

The results of the 2008/2009 surveys are statistically independent of the 2004 baseline survey. Hence, once results are obtained, statistical tests about changes can be made in the usual way: the variance of each difference is the sum of the variances of the differenced quantities, and tests

[30] Many of the most highly significant relationships for the 2004 surveys were discussed in the report by Schmoyer, Truett, and Cooper.

(e.g., t-tests) about each difference can be computed by relating estimated difference to its standard error (i.e., square root of the variance of the difference). Once the 2004 and 2008/2009 estimates and standard errors are computed (the technically more difficult step, particularly for the surveys with sampling weights), cross-survey comparisons are thus relatively straightforward.[31]

The following questions were addressed in the comparison of the 2008/2009 findings with the 2004 baseline.

- For each population group, how have the average numbers of correct, incorrect, and don't know responses to the technical questions changed?
- For each population group, have opinions about the safety of hydrogen and fuel cell technologies changed? If so, how? Is the change statistically significant?
- Have there been changes in the media sources used by respondents to obtain energy information?
- How have respondent concepts of time frames for implementing hydrogen technologies changed? (state and local government agencies and end user populations only)
- Have response rates for the surveys changed?

It should be noted that for the 2004 survey, there were 11 technical questions. On the basis of the 2004 analysis, three of these questions were eliminated from the 2008/2009 surveys. The comparison of technical "scores" is, therefore, based only on the eight technical questions that are common to both the 2004 and the 2008/2009 surveys.

[31] Because the survey of safety and code officials was not fielded in 2004, the 2008/2009 survey of this group will establish the baseline of knowledge and opinions for this population. Changes with respect to this baseline will be measured when the survey is fielded again in 2011/2012.

4. RESULTS: GENERAL PUBLIC SURVEY

4.1. INTRODUCTION

This section summarizes the results of the general public survey. A copy of the survey is provided in Appendix A.1. A total of 1,000 interviews with the general public were completed during the period of January 8-28, 2008. Interviews were by telephone survey conducted among a national probability sample of adults (500 men and 500 women) 18 years of age and older, living in private households in the continental United States. The total average interview length was slightly less than 11.4 minutes, broken down into a screening time of 2.5 minutes and a main interview length of 8.8 minutes. A summary of responses to this survey, by question number, is in Appendix C.1.

If the person who answered the telephone answered in Spanish or requested that the interview be conducted in Spanish, the interview was conducted in Spanish. If the person who answered the telephone was not proficient in either English or Spanish, the interview was terminated.

Section 4.2 is a general summary of the general public responses. Relationships between the response variables are discussed in Section 4.3. Differences between the 2008 and 2004 survey results are discussed in Section 4.5.

For the sake of simplicity, the responses "Don't know," "No opinion," and "Don't know/no opinion" are all treated equivalently and generally as "Don't know" in this report.

The response rate for the General Public Survey is discussed in Appendix E.1. The response rate is .2301, which is just slightly lower than the response rate of .2480 calculated for the 2004 hydrogen survey[32]. It is reasonable to assume that the more enthusiastic or at least knowledgeable people are about hydrogen technology, the more likely they would be (all else equal) to respond if sampled in the survey. Thus response rates are of interest from the perspective of hydrogen technology awareness itself. On the other hand, it is well known that telephone survey response rates have been declining in recent years.[33] Reasons include the volume of surveys conducted, other forms of telephone solicitation, people spending more time away from home, and the use of answering machines and caller ID. In view of the general decline in response rates, the difference in response rate between the 2004 and 2008 surveys is probably unimportant.

[32] Schmoyer, R. L., Tykey Truett, and Christy Cooper, *Results of the 2004 Knowledge and Opinions Surveys for the Baseline Knowledge Assessment of the U.S. Department of Energy Hydrogen Program,* ORNL/TM-2006/417, http://cta.ornl.gov/cta/Publications/Reports/ORNL_TM_2006_417.pdf, April 2006.

[33] Keeter, S., C. Kennedy, M. Dimock, J. Best, and P. Craighill, "Gauging the Impact of Growing Nonresponse on Estimates from a National RDD Telephone Survey," *Public Opinion Quarterly,* 70(5), 759-779, http://poq.oxfordjournals.org/cgi/reprint/70/5/759.pdf , Special Issue, 2006.

4.2. SUMMARY

The section summarizes the responses to the individual questions in the general public survey. Most of the questions are summarized as proportions of respondents in each of the respective multiple choice categories. Preference ranks are summarized as means. Answers to the technical questions are summarized individually and are also compiled into an overall technical score. Relationships between responses to different questions and comparisons with the 2004 survey results are considered in Section 4.3 and 4.4.

Table 4.1 summarizes the technical questions in terms of whether they were answered correctly or incorrectly with "Don't know" treated as an incorrect response.

Table 4.1. Summary of Results on the Technical Knowledge Questions (correct/incorrect), General Public

Question	Number of responses	Weighted percent correct	Lower 95% confidence bound	Upper 95% confidence bound
2A. Hydrogen gas is toxic (false)	1,000	42.87	38.92	46.82
2B. Fuel cells produce electricity through hydrogen combustion (false)	1,000	11.25	9.05	13.45
2C. Hydrogen is lighter than air (true)	1,000	51.83	47.83	55.83
2D. Hydrogen has a distinct odor (false)	1,000	49.62	45.61	53.63
4. In which state or condition can hydrogen be stored? (chemical compound, liquid)	1,000	29.20	25.64	32.77
5. When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else? (heat)	1,000	22.13	19.07	25.20
6. Hydrogen can be produced using which of the following sources of energy? (natural gas, sunlight, organic matter)	1,000	29.65	26.23	33.06
9. Hydrogen is too dangerous for everyday use by the general public (false)	1,000	44.95	41.05	48.85
Overall average	1,000	35.2	33.17	37.21

The greatest percentage of correct responses is 51.8%, for Question 2C (Hydrogen is lighter than air…), followed by 49.6% for Question 2D (Hydrogen has a distinct odor...). The smallest percentage of correct responses is 11.3% for Question 2B (Fuel cells produce electricity through…), followed by 22.1% for Question 5 (When using pure hydrogen…). Questions 2B, 4, 5, and 6 were all answered correctly by less than 30% of respondents.

The correct/incorrect perspective used in Table 4.1 is conventional, since "Don't know" is generally considered an incorrect response. However, "Don't know" was a very common response to the survey technical questions. Figure 4.1 shows the responses broken down according to type: Correct, Incorrect, and "Don't know." On average, 35.2% of the technical questions were answered correctly, 19.4% were answered incorrectly, and 45.4% were answered with "Don't know."

Figure 4.2 shows the distribution of the number of correct responses. The dispersion about the mean score (35.3% or 2.8 correct) is substantial, as might be expected, given the varied backgrounds of general public respondents. The distribution is right skewed, with over 16% of respondents answering zero technical questions correctly but fewer than 1% of respondents answering all eight technical questions correctly.

The first question in the survey asked respondents to gauge their familiarity with hydrogen and fuel cell technologies. Figure 4.3 shows the distribution of responses. Almost half of all respondents considered themselves not at all familiar.

Table 4.2 summarizes the rank scores for the question (Question 7) asking respondents to rank the importance of safety, cost, environment, convenience, and performance when selecting a fuel for your vehicle or power supply for your home or business. The table shows weighted averages of the ranks (1-5) assigned by each survey subject and confidence bounds for the average. In this ranking, "1" ranks as more important than "2," etc. Therefore, the lower the weighted average rank, the more important the "Value" to the respondent. On average, "Cost" was considered most important, followed in order by "Safety," "Environment," "Performance," and "Convenience." Of course many individuals departed from this exact order. The last ten "Value" entries in Appendix C.1 are for pairwise comparisons based on the safety, cost, environment, convenience, and preference rankings, with each possible pair (e.g., safety and cost) considered separately.

Table 4.2. Summary of Importance Ranking, General Public

Question	Number of responses	Weighted average rank	Lower 95% confidence bound	Upper 95% confidence bound
Cost	982	2.23	2.13	2.33
Safety	978	2.50	2.40	2.59
Environment	966	3.10	3.00	3.21
Performance	973	3.40	3.30	3.51
Convenience	971	3.73	3.63	3.83

Figure 4.4 also illustrates the pattern shown in Table 4.2.

Respondents were asked to imagine that they were shopping for a new car. They were asked whether they would buy a fuel cell vehicle if they could purchase it at the same price as a comparable gasoline vehicle model. As shown in Figure 4.5, over 60% of the respondents indicated that they would purchase a fuel cell vehicle.

Related to the preference ranking question, Figure 4.6 shows that the general public generally agree that the use of hydrogen will reduce U.S. dependence on foreign oil and will reduce emissions and improve air quality.

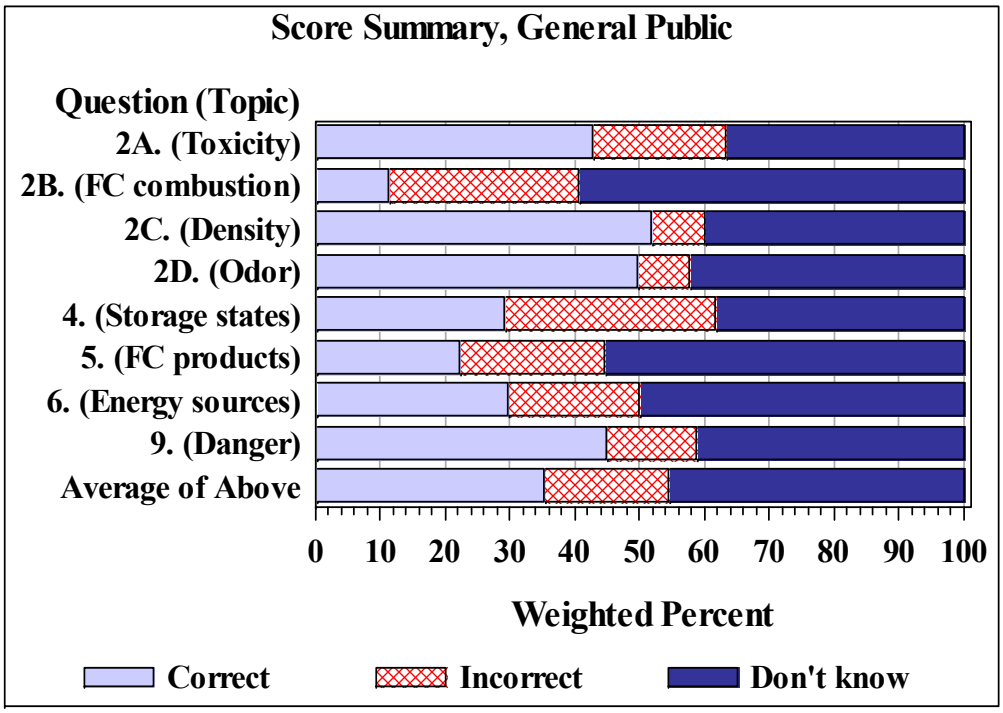

Figure 4.1. Weighted percent of correct, incorrect, and "Don't know" responses for the technical knowledge questions, general public survey.

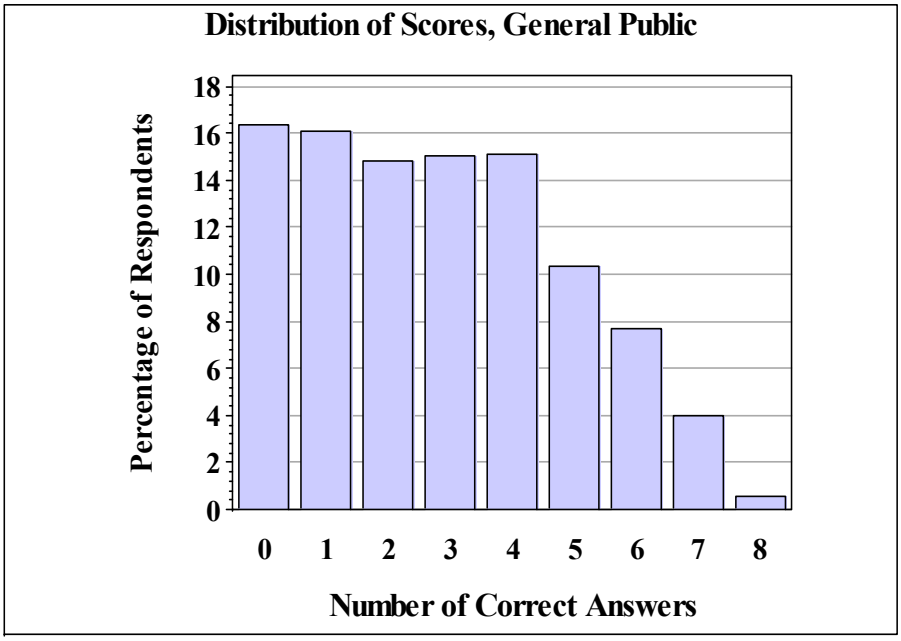

Figure 4.2. Distribution of the number of correct answers to the eight technical knowledge questions, general public survey.

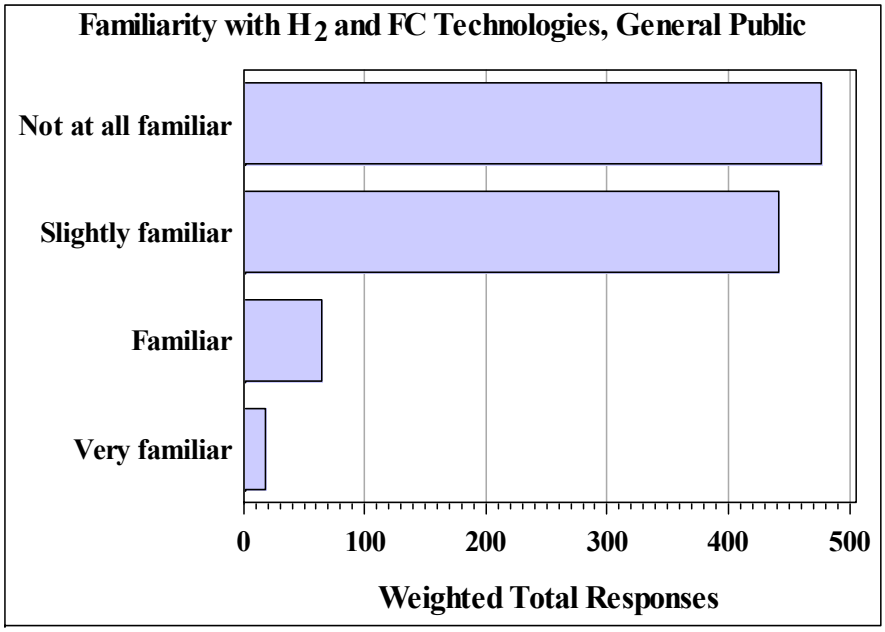

Figure 4.3. Distribution of responses to the question about familiarity with hydrogen and fuel cell technologies, Question 1, general public survey.

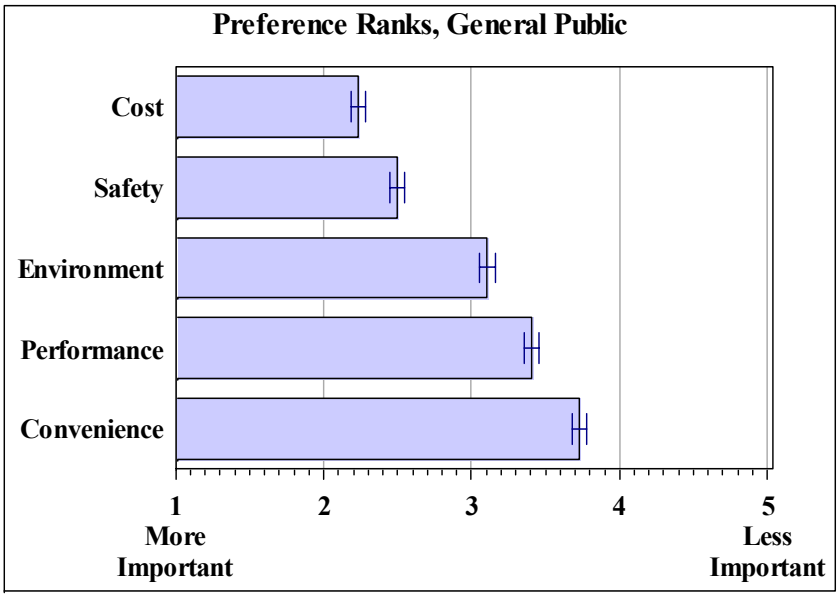

Figure 4.4. Mean of preference rankings of cost, safety, environment, convenience, and performance, Question 7, general public survey. (Rank=1 for first choice, 2 for second choice, etc.) The error bar on each chart bar shows 95% confidence limits for the mean rank.

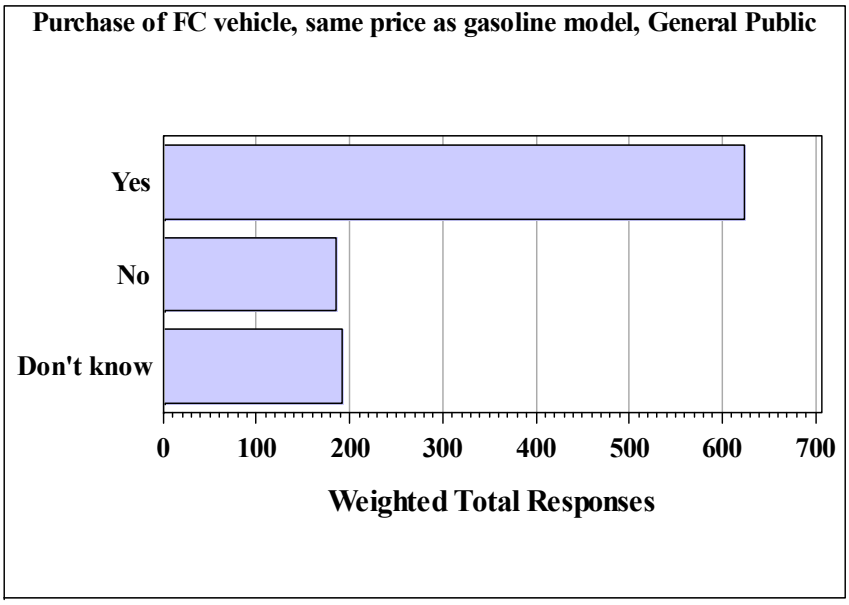

Figure 4.5. Share of respondents who would purchase a fuel cell vehicle if it were available at the same price as a gasoline-fueled vehicle, Question 11, general public survey.

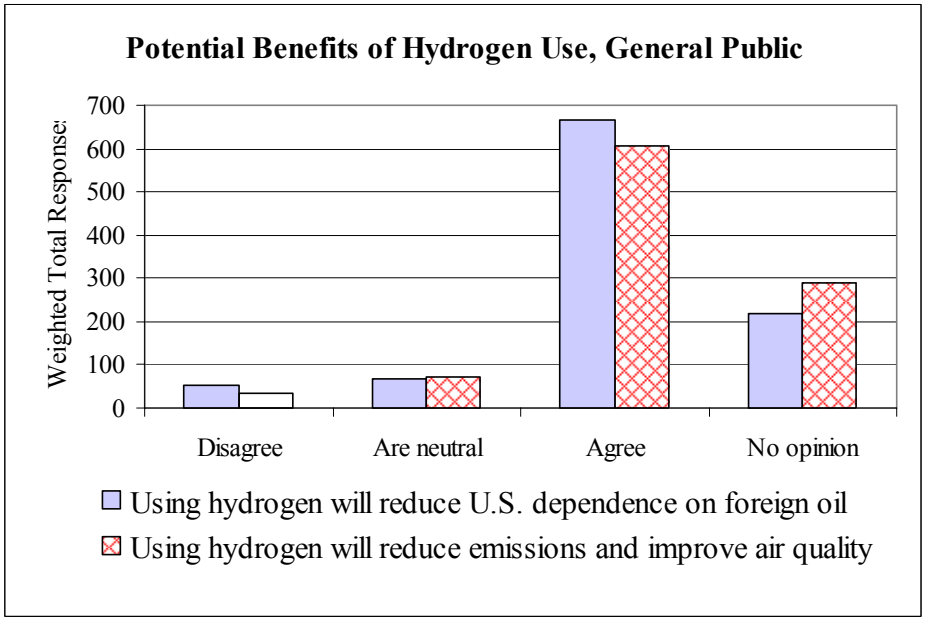

Figure 4.6. Responses to statements about the potential benefits of the use of hydrogen as a vehicle fuel, Questions 10A and 10B, general public survey.

Figure 4.7 shows that more than 40% of respondents agree with the statement "Hydrogen is as safe to use in my car as gasoline and diesel fuels." At the same time, however, nearly 40% of respondents provided a "Don't know/No opinion" response to this question.

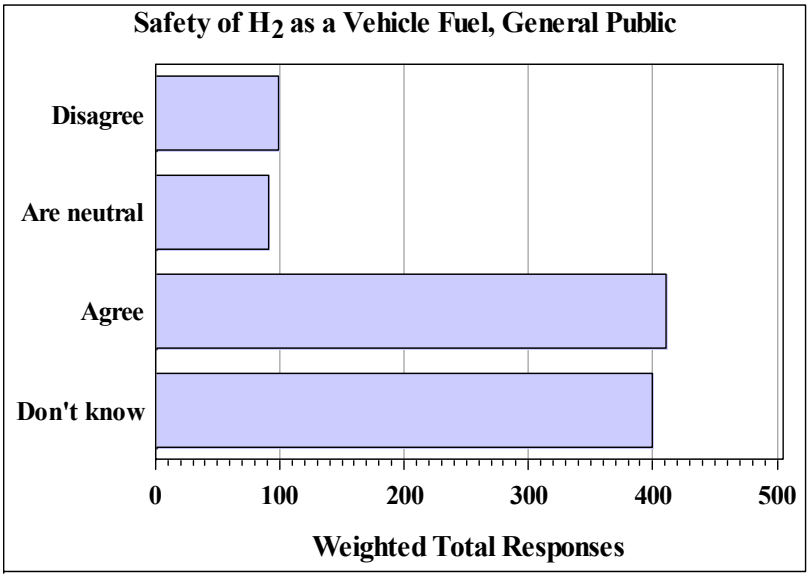

Figure 4.7. Responses to the statement, "Hydrogen is as safe to use in my car as gasoline and diesel fuels," Question 10C, general public survey.

Respondents were asked how they would feel if their local gas station also sold hydrogen. Figure 4.8 shows their responses to this question. Over half of the respondents indicated that they would be either "At ease" or "Pleased."

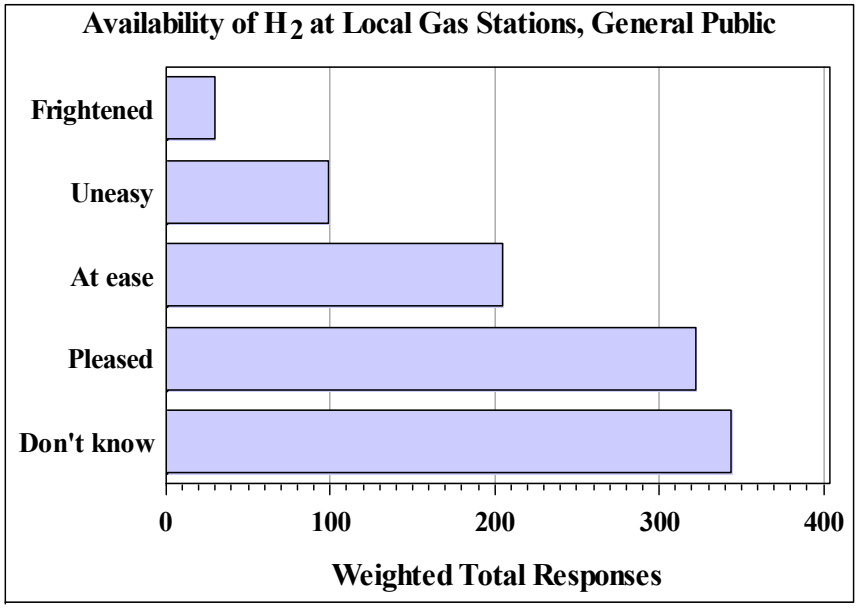

Figure 4.8. Reactions to the possibility of sales of hydrogen at a local gas station, Question 8, general public survey.

A similar question asked respondents how they would feel if a school, hospital, or other building in their neighborhood was powered by a fuel cell located on its property. Figure 4.9 shows the

results to this question, which indicate that over half of the general public respondents would feel either "At ease" or "Pleased" about the use of a fuel cell to provide power at a public building.

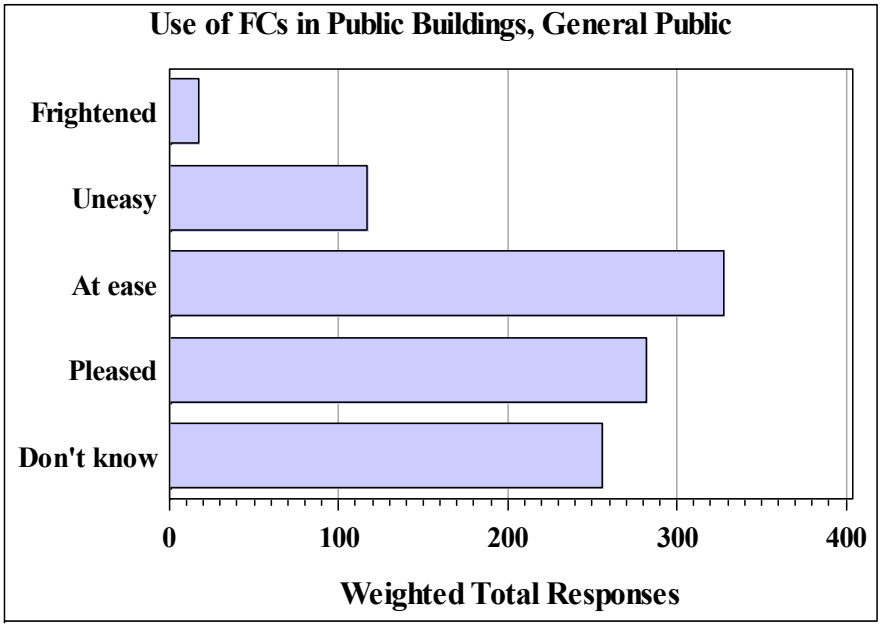

Figure 4.9. Reactions to the possible onsite use of a fuel cell to provide power for a public building, Question 12, general public survey

The population-wide response profiles in Figures 4.8 and 4.9 are similar. For individual respondents, the responses to the two questions (Questions 8 and 12) also tended to be the same. More than 40% of respondents gave exactly the same ordinal response (frightened, uneasy, at ease, or pleased) to both questions, and 15% of respondents differed by only one place on this scale. Only 5% of respondents differed by more than one place, the remaining 40% or respondents answering "Don't know" to either one or both questions.

The adults responding to the general public survey were asked two questions about information sources. Question 14 asked about the frequency ("Never," "Sometimes," "Frequently") of use of information sources to make decisions about energy costs and safety. As shown in Figure 4.10, the source marked "Frequently" most often was friends and family members (22.3% of respondents indicated frequent use of this source). On the other hand, "Never" was the most common response (followed by "Sometimes"). In fact, the only information sources for which "Never" was not the most frequent were friends and family members and utility companies or brokers. The responses of the general public to this question were very similar to those recorded in the 2004 survey.

Question 15 also asked about information sources, but from the perspective of media sources, that is, information vectors (television, radio, internet, etc.) for obtaining energy information. As shown in Figure 4.11, general public respondents indicated that they rarely used science and technology journals and trade magazines; their most frequent media source for obtaining energy information was television.

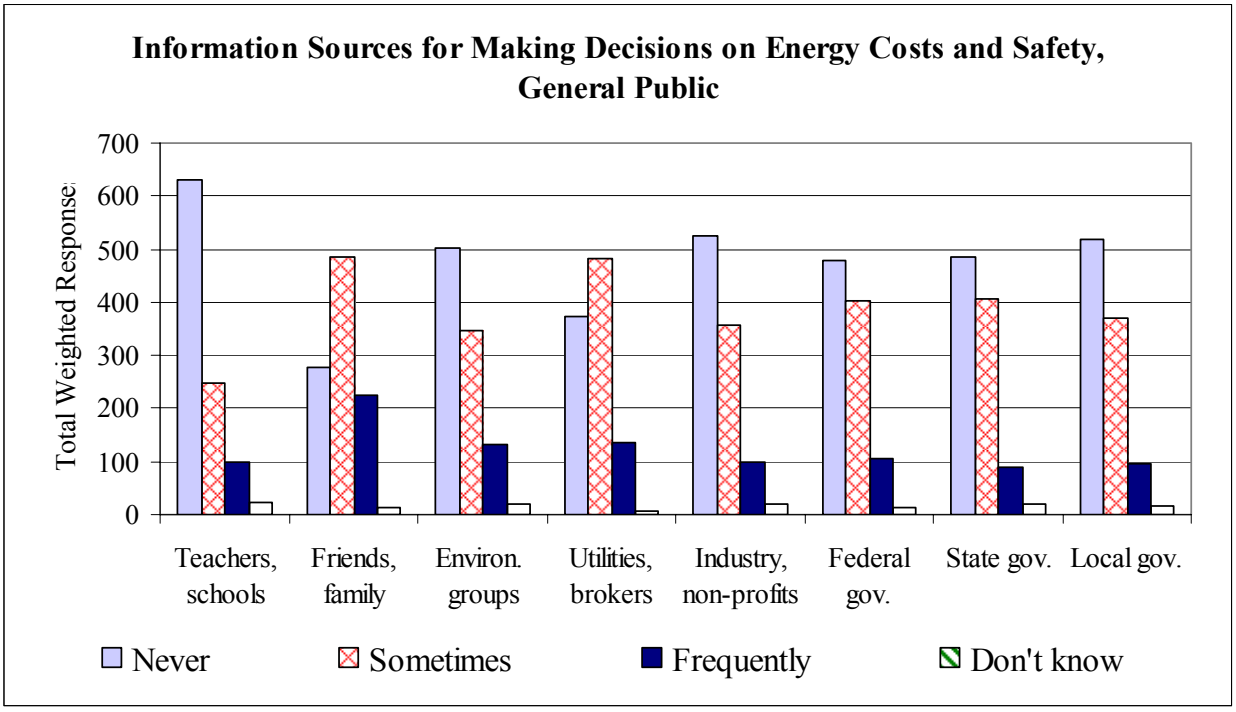

Figure 4.10. Weighted counts of responses regarding the frequency of use of information sources when making decisions about energy costs and safety, Question 14, general public survey.

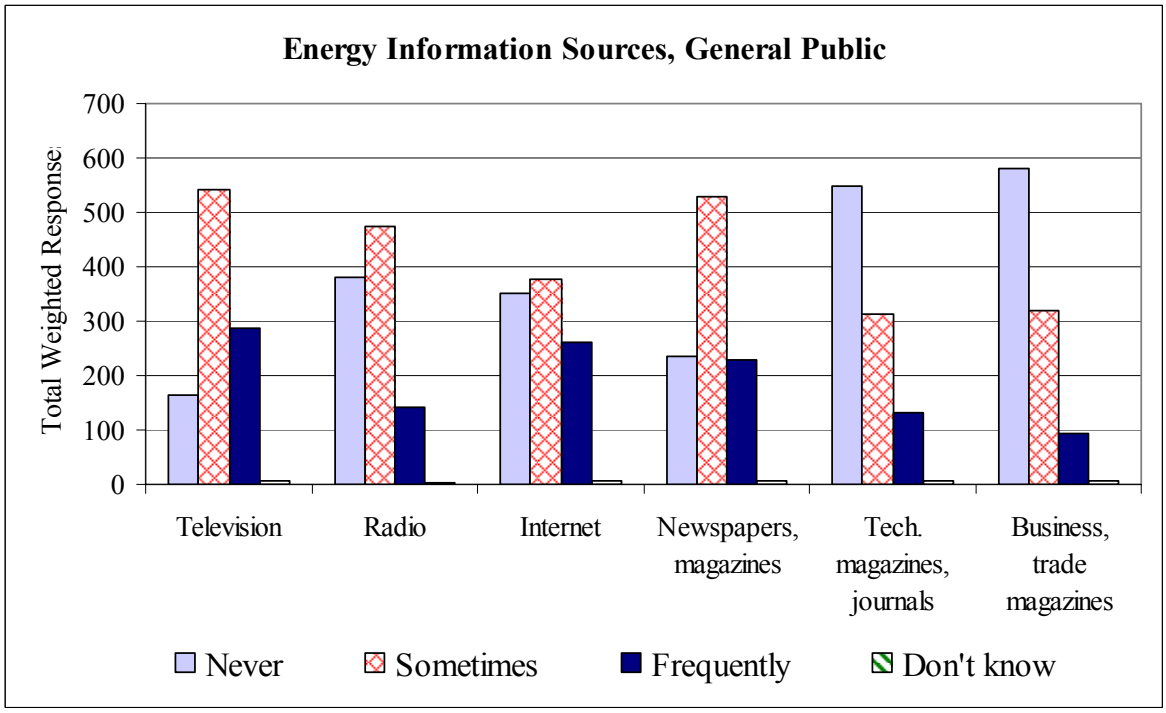

Figure 4.11. Weighted counts of responses regarding the frequency of use of different types of mass media for obtaining energy information, Question 15, general public survey.

4.3. RELATIONSHIPS

The summary statistics discussed in Section 4.2 are "one-way" statistics in the sense that the response categories are defined in terms of one variable such as the response to an opinion question such as "Hydrogen is as safe to use in my car as gasoline and diesel fuels." However, relationships in the responses determined by two or more variables are also of interest. Although no relationships were of particular interest a priori, a few of the more statistically significant two-way relationships are illustrated in this section. Interactions that were considered were between survey variables and sex, age (18-44, and 45+; divides population in approximate halves), region, urban/non-urban, degree (no degree/associate or above), the individual assessment of familiarity with hydrogen and fuel cell technologies, and whether or not the score on the technical questions was above the average for the sample. The statistical significance criterion here is the significance level (p)[34] of a chi-square test that accounts for the sampling weights.[35]

As shown in Figure 4.12, respondents who scored below average on the technical questions were more likely to assess their familiarity as "Not at all familiar," and respondents who scored above average were more likely to claim a higher familiarity with hydrogen and fuel cell technologies. Thus, the familiarity self-assessments are consistent with the technical awareness scores.

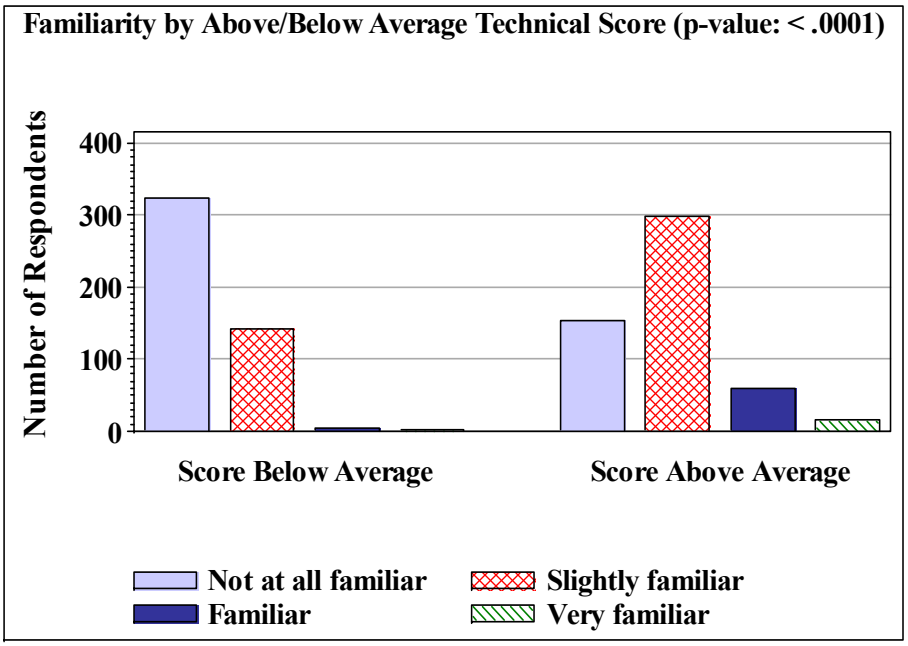

Figure 4.12. Responses by technical score above/below average to Question 1 (familiarity of respondents to hydrogen and fuel cell technologies), general public survey.

[34] Significance levels (p) are expressed in this report either as "p=value" or, for values less than 0.0001, "p<0.0001." Significance levels for relationships, which are for chi-square tests, are printed at the tops of the figures.
[35] Measures could also be based on odds ratios or combinations of odd ratios and significance levels as well as other metrics. Significance levels alone were used for simplicity and because sample sizes are essentially the same for all survey questions.

In the 2004 general public survey results, an interesting and statistically significant finding was that respondents who did better on the technical knowledge questions were much more likely to say that they would be comfortable with a local hydrogen gas station. As shown in Figure 4.13, this finding was also evident in the 2008 survey results.

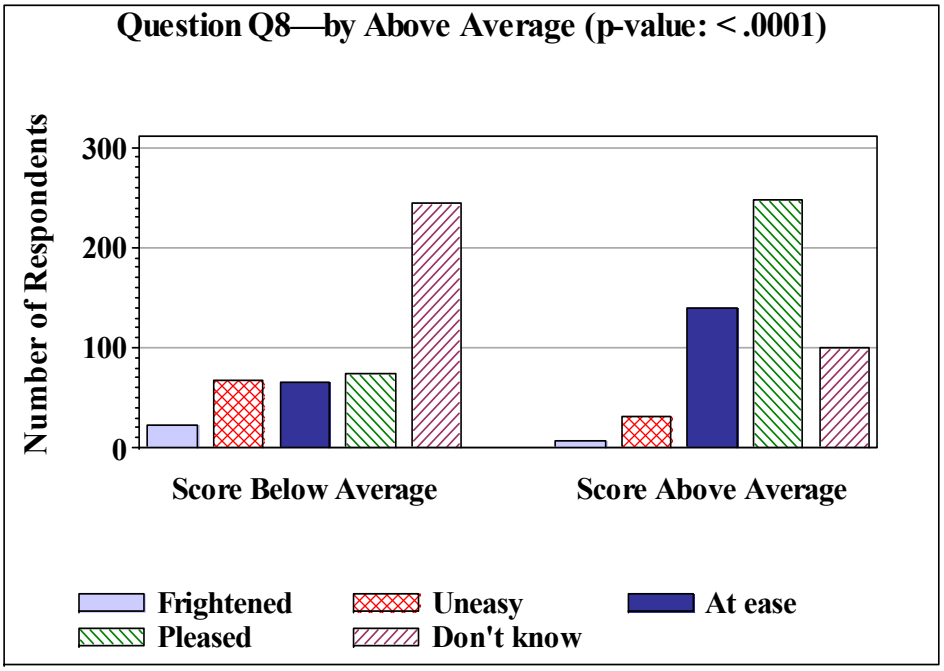

Figure 4.13. Responses by technical score above/below average to Question 8, "How would you feel if your local gas station also sold hydrogen," general public survey.

Another statistically significant finding in the 2008 survey is the relationship between the respondent's score on the technical questions and his/her reaction to the statement "Hydrogen is too dangerous for everyday use by the general public" (Question 9, general public survey). As shown in Figure 4.14, respondents who knew more about hydrogen and fuel cell technologies (as indicated by their technical scores) were much more likely to consider this statement false; that is, they were more comfortable with the idea of everyday use of hydrogen by the general public.

Three comparisons by gender were statistically significant. Males are much more comfortable with hydrogen and fuel cell technologies than females, as shown in Figures 4.15, 4.16, and 4.17. When asked how they would feel if their local gas station also sold hydrogen, females were more likely than males to respond "Frightened," "Uneasy," or "Don't know" (Figure 4.15). When asked how they would feel if a school, hospital, or other building in their neighborhood was powered by a fuel cell located on its property, females again were more likely than males to respond "Frightened," "Uneasy," or "Don't know" (Figure 4.16). Females were also more likely to believe that hydrogen was not as safe as gasoline for vehicle use (Figure 4.17).[36]

[36] Gender differences among general public respondents were also observed in 2004. See, for example, Figure 4.8 of the 2004 report.

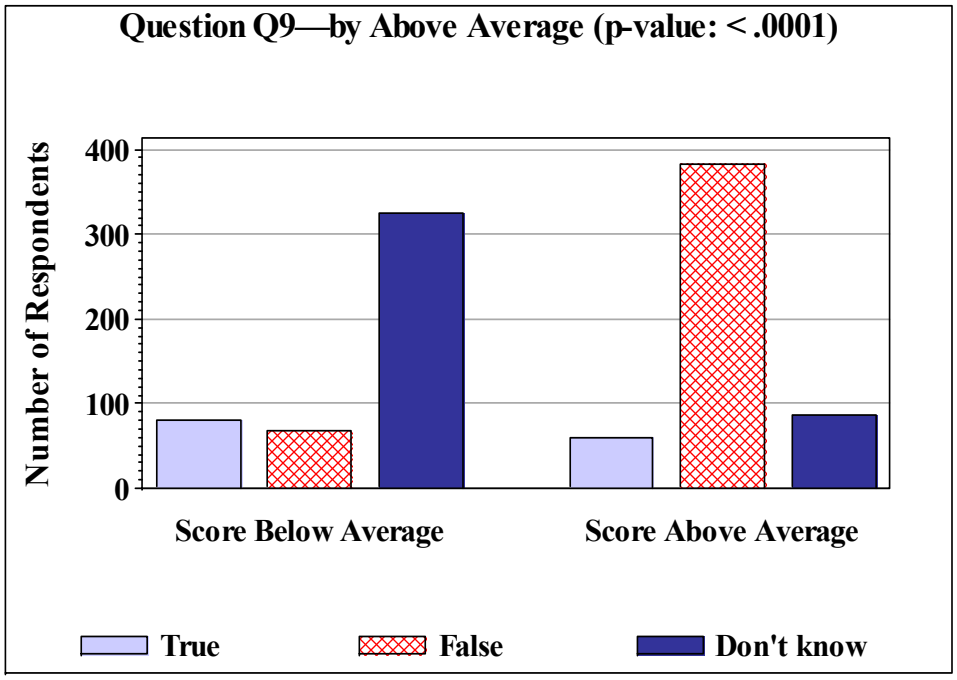

Figure 4.14. Responses by technical score above/below average to Question 9, "Please tell me if the following statement is true, if it is false, or if you don't know: "'Hydrogen is too dangerous for everyday use by the general public,'" general public survey.

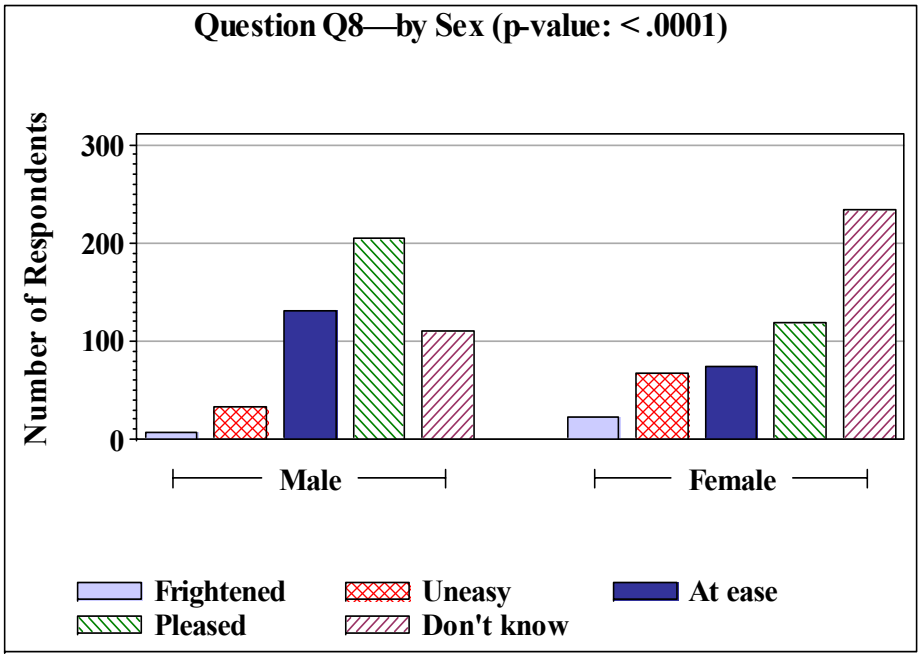

Figure 4.15. Responses by gender to Question 8, "How would you feel if your local gas station also sold hydrogen," general public survey.

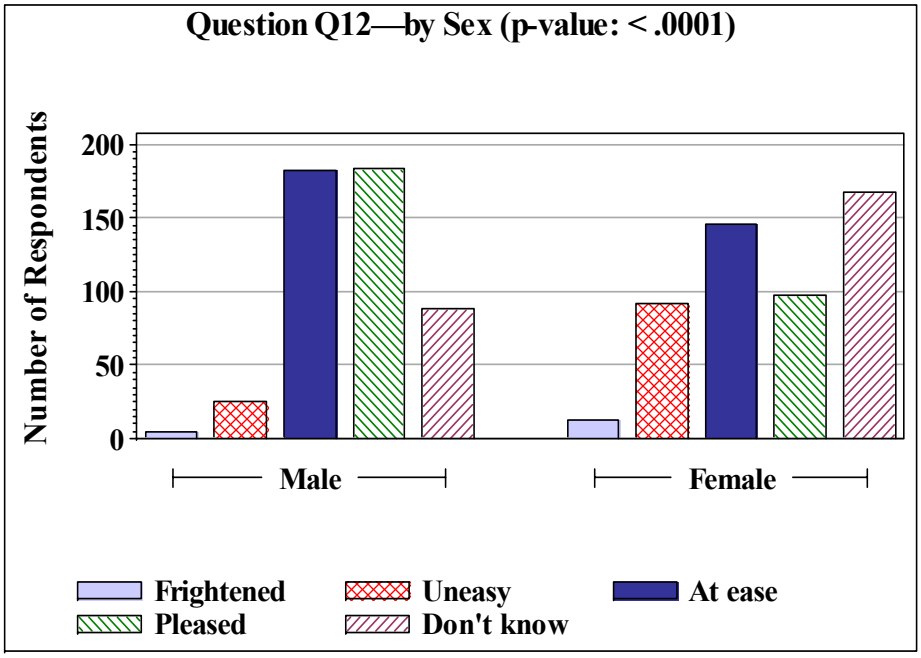

Figure 4.16. Responses by gender to Question 12, "How would you feel if a school, hospital, or other building in your neighborhood was powered by a fuel cell located on its property," general public survey.

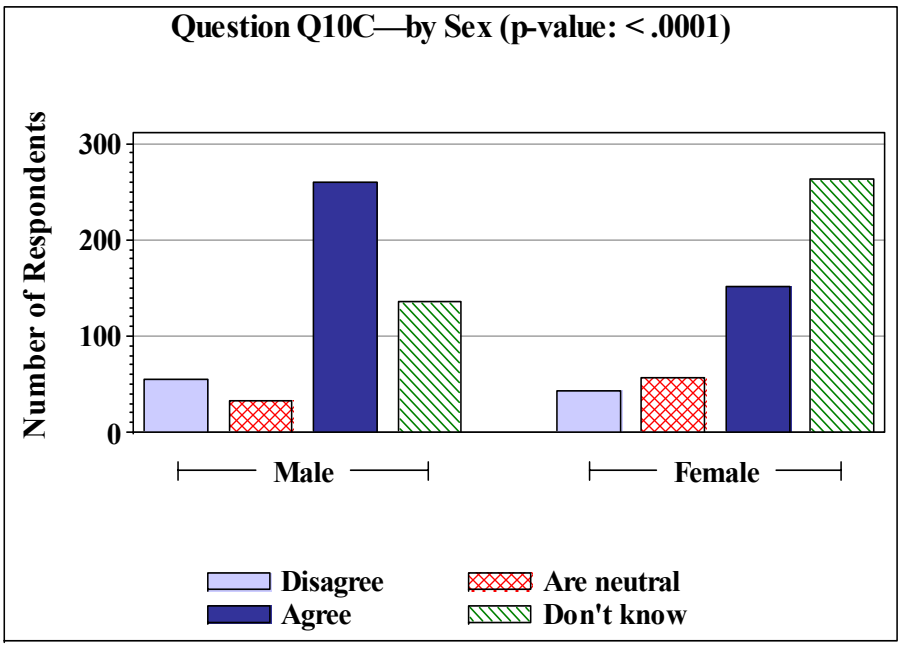

Figure 4.17. Responses by gender to Question 10C, "Hydrogen is as safe to use in my car as gasoline and diesel fuels," general public survey.

Another statistically significant finding was a comparison of responses to Question 8 by age. Figure 4.18 shows that respondents under age 45 were more likely to indicate that they did not know how they would feel if their local gas station also sold hydrogen; respondents age 45 and over were more likely to be pleased.

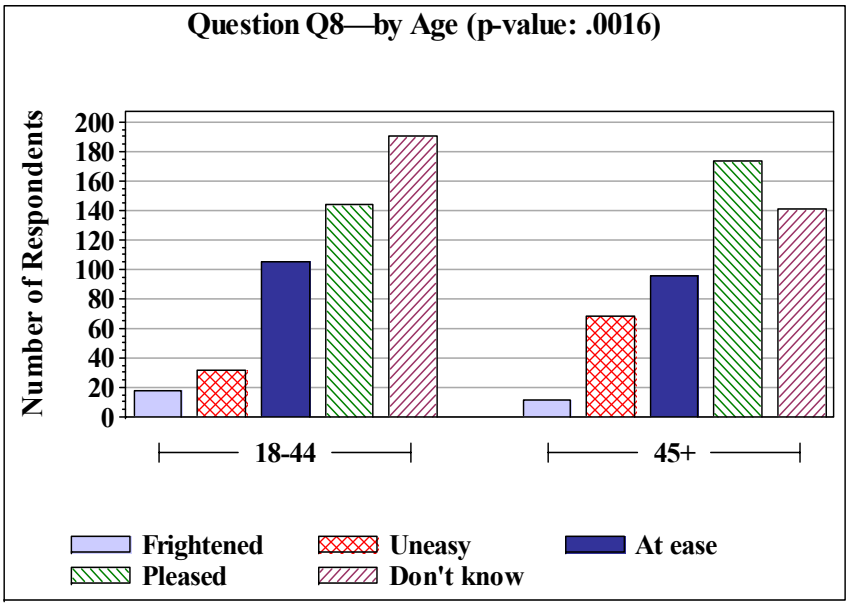

Figure 4.18. Responses by age to Question 8, "How would you feel if your local gas station also sold hydrogen," general public survey.

4.4. COMPARISON WITH THE 2004 BASELINE

A primary objective of conducting multiple surveys over time is to compare changes in the survey results. Figure 4.19 shows the differences in the average technical scores for each of the eight technical questions on the survey as well as the difference between 2008 and 2004 in the overall average score. A positive difference indicates improvement in 2008. For example, for the 2008 question 2A, the scores were on average 7 percentage points higher in 2008 than in 2004. Respondents in 2008 had higher average scores on Questions 2A, 2D, 5, and 9; however, they had lower average scores on Questions 2B, 2C, 4, and 6. The general public had an overall average technical score of 35.19% correct responses in 2008; in 2004 the average percent correct was 32.84% on eleven technical questions. However, only eight of those eleven questions were used again in 2008. The 2004 average score for the eight questions used in both 2004 and 2008 is 35.18. This is almost identical to the 2008 average. Thus, there is essentially no difference at all between 2004 and 2008 average scores. Error bars on the chart show 95% confidence ranges for the average score differences. A 95% error range containing 0 indicates that the corresponding difference is not statistically significant. In addition to showing that the difference in the overall average scores is not statistically significant (which is almost obvious from the nearly exact agreement in the two averages) the error range for the overall average difference (from -5% to +5%) shows that the nearly exact agreement is also, at least in part, merely a coincidence.

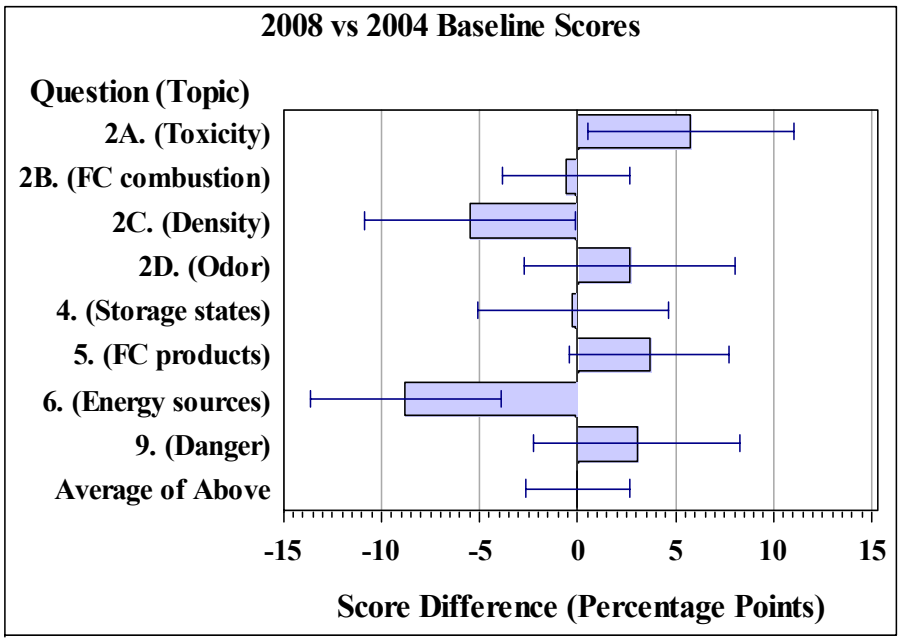

Figure 4.19. Differences between the 2008 and 2004 average percentage correct for each technical question and overall, general public survey. Bars to the right of zero indicate improvement in 2008; bars to the left indicate a decline. The error bars are 95% confidence intervals for the differences. Confidence limits that span the origin (0) indicate that the change indicated by the corresponding bar is not statistically significant (at the 0.05 level of significance).

In 2004, general public respondents were asked to rank the importance of safety, cost, environment, and convenience when selecting a vehicle fuel or home power supply. The ranking question was also asked in 2008 with the addition of another ranking option, "Performance." Results for the ranking question for the 2008/2009 survey are shown in Figure 4.4; the results of this question for 2004 are shown in Figure 4.20.

Although the "Performance" category was not considered in 2004, the preference ranks for the other four categories are directly comparable. The 2004 and 2008 average rankings for those four categories were in the same order, with one exception: in 2004, safety was considered most important, followed by cost; in 2008 cost was considered most important, followed by safety. As the tight confidence bars in Figures 4.4 and 4.20 suggest, this reversal is statistically significant ($p<0.0001$). A likely reason for the public's greater concern about cost in 2008 is the dramatic rise in gasoline costs.

Several questions in the survey concerned safety issues and the use of hydrogen. Changes in the public's perception of hydrogen safety are shown in the next few figures. Figure 4.21 shows that the 2008 percentage (13.9%) of respondents who believe that hydrogen is too dangerous for everyday use is about half of what it was in 2004 (27.5%). This difference is statistically significant ($p<0.0001$).

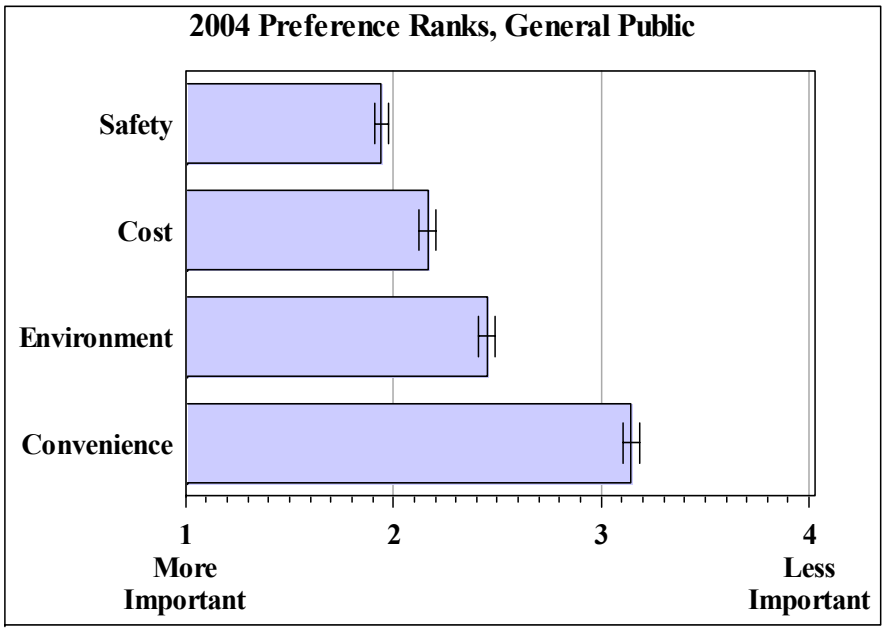

Figure 4.20. Mean of the general public's 2004 preference rankings of cost, safety, environment, and convenience. (Rank = 1 for first choice, 2 for second choice, etc.) The error bar on each chart bar shows 95% confidence limits for the mean rank.

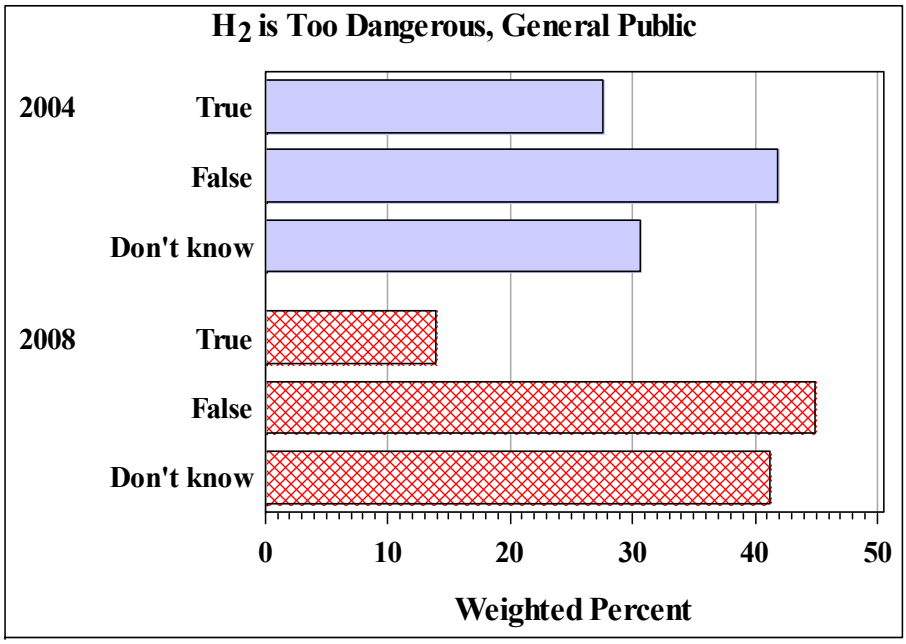

Figure 4.21. Comparison of results of the 2004 and 2008 surveys regarding opinions about the everyday use of hydrogen, Question 9, general public survey.

Another question concerned the comfort level of the general public with the sale of hydrogen at their local gas station. Figure 4.22 compares the 2004 and 2008 responses to this question. The number of respondents who indicated that they would be frightened or uneasy in 2004 (8.0% and 18.6% respectively) decreased appreciably in 2008 (to 3.0% and 9.9% respectively). Both decreases were statistically significant ($p<0.0001$ in each case).

Another question examined opinions about the safety of hydrogen in vehicles. As shown in Figure 4.23, the percentage of respondents who disagreed with the statement, "Hydrogen is as safe to use in my car as gasoline and diesel fuels" decreased between 2004 and 2008 (from 15.6% to 9.9%). The difference is also statistically significant ($p=0.002$). The proportion of respondents who agreed with the statement changed only slightly, however (41.1% in 2008; 39.2% in 2004).

Although no statistically significant change between the surveys of 2004 and 2008 was observed in the average percentage of correct responses to the technical knowledge questions, the results shown in Figures 4.21 through 4.23 indicate that the general public is nevertheless becoming more aware of and more comfortable with the use of hydrogen technology, and more confident in its safety.

The sources that the general public use to obtain energy information were almost identical to those identified in the 2004 survey.

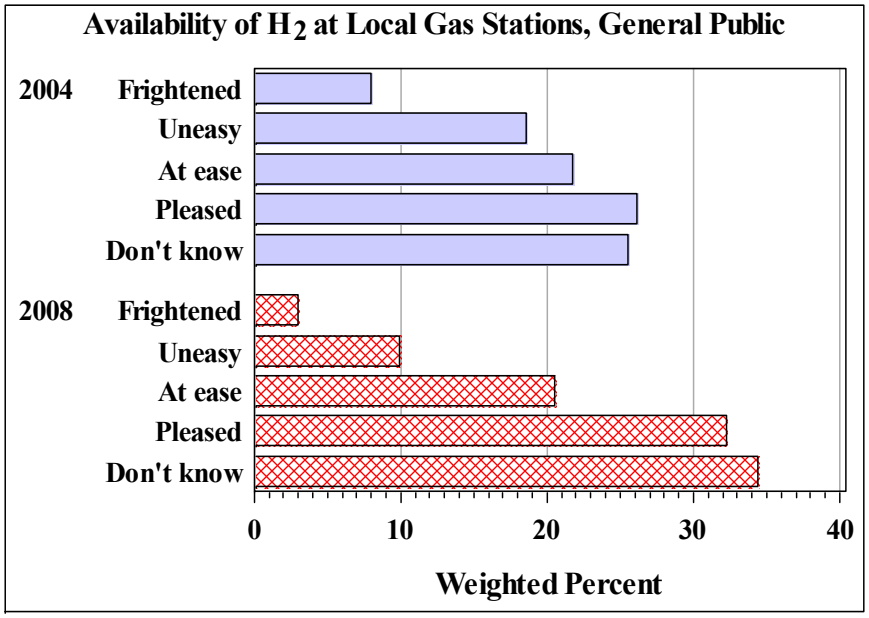

Figure 4.22. Comparison of results of the 2004 and 2008 surveys regarding opinions about the availability of hydrogen at a local gas station, Question 8, general public survey.

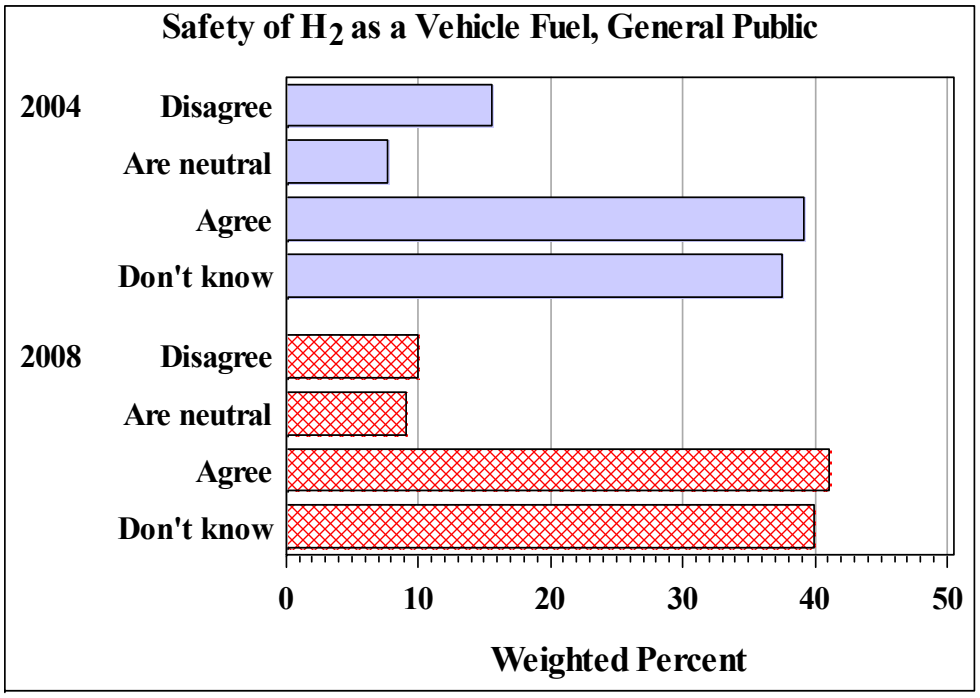

Figure 4.23. Comparison of results of the 2004 and 2008 surveys regarding opinions about the safety of hydrogen as a vehicle fuel, Question 10C, general public survey.

5. RESULTS: STUDENT SURVEY

5.1. INTRODUCTION

This section summarizes the results of the student survey. A copy of the survey questionnaire is in Appendix A.2. A total of 1,004 interviews with teens ages 12-17 were completed during the period of June 3 – July 12, 2008. Interviews were conducted via a telephone survey conducted among a national probability sample, which included 503 males and 501 females, living in private households in the continental United States. The total average interview length was 13.9 minutes, broken down into a screening time of 3.4 minutes and a main interview length of 10.4 minutes. A summary of responses to this survey, by question number, is provided in Appendix C.2.

The interview was conducted in Spanish if the person who answered the phone answered in Spanish or if the student requested that the interview be conducted in Spanish. It the person who answered the phone was not proficient in either English or Spanish, the interview was terminated.

Section 5.2 is a general summary of the student responses. Relationships between the response variables are discussed in Section 5.3. Differences between the 2008 and 2004 survey results are discussed in Section 5.4.

For the sake of simplicity, the responses "Don't know," "No opinion," and "Don't know/no opinion" are all be treated equivalently and generally as "Don't know" in this report.

The response rate for the 2008 Student Survey is discussed in Appendix E.2. The response rate is 29.53%. This 2008 rate is actually slightly higher than the rate of .2754 computed for the 2004 survey. It seems unlikely, however, that this is due to a behavioral change in subjects and their tendency to respond. Comparison of Table E.2 with the corresponding table (Table 5.3) in the 2004 report shows that the number of "known ineligible" subjects was much higher in 2008 than in 2004 (122,983 in 2008 and 64,231 in 2004), while the numbers of "known eligible" subjects were proportionately much closer (2,358 in 2008 and 1,984 in 2004). Furthermore the numbers of "eligibility unknown" subjects were nearly the same (55,367 in 2008 and 54,984 in 2004). In turn, the proportion **e** of eligible households is much smaller for 2008 (**e** = .01881) than for 2004 (**e** = .02996), which (because the numbers of "eligibility unknown" subjects are nearly the same) translates to a smaller response rate in 2008.

The AAPOR RR3 response rate used here is premised on the assumption that the proportion of eligible subjects is the same, whether eligibility is determined or not. This is an approximation, however, and it seems likely that the accuracy of the approximation might differ for the 2004 and 2008 vendor-supplied sampling frames, particularly since there were with so many more "known ineligibles" in 2008. The change in response rates thus seems more likely an artifact of the precision of the sampling frames than an increase in the tendency to respond among eligible subjects.

The teens were asked the last grade of school completed. The responses are shown in Figure 5.1. Most (83%) of the teens had completed elementary school (i.e., grade 6), but less that 10% had completed high school or college.

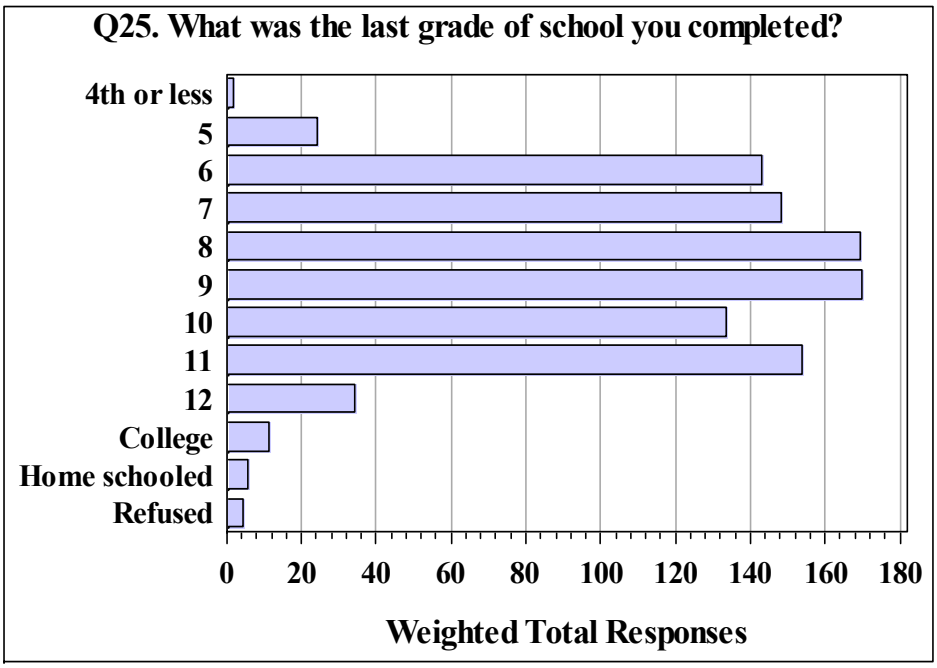

Figure 5.1. Distribution of students by grade level (Question 25, student survey).

5.2. SUMMARY

The section summarizes the responses to the individual questions in the student survey. Most of the questions are summarized as proportions of respondents in each of the respective multiple choice categories. Answers to the technical questions are summarized individually and are also compiled into an overall technical score. Relationships between responses to different questions and comparisons with the 2004 survey results are considered in Section 5.3 and 5.4.

Table 5.1 summarizes the technical questions in terms of whether they were answered correctly or incorrectly with "Don't know" treated as an incorrect response.

Table 5.1. Summary of Results for the Technical Knowledge Questions (correct/incorrect), Students				
Question	**Number of responses**	**Weighted percent correct**	**Lower 95% confidence bound**	**Upper 95% confidence bound**
2A. Hydrogen gas is toxic (false)	1,004	46.83	43.72	49.95
2B. Fuel cells produce electricity through hydrogen combustion (false)	1,004	16.02	13.71	18.33
2C. Hydrogen is lighter than air (true)	1,004	50.87	47.77	53.97
2D. Hydrogen has a distinct odor (false)	1,004	56.98	53.87	60.09
4. In which state or condition can hydrogen be stored? (chemical compound and liquid)	1,004	38.93	35.88	41.98
5. When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else? (heat)	1,004	20.55	18.01	23.08
6. Hydrogen can be produced using which of the following sources of energy? (natural gas, sunlight, organic matter)	1,004	33.74	30.78	36.71
9. Hydrogen is too dangerous for everyday use by the general public (false)	1,004	54.83	51.75	57.91
Overall Average	1,004	39.8	38.51	41.18

The greatest percentage of correct responses is 57.0%, for Question 2D (Hydrogen has a distinct odor…), followed by 54.8% for Question 9 (Hydrogen is too dangerous…). The smallest percentage of correct responses is 16.0%, for Question 2B (Fuel cells produce electricity through…), followed by 20.6% for Question 5 (When using pure hydrogen, fuel cell vehicles generate…).

The correct/incorrect perspective used in Table 5.1 is conventional, since "Don't know" is generally considered an incorrect response. However, "Don't know" was a very common response to the survey technical questions. Figure 5.2 shows the responses broken down according to type: Correct, Incorrect, and "Don't know." On average, 39.8% of the technical questions were answered correctly, 35.8% were answered incorrectly, and 24.4% were answered with "Don't know."

Figure 5.3 shows the distribution of the number of correct responses. The distribution is more normal (bell-shaped) than the distribution in Figure 4.2 for the general public, but the dispersion about the mean score (39.8% or 3.2 correct) is again substantial, with the number of correct responses ranging from 0 correct (5% of students) to all 8 correct (0.5% of students).

The first question in the survey asked respondents to gauge their familiarity with hydrogen and fuel cell technologies. Figure 5.4 shows the distribution of responses. A greater number of student respondents considered themselves "Familiar" with hydrogen and fuel cell technologies than did general public respondents. (This and other cross-population comparisons are considered in detail in Section 9.)

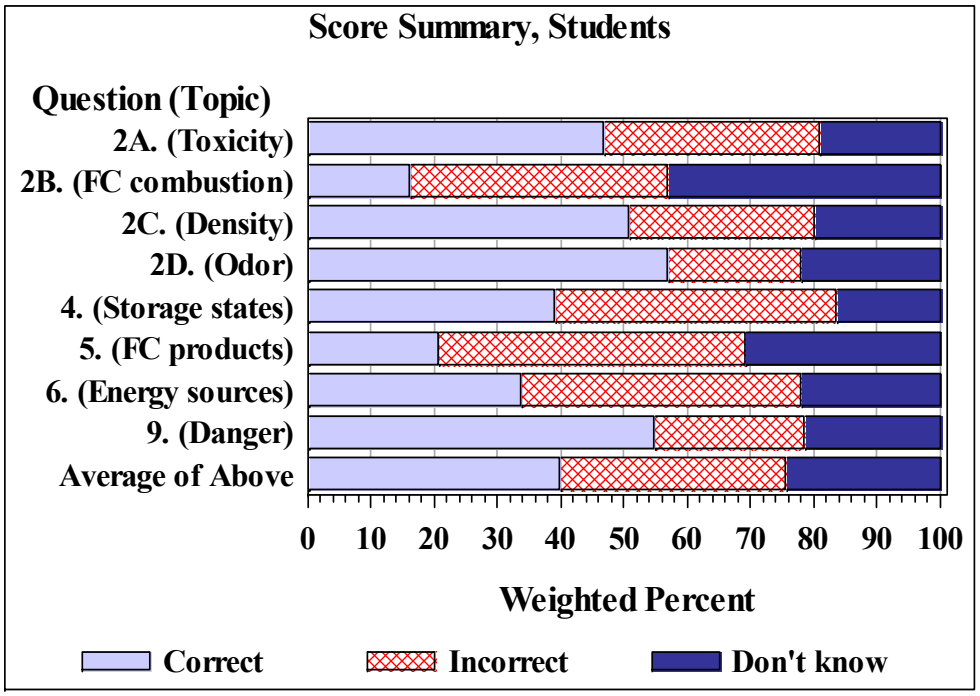

Figure 5.2. Weighted percent of correct, incorrect, and "Don't know" responses for the technical knowledge questions, student survey.

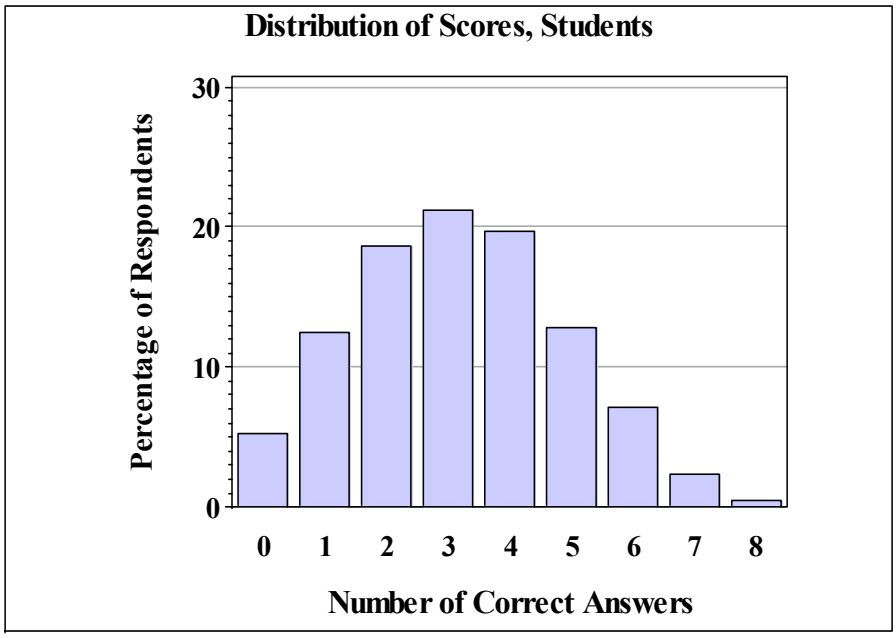

Figure 5.3. Distribution of the number of correct answers to the eight technical knowledge questions, student survey.

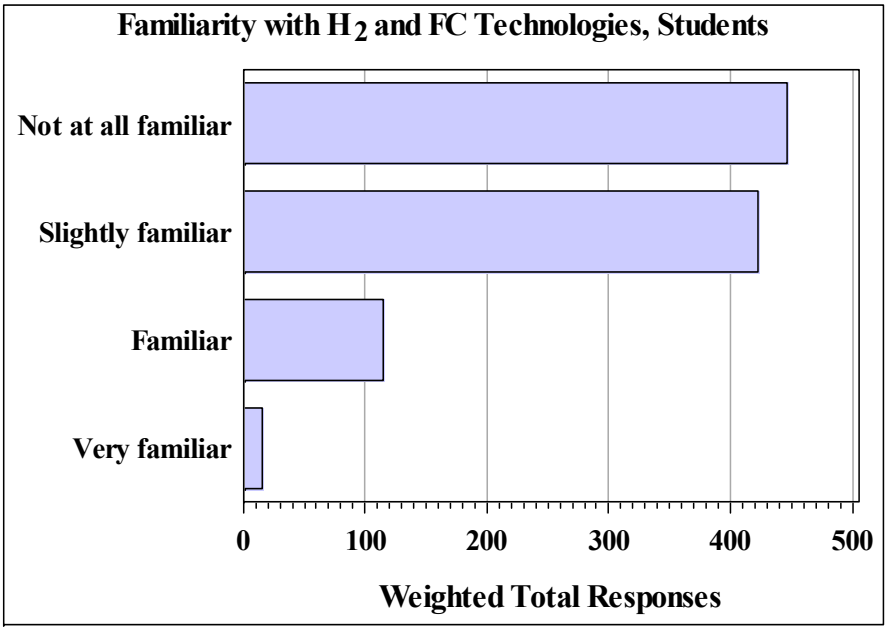

Figure 5.4. Distribution of responses to the question about familiarity with hydrogen and fuel cell technologies, Question 1, student survey.

Each student respondent was asked first to imagine going shopping for a new automobile and then to rank each of six characteristics (cost of vehicle at the point of sale, gas mileage, power and speed, reliability, safety, and impact on the environment or emissions produced) for its importance (responses: not important, neutral, important, no opinion). Figure 5.5 shows the student responses among students who had an opinion. The teens rated "Safety" as the most important characteristic and rated "Power and speed" as the least important characteristic. The teens also rated a vehicle's gas mileage as more important than the purchase price of the vehicle.

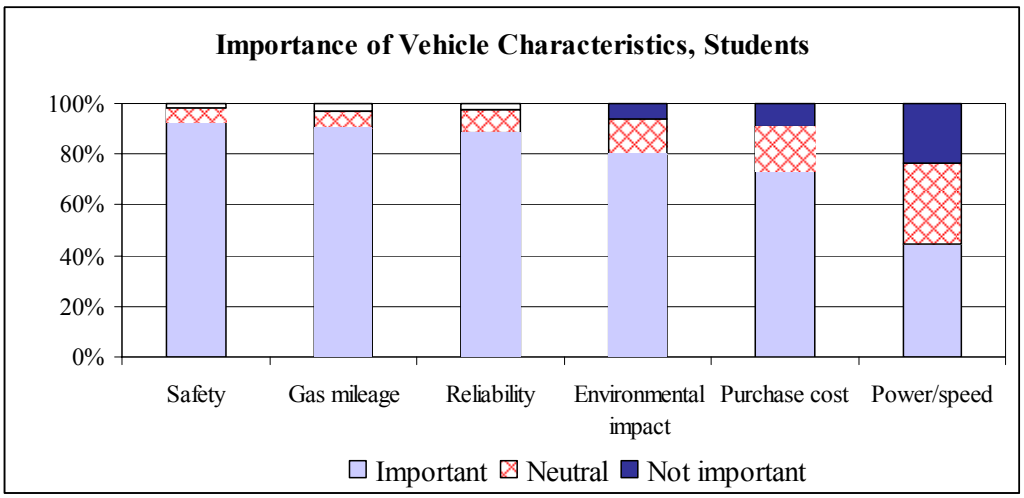

Figure 5.5. Importance of six specific characteristics of a new automobile, Question 20, student survey.

Two statements were read to students in order to obtain opinions about potential benefits of using hydrogen as a vehicle fuel. Students were asked whether they agreed or disagreed with the statements. Responses (Figure 5.6) indicated that students generally "Agree" that the use of hydrogen will reduce U.S. dependence on foreign oil and will reduce emissions and improve air quality.

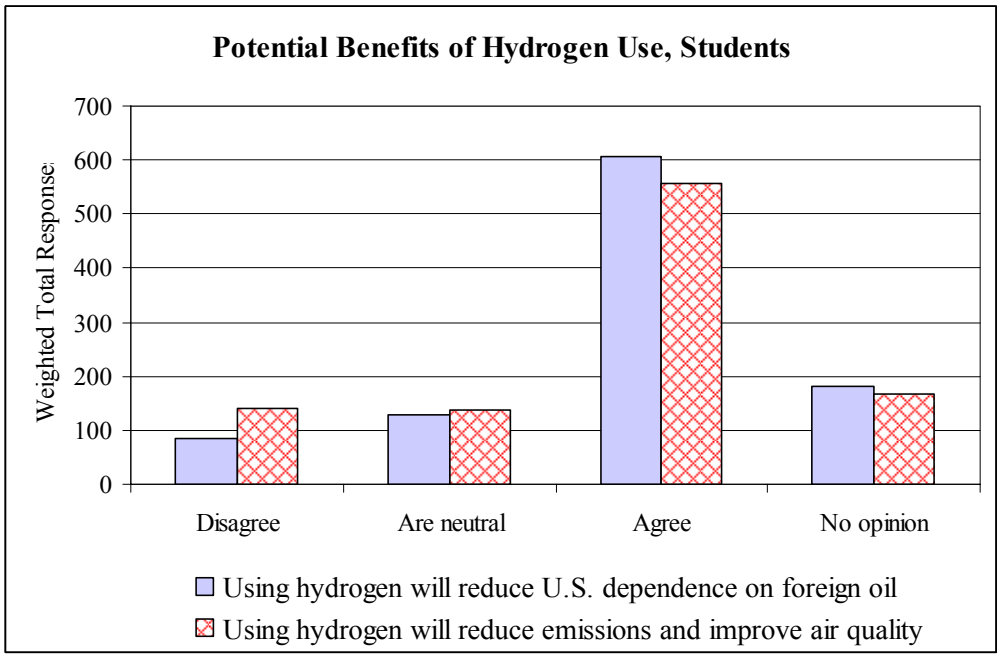

Figure 5.6. Responses to statements about the potential benefits of the use of hydrogen as a vehicle fuel, Questions 10A and 10B, student survey.

Students were also asked about the use of fuel cells for providing power to their home, car, laptop computer, or (the correct response) all of these. Figure 5.7 suggests that students are aware of the potential uses of fuel cells.

Several questions asked students to provide opinions about the safety of fuel cells and hydrogen. Figure 5.8 shows the responses for the survey question about the safety of hydrogen relative to gasoline and diesel (survey Question 10C). The options that were provided to respondents were "Disagree," "Are neutral," "Agree," or "Don't know." As can be seen in Figure 5.8, most (43.9%) students agreed with the statement "Hydrogen is as safe to use in my car as gasoline and diesel fuels," though "Don't know" was also a common a response.

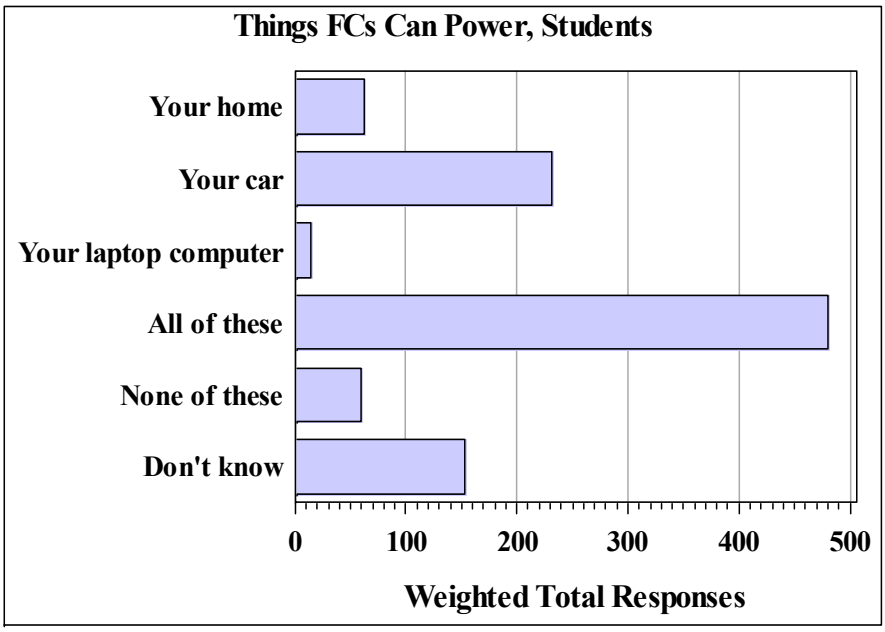

Figure 5.7. Responses to statements about the uses of fuel cells, Question 3, student survey.

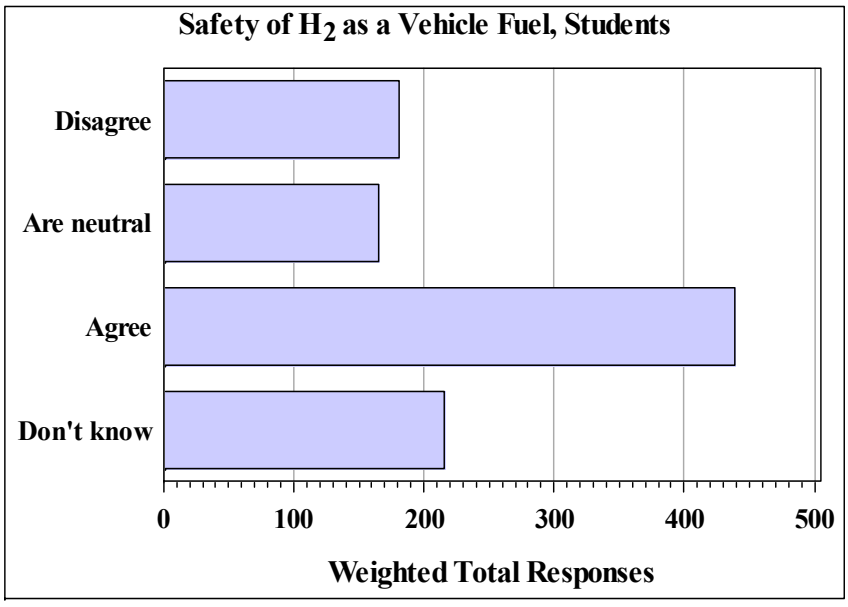

Figure 5.8. Responses to the statement, "Hydrogen is as safe to use in my car as gasoline and diesel fuels," Question 10C, student survey.

Students were asked how they would feel if their local gas station also sold hydrogen (Figure 5.9). More than half of respondents indicated that they would be either "At ease" or "Pleased," and only 18% said they would be either "Uneasy" or "Frightened."

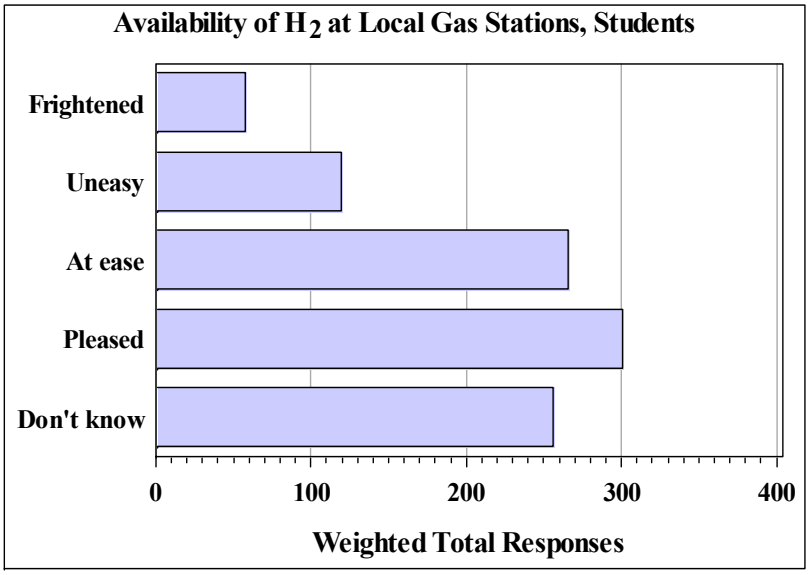

Figure 5.9. Responses to the possibility of sales of hydrogen at a local gas station, Question 8, student survey.

A similar question (Question 8A) asked students how they would feel if their school's electricity and heat were provided by a fuel cell located on school grounds. The students' responses are shown in Figure 5.10. As with Question 8, more than half of the students indicated that they would be either "At ease" or "Pleased."

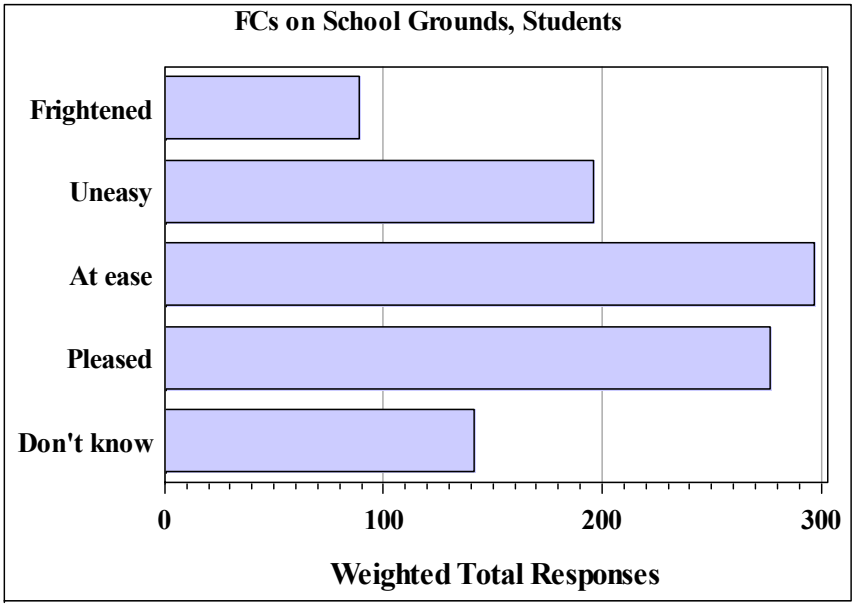

Figure 5.10. Responses to the possibility of using a fuel cell to provide electricity and heat for the respondent's school, Question 8A, student survey.

Question 24 asked students about the frequency of use ("Never," "Sometimes," "Frequently") of mass media sources (television, radio, internet, etc.) they use to obtain energy information. As

shown in Figure 5.11, respondents indicated that they used television and classroom instruction most frequently for obtaining energy information. Over half the students indicated that they never used the radio to obtain energy information

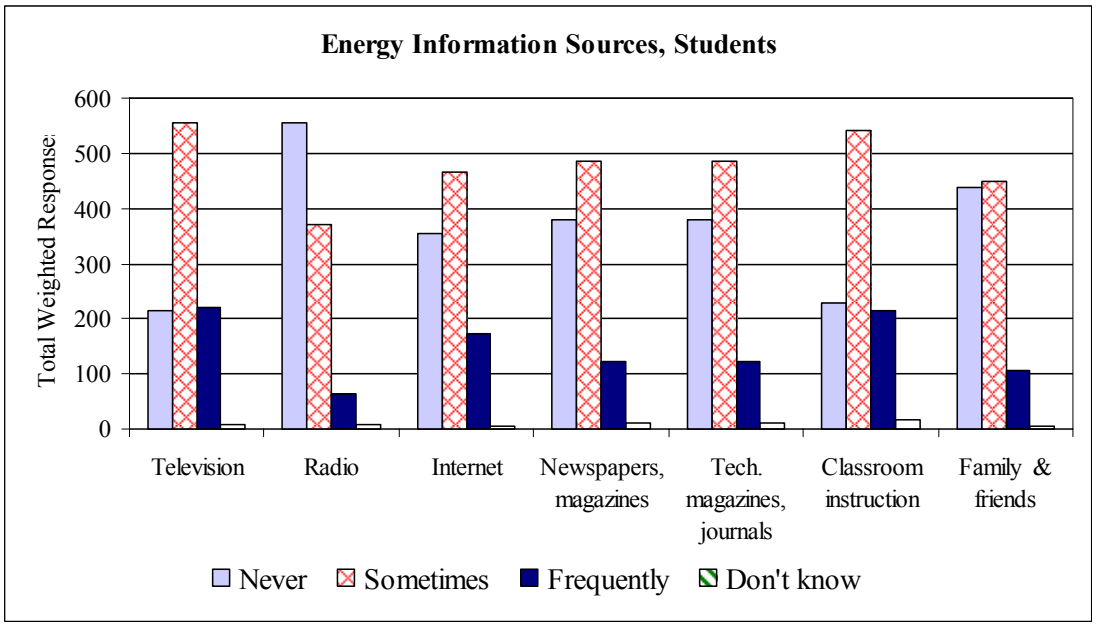

Figure 5.11. Weighted counts of responses regarding the frequency of use of different types of mass media for obtaining energy information, Question 24, student survey.

5.3. RELATIONSHIPS

The summary statistics discussed in Section 5.2 are "one-way" statistics in the sense that the response categories are defined in terms of one variable such as sex, region, or response to an opinion question such as "Hydrogen is as safe to use in my car as gasoline and diesel fuels." However, relationships in the responses determined by two or more variables may also be of interest. Although no relationships were of particular interest a priori, a few of the more statistically significant two-way relationships are illustrated in this section. Interactions that were considered were with the survey variables and sex, region, urban/non-urban familiarity with hydrogen technologies, and whether or not the score on the technical questions was above the average for the sample. The statistical significance criterion is the significance level (p) of a chi-square test that accounts for the sampling weights.[37]

As shown in Figure 5.12, respondents who scored below average on the technical questions were more likely to assess their familiarity as "Not at all familiar," and respondents who scored above average were more likely to claim a higher familiarity with hydrogen and fuel cell technologies. Thus, the familiarity self-assessments are consistent with the technical awareness scores.

[37]Measures could also be based on odds ratios or combinations of odd ratios and significance levels as well as other metrics. Significance levels alone were used for simplicity and because sample sizes are essentially the same for all survey questions.

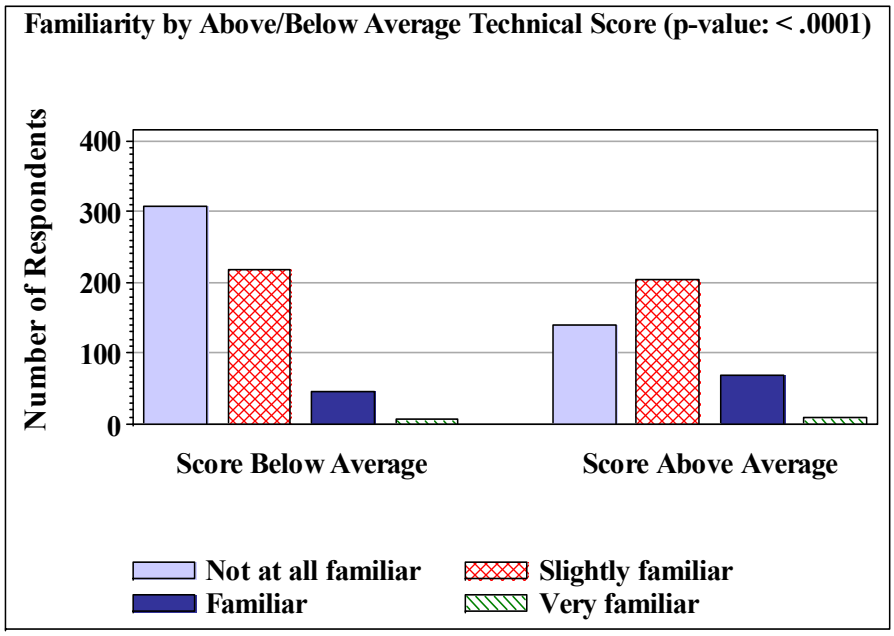

Figure 5.12. Responses by technical score above/below average to Question 1 (familiarity of respondents to hydrogen and fuel cell technologies), student survey.

In the 2004 survey results, an interesting and statistically significant finding was that respondents who did better on the technical knowledge questions were much more likely to say that they would be comfortable with a local hydrogen gas station. This finding was also evident in the 2008 survey of the students, as shown in Figure 5.13.

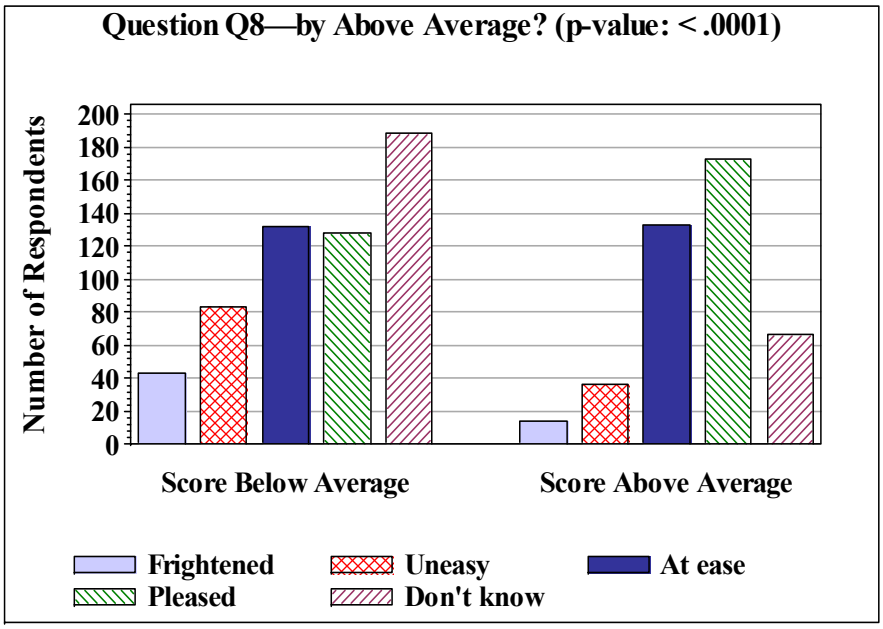

Figure 5.13. Responses by technical score above/below average to Question 8, "How would you feel if your local gas station also sold hydrogen," student survey.

The relationship of students' responses to Question 8 was also examined in terms of their expression of familiarity with hydrogen and fuel cell technologies. This relationship, shown in Figure 5.14, shows that students who considered themselves "Slightly familiar" or "Familiar" with hydrogen and fuel cell technologies were more likely to be "Pleased" with the idea of a local gas station that also sold hydrogen.

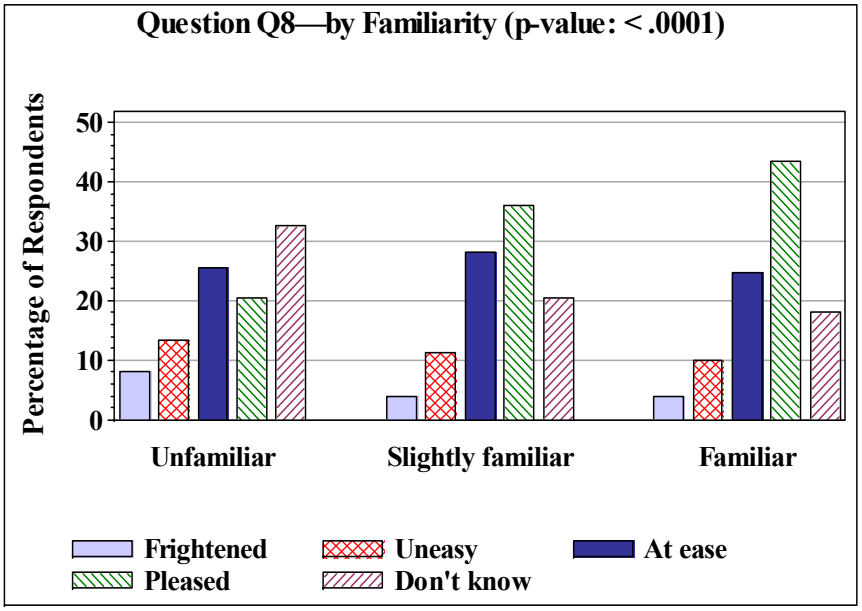

Figure 5.14. Response percentages by familiarity to Question 8, "How would you feel if your local gas station also sold hydrogen," student survey.

The relationship of technical knowledge score and responses to Question 8a was also studied. Question 8a asked students how they would feel if their school's power were provided by a fuel cell located on school grounds. It was found that students with a technical score above average were more comfortable with the idea of a fuel cell being located on the school grounds. In fact, the students with "Above average" scores provided fewer "Don't know" responses, and their most frequent response was "Pleased" (Figure 5.15).

Teens generally agreed with the statement that the use of hydrogen would reduce U.S. dependence on foreign oil (see Figure 5.6). Their responses by degree of familiarity to this statement are shown in Figure 5.16. The more familiar students were with hydrogen and fuel cell technologies, the more likely they were to agree with the statement.

Another statistically significant ($p<0.0001$) relationship is between responses to Question 8A (feelings about having a fuel cell located on school grounds) and gender. Female students responded more often with "Uneasy" or "Don't know" and less often with "At ease" or "Pleased" (Figure 5.17).[38]

[38] Gender differences among students were also observed in 2004. See, for example, Figure 5.8 of the 2004 report.

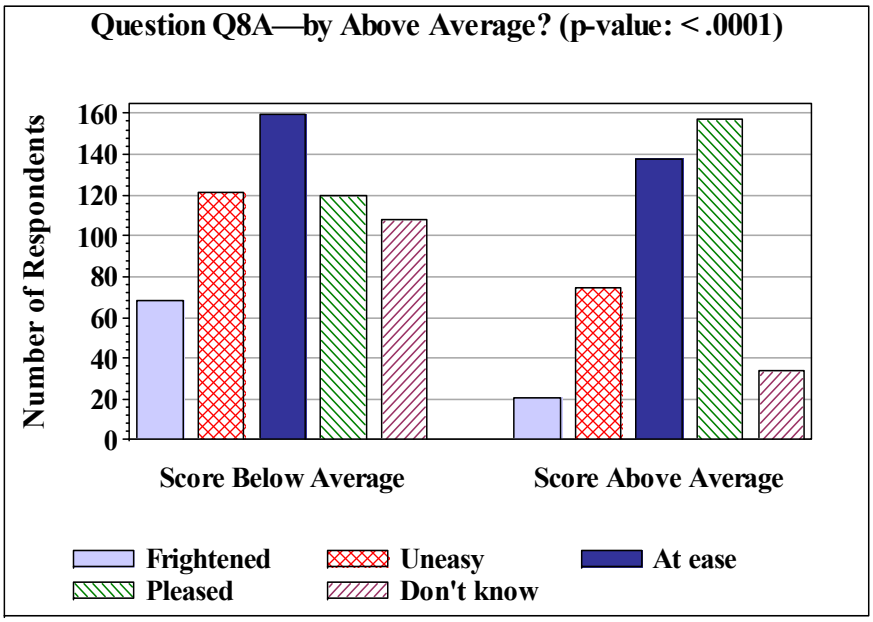

Figure 5.15. Responses by technical score above/below average to Question 8A, "How would you feel if your school's electricity and heat were provided by a fuel cell located on school grounds," student survey.

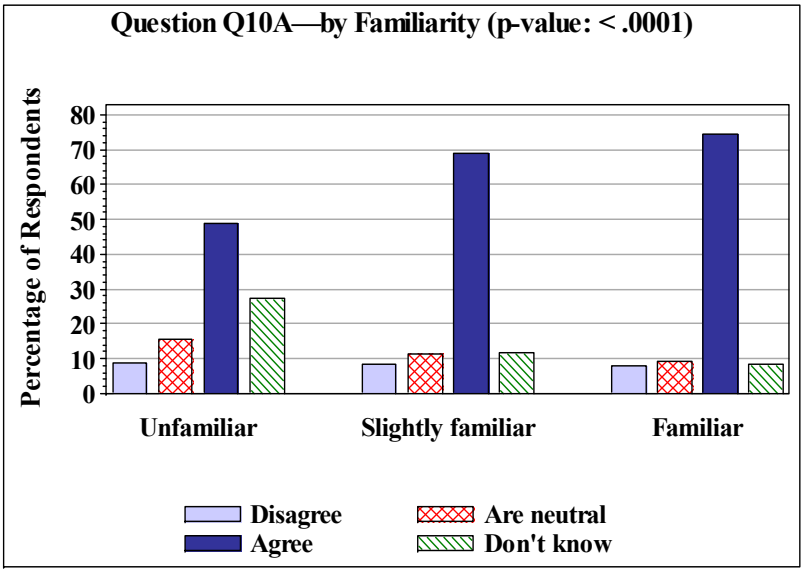

Figure 5.16. Response percentages by familiarity to Question 10A, "Using hydrogen will reduce U.S. dependence on foreign oil," student survey.

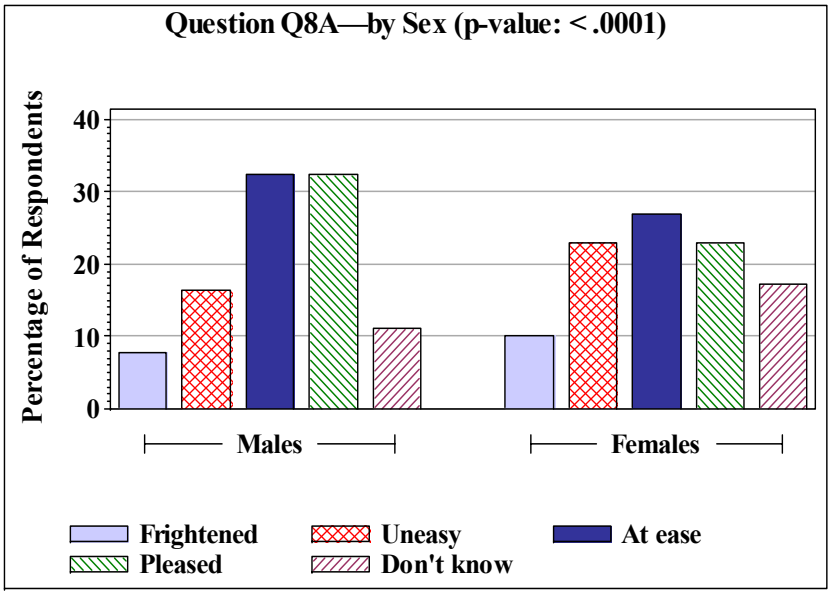

Figure 5.17. Response percentages by gender to Question 8A, "How would you feel if your school's electricity and heat were provided by a fuel cell located on school grounds," student survey.

5.4. COMPARISON WITH THE 2004 BASELINE

A primary objective of repeating surveys over time is to compare changes in the survey results. Figure 5.18 shows the differences in the average technical scores for each of the eight technical questions on the survey. The overall average technical score in 2008 was 39.8% correct responses; in 2004 the average score was 32.2%. This difference is statistically significant ($p<0.0001$). As Figure 5.18 indicates, the increase in the overall score was primarily due to increases in the scores for four individual questions: 2A (about toxicity), 2D (about odor), 5 (about fuel cell combustion products), and 9 (about hydrogen safety). The differences for these four questions are all statistically significant (respectively, $p=0.0001$; $p<0.0001$; $p=0.03$; $p<0.0001$). For the other questions, the changes, either positive or negative, were not statistically significant.

Several questions in the survey concerned safety issues and the use of hydrogen. Changes in students' perceptions of hydrogen safety are shown in the next few figures. Figure 5.19 shows that student opinions about hydrogen safety have changed slightly. In 2004, for example, 31.5% of the students felt that hydrogen was too dangerous for everyday use; in 2008, 23.7% of the students thought that hydrogen was too dangerous for everyday use. The difference (7.3 percentage points) is statistically significant ($p=0.0001$).

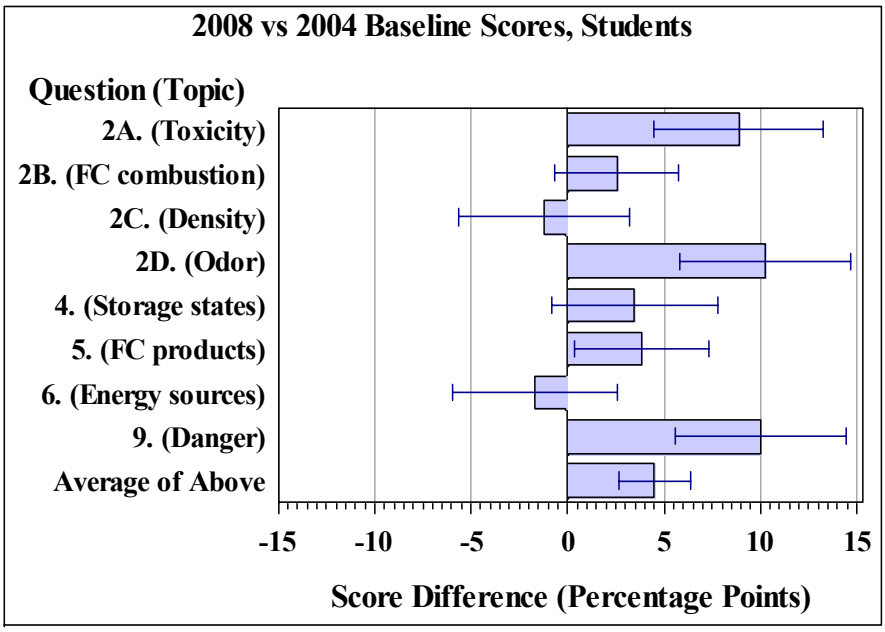

Figure 5.18. Differences between the 2008 and 2004 average percentage correct for each technical question and overall, student survey. Bars to the right of zero show improvement in 2008. The error bars are 95% confidence intervals for the differences.

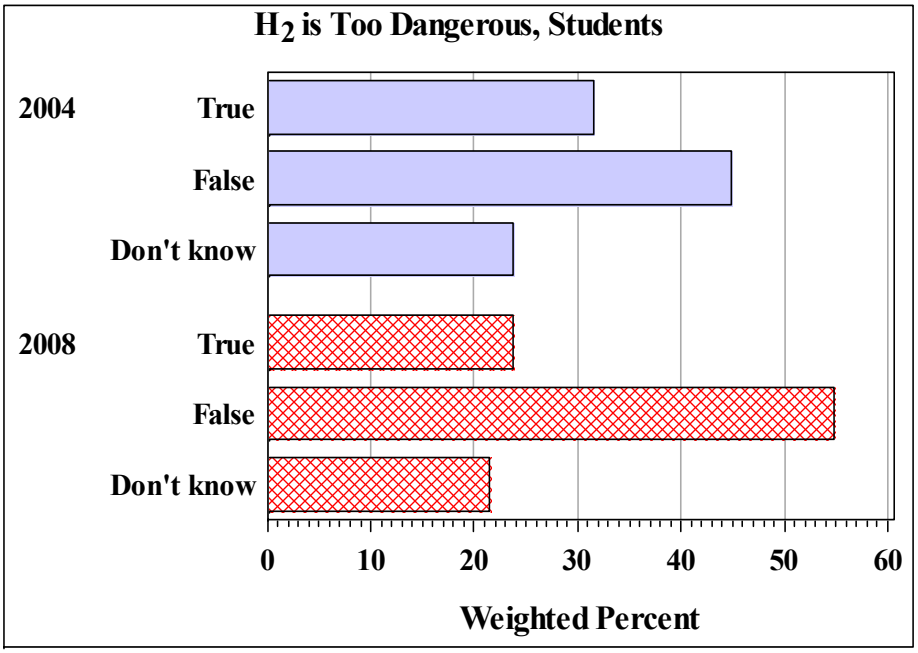

Figure 5.19. Comparison of results of the 2004 and 2008 surveys regarding opinions about the everyday use of hydrogen, Question 9, student survey.

Another question was about the comfort level of students with the sale of hydrogen at their local gas station. Figure 5.20 compares the results of the 2004 and 2008 surveys to this question. The percentage of respondents who indicated that they would be "Frightened" or "Uneasy" in 2004 (9.1% and 18.7% respectively) decreased in 2008 (to 5.6% and 12.0% respectively). Both decreases were statistically significant ($p=0.006$ and $p<0.0001$ respectively.) In addition, the students who provided a "Don't know" response also decreased significantly from 35.3% to 25.6% ($p<0.0001$).

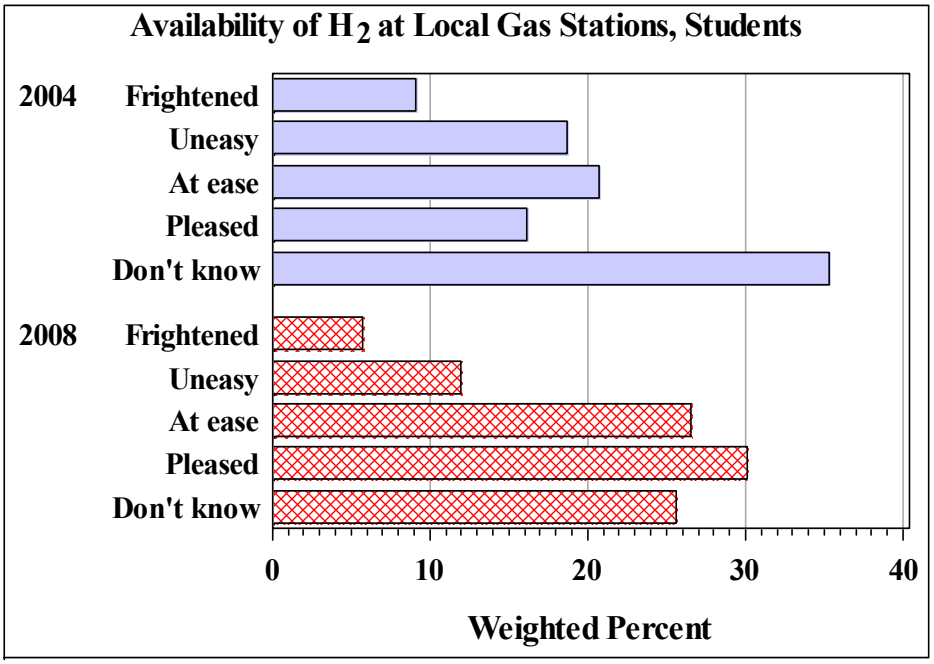

Figure 5.20. Comparison of results of the 2004 and 2008 surveys regarding opinions about the availability of hydrogen at a local gas station, Question 8, student survey.

So, in addition to statistically significant increases in the percentage of correct responses to the technical knowledge questions, the results shown in Figures 5.19 through 5.21 indicate that students are becoming more aware of, more comfortable with, and more confident in the safety of hydrogen technologies.

Sources used by students to obtain energy information showed growth in the use of the Internet since 2004. The number of students indicating that they "Sometimes" use the Internet rose from 361 to 467. The number of students indicating that they "Sometimes" read technical magazines or journals to obtain energy information also rose slightly.

Response rates for the two student surveys were very similar: 0.2754 for the 2004 survey and 0.2953 for the 2008/2009 survey.

Another question examined opinions about the safety of hydrogen in vehicles. As shown in Figure 5.21, the percentage of respondents who disagreed with the statement, "Hydrogen is as safe to use in my car as gasoline and diesel fuels" decreased between 2004 and 2008 (27.0% in 2004 to 18.1% in 2008). The percentage of respondents who agreed with the statement also increased slightly (36.6% in 2004 to 43.9% in 2008).

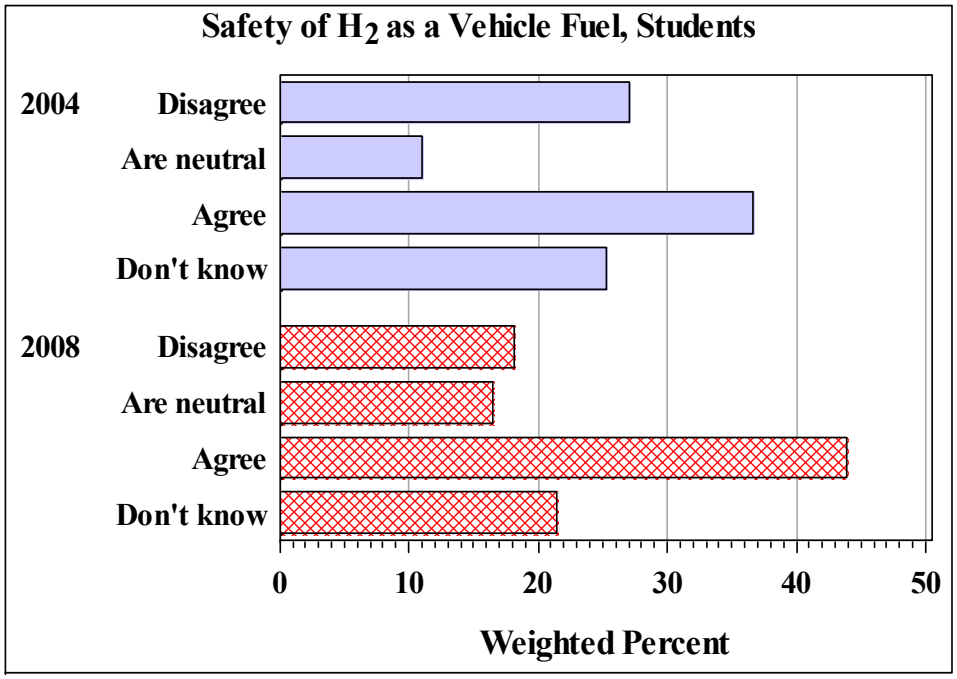

Figure 5.21. Comparison of results of the 2004 and 2008 surveys regarding opinions about the safety of hydrogen as a vehicle fuel, Question 10C, student survey.

6. RESULTS: STATE AND LOCAL GOVERNMENT SURVEY

6.1. INTRODUCTION

This section summarizes the results of the survey of state and local governments. A copy of the survey questionnaire is in Appendix A.3. From a master list of 246 potential respondents, a total of 220 interviews were completed during the period of March 12 – May 9, 2008. The total average interview length was 14.3 minutes, broken down into a screening time of slightly under 1.8 minutes and a main survey length of 12.6 minutes. A summary of responses to this survey, by question number, is provided in Appendix C.3.

To improve survey response rates, the DOE FCT Office sent letters to the individuals on the master list telling them about the survey and encouraging their participation. A copy of this letter is provided in Appendix D.1.

Section 6.2 is a general summary of the responses of the state and local officials. Relationships between the response variables are discussed in Section 6.3. Differences between the 2008 and 2004 survey results are discussed in Section 6.4.

For the sake of simplicity, the responses "Don't know," "No opinion," and "Don't know/no opinion" are all treated equivalently and generally as "Don't know" in this report.

The response rate for the 2008 State and Local Government Survey is discussed in Appendix E.3. The response rate is 89.4%. Had the entire target population been sampled (100% response), there would be no statistical sampling error in the survey estimates. The response rate is less than perfect, however, and so estimates computed from this data ***are*** subject to error. As an approximation, this error is handled as sampling error in the data analysis. Because the sample is nearly complete, finite population correction factors[39] are applied in the analysis with the SAS surveymeans and surveyfreq procedures.[40]

6.2. SUMMARY

The section summarizes the responses to the individual questions in the state and local government survey. Most of the questions are summarized as proportions of respondents in each of the respective multiple choice categories. Preference ranks are summarized as means. Answers to the technical questions are summarized individually and are also compiled into an overall technical score. Relationships between responses to different questions and comparisons with the 2004 survey results are considered in Section 6.3 and 6.4.

Table 6.1 summarizes the technical questions in terms of whether they were answered correctly or incorrectly with "Don't know" treated as an incorrect response. Confidence intervals for the percentages of correct responses reflect statistical error due to nonresponse.

[39] Cochran, William G., *Sampling Techniques*, Third Edition, John Wiley & Sons, Inc., New York, 1977, p. 24.
[40] SAS Institute, *SAS/STAT 9.1 User's Guide*, SAS Institute, Inc., Cary, North Carolina, 2004, p. 165.

The greatest percentage of correct responses is 82.3%, for Question 9 (Hydrogen is too dangerous…), followed by 78.1% for Question 2C (Hydrogen is lighter than air). The smallest percentage of correct responses 43.2%, for Question 2B (Fuel cells produce electricity through…), followed by 60.5% for Question 4 (In which state or condition can hydrogen…).

Table 6.1. Summary of Results on the Technical Knowledge Questions (correct/incorrect), State and Local Governments

Question	Number of responses	Percent correct	Lower 95% confidence bound	Upper 95% confidence bound
2A. Hydrogen gas is toxic (false)	220	66.82	64.77	68.86
2B. Fuel cells produce electricity through hydrogen combustion (false)	220	43.18	41.15	45.21
2C. Hydrogen is lighter than air (true)	220	78.18	76.46	79.91
2D. Hydrogen has a distinct odor (false)	220	73.64	71.76	75.51
4. In which state or condition can hydrogen be stored? (chemical compound, liquid)	220	60.45	58.45	62.46
5. When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else? (heat)	220	63.64	61.59	65.68
6. Hydrogen can be produced using which of the following sources of energy? (natural gas, sunlight, organic matter)	220	65.00	62.99	67.01
9. Hydrogen is too dangerous for everyday use by the general public (false)	220	82.27	80.63	83.92
Overall Average	220	66.65	65.60	67.69

The correct/incorrect perspective used in Table 6.1 is conventional, since "Don't know" is generally considered an incorrect response. However, "Don't know" was a very common response to the survey technical questions. Figure 6.1 shows the responses broken down according to type: Correct, Incorrect, and "Don't know." On average, 66.6% of the technical questions were answered correctly, 14.8% were answered incorrectly, and 18.5% were answered with "Don't know."

Figure 6.2 shows the distribution of the number of correct responses for the state and local government survey. Although there were a few respondents with no correct answers, 68.6% of respondents had five or more correct answers. Comparison of Figure 6.2 with the corresponding figure for the general public (Figure 4.2) shows that in addition to having a higher mean, the distribution of scores for the government officials is also slightly less dispersed than the distribution for the general public,[41] as might be expected, given the more varied backgrounds of general public respondents.

[41] Mean ± standard deviation for the two distributions are 5.33 ± 1.97 for the government officials and 2.81 ± 2.07 for the general public.

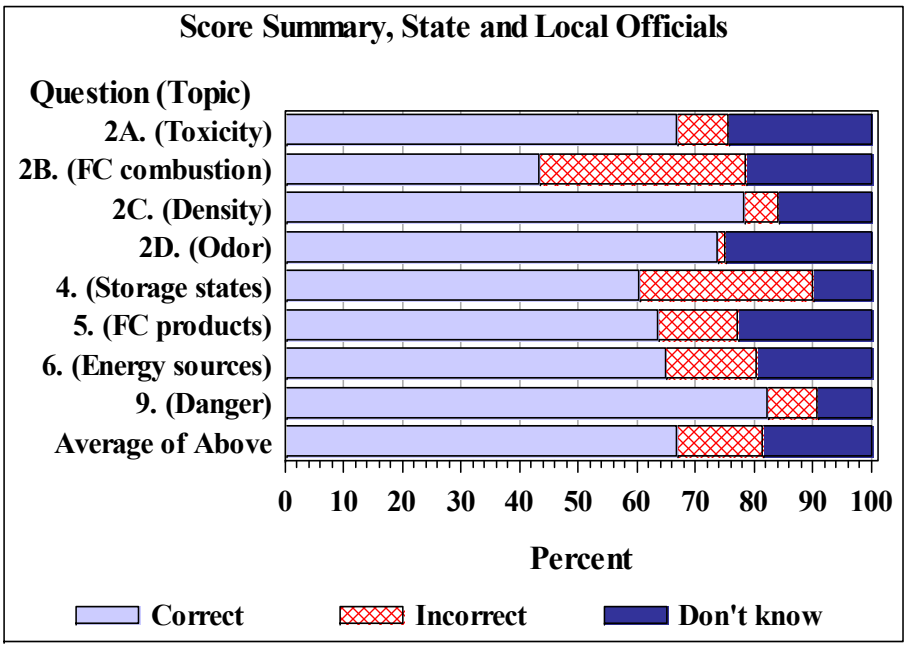

Figure 6.1. Weighted percent of correct, incorrect, and "Don't know" responses for the technical knowledge questions, state and local government agencies.

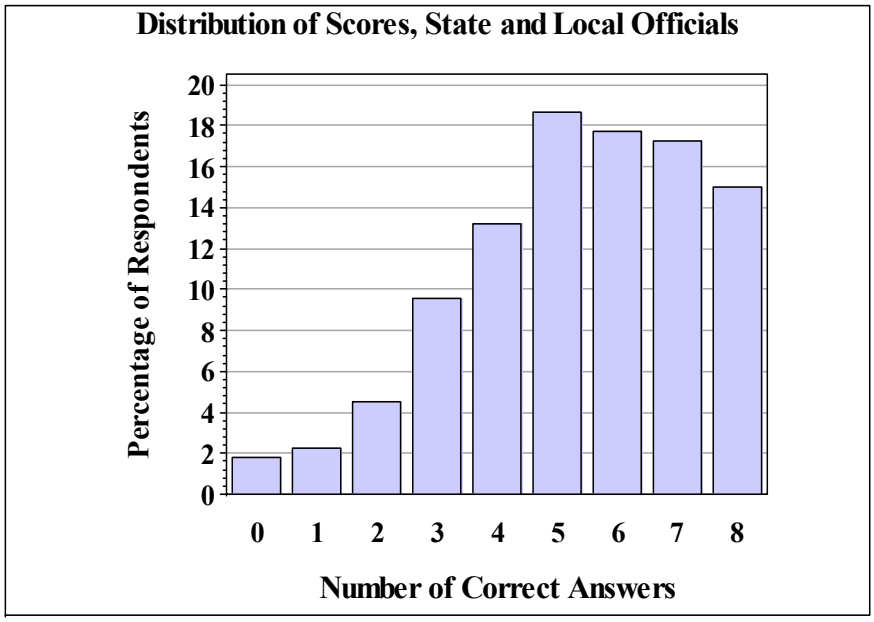

Figure 6.2. Distribution of the number of correct answers to the eight technical knowledge questions, state and local government agencies.

The first question in the survey asked respondents to gauge their familiarity with hydrogen and fuel cell technologies. Figure 6.3 shows the distribution of responses. Half of all respondents considered themselves "Slightly familiar" with hydrogen and fuel cell technologies, and 8.6% considered themselves "Very familiar."

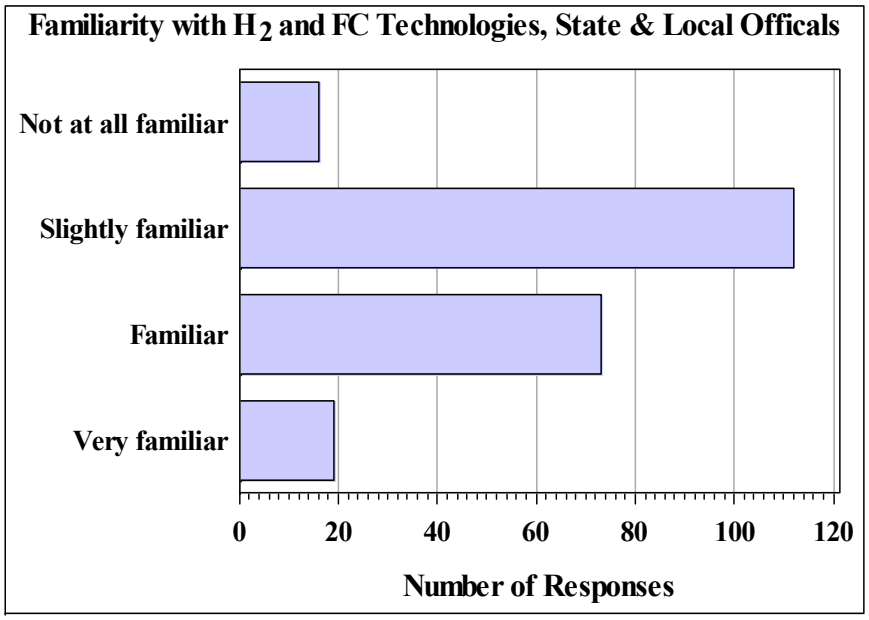

Figure 6.3. Distribution of responses to the question about familiarity with hydrogen and fuel cell technologies, Question 1, state and local government agencies.

The rank scores for the question asking respondents to rank the importance of safety, cost, environment, convenience, and performance (Question 7) are summarized in Table 6.2 as the weighted averages of the ranks (1-5) assigned by each survey subject. In this ranking, "1" ranks as more important than "2," etc. Therefore, the lower the weighted average rank, the more important is the "Value." On average, the rankings were in the order "Cost" is more important than "Safety" is more important than "Environment" is more important than "Performance" is more important than "Convenience." Of course many individuals departed from this exact order.

Table 6.2. Summary of Importance Ranking, State and Local Governments

Question	Number of responses	Average rank	Lower 95% confidence bound	Upper 95% confidence bound
Cost	218	2.43	2.37	2.48
Safety	219	2.75	2.69	2.81
Environment	218	2.96	2.90	3.02
Performance	217	3.38	3.32	3.43
Convenience	218	3.46	3.40	3.52

Figure 6.4 illustrates the pattern shown in Table 6.2. The last ten "Value" entries in Appendix C.3 are for pairwise comparisons based on the safety, cost, environment, convenience, and performance rankings. Each possible pair (e.g., safety and cost) is considered separately.

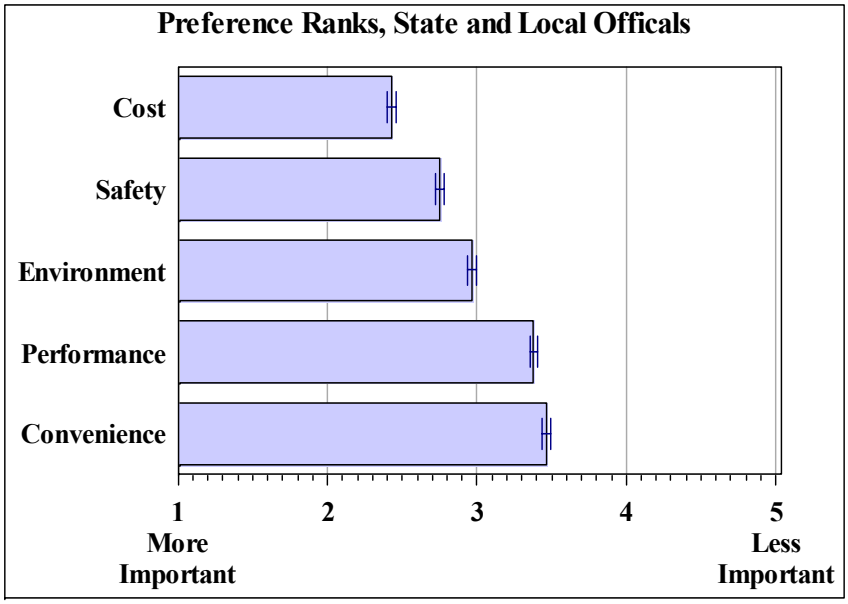

Figure 6.4. Mean of preference rankings of cost, safety, environment, convenience, and performance, Question 7, state and local government agencies. (Rank=1 for first choice, 2 for second choice, etc.) The error bar on each chart bar shows 95% confidence limits for the mean rank.

Officials with the government agencies were asked whether they would recommend buying or leasing fuel cell vehicles for their organization's vehicle or a stakeholder organization's vehicle fleet if the fuel cell vehicles were available at a cost competitive to gasoline internal combustion engine vehicles. Almost 80% of the officials responded "Yes." The responses to this question are shown in Figure 6.5.

Officials were also asked whether they would recommend buying a stationary fuel cell to help with the power needs of their facility or a stakeholder organization's facility if the stationary fuel cells were available at a cost competitive to traditional power systems. Over 82% of the officials responded "Yes." The responses to this question are shown in Figure 6.6.

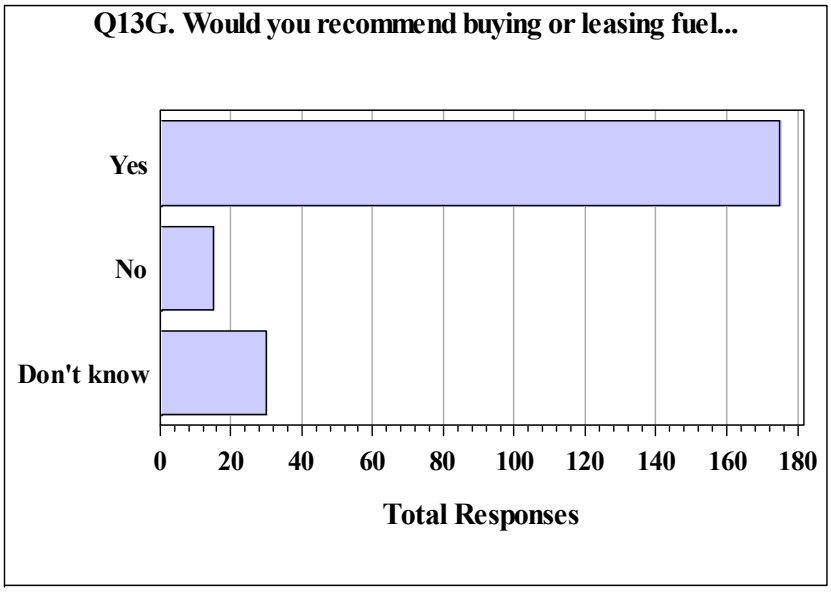

Figure 6.5. Share of respondents who would recommend purchasing a fuel cell vehicle for their organization's vehicle fleet if the cost were comparable to that of a gasoline vehicle, Question 13G, state and local government agencies.

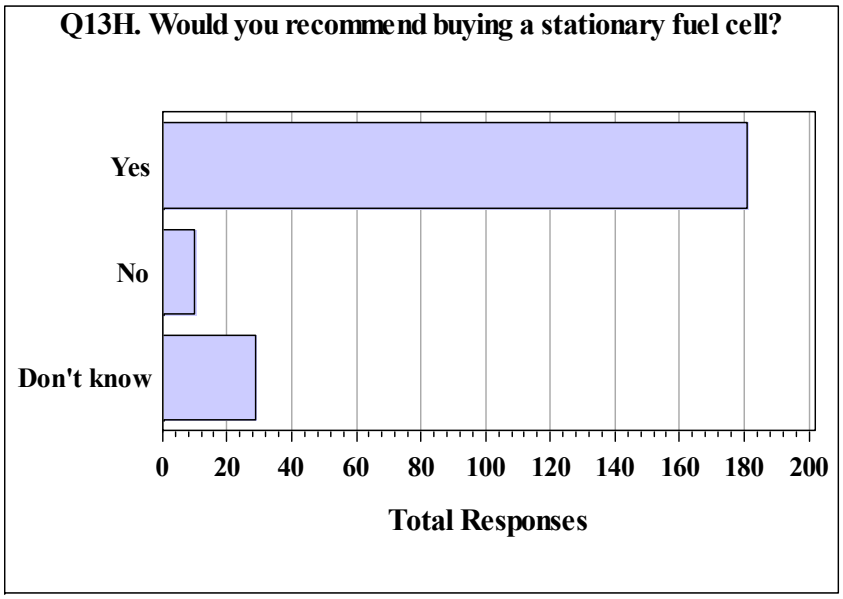

Figure 6.6. Share of respondents who would recommend purchasing a stationary fuel cell to help meet the power needs of their facility if stationary fuel cells were available at a cost comparable to that of traditional power systems, Question 13H, state and local government agencies.

Government officials were next asked a similar question (Question 13I) about the use of hydrogen and fuel cell technologies to meet their organization's energy needs; in this case, however, the relative costs of traditional technologies were not considered as part of the question. In this case most (47.7%) officials responded that they plan to wait to see how the market develops (Figure 6.7).

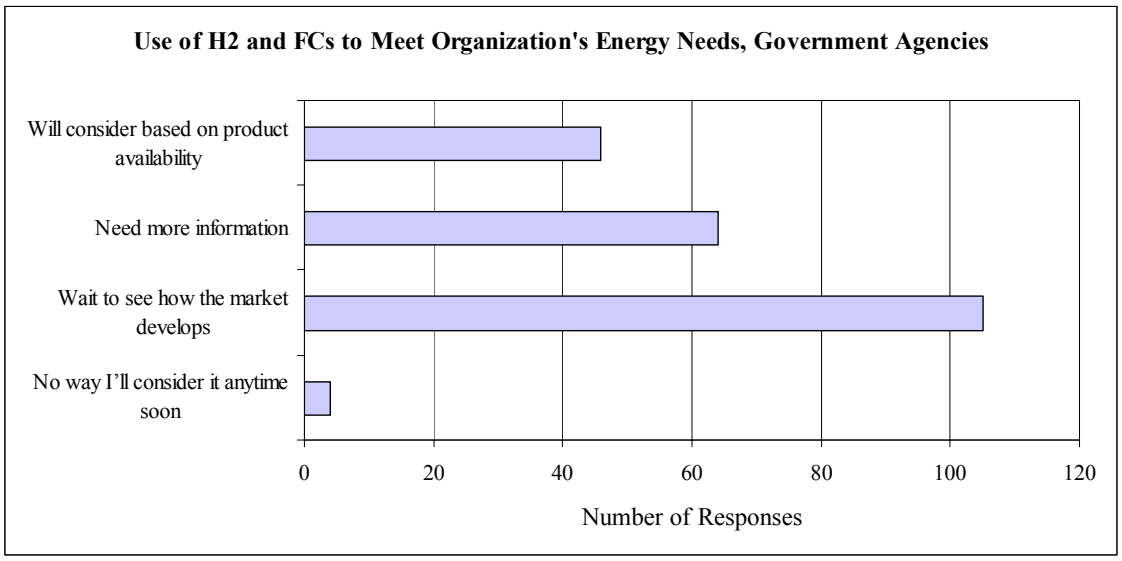

Figure 6.7. Opinions of government officials about using hydrogen and fuel cell technologies to meet their organization's energy needs, Question 13I, state and local government agencies.

Respondents to the survey of government agencies were asked two questions about information sources. Question 14 asked about the frequency of use ("Never," "Sometimes," "Frequently") of information sources to make decisions about energy costs and safety. As shown in Figure 6.8, the sources marked "Frequently" most often were industry or trade associations or non-profit organizations, Federal government, and State government. The sources of information that received the greatest number of "Never" responses were teachers and schools, friends and family members, and local government agencies. These responses were very similar to those recorded in the 2004 survey.

Question 15 also asked about information sources, but from the perspective of media sources, that is, information vectors (television, radio, internet, etc.) for obtaining energy information. As shown in Figure 6.9, respondents indicated that they most frequently used the Internet, science and technology journals, and trade magazines.

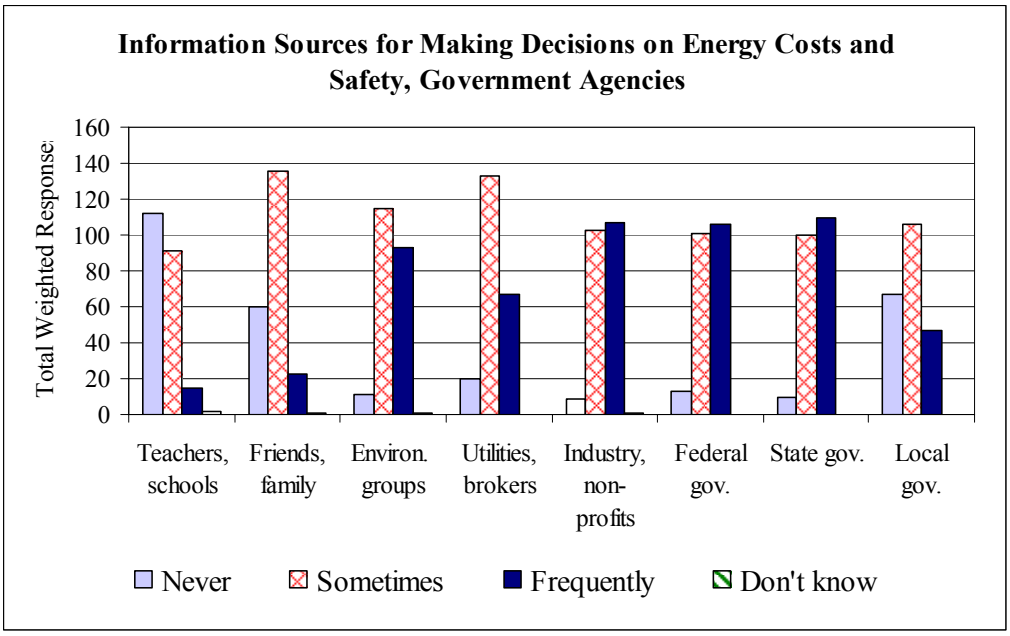

Figure 6.8. Weighted counts of responses regarding the frequency of use of information sources when making decisions about energy costs and safety, Question 14, state and local government agencies.

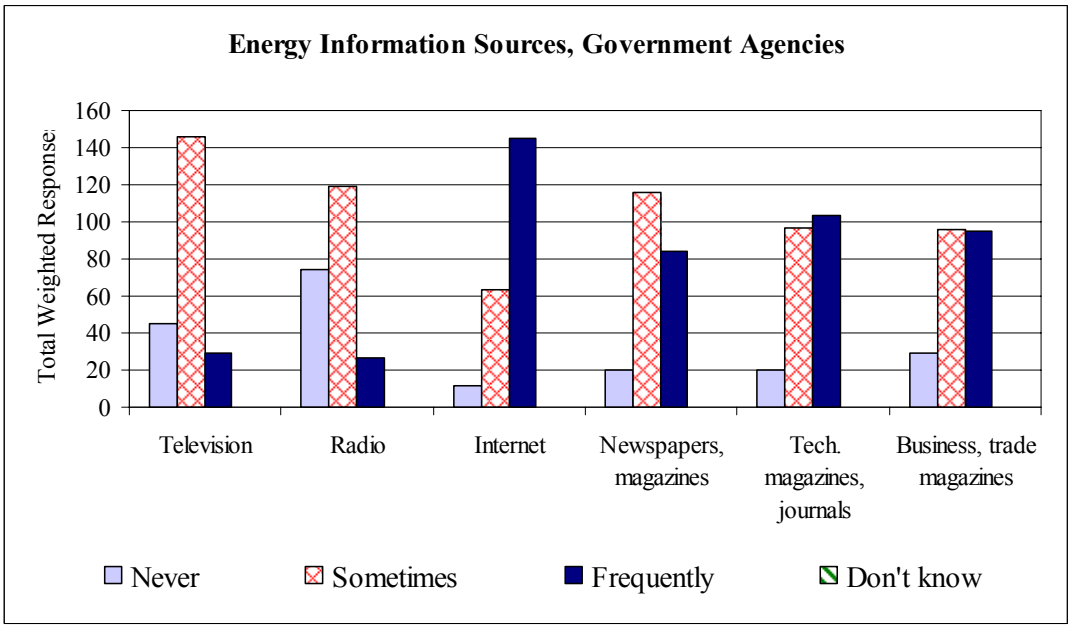

Figure 6.9. Weighted counts of responses regarding the frequency of use of different types of mass media for obtaining energy information, Question 15, state and local government agencies.

Questions 20-24 were about the respondents' awareness of hydrogen and fuel cell technology penetration. (To read the complete questions, please see Appendix A.3.) Figure 6.10 shows the percentages of state and local officials responding "Yes" to these questions. Only a few respondents indicated that their own agencies had hydrogen vehicles or stationary fuel cells. A greater number of respondents indicated that other agencies in their geographic jurisdiction were using hydrogen-powered vehicles or stationary fuel cells.

Officials were asked if their agencies had plans to use hydrogen and/or fuel cells in the future. Those responding "Yes" were then asked the time frame for implementation. As can be seen in Figure 6.11, almost half of the respondents indicated that their agencies had no plans to use hydrogen or fuel cells in the near future. About 21% plan to implement hydrogen or fuel cell technologies within the next five years. These percentages are very similar to the findings of the 2004 survey.

Almost 70% of the government officials indicated that they had received information about hydrogen and fuel cell technologies, which is much higher than the corresponding percentage for 2004 (52%). Less than 20% of respondents had attended a training class on hydrogen or fuel cells, and almost 70% indicated that they would like to participate in a class. These responses are shown in Figure 6.12.

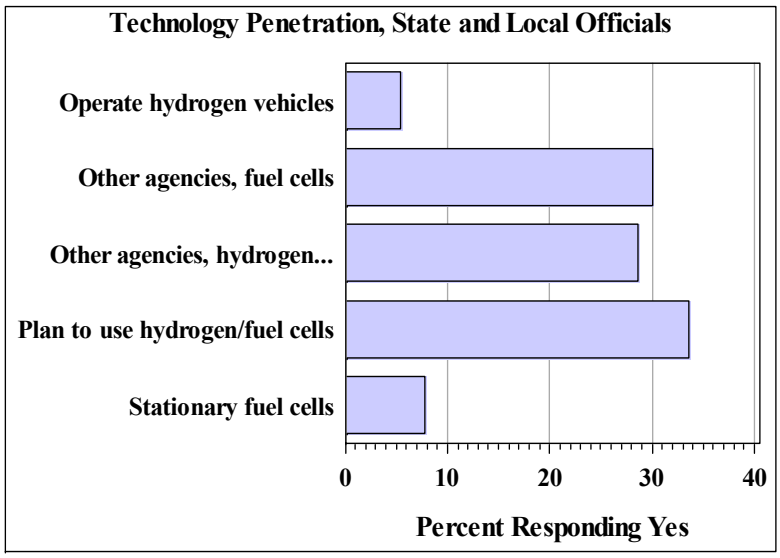

Figure 6.10. Percentages of officials who responded "Yes" to Questions 20-24 about hydrogen and fuel cell technology penetration, state and local government agencies.

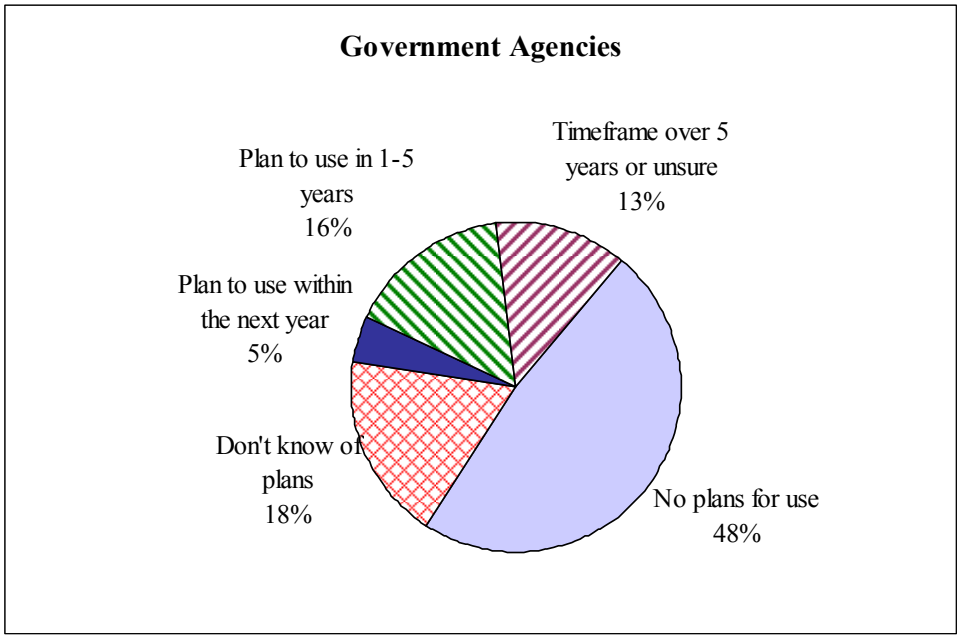

Figure 6.11. Responses to Questions 24-25 concerning plans to use hydrogen and fuel cell technologies, state and local government agencies.

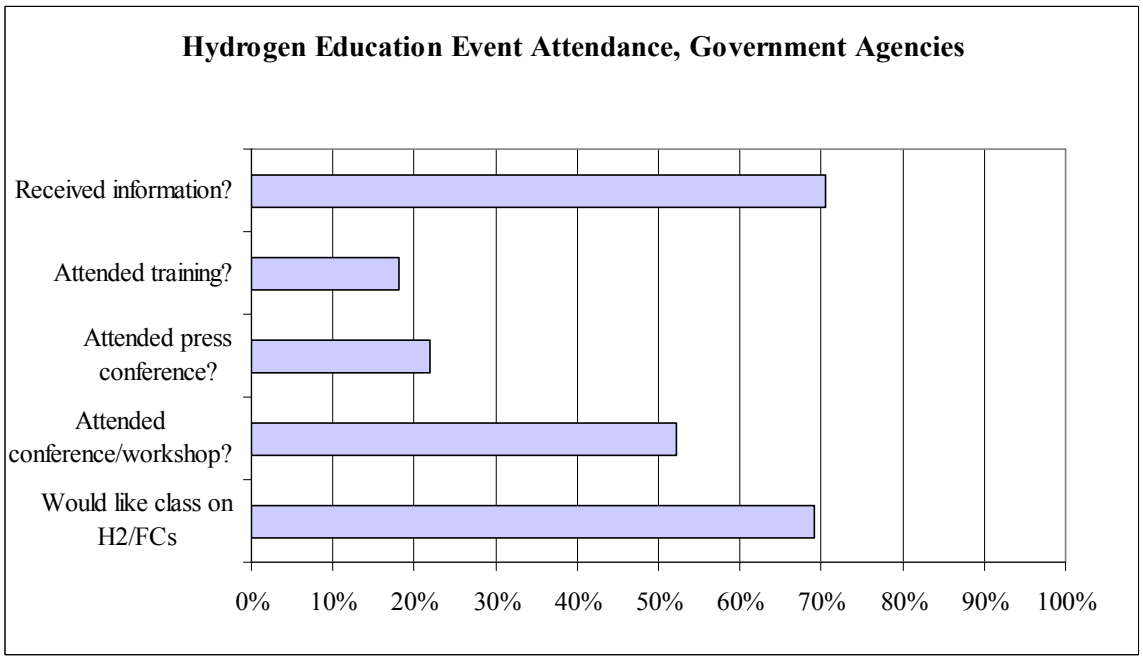

Figure 6.12. Percentages of "Yes" responses concerning possession of information about hydrogen and/or fuel cells and desire to attend a class, Questions 26-29, state and local government agencies.

6.3. RELATIONSHIPS

The summary statistics in Section 6.2 are "one-way" statistics in the sense that the response categories are defined in terms of one variable such as response to an opinion question (e.g., Question 10C, "Hydrogen is as safe to use in my car as gasoline and diesel fuels"). However, relationships in the responses determined by two or more variables may also be of interest. Although no relationships were of particular interest a priori, in this section a few of the more statistically significant ones are illustrated. Interactions that were considered were with the survey variables and region, function (environmental protection, transportation, energy, etc.), familiarity with hydrogen and fuel cell technologies, and whether or not the score on the technical questions was above the average for the sample. The statistical significance criterion is the significance level (p) of a chi-square test.[42]

As shown in Figure 6.13, respondents who scored below average on the technical questions were more likely to assess their familiarity as "Not at all familiar" or "Slightly familiar," and respondents who scored above average were more likely to claim a higher familiarity with hydrogen and fuel cell technologies. Thus, the familiarity self-assessments are consistent with the technical awareness scores.

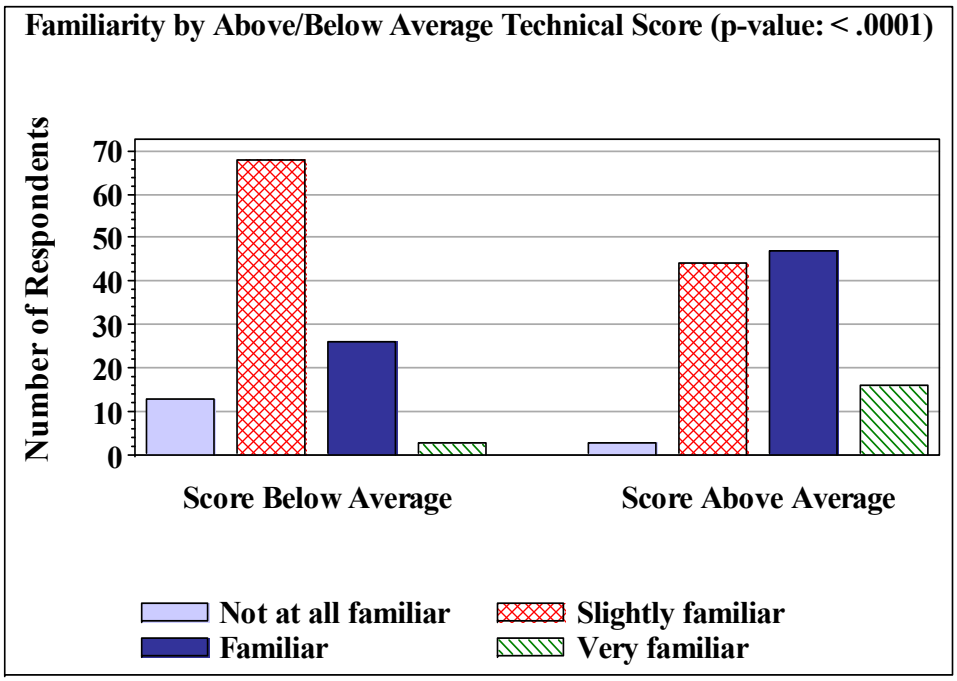

Figure 6.13. Responses by technical score above/below average to Question 1 (familiarity of respondents to hydrogen and fuel cell technologies), state and local government agencies.

[42]Measures could also be based on odds ratios or combinations of odd ratios and significance levels as well as other metrics. Significance levels alone were used for simplicity and because sample sizes are essentially the same for all survey questions.

Another interesting relationship was that of responses to the technical questions by functional group. For example, respondents were asked whether the following statement was true or false: "Fuel cells produce electricity through hydrogen combustion." (The statement is false.) Over half of the State Energy Offices and Departments of Environmental Protection answered this question correctly. State Departments of Transportation and city and county offices, however, responded correctly much less frequently.

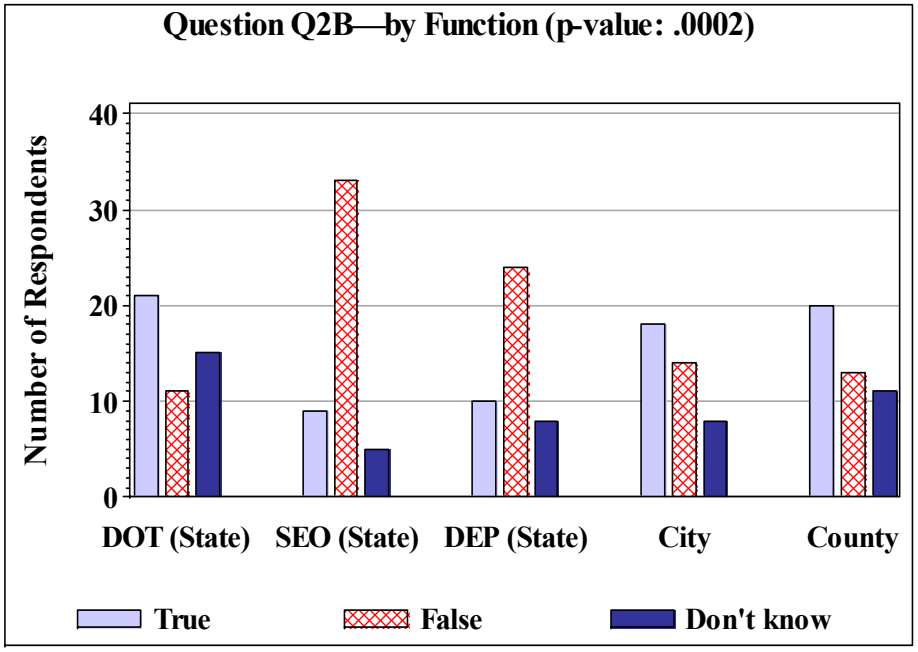

Figure 6.14. Responses by functional group to Question 2B (technical question on fuel cells), state and local government agencies.

6.4. COMPARISON WITH THE 2004 BASELINE

A primary objective of conducting multiple surveys over time is to compare survey results. Figure 6.15 shows the differences in the average technical scores for each of the eight technical questions on the survey. The overall average technical score in 2008 was 66.65% correct responses; in 2004 the average score was 66.58%.[43] The difference (.07) is essentially zero. There were statistically significant changes between 2004 and 2008, however, in the percentages correct for some of the individual questions. In particular, respondents did much better on the fuel cell questions, 2B and 5 ($p<0.0001$ in both cases). This improvement was offset by significantly poorer performance on some of the basic hydrogen questions, for example Questions 2A about toxicity and 2D about odor ($p<0.0001$ in both cases).

[43] This is the 2004 percentage of correct responses to the eight technical questions asked both in 2004 and 2008. For all eleven of the technical questions that were asked originally in 2004, the percentage correct was 65.8%.

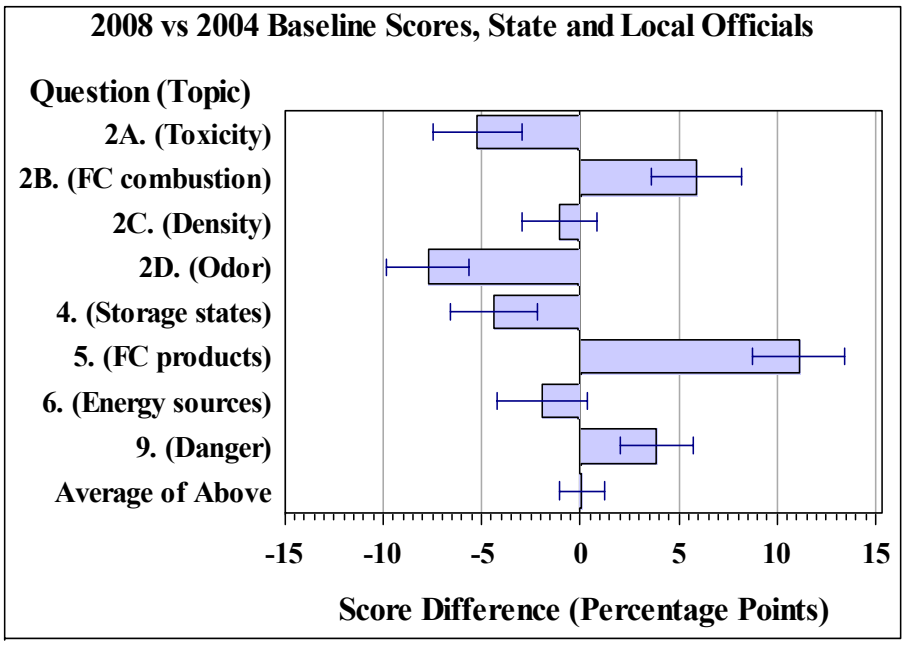

Figure 6.15. Differences between the 2008 and 2004 average percentage correct for each technical question and overall, state and local government agencies. Bars to the right of zero show improvement in 2008. The error bars are 95% confidence intervals for the differences.

Several questions in the survey concerned safety issues and the use of hydrogen. For many of these, changes in the opinions of government officials toward hydrogen safety are shown in the next few figures. There is much less difference between the 2004 and 2008 perceptions about hydrogen safety for government officials than for the other survey populations. This is likely because in 2004 government officials were already more informed than the other survey populations about hydrogen and fuel cell technologies. Figure 6.16 shows the very slight changes in responses to the statement, "Hydrogen is too dangerous for everyday use by the general public (false)."

On the other hand, for the question (Question 8) about comfort level with the sale of hydrogen at their local gas station, there ***was*** a statistically significant change. Figure 6.17 compares the results of the 2004 and 2008 surveys to this question. The number of officials that said they would be "Pleased" increased from 53% to 67%. This difference is highly significant ($p<0.0001$).

Another question examined opinions about the safety of hydrogen in vehicles. The 2004 and 2008 response profiles for this question are shown in Figure 6.18. Although there are some slight differences, the response profiles are quite similar. Again, the slight differences probably reflect the fact that many of the state and local officials were already familiar with hydrogen issues in 2004, as they continue to be in 2008.

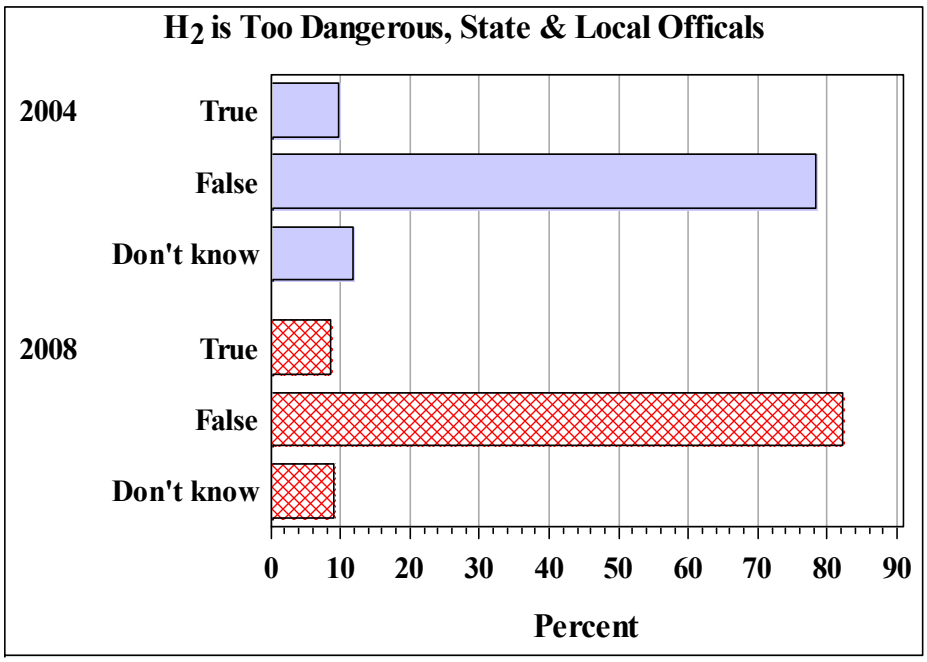

Figure 6.16. Comparison of results of the 2004 and 2008 surveys regarding the statement, "Hydrogen is too dangerous for everyday use by the general public (false)," Question 9, state and local government survey.

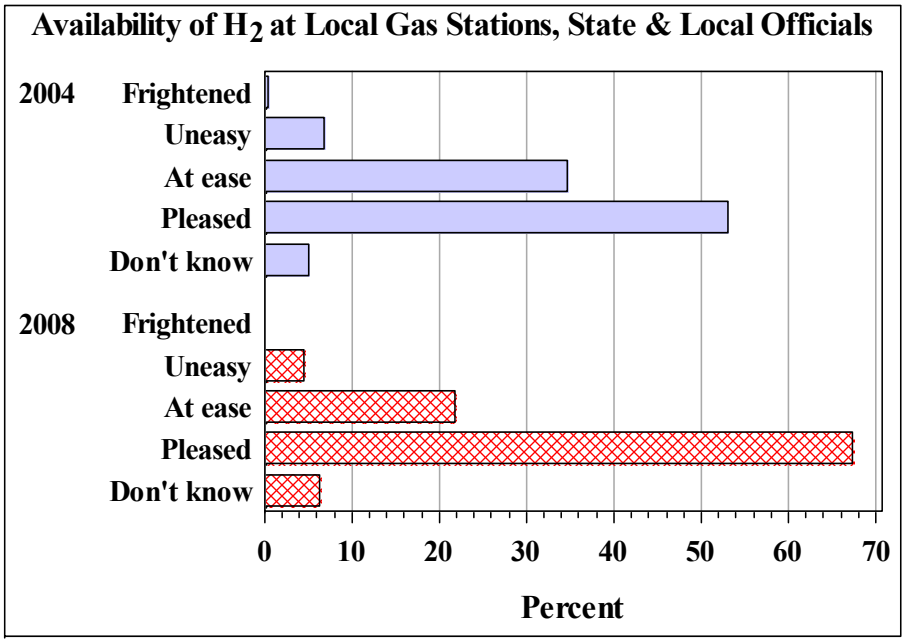

Figure 6.17. Comparison of results of the 2004 and 2008 surveys regarding opinions about the availability of hydrogen at a local gas station, Question 8, state and local government survey.

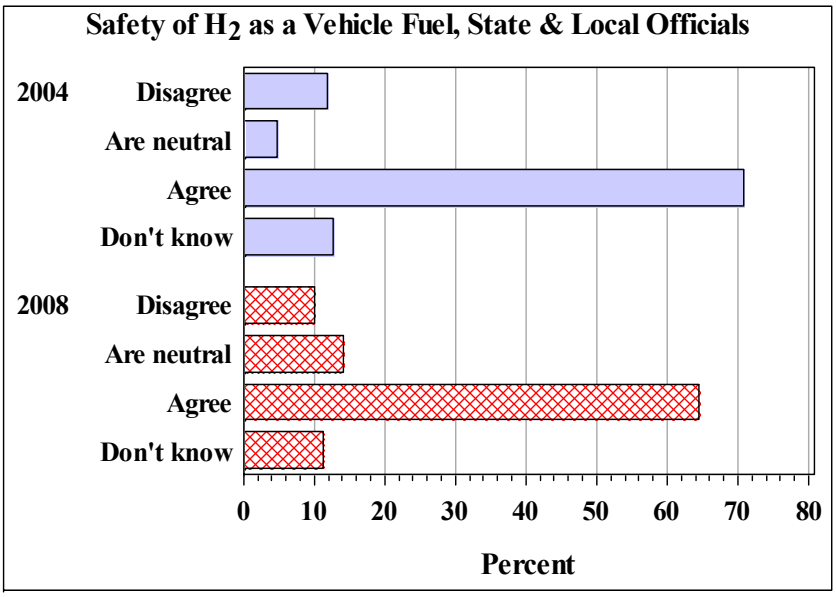

Figure 6.18. Comparison of results of the 2004 and 2008 surveys regarding opinions about the safety of hydrogen as a vehicle fuel, Question 10C (Hydrogen is as safe to use in my car as gasoline and diesel fuels), state and local government survey.

In general, the same sources were used by government personnel to obtain energy information in 2008/2009 as were used in 2004 (see Figure 6.9). A slightly greater percentage of respondents indicated that they used the Internet "Frequently" (58% in 2004 and 66% in 2008/2009).

The time frames for implementing hydrogen and fuel cell technologies in the future were relatively unchanged. In 2004, 30% of respondents indicated that their agency had plans to use hydrogen or fuel cells in the future; in 2008/2009, 34% indicated such plans. For those respondents with plans for use, Table 6.3 shows the time frames for implementation.

Table 6.3. Time frames for Implementation for Government Agencies Planning to Use Hydrogen or Fuel Cells in the Future

	2004	2008
Within the next year	13	10
1-5 years	33	35
Over 5 years	23	26
Don't know	2	3
Total of those with implementation plans	71	74

Finally, response rates were lower for the current survey, down from 0.959 to 0.894.

7. RESULTS: END USER SURVEY

7.1. INTRODUCTION

This section summarizes the results of the survey of end users and potential end users of hydrogen and fuel cell technologies. A copy of the survey questionnaire is in Appendix A.4. A total of 601 interviews with persons in positions of responsibility in business and industry in the United States were completed during the period of May 2-13, 2008. The total average interview length was 14.4 minutes, broken down into a screening time of 2.5 minutes and a main interview length of 11.9 minutes. A summary of responses to this survey, by question number, is provided in Appendix C.4.

The survey was stratified into three sectors of business and industry: transportation, business types for which energy usage is primarily for heating/cooling and uninterrupted power is required, and industrial sectors with large power requirements. Businesses were identified using NAICS (North American Industry Classifications System) codes. Two hundred potential end users were surveyed in each of the three categories. The distribution of survey respondents by subcategory are shown in Figure 7.1.

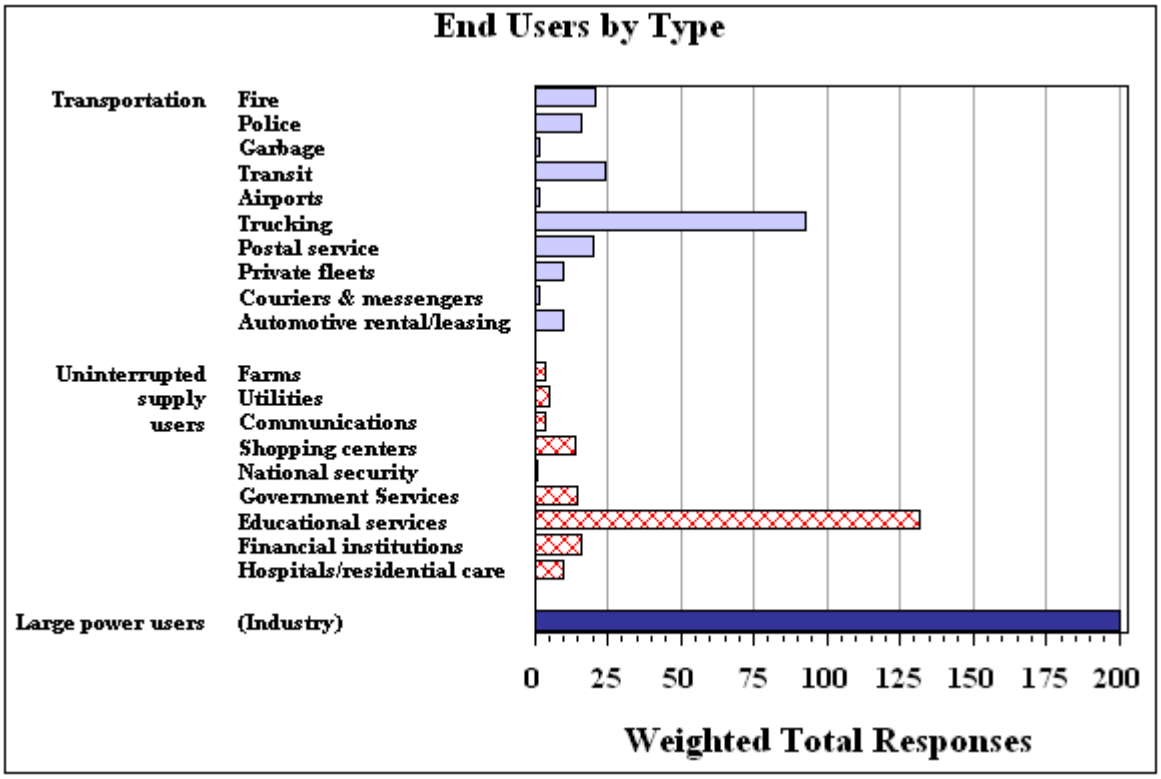

Figure 7.1. Distribution of respondents by business subcategory, end user survey.

Section 7.2 is a general summary of the responses of the end users. Relationships between the response variables are discussed in Section 7.3. Differences between the 2008 and 2004 survey results are discussed in Section 7.4.

For the sake of simplicity, the responses "Don't know," "No opinion," and "Don't know/no opinion" are all treated equivalently and generally as "Don't know" in this report.

The response rate for the 2008 End User Survey is discussed in Appendix E.4. The response rate is 17.0%. This response rate is considerably lower than the 2004 rate of 0.2914. The drop in the response rate does not appear related to the response rate among the "known eligible" respondents or to the eligibility rate, which was .6962 in 2004. Rather it is due to a disproportionate increase in the number of unknown eligibility, which was 330 in 2004 but increased to 4,619 in 2008. (Note that 4,619/330 = 14.0, while the 2008 and 2004 surveys were designed to capture 600 and 99 respondents respectively, 600/99 = 6.1.) As with the student survey this difference is probably at least partly due to the precision of the vendor-supplied sampling frames.

7.2. SUMMARY

The section summarizes the responses to the individual questions in the end user survey. Most of the questions are summarized as proportions of respondents in each of the respective multiple choice categories. Answers to the technical questions are summarized individually and are also compiled into an overall technical score. Relationships between responses to different questions and comparisons with the 2004 survey results are considered in Section 7.3 and 7.4.

Table 7.1 summarizes the technical questions in terms of whether they were answered correctly or incorrectly with "Don't know" treated as an incorrect response. The greatest percentage of correct responses is 63.4%, for Question 5C (Hydrogen is lighter than air), followed by 62,1% for Question 12 (Hydrogen is too dangerous…). The smallest percentage of correct responses is 22.5%, for Question 5B followed by 31.5% for Question 8 (When using pure hydrogen…).

The correct/incorrect perspective used in Table 7.1 is conventional, since "Don't know" is generally considered an incorrect response. However, "Don't know" was a very common response to the survey technical questions. Figure 7.2 shows the responses broken down according to type: Correct, Incorrect, and "Don't know." On average, 47.9% of the technical questions were answered correctly, 15.7% were answered incorrectly, and 36.4% were answered with "Don't know."

Table 7.1. Summary of Results on the Technical Knowledge Questions (correct/incorrect), End Users				
Question	**Number of responses**	**Percent correct**	**Lower 95% confidence bound**	**Upper 95% confidence bound**
5A. Hydrogen gas is toxic (false)	601	55.24	51.54	58.95
5B. Fuel cells produce electricity through hydrogen combustion (false)	601	22.46	19.35	25.57
5C. Hydrogen is lighter than air (true)	601	63.39	59.79	67.00
5D. Hydrogen has a distinct odor (false)	601	60.07	56.42	63.71
7. In which state or condition can hydrogen be stored? (chemical compound, liquid)	601	45.76	42.02	49.50
8. When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else? (heat)	601	31.45	27.96	34.93
9. Hydrogen can be produced using which of the following sources of energy? (natural gas, sunlight, organic matter)	601	42.76	39.05	46.47
12. Hydrogen is too dangerous for everyday use by the general public (false)	601	62.06	58.42	65.70
Overall average	601	47.9	45.85	49.95

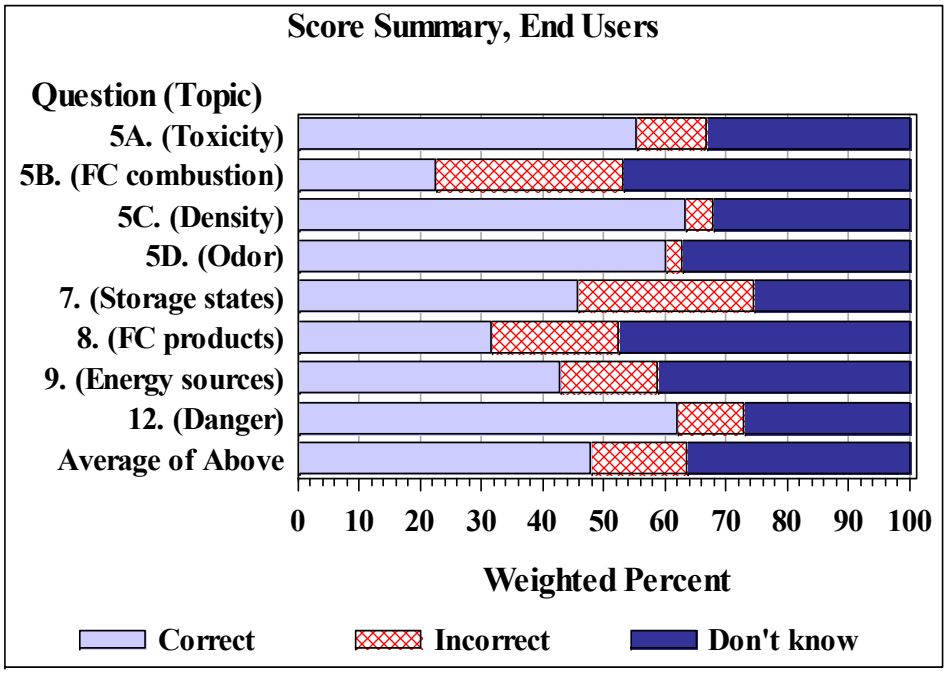

Figure 7.2. Weighted percent of correct, incorrect, and "Don't know" responses for the technical knowledge questions, end user survey.

Figure 7.3 shows the distribution of the number of correct responses. The distribution mean is 3.83 (47.9%) correct answers; the standard deviation is 2.2 correct answers.

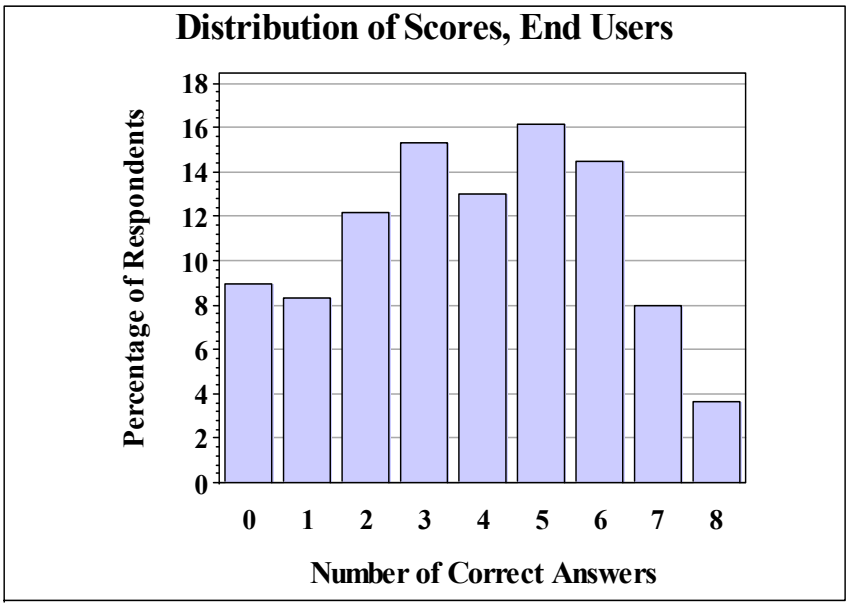

Figure 7.3. Distribution of the number of correct answers to the eight technical knowledge questions, end user survey.

End users with fewer than three correct responses to the eight technical questions did not necessarily have a greater number of incorrect answers. They had a high frequency of "Don't know" responses. The high proportions of "Don't know" responses suggest that these respondents may have been dismissive with the technical questions, for whatever reason, not even wanting to bother with them. Because these respondents represent a substantial and clearly separate subpopulation of end users, an education program might be designed to treat them separately.

The first question in the survey asked respondents to gauge their familiarity with hydrogen and fuel cell technologies. Figure 7.4 shows the distribution of responses. Over half of all respondents considered themselves "Slightly familiar" with hydrogen and fuel cell technologies.

When asked about the importance of specific characteristics of fuels or power supplies, end users responded that all of the itemized characteristics were considered important. End users listed "Safety" and "Dependability" as having the highest importance and "Environmental impact," "Maintenance cost," and "Installation cost" as having the least importance (Figure 7.5).

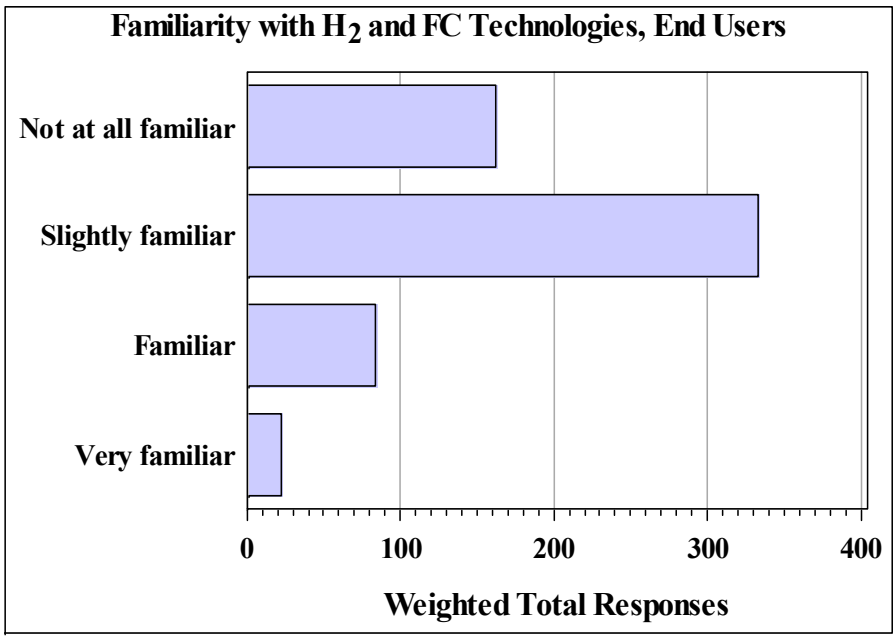

Figure 7.4. Distribution of responses to the question about familiarity with hydrogen and fuel cell technologies, Question 1, end user survey.

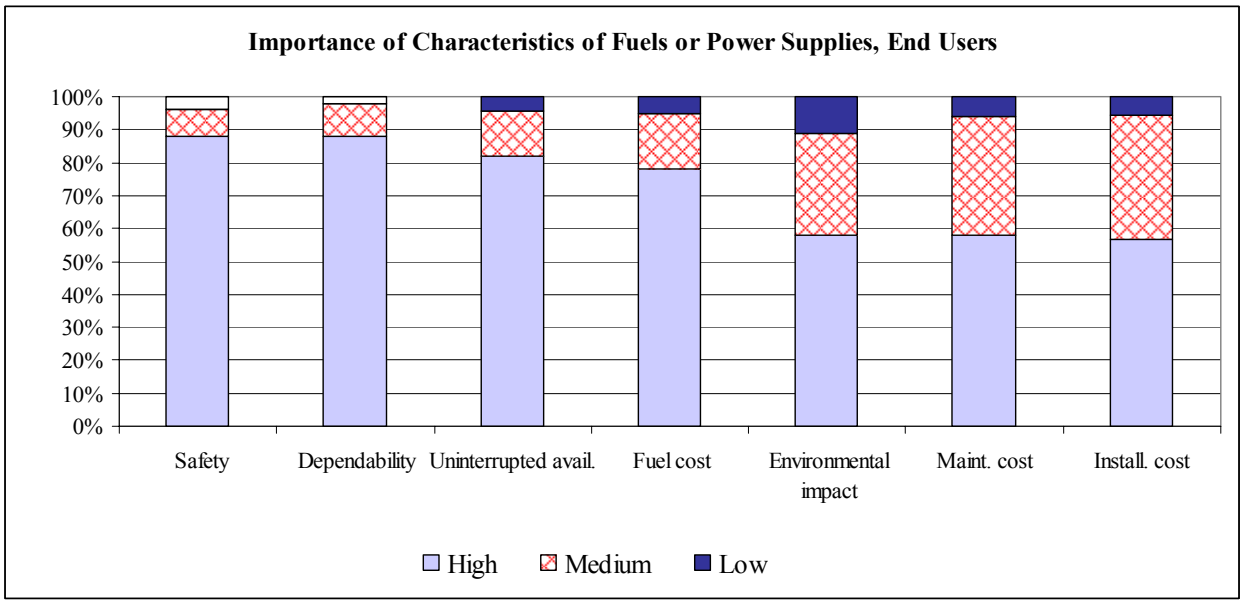

Figure 7.5. Importance of seven specific characteristics of fuels or power supplies, end user survey.

Only 47 end users (less than 8%) responded that their organization used hydrogen and/or fuel cells for any purpose. Of these respondents, 19 indicated that the usage was to power buses and other vehicles.

When asked about future plans to use hydrogen and/or fuel cells, 77 respondents (about 14%) indicated that their organization did have plans for future use. Of these 77, only four end users indicated that the time frame for future usage was within one year; 29 of the total 77 indicated that usage was planned within 1-5 years. (See Appendix C.3, Q26. Does your organization have plans to use hydrogen and/or fuel cells in the future? And Q27. What is the time frame for plans to use hydrogen and/or fuel cells?)

End users were asked whether they would recommend buying or leasing fuel cell vehicles for their organization's vehicle or a stakeholder organization's vehicle fleet if the fuel cell vehicles were available at a cost competitive to gasoline internal combustion engine vehicles. Over 80% of the respondents answered "Yes" (Figure 7.6).

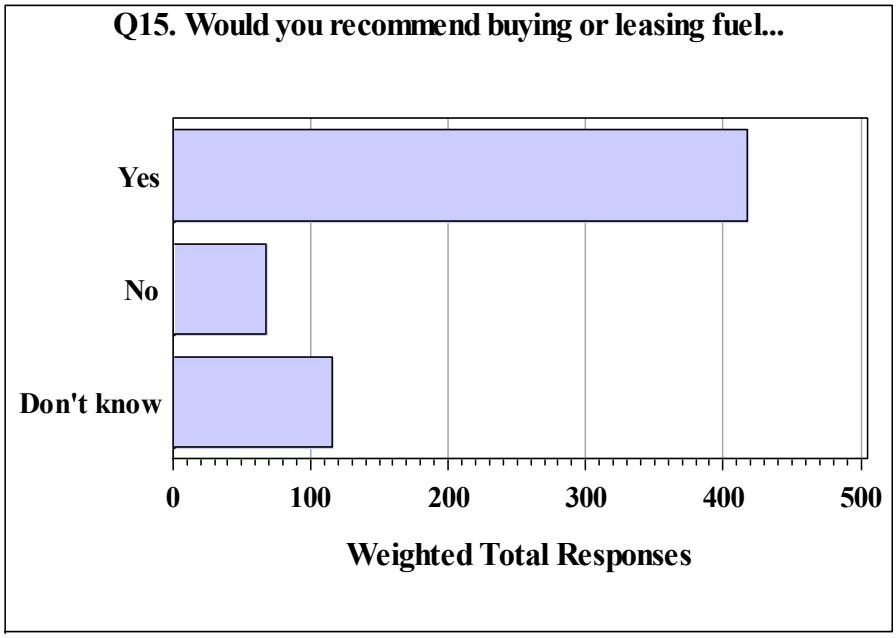

Figure 7.6. Share of respondents who would recommend purchasing a fuel cell vehicle for their organization's vehicle fleet if the cost were comparable to that of a gasoline vehicle, Question 15, end user survey.

End users were also asked whether they would recommend buying a stationary fuel cell to help with the power needs of their facility or a stakeholder organization's facility if the stationary fuel cells were available at a cost competitive to traditional power systems. Over 82% of the respondents responded "Yes." The responses to this question are shown in Figure 7.7.

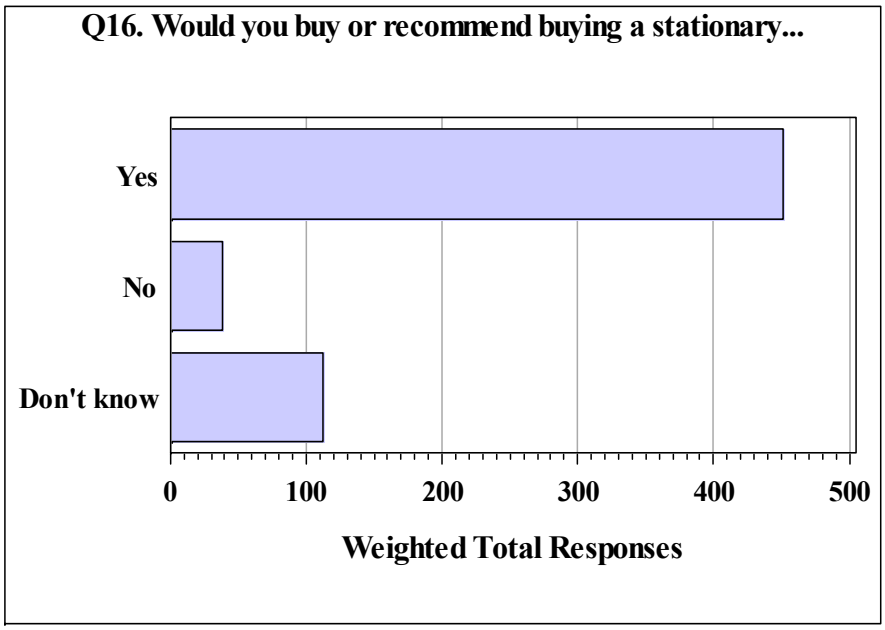

Figure 7.7. Share of respondents who would recommend purchasing a stationary fuel cell to help meet the power needs of their facility if the cost were comparable to that of traditional power systems, Question 16, end user survey.

End users were next asked a similar question (Question 17) about the use of hydrogen and fuel cell technologies to meet their organization's energy needs, though in this case, the relative costs of traditional technologies were not considered as part of the question. In this case the most frequent (47.7%) response is "wait to see how the market develops" (Figure 7.8).

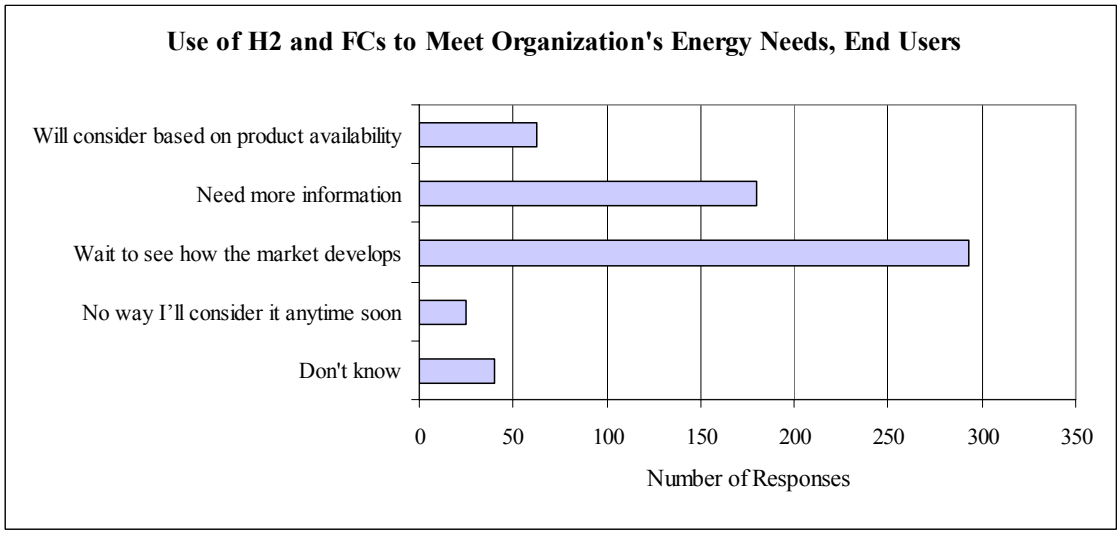

Figure 7.8. Opinions of end users about using hydrogen and fuel cell technologies to meet their organization's energy needs, Question 17, end user survey.

Two statements were read in order to obtain opinions about potential benefits of using hydrogen as a vehicle fuel. Respondents were asked whether they agreed or disagreed with the statements. Responses (Figure 7.9) indicated that about 80% of the end users agreed with the two statements about the benefits of hydrogen usage.

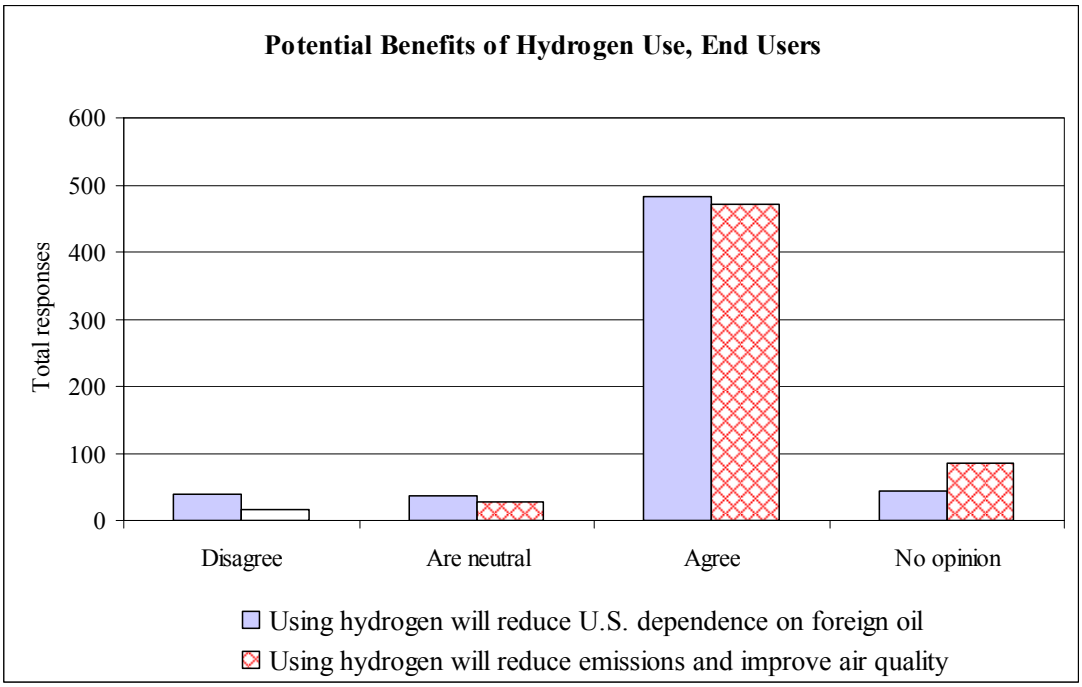

Figure 7.9. Responses to statements about the potential benefits of the use of hydrogen as a vehicle fuel, Questions 13A (Using hydrogen will reduce U.S. dependence on foreign oil) and 13B (Using hydrogen will reduce emissions and improve air quality), end user survey.

Several questions addressed interviewee perceptions regarding the safety of hydrogen and fuel cells. Figure 7.10 shows the responses graphically for the survey question about the safety of hydrogen relative to gasoline and diesel (survey Question 13C). As shown in this figure, over half of all respondents agreed that hydrogen is as safe to use as gasoline and diesel fuels.

Respondents were asked how they would feel if their local gas station also sold hydrogen. Almost half (48.9%, Appendix C.4) said they would be pleased. Figure 7.11 shows their responses to this question.

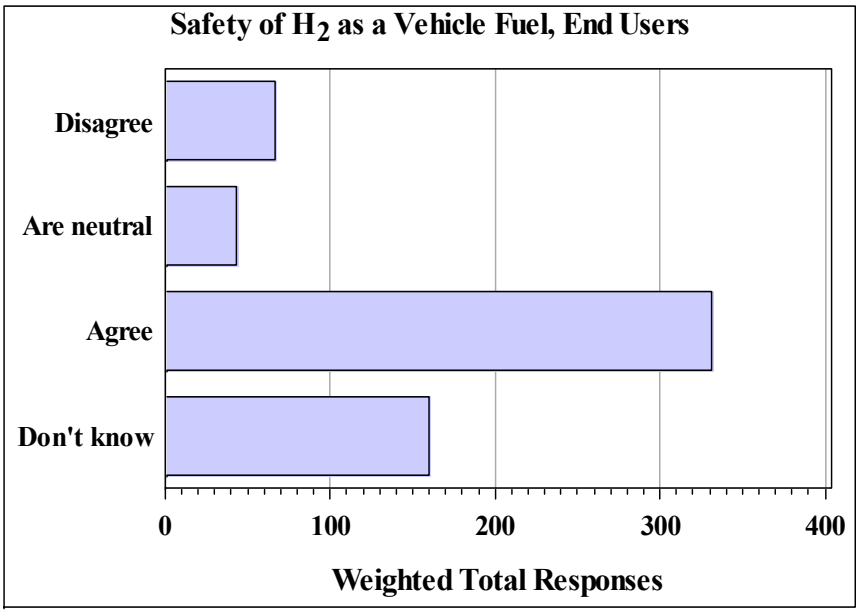

Figure 7.10. Responses to the statement, "Hydrogen is as safe to use in my car as gasoline and diesel fuels," Question 13C, end user survey.

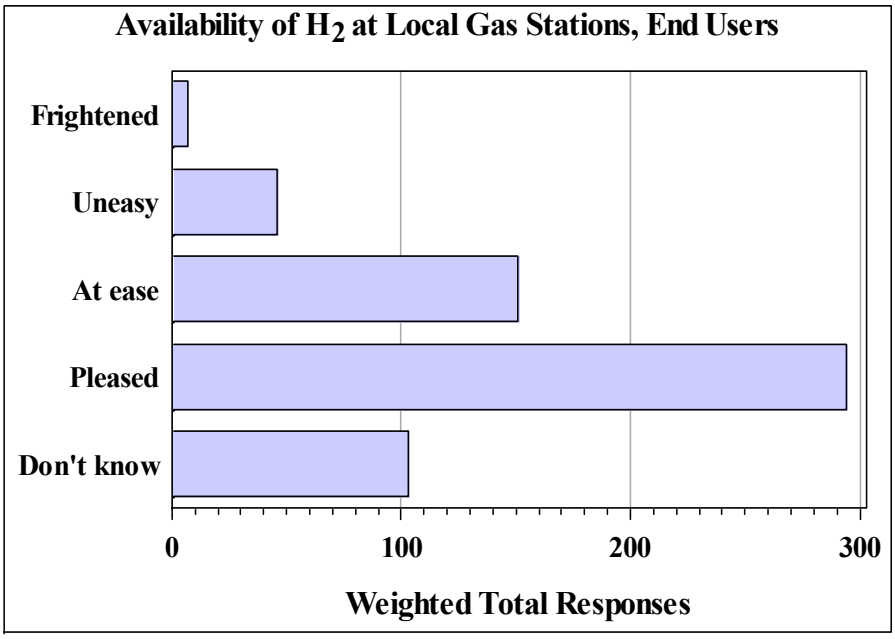

Figure 7.11. Reactions to the possibility of sales of hydrogen at a local gas station, Question 11, end user survey.

When asked their opinions on the safety of hydrogen for everyday use by the general public, most end users indicated that they thought hydrogen was safe for usage (Figure 7.12).

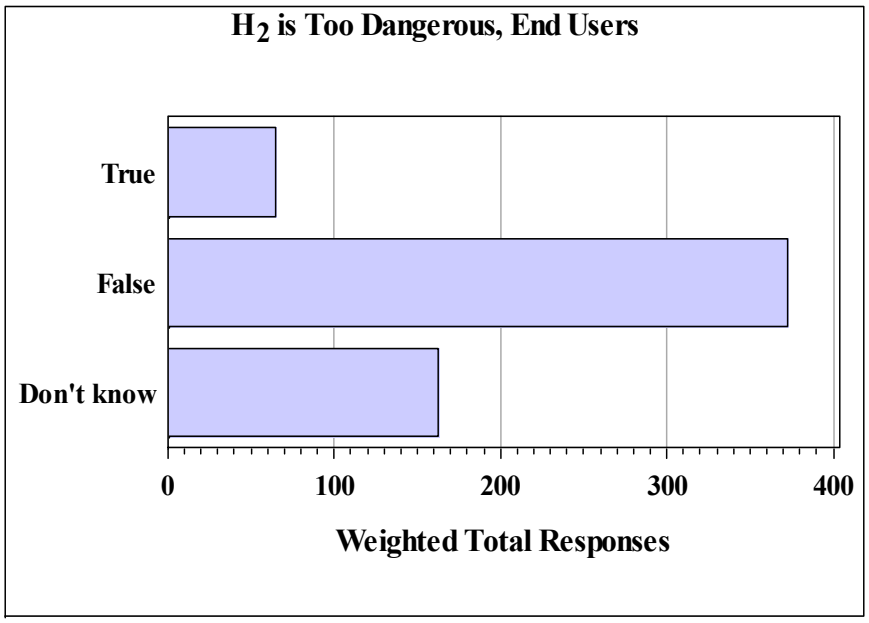

Figure 7.12. Reactions to the statement, "Hydrogen is too dangerous for everyday use by the general public," Question 12, end user survey.

Respondents to the end user survey were asked two questions about information sources. Question 18 asked about the frequency of use ("Never," "Sometimes," "Frequently") of information sources to make decisions about energy costs and safety. As shown in Figure 7.13, the sources marked "Frequently" most often were utility companies or brokers and industry or trade associations or non-profit organizations. Federal and State government sources and environmental groups were noted as "Sometimes" and "Frequently" used by a large percentage of respondents. The sources of information that received the greatest number of "Never" responses were teachers and schools, friends and family members, and local government agencies. These responses were very similar to those recorded in the 2004 survey.

Question 19 also asked about information sources, but from the perspective of media sources, that is, information vectors (television, radio, internet, etc.) for obtaining energy information. As shown in the Figure 7.14, respondents indicated that they rarely used the radio to obtain energy information; their most frequent media sources for obtaining energy information were the Internet and trade magazines.

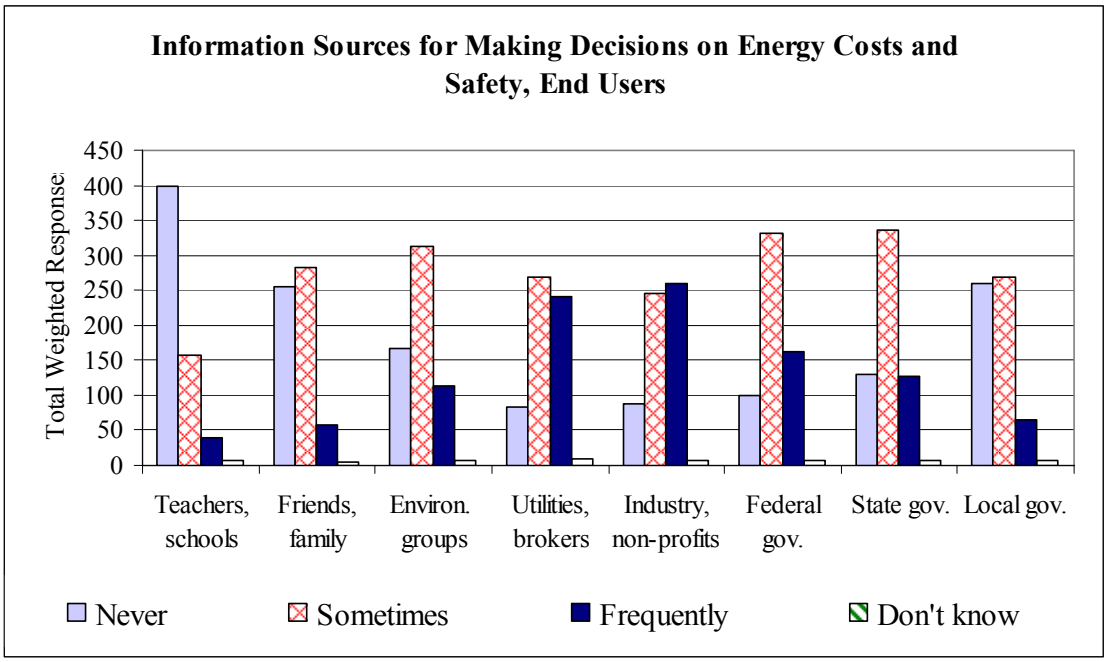

Figure 7.13. Weighted counts of responses regarding the frequency of use of information sources when making decisions about energy costs and safety, Question 18, end user survey.

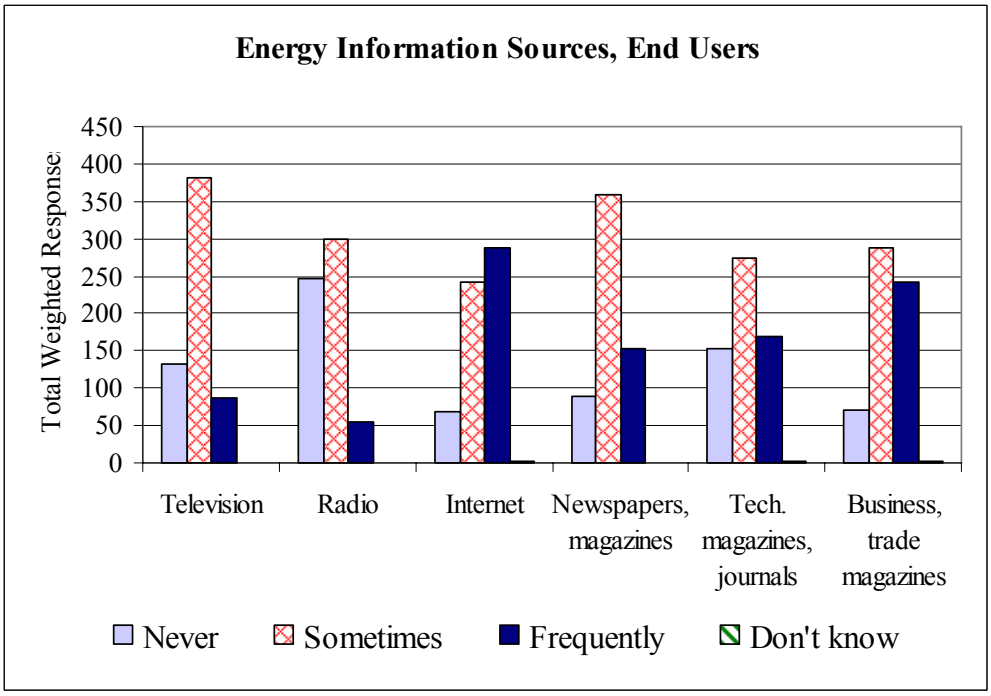

Figure 7.14. Weighted counts of responses regarding the frequency of use of different types of mass media for obtaining energy information, Question 19, end user survey.

End users were asked several questions on whether they had received specific information or training on hydrogen and/or fuel cell technologies. Figure 7.15 shows the responses to these questions. Only 29.5% of end user respondents had received information at their workplace, and 70.7% of the respondents indicated that training would be helpful.

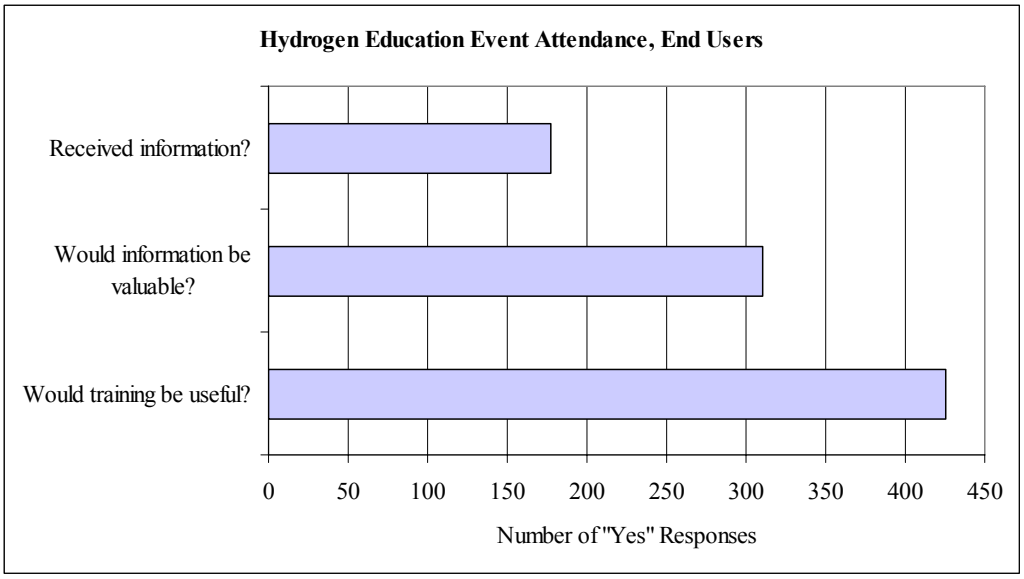

Figure 7.15. Number of "Yes" responses to Questions 20-22 concerning receiving information about hydrogen and/or fuel cells and the desire to attend a class, end user survey.

7.3. RELATIONSHIPS

The summary statistics in Section 7.2 are "one-way" statistics in the sense that the response categories are defined in terms of one variable such as response to an opinion question (e.g., Question 13C, "Hydrogen is as safe to use in my car as gasoline and diesel fuels"). However, relationships in the responses determined by two or more variables may also be of interest. Although no relationships were of particular interest a priori, in this section a few of the more statistically significant ones are illustrated. Interactions that were considered were with the survey variables and sex, region, urban/non-urban, familiarity with hydrogen and whether or not the score on the technical questions was above the average for the sample. The statistical significance criterion is the significance level (p) of a chi-square test that accounts for the sampling weights.[44]

As shown in Figure 7.16, respondents who scored below average on the technical questions were more likely to assess their familiarity as "Not at all familiar" or "Slightly familiar," and respondents who scored above average were more likely to claim a higher familiarity with

[44]Measures could also be based on odds ratios or combinations of odd ratios and significance levels as well as other metrics. Significance levels alone were used for simplicity and because sample sizes are essentially the same for all survey questions.

hydrogen and fuel cell technologies. Thus, the familiarity self-assessments are consistent with the technical awareness scores.

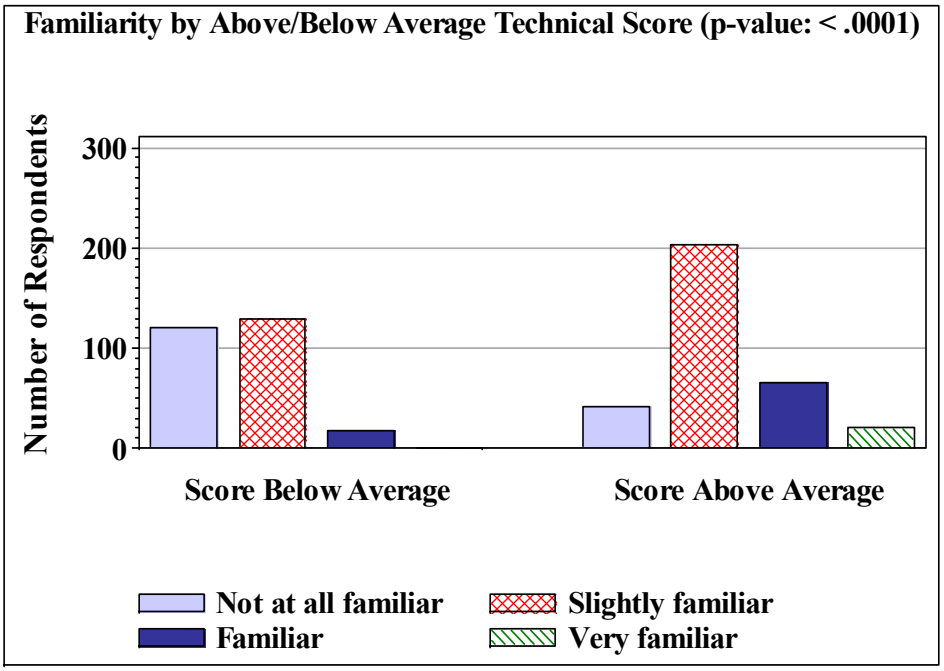

Figure 7.16. Responses by technical score above/below average to Question 1 (familiarity of respondents to hydrogen and fuel cell technologies), end user survey.

Respondents who knew more about hydrogen (i.e., who answered more technical questions correctly) were much more likely to agree with the statement "Hydrogen is as safe to use in my car as gasoline and diesel fuels." As shown in Figure 7.17, respondents with a score below average on the technical questions were most likely to express "No opinion" to this statement.

In the end user survey, males were much more likely to agree with the statement that "Hydrogen is as safe to use in my car as gasoline and diesel fuels."[45] Figure 7.18 shows that females were more likely to express "No opinion" to this statement.

End users who considered themselves as "Slightly familiar" or "Familiar" with hydrogen and fuel cell technologies were highly likely to believe that hydrogen is safe for everyday use by the general public, as shown in Figure 7.19.

When asked for an opinion about the statement "Using hydrogen will reduce emissions and improve air quality," there was a statistically significant ($p<0.0001$) difference in the responses of male and female respondents. Male end users were much more likely to agree with the statement; females were more likely to respond "Don't know" (Figure 7.20).

[45] Note that the end user survey sample consisted for 519 males and 82 females. Males constituted 86% of the survey sample.

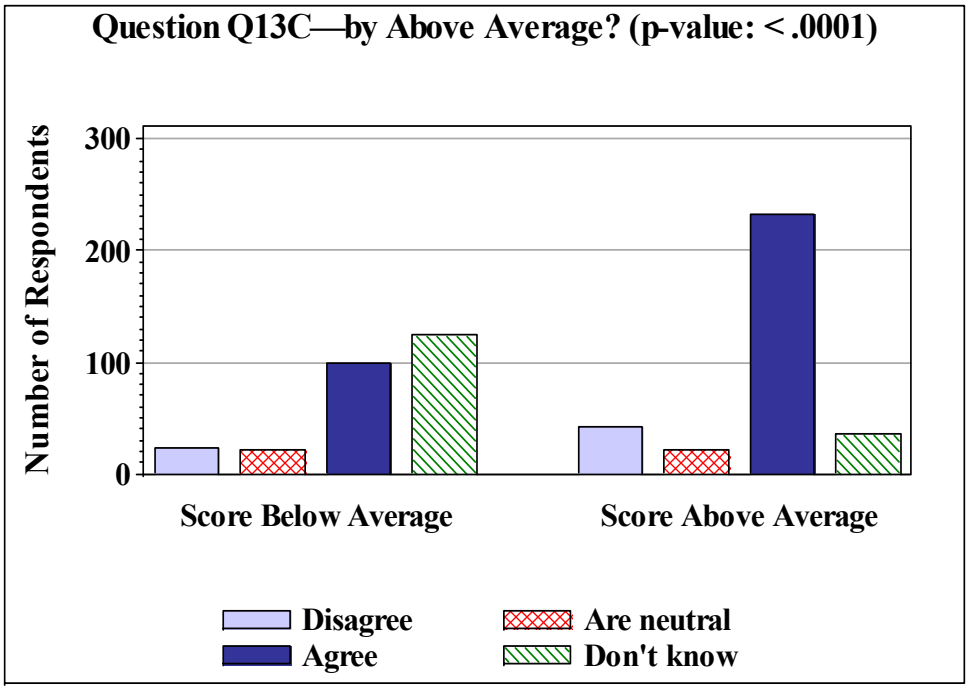

Figure 7.17. Responses by technical score above/below average to Question 13C, "Hydrogen is as safe to use in my car as gasoline and diesel fuels," end user survey.

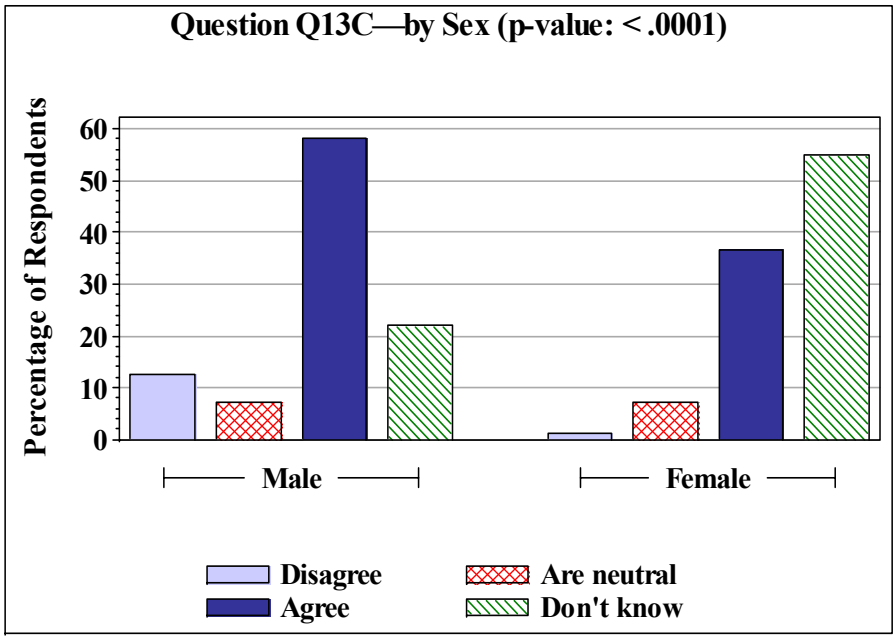

Figure 7.18. Percent of responses by gender to Question 13C, "Hydrogen is as safe to use in my car as gasoline and diesel fuels," end user survey.

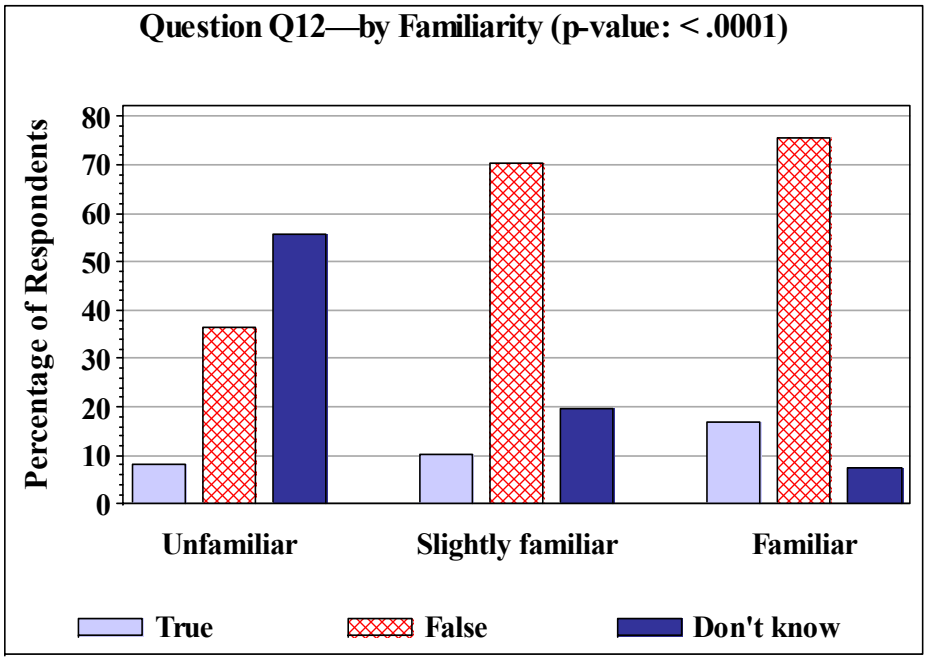

Figure 7.19. Percent of responses by familiarity to Question 12, "Hydrogen is too dangerous for everyday use by the general public," end user survey.

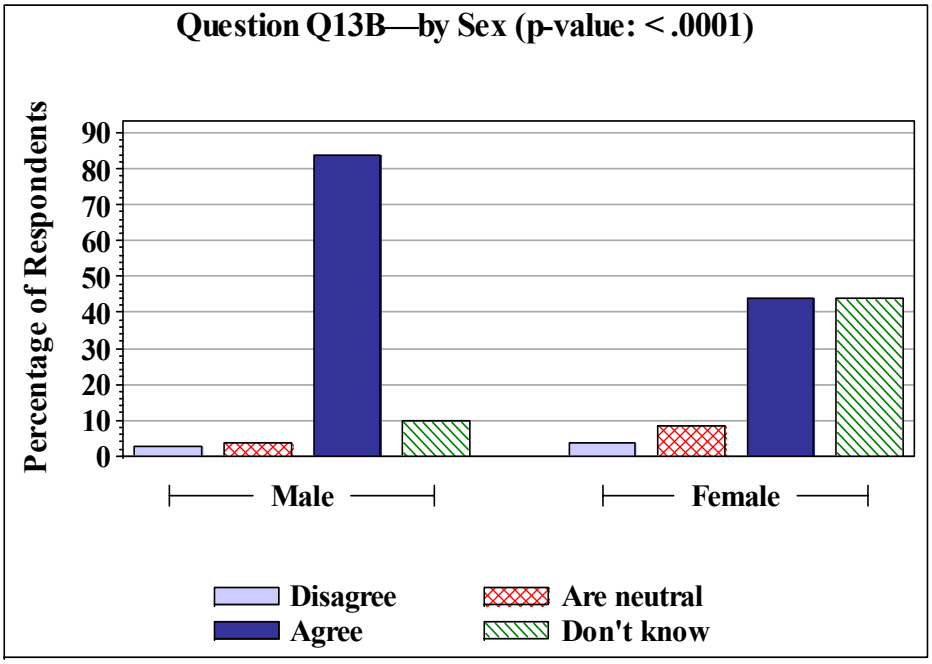

Figure 7.20. Response percentages by gender to Question 13B, "Using hydrogen will reduce emissions and improve air quality," end user survey.

Figure 7.21 shows the frequencies of business categories (transportation users, users needing an uninterrupted power supply, users with large power requirements) for respondents with fewer than three and with three or more correct answers to the eight technical questions. The distribution of correct/incorrect technical responses over the three sectors is fairly equal except that respondents in the lower scoring group were more likely to be from the transportation sector. In the 2004 survey, lower scores were more likely to be from the uninterrupted supply category.

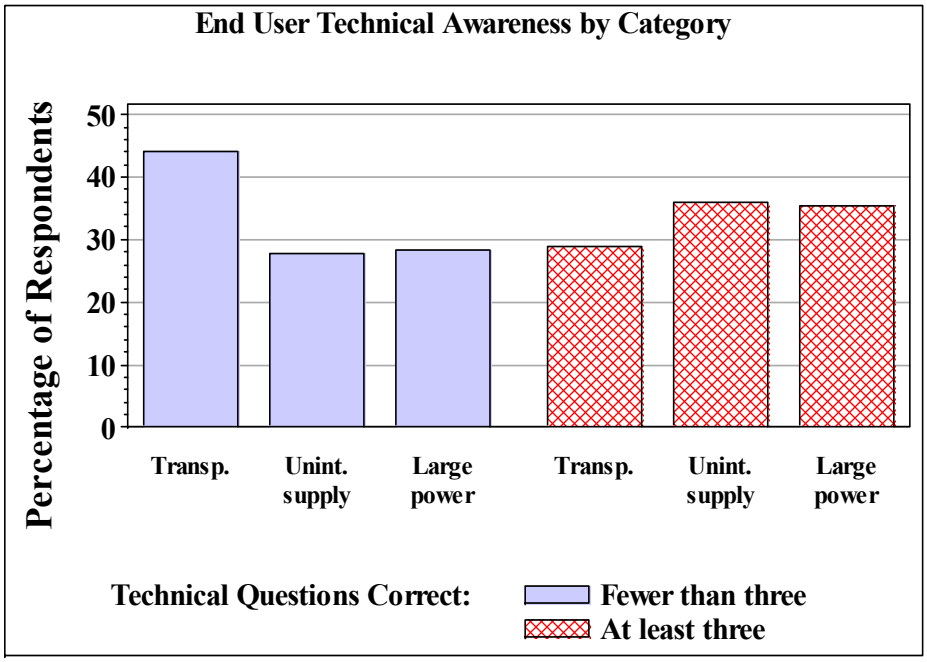

Figure 7.21. Business categories of the end user respondents who correctly answered fewer than three and at least three of the eight technical questions, end user survey.

Figure 7.22 shows responses to "How would you feel if your local gas station also sold hydrogen?" for respondents with fewer than three or at least three correct answers to the technical questions. This chart clearly shows that respondents that answered fewer than three questions correctly were much less likely to be "Pleased" and much more likely to select "Don't know" in response to this question.

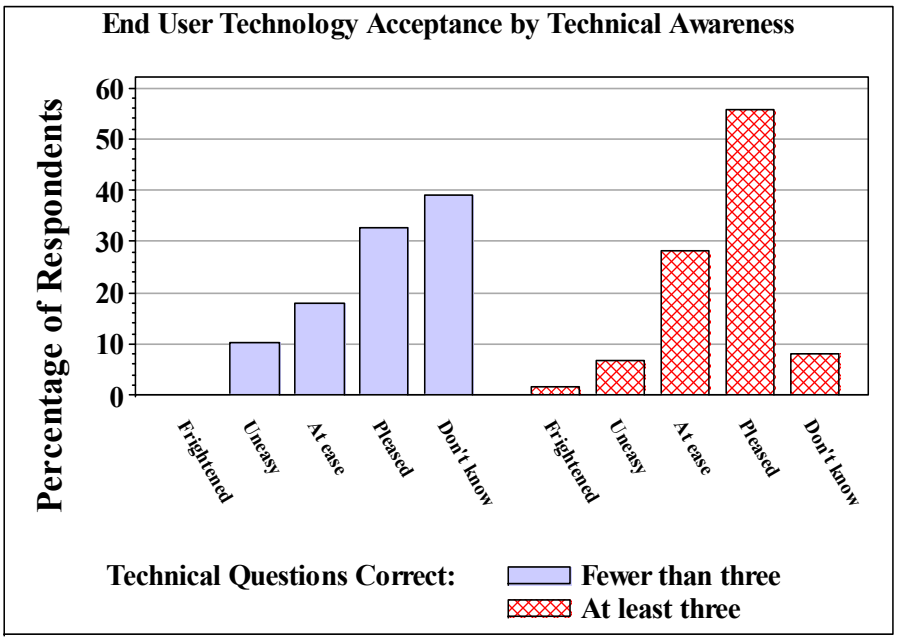

Figure 7.22. Response percentages to "How would you feel if your local gas station also sold hydrogen" by whether or not respondents correctly answered at least three of the eight technical questions, end user survey.

7.4. COMPARISON WITH THE 2004 BASELINE

A primary objective of repeating surveys over time is to compare survey results. Figure 7.23 shows the differences in the average technical scores for each of the eight technical questions on the survey. The overall average technical score in 2008 was 47.9% correct responses; in 2004 the average score was 46.3%.[46] Respondents in 2008 had higher average scores overall and on every individual question except Question 7, which concerned states or conditions in which hydrogen could be stored. The differences were generally small, however, and none were statistically significant.[47]

Several questions in the survey concerned safety issues and the use of hydrogen. Changes in the opinions of potential end users toward hydrogen safety are shown in the next three figures. Although the three figures all reflect a trend toward slightly more positive perceptions about hydrogen technology, only the last of the three (Figure 7.26) reflects statistically significant changes since 2004.

[46] This is the 2004 percentage of correct responses to the technical questions asked both in 2004 and 2008. For all eleven of the technical questions that were asked originally in 2004, the percentage correct was 44.4%.

[47] Although the 2008 end user survey had 601 respondents, the 2004 end user survey had only 99. As the differences here are subject to the statistical error in both surveys, the confidence limits for the differences are much wider than for any of the other survey components.

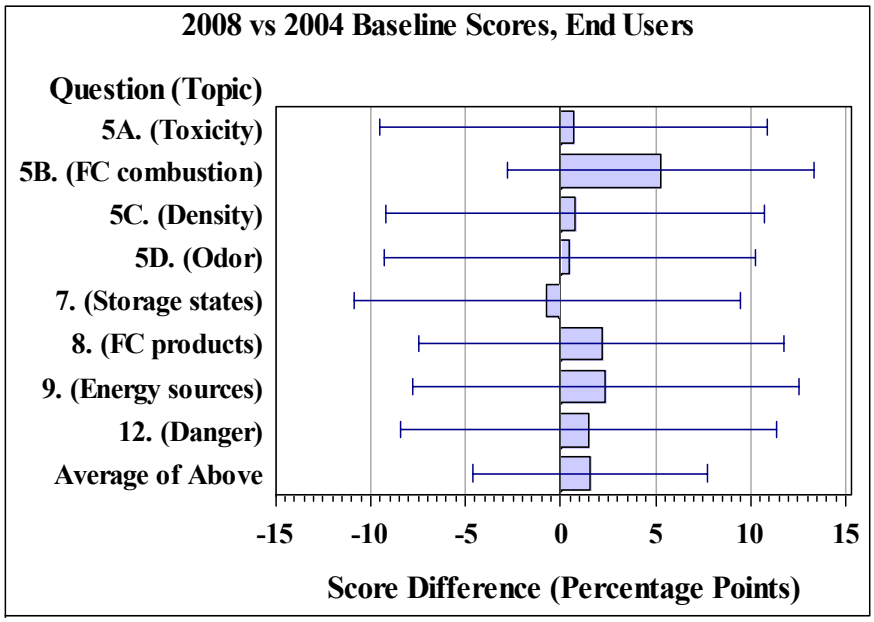

Figure 7.23. Differences between the 2008 and 2004 average percentage correct for each technical question and overall, end user survey. Bars to the right of zero show improvement in 2008. The error bars are 95% confidence intervals for the differences.

Figure 7.24 shows changes in opinions about the everyday use of hydrogen.

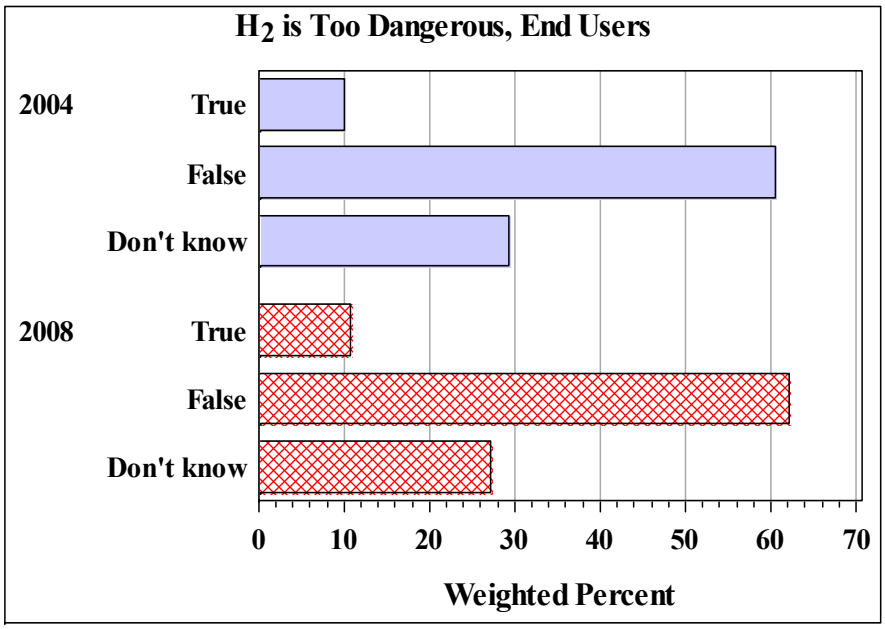

Figure 7.24. Comparisons of results of the 2004 and 2008 surveys regarding the statement, "Hydrogen is too dangerous for everyday use by the general public," Question 12, end user survey.

Another question examined opinions about the safety of hydrogen in vehicles. As shown in Figure 7.25, opinions about the use of hydrogen as a vehicle fuel changed only slightly between 2004 and 2008. Over 50% of respondents agreed that the fuel is safe, but about 10% disagreed.

Another question was about the comfort level of end users with the sale of hydrogen at their local gas station. Figure 7.26 compares the results of the 2004 and 2008 surveys to this question. The number of end users that said they would be "Pleased" increased from 32.3% to 48.9%. This difference is statistically significant ($p = 0.0009$). (The percentages responding that they were either frightened or uneasy also increased slightly, however.)

The sources used by end users to obtain energy information as recorded by the 2008/2009 survey were similar to those used in 2004, with two exceptions: radio and Internet usage. In 2004, 60% of end users indicated that they "Never" used the radio to obtain energy information; in the current survey, only 41% said they "Never" use the radio. In 2004, over a fourth of the respondents indicated that they "Never" used the Internet; however, in 2008/2009, only 11% indicated they "Never" use the Internet and 48% indicated that they use it "Frequently." (See entry Q11 in Appendix C.4 and the entry for Question 13e in Appendix C.4 of 2004 report.)

End user plans for using hydrogen and/or fuel cell technologies in the future have changed slightly. In 2004, 8% indicated their agency had plans for future use, 63% indicated "No," and 29% responded "Don't know." In 2008/2009, 14% had implementation plans, 63% indicated "No," and 23% responded "Don't know." In 2004, only 99 end user respondents were interviewed; in 2008/2009, 600 end users were interviewed. Table 7.2 compares the differences in terms of percentage of respondents who indicated their agency had plans for future implementation.

Finally, there was a large drop in the response rates for the end user population – from 0.2914 in 2004 to 0.1701 in 2008/2009.

Table 7.2. Time frames for Implementation for End Users Planning to Use Hydrogen or Fuel Cells in the Future

	2004 (%)	**2008 (%)**
Within the next year	0 (0%)	4 (5%)
1-5 years	5 (71%)	29 (38%)
Over 5 years	1 (14%)	21 (27%)
Don't know	1 (14%)	23 (30%)
Total of those with implementation plans	7	77

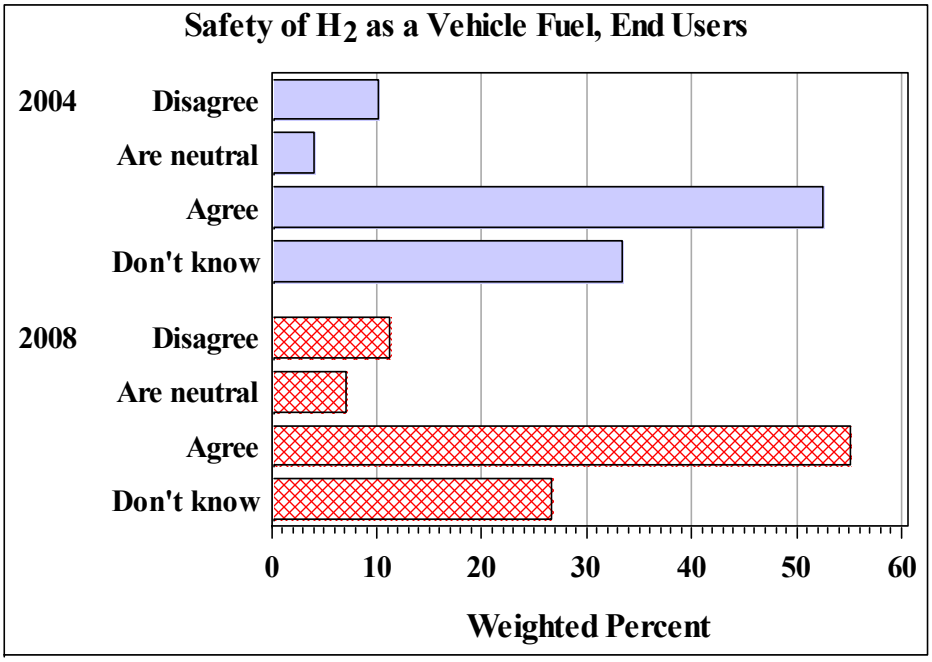

Figure 7.25. Comparisons of results of the 2004 and 2008 surveys regarding opinions about the safety of hydrogen as a vehicle fuel, Question 13C, end user survey.

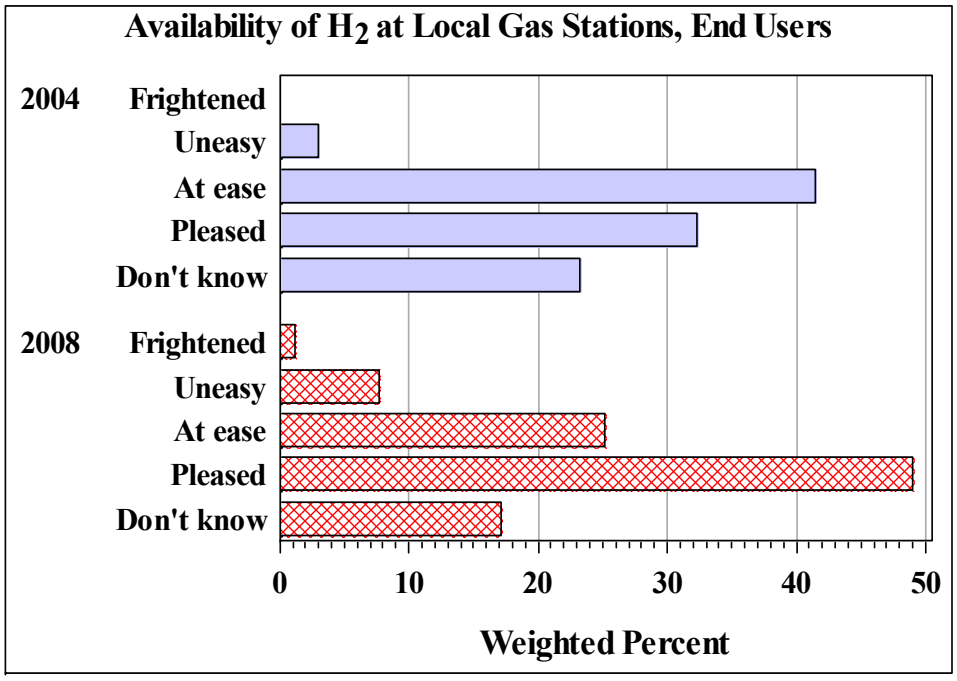

Figure 7.26. Comparisons of results of the 2004 and 2008 surveys regarding opinions about the availability of hydrogen at a local gas station, Question 11, end user survey.

8. RESULTS: SAFETY AND CODES OFFICIALS SURVEY

8.1. INTRODUCTION

This section summarizes the results of the survey of safety and codes officials. A copy of the survey questionnaire is in Appendix A.5. A master list of 193 potential respondents was compiled; the master list contained contact information from four groups: International Association of State Fire Chiefs (IAFC), 50 contacts; International Code Council (ICC), 49 contacts; National Association of State Fire Marshalls (NASFM), 50 contacts; and National Fire Protection Association (NFPA), 44 contacts. A total of 149 interviews were completed during the period of May 27-June 26, 2009. The total average interview length was 17 minutes, broken down into a screening time of 3 minutes and a main interview length of 14 minutes. A summary of responses to this survey, by question number, is provided in Appendix C.5.

To improve survey response rates, the DOE FCT office sent letters to the individuals on the master list telling them about the survey and encouraging their participation. A copy of this letter is provided in Appendix D.2.

Section 8.2 is a general summary of the responses of the safety and codes officials. Relationships between the response variables are discussed in Section 8.3. There was no survey of safety and codes officials in 2004; therefore, the 2008/2009 survey results are the baseline for this population.

For the sake of simplicity, the responses "Don't know," "No opinion," and "Don't know/no opinion" are all treated equivalently and generally as "Don't know" in this report.

The response rate for the 2008 End User Survey is discussed in Appendix E.5. The response rate is 77.2%. Had the entire target population been sampled (100% response), there would be no statistical sampling error in the survey estimates. The response rate is less than perfect, however, and so estimates computed from this data ***are*** subject to error. As an approximation, this error is handled as sampling error in the data analysis. Because the sample is nearly complete, finite population correction factors[48] are applied in the analysis with the SAS surveymeans and surveyfreq procedures.[49]

8.2. SUMMARY

The section summarizes the responses to the individual questions in the safety and codes officials survey. Most of the questions are summarized as proportions of respondents in each of the respective multiple choice categories. Preference ranks are summarized as means. Answers to the technical questions are summarized individually and are also compiled into an overall technical score. Relationships between responses to different questions are considered in Section 8.3.

[48] Cochran, William G., *Sampling Techniques*, Third Edition, John Wiley & Sons, Inc., New York, 1977, p. 24.
[49] SAS Institute, *SAS/STAT 9.1 User's Guide*, SAS Institute, Inc., Cary, North Carolina, 2004, p. 165.

Table 8.1 summarizes the technical questions in terms of whether they were answered correctly or incorrectly with "Don't know" treated as an incorrect response. Confidence intervals for the percentages of correct responses reflect statistical error due to nonresponse, under the assumption that nonresponse is random.

The greatest percentage of correct responses is 73.8%, for Question 9 (Hydrogen is too dangerous), followed by 73.2% for Question 2C (Hydrogen is lighter than air…). The smallest percentage of correct responses is 20.1%, for Question 2B (Fuel cells produce electricity through…) followed by 36.2% for Question 5 (When using pure hydrogen…).

Table 8.1. Summary of Results on the Technical Knowledge Questions (correct/incorrect), Safety and Codes Officials

Question	Number of responses	Percent correct	Lower 95% confidence bound	Upper 95% confidence bound
2A. Hydrogen gas is toxic (false)	149	53.69	45.66	61.72
2B. Fuel cells produce electricity through hydrogen combustion (false)	149	20.13	13.65	26.62
2C. Hydrogen is lighter than air (true)	149	73.15	65.96	80.35
2D. Hydrogen has a distinct odor (false)	149	63.09	55.28	70.90
4. In which state or condition can hydrogen be stored? (chemical compound, liquid)	149	43.62	35.67	51.57
5. When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else? (heat)	149	36.24	28.36	44.13
6. Hydrogen can be produced using which of the following sources of energy? (natural gas, sunlight, organic matter)	149	48.32	40.26	56.38
9. Hydrogen is too dangerous for everyday use by the general public (false)	149	73.83	66.71	80.94
Overall Average	149	51.5	47.60	55.42

The correct/incorrect perspective used in Table 8.1 is conventional, since "Don't know" is generally considered an incorrect response. However, "Don't know" was a very common response to the survey technical questions. Figure 8.1 shows the responses broken down according to type: Correct, Incorrect, and "Don't know." On average, 51.5% of the technical questions were answered correctly, 21.3% were answered incorrectly, and 27.2% were answered with "Don't know."

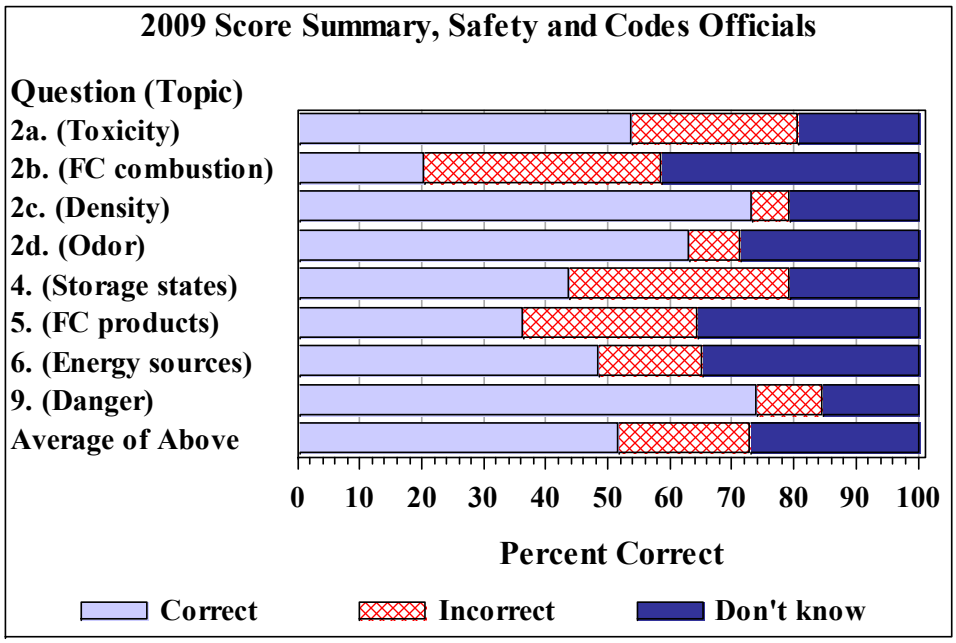

Figure 8.1. Weighted percent of correct, incorrect, and "Don't know" responses for the technical knowledge questions, safety and codes officials.

Figure 8.2 shows the distribution of the number of correct responses for the safety and codes officials survey. There were a few respondents with no correct answers and a few who answered all eight questions correctly. Most respondents answered between three and six questions correctly, and 45.6% of respondents had five or more correct answers. Comparison of Figure 8.2 with the corresponding figure for state and local government officials (Figure 6.2) shows that the government officials have a higher mean; however, the dispersions (standard deviations) are almost exactly the same.[50]

The first question in the survey asked respondents to gauge their familiarity with hydrogen and fuel cell technologies. Figure 8.3 shows the distribution of responses. Over 62.4% of all respondents considered themselves "Slightly familiar" with hydrogen and fuel cell technologies, and 22.1% considered themselves "Familiar."

The rank scores for the question asking respondents to rank the importance of safety, cost, environment, convenience, and performance (Question 7) are summarized in Table 8.2 as the averages of the ranks (1-5) assigned by each survey subject. Note that on the rank scale, 1 is higher (more important) than 2, which is higher than 3, etc. Thus, the lower the weighted average rank, the more important is the "Value." On average cost and safety were considered of essentially the same and of greatest importance, followed by convenience, performance, and the environment (with performance and the environment also essentially the same). Of course many individuals departed from this exact order.

[50] Mean ± standard deviation for the two distributions are 5.33 ± 1.97 for the government officials and 4.12 ± 1.95 for the safety and codes officials.

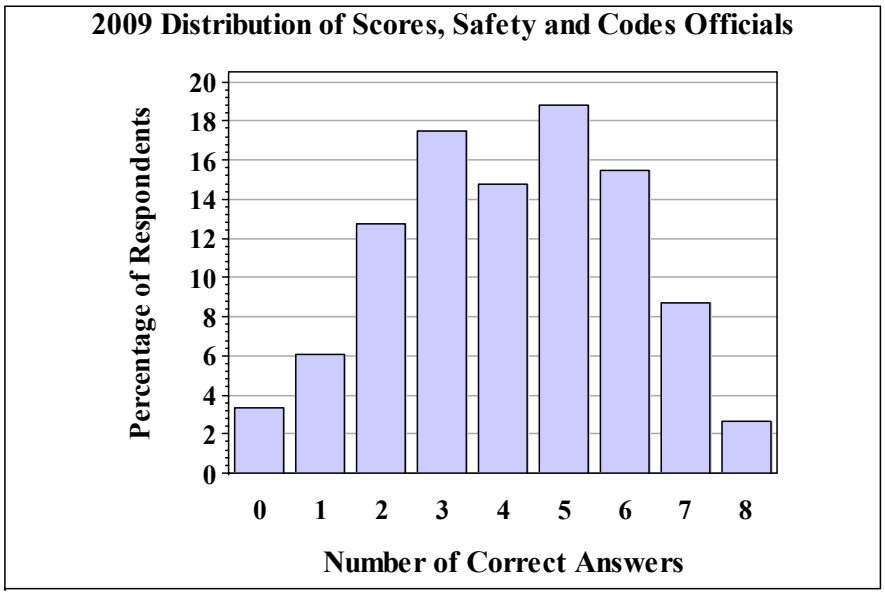

Figure 8.2. Distribution of the number of correct answers to the eight technical knowledge questions, safety and codes officials.

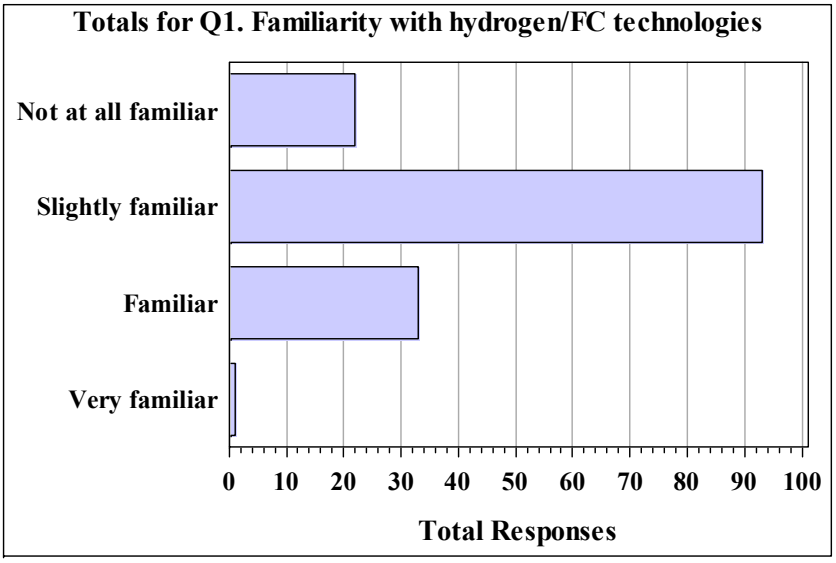

Figure 8.3. Distribution of responses to the question about familiarity with hydrogen and fuel cell technologies, Question 1, safety and codes officials.

Table 8.2. Summary of Importance Ranking, Safety and Codes Officials				
Question	**Number of responses**	**Average rank**	**Lower 95% confidence bound**	**Upper 95% confidence bound**
Cost	148	2.26	2.17	2.35
Safety	148	2.26	2.17	2.35
Environment	148	3.70	3.59	3.80
Performance	148	3.68	3.58	3.77
Convenience	148	3.11	3.01	3.21

Figure 8.4 illustrates the pattern shown in Table 8.2. The last ten "Value" entries in Appendix C.5 are for pairwise comparisons based on the safety, cost, environment, convenience, and performance rankings. Each possible pair (e.g., safety and cost) is considered separately.

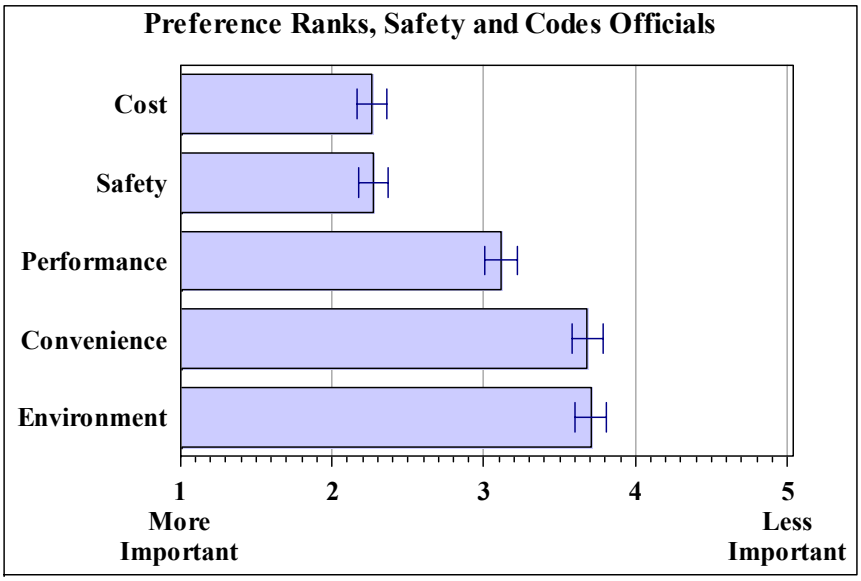

Figure 8.4. Mean of preference rankings of cost, safety, environment, convenience, and performance, Question 7, safety and codes officials. (Rank=1 for first choice, 2 for second choice, etc.) The error bar on each chart bar shows 95% confidence limits for the mean rank.

Respondents were asked about the use of fuel cells for providing power to their home, car, laptop computer, or all of these. Figure 8.5 suggests that safety and codes officials are aware of the potential uses of fuel cells since 57.0% indicated the correct response (all of these).

Several questions involved respondents' opinions about the safety of fuel cells and hydrogen. Figure 8.6 shows the responses for the survey question about the safety of hydrogen relative to gasoline and diesel (Question 10C). The options that were provided to respondents were "Disagree," "Are neutral," "Agree," or "Don't know/no opinion." As can be seen in Figure 8.5, over 90% of the safety and codes officials agreed with the statement "Hydrogen is as safe to use

in my car as gasoline and diesel fuels," although "Don't know/no opinion" was also a common response.

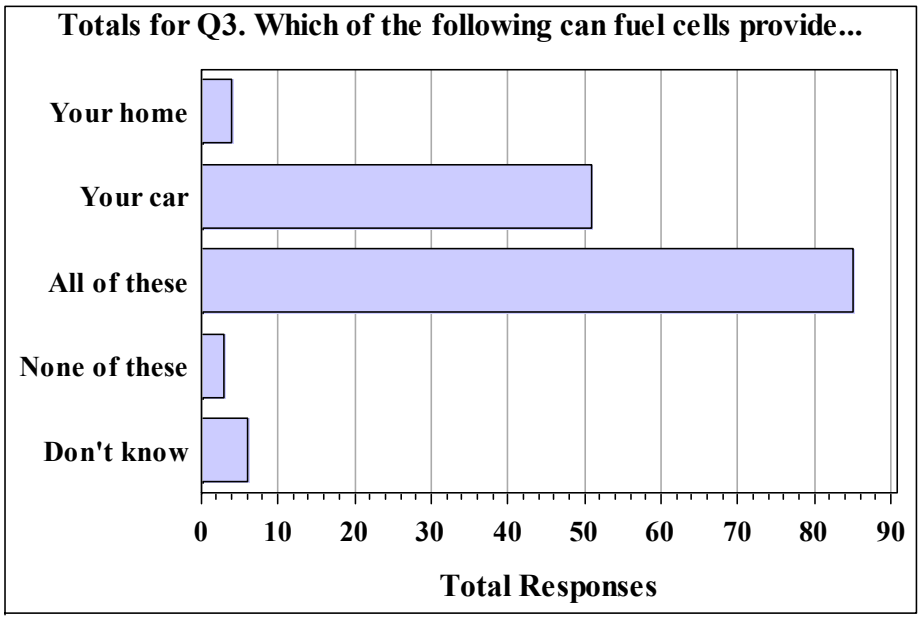

Figure 8.5. Responses to statements about the uses of fuel cells, Question 3 (Which of the following can fuel cells provide power to?), safety and codes officials.

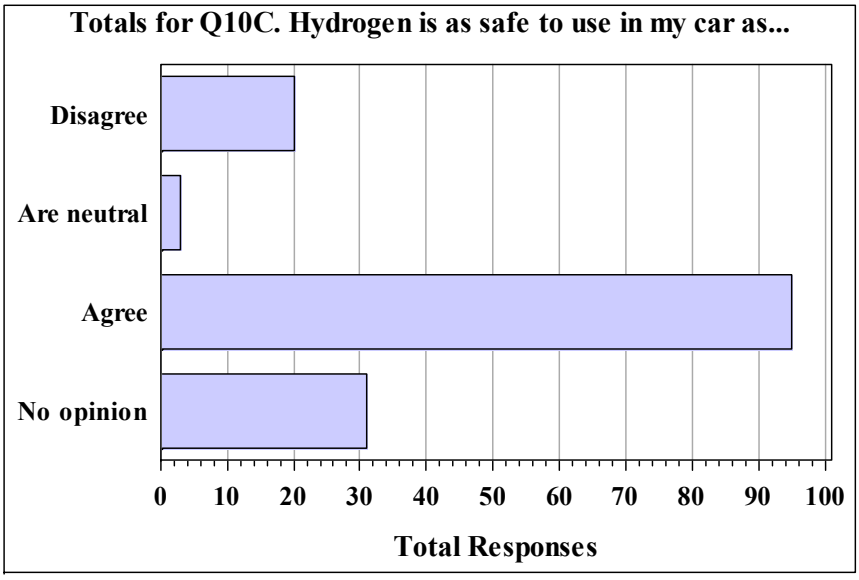

Figure 8.6. Responses to statement, "Hydrogen is as safe to use in my car as gasoline and diesel fuels," Question 10C, safety and codes officials.

Safety and codes officials were asked how they would feel if their local gas station also sold hydrogen. Figure 8.7 shows their responses to this question. While slightly over 12% of respondents indicated they would be "Frightened" or "Uneasy," 38.9% indicated they would be "At ease," and 40.3% responded that they would be "Pleased."

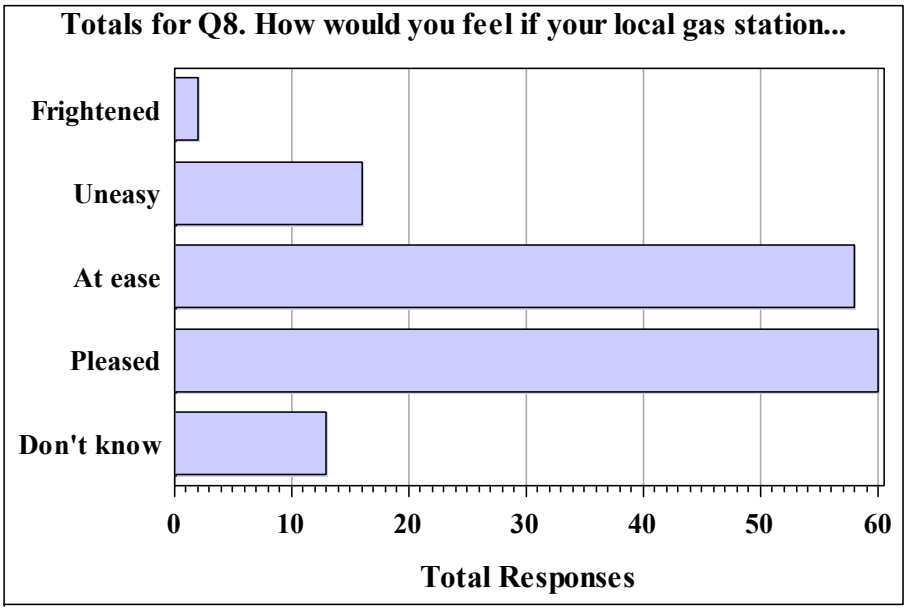

Figure 8.7. Responses to the possibility of sales of hydrogen at a local gas station, Question 8 (How would you feel if your local gas station also sold hydrogen?**), safety and codes officials.**

When safety and codes officials were asked whether they had ever been involved in permitting a stationary fuel cell installation, hydrogen refueling station, or other hydrogen fuel cell project, 87.3% of the respondents answered "No." In addition, fewer than one in four respondents (24.2%) knew anyone who had been involved in permitting a hydrogen fuel cell project.

Safety and codes officials were asked whether they had the information that they would need if they were asked to review a request for a stationary fuel cell permit. Only 37.6% responded "Yes," and only 24.8% of all respondents indicated that they would feel "Comfortable" conducting the review.

Similar questions were asked about reviewing a request for a hydrogen fueling station permit. About 41% (40.9%) of respondents said that they had the information needed to review the permit request, and 26.8% indicated that they would feel "Comfortable" conducting the review.

It is significant that a large number of safety and codes officials involved in the survey indicated the would feel "Uneasy" conducting the reviews; 40.9% would feel "Uneasy" conducting a permitting review for a stationary fuel cell, and 38.9% would feel "Uneasy" reviewing a permit request for a hydrogen fueling station.

When asked where they would go to obtain information for reviewing an application, only one respondent indicated a complete lack of knowledge on where to seek information. Generally, respondents indicated that they would try all sources, but the source most frequently chosen was industry, followed closely by national organizations. Table 8.3 provides the responses to this question.

Table 8.3. Sources that Would Be Used if Additional Information Were Needed to Review an Application for a Stationary Fuel Cell or Hydrogen Fueling Station, Question 35, Safety and Codes Officials

	Would use	Would not use	Total responses
Peers	108	41	149
Federal government	117	32	149
State government	118	31	149
Nonprofit organization	82	67	149
Industry source	138	11	149
National organization	136	13	149
Local agency's regulations	115	34	149
Don't know/no opinion	1	148	149

Safety and codes officials were asked two questions about information sources. Question 14 asked about the frequency of use ("Never," "Sometimes," "Frequently") of information sources to make decisions about energy costs and safety. As shown in Figure 8.8, the source marked "Frequently" most often was industry, trade associations, or non-profit organizations; this source was followed closely by utilities/brokers and State government. The sources of information that received the greatest number of "Never" responses were teachers and schools, friends and family members, and environmental groups.

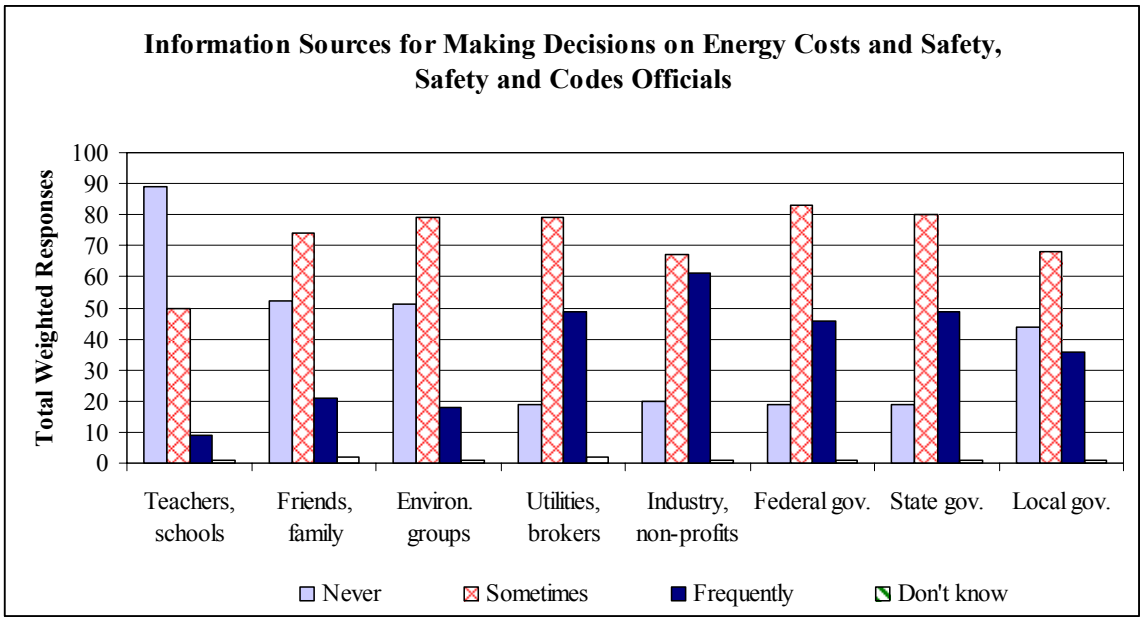

Figure 8.8. Weighted counts of responses regarding the frequency of use of information sources when making decisions about energy costs and safety, Question 14, safety and codes officials.

Question 15 also asked about information sources, but from the perspective of media sources, that is, information vectors (television, radio, internet, etc.) for obtaining energy information. As shown in Figure 8.9, respondents indicated that their most frequent media source for obtaining energy information was the Internet, followed by business and trade magazines.

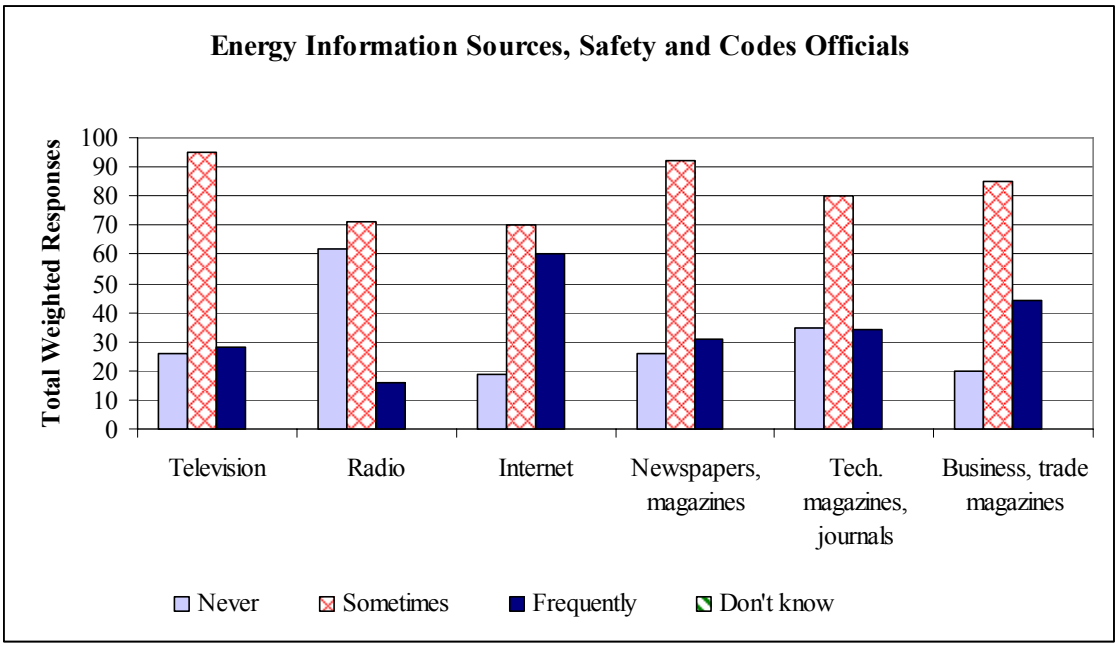

Figure 8.9. Weighted counts of responses regarding the frequency of use of different types of mass media for obtaining energy information, Question 15, safety and codes officials.

Over 65% of the safety and codes officials indicated that they had received information about hydrogen and fuel cell technologies (Question 26). While only 27.5% of respondents had participated in a training class on hydrogen or fuel cells, 77.8% indicated that they would like to participate in a class (Questions 17 and 19). Most respondents (50%) indicated that an in-person class at a local facility would be the most useful format for a class (Question 20).

8.3. RELATIONSHIPS

The summary statistics in Section 8.2 are "one-way" statistics in the sense that the response categories are defined in terms of one variable such as response to an opinion question (e.g., Question 10C, "Hydrogen is as safe to use in my car as gasoline and diesel fuels"). However, relationships in the responses determined by two or more variables may also be of interest. Although no relationships were of particular interest a priori, in this section a few of the more statistically significant ones are illustrated. Interactions that were considered were with the survey variables and familiarity with hydrogen and fuel cell technologies and the whether

respondent overall technical scores were above average for the sample. The statistical significance criterion is the significance level (p) of a chi-square test.[51]

As shown in Figure 8.10, respondents who scored below average on the technical questions were more likely to assess their familiarity as "Not at all familiar" or "Slightly familiar," and respondents who scored above average were more likely to claim a higher familiarity with hydrogen and fuel cell technologies. Thus, the familiarity self assessments are consistent with the technical awareness scores.

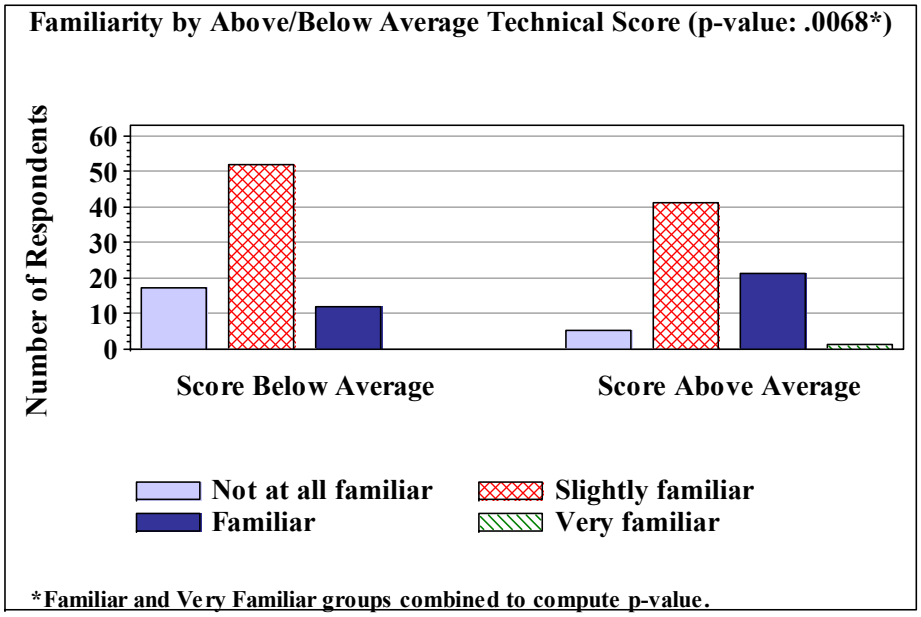

Figure 8.10. Responses by technical score above/below average to Question 1 (familiarity of respondents to hydrogen and fuel cell technologies), safety and codes officials.

Safety and codes officials considered hydrogen and fuel cell technologies as "Equally as safe" or, in many cases, "Safer" than technologies in use today. This opinion was even more pronounced for respondents with above average scores on the technical knowledge questions. Figure 8.11 shows that respondents with below average scores were much more likely to have "No opinion" about the safety of small portable devices such as laptop computers or cell phones; respondents with below average scores were also more likely to think these devices were "Not as safe." Respondents with above average score, on the other hand, were more likely to assert that these devices were "Equally as safe" as technologies in use today.

[51]Measures could also be based on odds ratios or combinations of odd ratios and significance levels as well as other metrics. Significance levels alone were used for simplicity and because sample sizes are essentially the same for all survey questions.

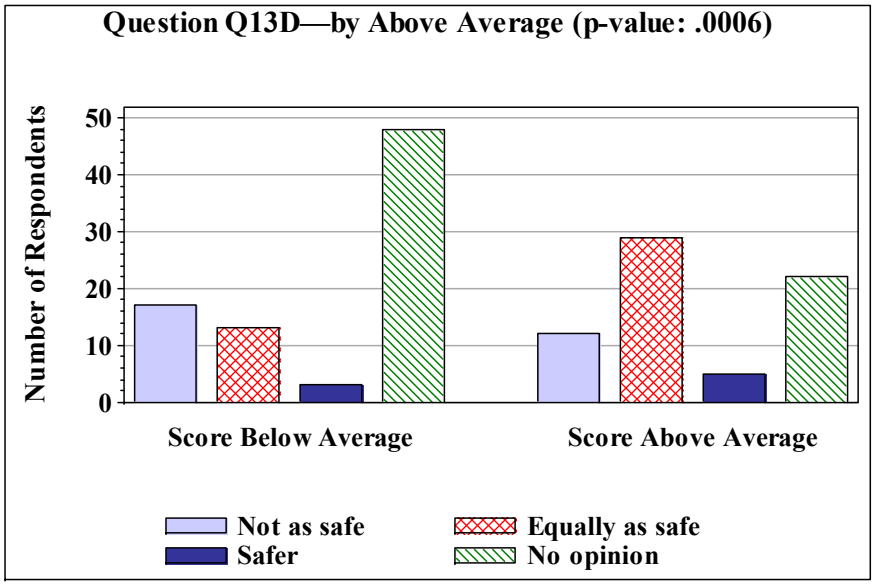

Figure 8.11. Responses by technical score above/below average concerning the safety relative to technology in use today of small portable devices such as laptop computers or cell phones, Question 13D, safety and codes officials.

9. COMPARISON OF RESULTS FOR THE FIVE POPULATIONS

Sections 4-8 summarize the findings of the 2008/2009 surveys of the general public, students, state and local governments, end users, and safety and codes officials, respectively. Some comparisons are also made with the results of the 2004 surveys, to measure changes, but very few comparisons are made among the five component populations. Cross-population comparisons are discussed in this section. It should be stressed, however, that comparisons of the different populations are not the primary purpose of the hydrogen surveys. Each of the populations is different, and each population may require a different approach in the education program. The primary purpose of the surveys is to measure knowledge and opinions and changes in knowledge and opinions in each survey population separately.[52]

Table 9.1 shows numbers of respondents and response rates for the survey populations in 2004 and 2008/2009. Response rates for students and the general public were similar in both survey years. Response rates for government officials and end users declined. In both survey years, response rates for government officials were the highest, although the 2009 response rate for safety and codes officials was also high.

Table 9.1. Sample Sizes and Response Rates by Population for the 2004 and 2008/2009 Surveys

Population	Sample size		Response rate (%)		Response rate difference (percentage points)
	2004	2008/9	2004	2008/9	
General public	889	1,000	24.8	23.0	-1.8
Students	1,000	1,004	27.5	29.5	+2.0
Government agencies	236	220	95.9	89.4	-6.5
End users	99	601	29.1	17.0	-12.1
Safety and codes officials	NA	149	NA	77.2	NA

The five different survey populations expressed very different opinions about their familiarity with hydrogen and fuel cell technologies. Figure 9.1 shows that the general public and to a slightly lesser extent students, rated themselves for the most part "Not at all familiar" or "Slightly familiar," while end users rated themselves more familiar, and government officials even more familiar than end users. Safety and codes officials had the highest percentage of "Slightly familiar" responses. This population also had a high percentage of respondents rating themselves as "Familiar" with hydrogen and fuel cell technologies.

Figure 9.2 illustrates the differences in percentages of correct technical responses among the five populations. Students (ages 12-17) performed slightly better than the adult general public. Among the other populations, the state and local officials correctly answered the technical questions most frequently.

[52] The population of safety and codes officials was not surveyed in 2004.

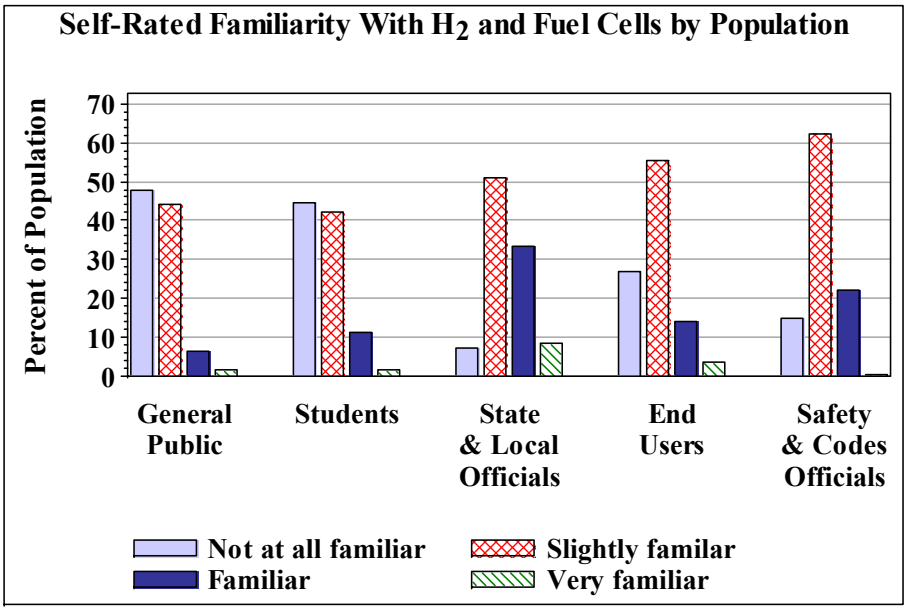

Figure 9.1. The self-rated levels of familiarity with hydrogen and fuel cell technologies for each of the five component populations, 2008/2009 survey.

Figure 9.2 also shows differences between the average percentage of correct scores for technical questions about fuel cell questions (Questions 2B and 5 on the general public survey) and for all eight technical questions together. Because the fuel cell questions were less likely to be answered correctly than the general hydrogen questions, it might be assumed that either (1) knowledge about fuel cells is not as prevalent as general knowledge about hydrogen and the hydrogen economy (particularly so for the general public and students), or (2) the fuel cell questions were more difficult questions.

Another way of looking at the technical scores for the 2008/2009 survey, is to look at the proportion of correct, incorrect, and don't know scores for all populations. As shown in Figure 9.3, the population with the greatest proportion of correct responses and least proportion of incorrect and "Don't know" responses is the state and local government agencies. The general public has the fewest correct responses and greatest proportion of "Don't know" responses.

A comparison of the percentages of "Don't know" responses to the technical questions over time is another indicator of change in knowledge. Figure 9.4 shows percentages of "Don't know" responses to the eight technical questions. In 2008/2009, the population with the highest percentage of "Don't know" responses was the general public (45.4%), followed by the end users (36.4%), the students (24.4%) and the state and local officials (18.5%). Figure 9.3 shows that these percentages are generally fairly close to the corresponding 2004 percentages (safety and codes officials results for 2009 only).

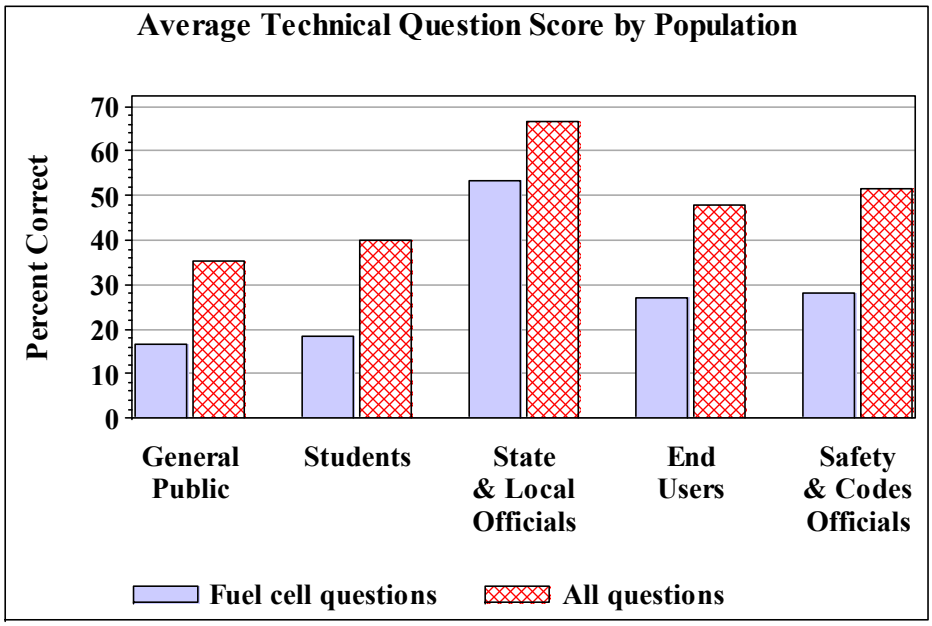

Figure 9.2. Distribution of the average percentage of correct responses to the eight technical questions by population, for fuel cell questions (Questions 2B and 5 on the general public survey) and all eight technical questions, 2008/2009 survey.

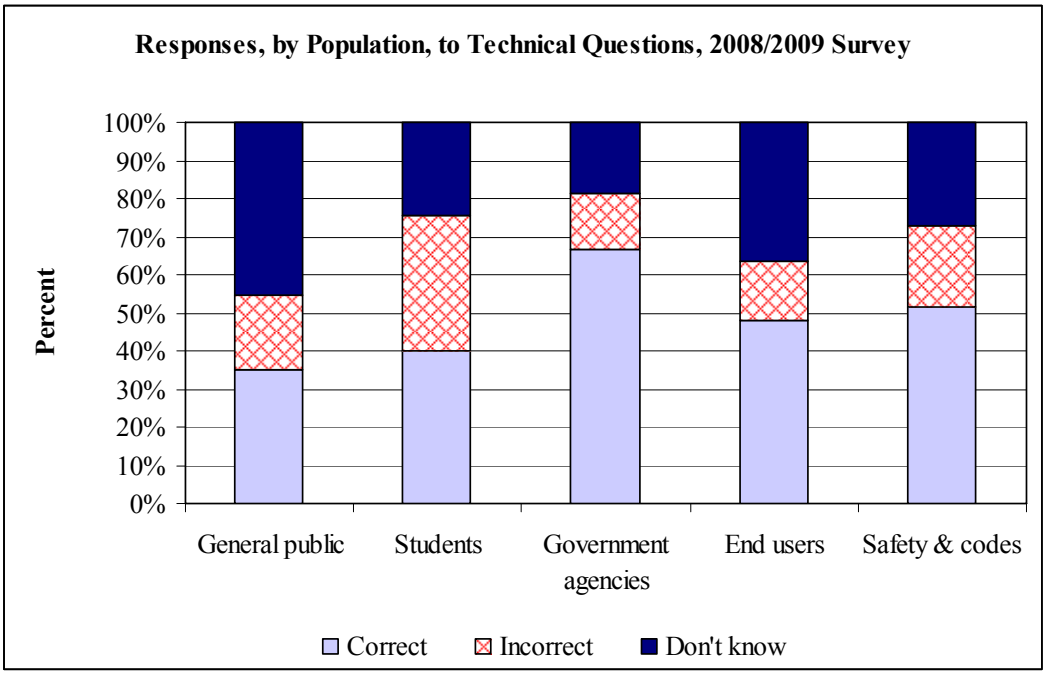

Figure 9.3. Distribution of the average percentage of correct, incorrect, and "Don't know" responses to the eight technical questions by population, 2008/2009 survey.

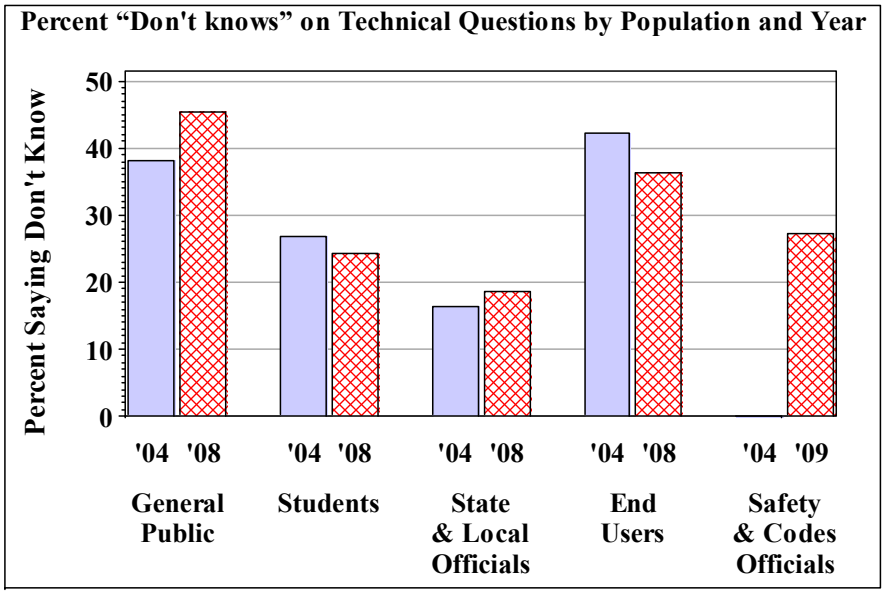

Figure 9.4. Percentage of respondents in each population that answered "Don't know" to the eight technical questions assessing knowledge of hydrogen and fuel cells.

Table 9.2 is similar to Table 9.1 but shows, rather than response rates, average technical question scores (percent correct) for the five populations. The table shows that in 2004 and again in 2008, government agencies were by far the most knowledgeable about hydrogen, according to the survey responses. The 2008 performance for all populations (except safety and codes officials) was as good or slightly better than in 2004. However, only for the students was the increase (4.5%) statistically significant ($p<0.0001$).

Table 9.2. Average Technical Scores by Population for the 2004 and 2008/2009 Surveys

Population	Sample size		Technical score (% correct)		Score difference (percentage points)
	2004	2008-09	2004	2008-09	
General public	889	1,000	35.2	35.2	+0.0
Students	1,000	1,004	35.3	39.8	+4.5
Government agencies	236	220	66.6	66.6	+0.1
End users	99	601	46.3	47.9	+1.6
Safety and codes officials	NA	193	NA	51.5	NA

The general public, state and local officials, and safety and codes officials were asked to rank the importance of safety, cost, environment, convenience, and performance when selecting a vehicle fuel or a power supply for a home or business. Figure 9.5 shows the average preference rankings for each of these population groups. For both the general public and the state and local officials, the rankings were in the order of cost (most important), followed by safety, environment, performance, and convenience. The trend from cost to performance was steeper for the general public than for the state and local officials, however, indicating that preferences for the general

public were somewhat stronger. The same trend was also seen for the safety and codes officials, with the exception that they considered environmental impact least important.

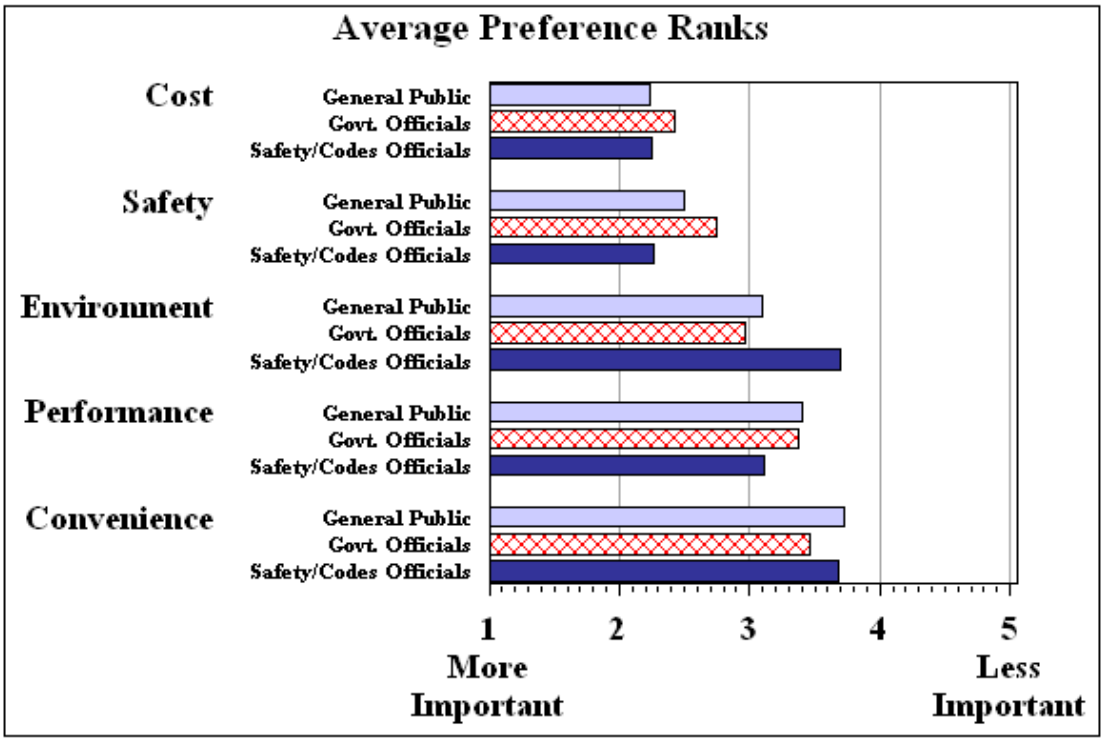

Figure 9.5. Comparison of average preference rankings of cost, safety, environment, convenience, and performance for the general public, government officials, and safety and codes officials, 2008/2009 survey.

Several questions asked for opinions about the safety and advantages of hydrogen as a vehicle fuel. Figure 9.6 shows that in 2008 all five populations tended to believe that hydrogen technologies will reduce emissions and dependence on foreign oil, with government officials the most optimistic of all. In addition, over 60% of the government officials, over 60% of the safety and codes officials, and over 50% of the end user respondents considered hydrogen as safe as gasoline or diesel fuels. (For a comparison of this figure with 2004 results, see Figure 8.3 of the 2004 report.)

Figure 9.7 shows that every 2008 population considered hydrogen as generally safe for use with all specified applications. Students were slightly more positive in their responses than the general public. The applications receiving the most positive reactions were "Personal cars and trucks" and "Commercial vehicles." The application that received the lowest safety rating was "Small portable devices." Again, the safety ratings provided by government officials were higher (more optimistic) than ratings provided by the other populations. (For a comparison of this figure with 2004 results, see Figure 8.5 of the 2004 report.)

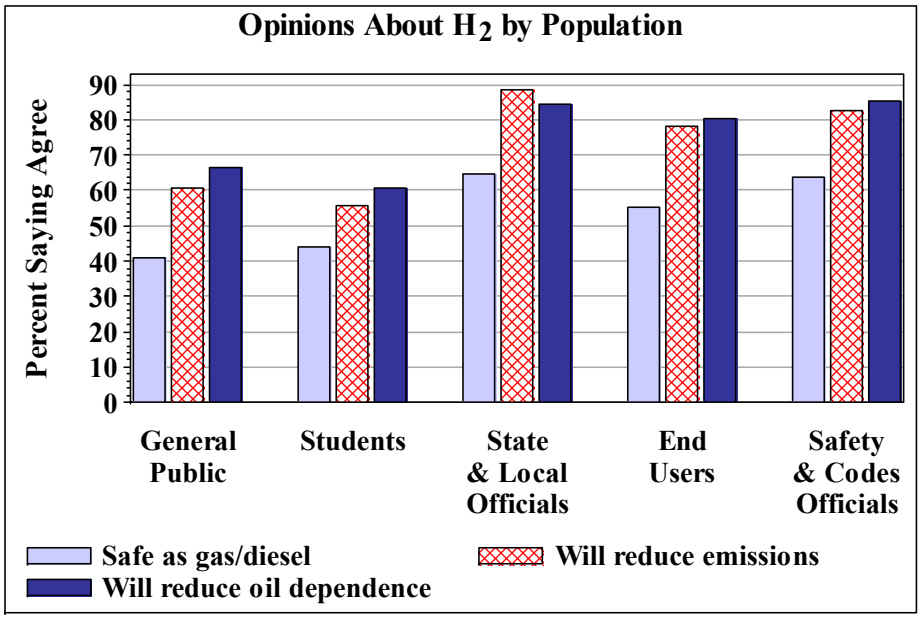

Figure 9.6. Percentage of respondents in each population that agreed with statements about the advantages and safety of hydrogen as a vehicle fuel, 2008/2009 survey.

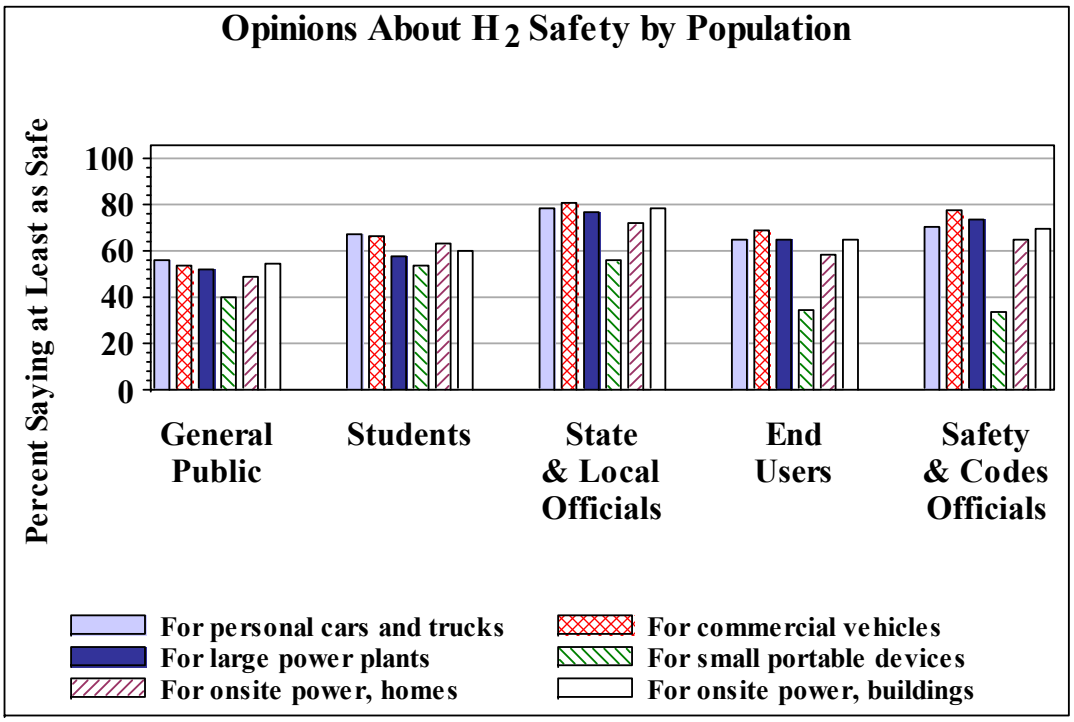

Figure 9.7. For each survey population and for six applications, the percentages of respondents answering that hydrogen and fuel cells are equally as safe as other technologies in use today.

Figure 9.8 shows that for each of the survey populations, in both 2004 and 2008, the percentage of respondents indicating that hydrogen is "Not too dangerous for everyday use by the general public" was consistently higher than the percentage indicating that hydrogen is "As safe to use in my car as gasoline and diesel fuels." The state and local officials are again the most optimistic. Apparently "Not too dangerous for everyday use" is an easier criterion to meet, in the opinions of respondents, than "As safe as gasoline and diesel fuel." Given our nation's long history with gasoline and diesel fuels but inexperience with hydrogen, this is not surprising.

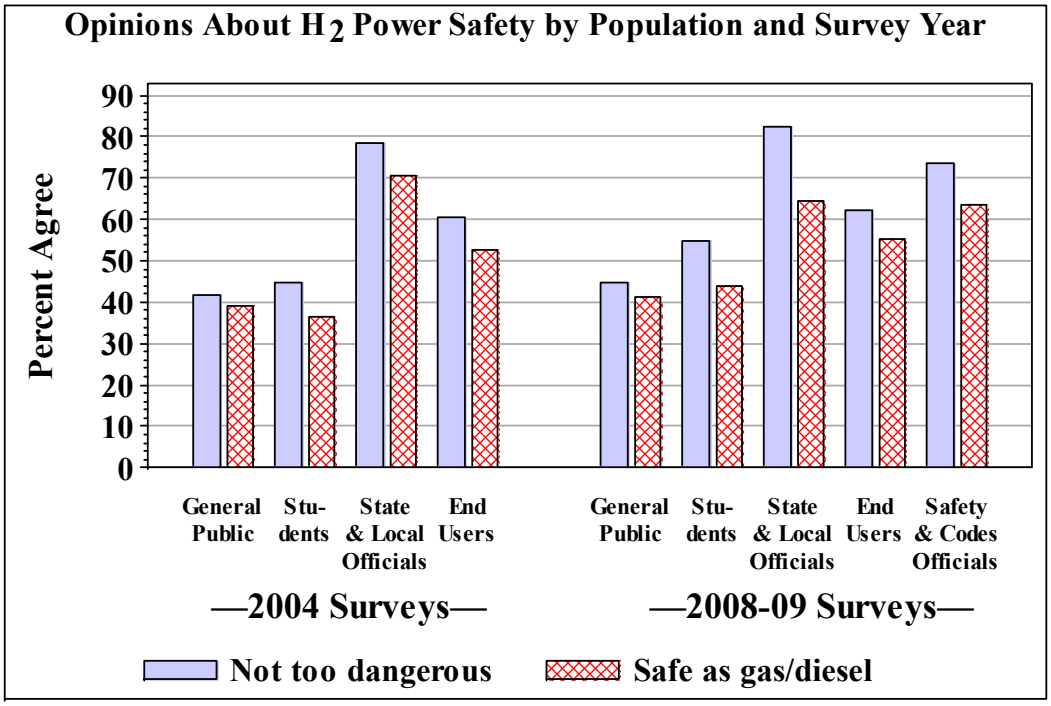

Figure 9.8. Percentages of respondents who disagreed with the statement "Hydrogen is too dangerous for everyday use by the general public" and percentages who agreed with the statement "Hydrogen is as safe to use in my car as gasoline and diesel fuels."

Figure 9.9 shows that the percentages of respondents who would be pleased or at ease with the sales of hydrogen at their local gas station has increased slightly in each population group since the 2004 survey. The greatest increase was for students. In the 2008 survey students were more positive that the general public about a gas station selling hydrogen, whereas they were less positive in 2004.[53]

[53] See Figures 4.22, 5.20, 6.17, 7.22, and surrounding discussion for statistical significance levels of comparisons of 2004 and 2008 results for individual populations.

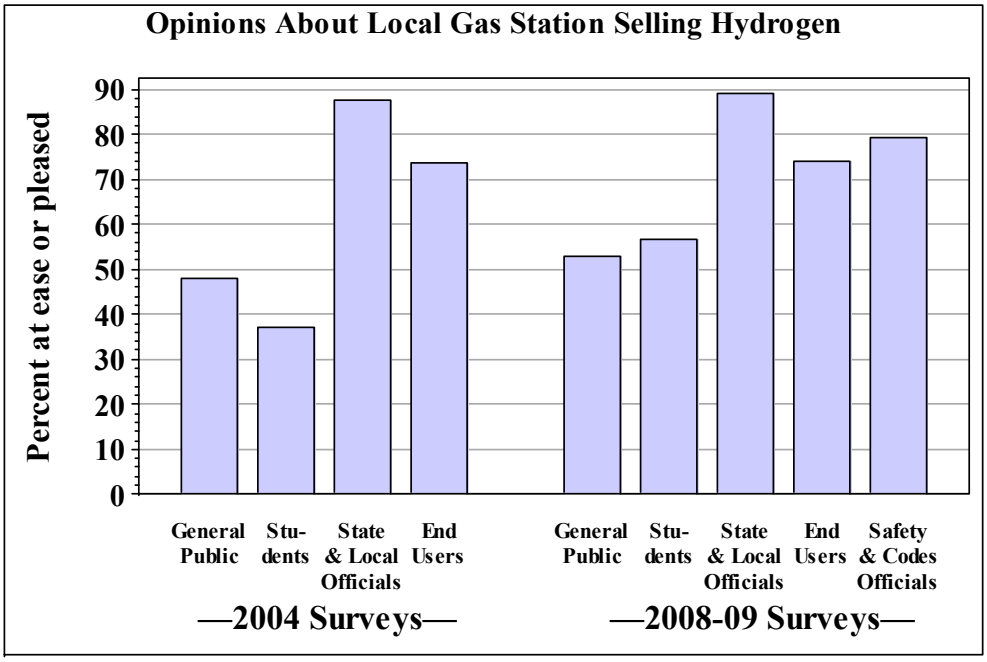

Figure 9.9. Percentage, by population group, of respondents that indicated they would be pleased or at ease with sales of hydrogen at a local gas station, 2004 and 2008 surveys.

Figure 9.10 shows the percentage of respondents from each population that noted frequent use of different types of mass media for obtaining energy information. The figure shows that the Internet is the prime energy information source for government officials, end users, and safety and codes officials. Government officials and end users were also the most likely to refer to science and technology magazines and journals. With the exception of science and technology magazines and journals, the general public indicated a higher usage than students for each media source. The media source used least by all populations for obtaining energy information was the radio. (For a comparison of this figure with 2004 results, see Figure 8.6 of the 2004 report.)

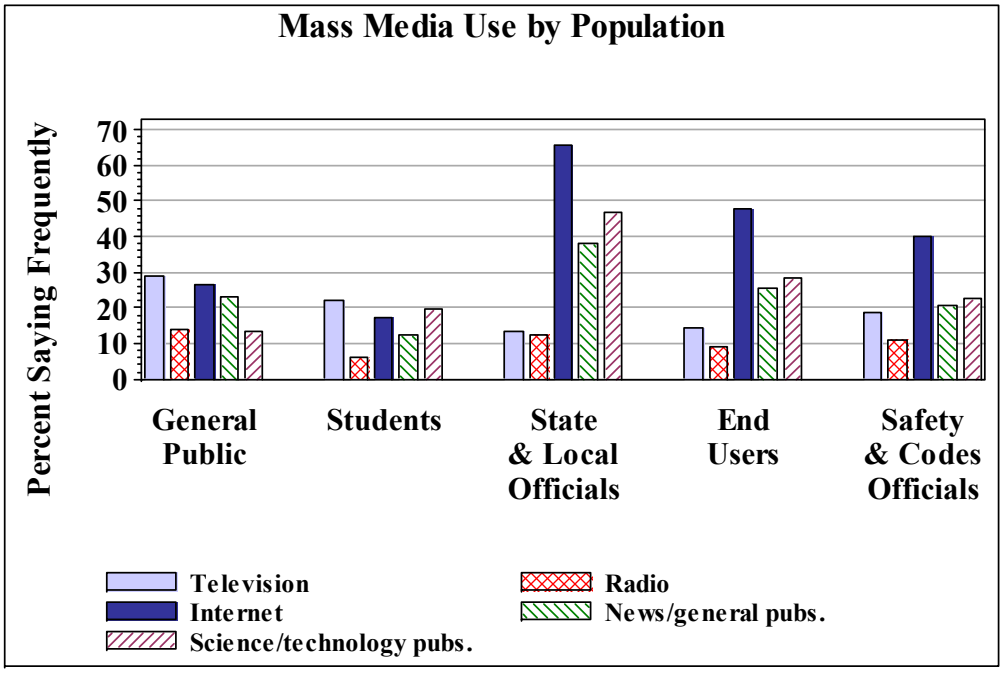

Figure 9.10. Percentages of respondents indicating frequent use of various mass media for obtaining energy information, by population group.

10. SUMMARY AND CONCLUSIONS

10.1 SUMMARY

Scientific sampling was used to survey five populations: (1) the general public, ages 18 and over; (2) students, ages 12-17; (3) state and local government officials from state departments of transportation and environmental protection, state energy offices, and functionally similar personnel from cities and counties; (4) potential hydrogen end users in three business categories: transportation, businesses requiring uninterrupted power supplies, and industries with large power requirements; and (5) safety and codes officials in four organizations: International Association of State Fire Chiefs (IAFC), International Code Council (ICC), National Association of State Fire Marshalls (NASFM), and National Fire Protection Association (NFPA). The surveys were designed to obtain 1,000 sample responses from each of the general public and student categories, and to sample 246 state and local officials, 600 large-scale end users, and 200 safety and codes officials.

The survey questions were designed to accomplish specific objectives. Technical questions were posed to measure technical understanding and awareness of hydrogen and fuel cells technologies. Opinion questions measured attitudes about the relative importance of safety, cost, the environment, performance, and convenience for a vehicle fuel or power supply for a home or business. Questions were posed to assess visions about the likelihood of various future applications of hydrogen technology. For most of the questions, "I don't know" or "I have no opinion" were perfectly acceptable answers. Questions about information sources (teachers, friends, government, etc.) and media (radio, Internet, magazines, etc.) were posed to assess how energy technology information is received.

At various stages in their development the survey questionnaires were reviewed by National Hydrogen Association and U.S. Fuel Cell Council personnel and by management at the DOE FCT program office. *Federal Register* notices were published, and Office of Management and Budget approval to conduct the surveys was obtained, per the Paperwork Reduction Act of 1995.

The general public and student survey samples were selected by random digit dialing. Potential large-scale end users were selected by random sampling. The surveys of state and local government agencies and of safety and codes officials were of their entire target populations (i.e., except for nonresponse, they are complete samples). All five surveys were administered by computer-assisted telephone interviewing (CATI). The General Public and Student Surveys were administered in either English or Spanish, at the option of the respondents. For all populations except the safety and codes officials, the length of the survey was less than 15 minutes, including the introduction, screening process, and general information and demographic questions. The average interview length of safety and codes officials was 17 minutes.

The five surveys were conducted in 2008/2009. This report is essentially a data book, a digest of the survey data collected for the five survey populations. In addition, the report shows changes in

knowledge and opinions of the four component populations that were surveyed in 2004.[54] Many conclusions can be made from the survey data. However, the purpose here is not to draw the conclusions, but rather to summarize the data in a way that facilitates drawing them.

10.2 CONCLUSIONS

The biggest data quality limitation of the hydrogen survey data is nonresponse bias. Table 10.1 shows 2004 and 2008/2009 response rates (percentages) by survey component population. Response rates were for the most part very slightly lower for the 2008/2009 surveys. This is consistent with trends toward increasing use of caller ID.

Table 10.1. Response Rates by Population, 2004 and 2008/2009 Surveys

Population	2004	2008/2009
General public	24.8%	23.0%
Students	27.5%	29.5%
Government agencies	95.9%	89.4%
End Users	29.1%	17.0%
Safety and codes officials	NA*	77.2%
*Safety and codes officials were not surveyed in 2004.		

We are willing to accept nonresponse bias because it is not severe enough to invalidate the survey, and because all reasonable measures were taken to minimize it. We also expect that changes in response rates will not obscure measurements of changes in knowledge of, awareness of, and attitudes toward hydrogen. An issue involving telephone surveys is the possibility of undercoverage because of cell-phone-only households. While sampling weights provide a partial correction, it is not feasible to fully address the cell-phone-only issue is the 2008/2009 hydrogen surveys.

The primary objective of the data analysis is to estimate the proportions of target population individuals who would respond to the survey questions in the various possible ways. The data analysis incorporates necessary adjustments for the sampling design (sampling probabilities and stratification) and sampling weights, which are used to adjust for a priori unequal sampling probabilities as well as nonresponse. Otherwise the data analysis mostly involves straightforward estimation of proportions of the respondents providing various answers to the questions. However, sample-weight-adjusted contingency table chi-square tests were also computed to further identify differences between demographic groups.

Several of the more significant results of the 2008/2009 hydrogen knowledge and opinions survey are as follows:

- The average technical knowledge scores for each of the populations surveyed in both 2004 and 2008 increased slightly, though, except for students, the increases were not

[54] In 2004, surveys of the general public, students, state and local government agencies, and end users were conducted.

statistically significant. For students, the average technical score increased 4.5 percentage points, a difference that is statistically significant ($p<0.0001$). As in the 2004 survey, state and local officials had the highest average score on the technical knowledge questions. (See Table 9.2.)

- When choosing a vehicle fuel or power source, the general public, on average, consider the following in decreasing order of importance: cost, safety, environmental impact, performance, convenience. State and local officials had exactly the same preference. Safety and codes officials had the same preferences also with the exception that environmental impact was ranked as least important. (Preference ranking questions were not asked to end users or students.)

- As in the 2004 survey, for the general public, students, and end users, hydrogen technology acceptance is strongly associated with hydrogen technical awareness ($p<0.0001$; see Figures 4.13, 5.13, 7.22). For state and local government officials and safety and codes officials, this relationship was not statistically significant.

- Despite having only small increases in average technical scores, all four populations surveyed in both 2004 and 2008 expressed greater confidence in the safety of hydrogen technologies in 2008 than in 2004. For example, in 2008 fewer students indicated that they would be "Frightened" or "Uneasy" with the availability of hydrogen at a local gas station and more students indicated that they would be "At ease" or "Pleased." Similar trend are evident for the general public, state and local officials, and end users. For state and local officials and end users, the proportions of respondents who indicated they would be "pleased" if hydrogen were available at their local gas station increased by over 15 percentage points. (See Figures 4.22, 5.20, 6.17, 7.22, and surrounding discussion for statistical significance levels of comparisons of 2004 and 2008 results for the individual populations. Safety and codes officials were surveyed in 2008/2009 only.)

- Most respondents in all five survey groups agreed that the use of hydrogen as a vehicle fuel would reduce U.S. dependence on foreign oil and would reduce emissions and improve air quality. (See Figure 9.6.)

- Over 60% of the government officials, over 60% of the safety and codes officials and over 50% of end user respondents believe that hydrogen is as safe as gasoline or diesel fuel. Corresponding percentages for the general public and students, though lower, have increased since 2004. In all five populations, greater proportions feel that hydrogen is not too dangerous for everyday use by the general public. (See Figure 9.8. Also see Figures 4.21, 5.19, 6.16, 7.24, and surrounding discussion for statistical significance levels of comparisons of 2004 and 2008 results for the individual populations. Safety and codes officials were surveyed in 2008/2009 only.)

- About 21% of the state and local agencies surveyed in 2008 have plans to use hydrogen and fuel cell technologies within the next five years, which is essentially the same as in 2004. (See Figure 6.11.)

- When asked about implementing hydrogen and fuel cell technologies to meet their organizations' energy needs, almost half (48.8%) of end users stated their position as "wait and see how the market develops," and 30% stated their position as "considering it but need more information." (See Figure 7.8.)

- According to the 2008/2009 surveys, the Internet is an important source for obtaining energy information for state and local officials, end users, and safety and codes officials; television is the primary source of energy information for the general public and students. (See Figure 9.10.) These results are very similar to findings in 2004.

- When asked about training, 69% of state and local agency officials, 71% of end users, and 78% of safety and codes officials said they would like to participate in a class on hydrogen or fuel cell technologies.

- State and local officials were most likely to rate themselves as either "familiar" or "very familiar" with hydrogen and fuel cell technologies, followed closely by safety and codes officials. End users were less likely to rate themselves this way, students and the general public, much less likely.

- State and local officials were most likely to rate themselves as either "Familiar" or "Very familiar" with hydrogen and fuel cell technologies, followed by safety and codes officials (See Figure 9.1.)

- Statistically significance differences between genders were observed in responses to several of the questions about safety and technology acceptance, in the general public, student, and end user populations. (See Figure 4.15-17, 5.12, 7.16.)

- No statistically significant changes since 2004 were observed in respondent concepts (state and local government agencies and end user populations only) of time frames for implementing hydrogen technologies. (See Tables 6.4 and 7.3.)

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APPENDIX A
SURVEY INSTRUMENTS

A.1. GENERAL PUBLIC SURVEY
A.2.. STUDENT SURVEY
A.3. STATE AND LOCAL GOVERNMENT AGENCIES
A.4. END USER SURVEY
A.5. SAFETY AND CODE OFFICIALS

A.1. GENERAL PUBLIC SURVEY

OPINION RESEARCH CORPORATION

JANUARY 2008

HYDROGEN-GENERAL PUBLIC

ORC # 35878

BALLOT #
TELEPHONE #
SURVEY #
CALL

QUOTA CELLS/TARGETS

1,000 total respondents

TELEPHONE NUMBER: (____)_____ TIME ENDED: _____

TIME STARTED:_____

LENGTH:_____(MINUTES)

DATE:_____

INTERVIEWER:_____

I.D.:_____

INTERVIEWERS: MAKE SURE YOU HAVE THE FOLLOWING TO GIVE TO RESPONDENTS AS NEEDED OR IF REQUESTED:
- OMB CONTROL NUMBER: 1910-5124
- HFCIT WEBSITE URL: http://www1.eere.energy.gov/hydrogenandfuelcells/education/
- IF ASKED AT ANY POINT DURING THE SURVEY, THE INTERVIEWER SHOULD TELL THE RESPONDENT THAT THERE ARE NO TRICK QUESTIONS

Hello, I'm ____ calling from Opinion Research Corporation on behalf of the U.S. Department of Energy. Your household has been randomly selected for an important national research survey about new energy sources. I want to assure you we are not selling any products or services.

S1 This survey is to be conducted with one adult, 18 years of age or older, who lives in this household. If there is more than one, may I please speak to the adult in this household who had the most recent birthday?

01 YES, SPEAKING
02 YES, SOMEONE ELSE
03 NO, NOT AVAILABLE NOW
04 NO, NOT AVAILABLE UNTIL AFTER FIELD (INSERT LAST DATE OF FIELD)
96 BUSINESS -->THANK AND RECORD AS UNUSABLE; BUSINESS
97 GROUP QUARTERS –-> THANK AND RECORD AS UNUSABLE; GROUP QUARTERS
98 OTHER NON-HOUSEHOLD – > THANK AND RECORD AS UNUSABLE; OTHER NON-HOUSEHOLD
99 REFUSED---> THANK, RECORD AS REFUSED AFTER INTRO/HH

IF S1(01), CONTINUE TO S2
IF S1 (02), CONTINUE
IF S1 (03), SET CALL BACK, RECORD FIRST NAME FOR REFERENCE
IF S1(04), THANK AND RECORD AS UNAVAILABLE TILL AFTER FIELD

WHEN RESPONDENT ON THE PHONE/ON CALLBACK : [READ AS NEEDED]
Hello, I'm ____ calling from Opinion Research Corporation. We're conducting a research survey on behalf of the U.S. Department of Energy about new energy sources. We are not selling any products or services.

S2 The survey takes about 12 minutes to complete. While your responses are voluntary, every response is extremely important because the results to this survey will be used to help design the hydrogen education program for the U.S. Department of Energy. Your responses are confidential and will not be associated with your household in any way.

01 OK TO CONTINUE
02 NOT CONVENIENT, SET CALL BACK APPOINTMENT
99 REFUSED --> RECORD AS REFUSED AFTER INTRO/RESP IDENTIFIED

RECORD GENDER
01 MALE
02 FEMALE

Before we get started, I want to mention that there are both technical and opinion questions in the survey. Tell me what you think or believe, but keep in mind that "no opinion" or "don't know" are perfectly acceptable responses.

First of all . . .

Q1 Please rate your familiarity with hydrogen and fuel cell technologies. Are you... [READ LIST. RECORD ONE ANSWER]

01 Not at all familiar – You know nothing about hydrogen and fuel cell technologies
02 Slightly familiar – You've heard about hydrogen and fuel cell technologies, read an article or watched a television feature about the technology, or participated in a casual conversation about the technology
03 Familiar – You've had limited experience with hydrogen and fuel cell technologies, researched the subjec
04 t for school, work, or personal interest, or learned about the technology in a class or workshop
05 Very familiar – You consider yourself an expert in hydrogen and fuel cell technologies

Q2 I am going to read several statements. After each one, please tell me if you believe the statement is true, if it is false, or if you don't know. [ROTATE STATEMENTS]

01 True
02 False
99 Don't know/No opinion

A. Hydrogen gas is toxic
B. Fuel cells produce electricity through hydrogen combustion
C. Hydrogen is lighter than air
D. Hydrogen has a distinct odor

Q3 Which of the following can fuel cells provide power to? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. ROTATE 01-03]

01 Your home
02 Your car
03 Your laptop computer
04 All of these
05 Or, none of these
99 Don't know/No opinion

Q4 In which state or condition can hydrogen be stored? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. ROTATE 01-02]

01 Chemical compound
02 Liquid
03 Both of these
04 Or, neither of these
99 Don't know/No opinion

Q5 When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. ROTATE 01-03]

01 Carbon dioxide
02 Nitrous oxides
03 Heat
04 Or, all of these
99 Don't know/No opinion

Q6 Hydrogen can be produced using which of the following sources of energy? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. ROTATE 01-03]

01 Natural gas
02 Sunlight
03 Organic matter
04 Or, all of these
99 Don't know/No opinion

Q7A For the next question, I will ask you to rank five items. It may be easier if you write them down. Do you need a moment to get something to write with?

The factors are: [READ AND ROTATE FACTORS]. Now, please tell me which factor is MOST important to you, personally, when selecting a fuel for your vehicle or power supply for your home or business? [RE-READ ENTIRE LIST AS NEEDED BEFORE RECORDING ONE ANSWER]

01 Safety
02 Low cost
03 Environmental impact
04 Convenience
05 Performance
99 DON'T KNOW/REFUSED/NO RESPONSE

[IF Q7A (01-05) MENTIONED, ASK FOR EACH NOT MENTIONED IN Q7A]

Q7B Now, from the remaining factors, which one of the following is MOST IMPORTANT to you when selecting a fuel for your vehicle or power supply for your home or business? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER]

01 Safety
02 Low cost
03 Environmental impact
04 Convenience
05 Performance
99 DON'T KNOW/REFUSED/NO RESPONSE

[IF Q7B (01-05) MENTIONED, ASK FOR EACH NOT MENTIONED IN Q7A AND Q7B]

Q7C Now, from the remaining factors, which one of the following is MOST IMPORTANT to you when selecting a fuel for your vehicle or power supply for your home or business? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER]

01 Safety
02 Low cost
03 Environmental impact
04 Convenience
05 Performance
99 DON'T KNOW/REFUSED/NO RESPONSE

[IF Q7C (01-05) MENTIONED, ASK FOR EACH NOT MENTIONED IN Q7A, Q7B, AND Q7C]

Q7D Finally, which of the following factors is MORE IMPORTANT to you when selecting a fuel for your vehicle or power supply for your home or business? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER]

01 Safety
02 Low cost
03 Environmental impact
04 Convenience
05 Performance
99 DON'T KNOW/REFUSED/NO RESPONSE

Q8 How would you feel if your local gas station also sold hydrogen? Would you say ... [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER.]

01 Frightened
02 Uneasy
03 At ease
04 Or, pleased
99 Don't know/No opinion

Q9 Please tell me if you believe the following statement is true, if it is false, or if you don't know.

"Hydrogen is too dangerous for everyday use by the general public."

01 TRUE
02 FALSE
99 DON'T KNOW/NO OPINION

Q10 Next, I am going to read several statements about potential benefits of using hydrogen as a VEHICLE FUEL. For each, tell me if you disagree, are neutral, agree or if you have no opinion? [ROTATE STATEMENTS]

01 Disagree
02 Are neutral
03 Agree
99 No opinion

A. Using hydrogen will reduce U.S. dependence on foreign oil
B. Using hydrogen will reduce emissions and improve air quality
C. Hydrogen is as safe to use in my car as gasoline and diesel fuels

Q11 Imagine you are shopping for a new car. If you could walk into a dealership today and buy a fuel cell vehicle at the same price as a comparable gasoline vehicle model, would you buy it?

01 YES
02 NO
99 DON'T KNOW/NO OPINION

Q12 How would you feel if a school, hospital, or other building in your neighborhood was powered by a fuel cell located on its property? Would you say ... [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER.]

01 Frightened
02 Uneasy
03 At ease
04 Or, pleased
99 Don't know/No opinion

Q13 For the following applications, please rate the safety of using hydrogen and fuel cells, in comparison with technology in use today.

Is it not as safe, equally as safe or safer to use hydrogen and fuel cells for… [ROTATE STATEMENTS]

01 Not as safe
02 Equally as safe
03 Safer
99 No opinion

A. Personal cars and trucks
B. Buses and commercial vehicles
C. Large power plants
D. Small portable devices such as laptop computers or cell phones
E. Onsite power for the home
F. Onsite power for buildings such as hospitals and schools

Q14 The next question is about your use of information sources that can help you make decisions about energy costs and safety. How often do you use each of the following sources for energy information? Would you say never, sometimes, or frequently? [DO NOT ROTATE STATEMENTS]

01 Never
02 Sometimes
03 Frequently
99 DON'T KNOW

A. Teachers and schools
B. Friends and family members
C. Environmental and conservation groups
D. Utility companies or brokers, for example, gas or electricity providers
E. Industry or trade associations or non-profit organizations
F. Federal government
G. State government
H. Local government

Q15 Finally, how often do you get ENERGY information from different types of mass media? Would you say that you never, sometimes, or frequently get energy information from … [ROTATE STATEMENTS]

01 Never
02 Sometimes
03 Frequently
99 DON'T KNOW

A. Television
B. Radio
C. The Internet
D. Newspapers and general interest magazines
E. Science and technology magazines and journals
F. Business or trade magazines

I have a few questions about you and your household for statistical purposes only.

Q16 What was the last grade in school you completed?

01 8TH GRADE OR LESS
02 HIGH SCHOOL INCOMPLETE [GRADES 9, 10, 11]
03 HIGH SCHOOL COMPLETE [GRADE 12]
04 SOME COLLEGE, BUT NO DEGREE
05 ASSOCIATES DEGREE
06 COLLEGE GRADUATE/BACHELORS DEGREE
07 POSTGRADUATE DEGREE, SUCH AS MASTER'S, PH.D., MD, JD
99 REFUSED/NR

Q17 What is your age?

01 18-20
02 21-24
03 25-29
04 30-34
05 35-39
06 40-44
07 45-49
08 50-54
09 55-59
10 60-64
11 65-69
12 70-74
13 75 OR OLDER
99 REFUSED/NR

Q18 Which of the following best describes you? [READ LIST]

01 White/Caucasian
02 Black/African-American
03 Hispanic
04 Asian/Asian-American
05 American Indian/Native Alaskan
06 Some other race
99 REFUSED/NR

Q19 How many total telephone numbers does your household have that a person can answer? Please do not include extension phones, cell phones or telephone lines that are used only for a fax or a modem.

01	ONE
02	TWO
03	THREE
04	FOUR
05	FIVE OR MORE
99	DON'T KNOW/REFUSED

That's all the questions we have today. Thank you very much for your time.

CONFIRM PHONE NUMBER.

A.2. STUDENT SURVEY

OPINION RESEARCH CORPORATION

JUNE 2008

HYDROGEN-STUDENTS (TEENS 12-17 YEARS OLD)

ORC # 36048

BALLOT #
TELEPHONE #
SURVEY #
CALL

1000 TEENS 12-17

INTERVIEWERS: MAKE SURE YOU HAVE THE FOLLOWING TO GIVE TO RESPONDENTS AS NEEDED OR IF REQUESTED:
- OMB CONTROL NUMBER: 1910-5124
- HFCIT WEBSITE URL: http://www1.eere.energy.gov/hydrogenandfuelcells/education/
- IF ASKED AT ANY POINT DURING THE SURVEY, THE INTERVIEWER SHOULD TELL THE RESPONDENT THAT THERE ARE NO TRICK QUESTIONS

Hello, I'm ____ calling from Opinion Research Corporation on behalf of the U.S. Department of Energy. Your household has been randomly selected for an important national research survey about new energy sources. I want to assure you we are not selling any products or services.

S1 May I speak to an adult 18 years old or older who lives in this household?

01	YES	--> CONTINUE
03	NO, NOT AVAILABLE NOW -- > SET CALL BACK	
04	NO, NOT AVAILABLE UNTIL AFTER FIELD	-->THANK AND RECORD AS UNAVAILABLE
05	SCHEDULE SPANISH CALLBACK _____	
96	BUSINESS -->THANK AND RECORD AS UNUSABLE; BUSINESS	
97	GROUP QUARTERS –-> THANK AND RECORD AS UNUSABLE; GROUP QUARTERS	
98	OTHER NON-HOUSEHOLD – > THANK AND RECORD AS UNUSABLE; OTHER NON-HOUSEHOLD	
99	REFUSED---> THANK, RECORD AS REFUSED AFTER INTRO/HH	

S2A-E OMITTED

S2F And how many people in this household are 12 to 17 years of age?

01 ONE
02 TWO OR MORE
98 NONE
99 REFUSED

IF TEENS 12-17, S2F [01,02] CONTINUE.
IF NO TEENS, S2F [98], THANK AND RECORD AS INELIGIBLE, NO TEEN (S2F)
IF REFUSED, S2F [99], THANK AND RECORD AS REFUSED AT SCREEN (S2F)

S3 May I please speak to the 12-17 year old who had the most recent birthday? The survey should take about 14 minutes to complete.

01 YES --> CONTINUE
02 NO, TEEN NOT AVAILABLE --> SET SPECIFIC CALL BACK; RECORD TEEN FIRST NAME
03 NOT AVAILABLE UNTIL AFTER FIELD --> THANK AND RECORD AS UNAVAILABLE
99 REFUSED TO PARTICIPATE --> THANK AND RECORD AS REFUSED
ELIGIBLE PARENT (S3)

IF THE TEEN 12-17 IS NOT AVAILABLE, SET CALLBACK. WHEN CALL BACK OCCURS, WE SHOULD BE ASKING FOR THE TEEN, SINCE WE ALREADY HAVE THE PARENTAL PERMISSION.

WHEN TEEN RESPONDENT ON THE PHONE/ON CALLBACK: [READ AS NEEDED]
Hello, I'm ____ calling from Opinion Research Corporation. We're conducting a research survey on behalf of the U.S. Department of Energy about your knowledge and opinions about hydrogen and fuel cell technologies. Your responses are voluntary; however, every response is extremely important. The survey takes about 14 minutes to complete.

S4 The results to this survey will be used to help design the hydrogen education program for the U.S. Department of Energy. Your answers are confidential and will not be associated with you or your household in any way.

INTERVIEWER RECORD:

01 OK TO CONTINUE
02 NOT CONVENIENT, SET CALL BACK APPOINTMENT; RECORD TEEN FIRST NAME
99 REFUSED --> RECORD AS REFUSED /TEEN IDENTIFIED [S4]

RECORD GENDER OF TEEN
MALE____
FEMALE_____

CHECK GENDER/REGION QUOTAS.
IF FULL, TERMINATE AND RECORD AS INELIGIBLE, QUOTA FILLED
NORTHEAST (N=182) - (MALE = 91/FEMALE = 91)
NORTH CENTRAL (N=211) - (MALE = 106/FEMALE = 105)
SOUTH (N = 368) - (MALE = 184/FEMALE = 184)
WEST (N = 239) - (MALE = 119/FEMALE = 120)

S5 Please tell me, what is your age?

01	12	
02	13	
03	14	
04	15	
05	16	
06	17	-> CONTINUE
99	REFUSED TO PARTICIPATE	-> THANK AND RECORD AS REFUSED AT AGE(S5)

CHECK AGE QUOTAS.
Ages 12-14 (N=500)
Ages 15-17 (N=500)

IF FULL, TERMINATE AND RECORD AS INELIGIBLE, QUOTA FILLED

Before we get started, I want to mention that there are both technical and opinion questions in the survey. Tell me what you think or believe, but keep in mind that "no opinion" or "don't know" are perfectly acceptable responses.

First of all . . .

Q1 Please rate your familiarity with hydrogen and fuel cell technologies. Are you...
[READ LIST. RECORD ONE ANSWER]

06 Not at all familiar – You know nothing about hydrogen and fuel cell technologies
07 Slightly familiar – You've heard about hydrogen and fuel cell technologies, read an article or watched a television feature about the technology, or participated in a casual conversation about the technology
08 Familiar – You've had limited experience with hydrogen and fuel cell technologies, researched the subject for school, work, or personal interest, or learned about the technology in a class or workshop
09 Very familiar – You consider yourself an expert in hydrogen and fuel cell technologies

Q2 I am going to read several statements. After each one, please tell me if you believe the statement is true, if it is false, or if you don't know.
[ROTATE STATEMENTS]

03 True
04 False
99 Don't know/No opinion

A. Hydrogen gas is toxic
B. Fuel cells produce electricity through hydrogen combustion
C. Hydrogen is lighter than air
D. Hydrogen has a distinct odor

Q3 Which of the following can fuel cells provide power to?
[READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. ROTATE 01-03]

04 Your home
05 Your car
06 Your laptop computer
06 All of these
07 Or, none of these
99 Don't know/No opinion

Q4 In which state or condition can hydrogen be stored?
[READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. ROTATE 01-02]

05 Chemical compound
06 Liquid
07 Both of these
08 Or, neither of these
99 Don't know/No opinion

Q5 When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else?
[READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. ROTATE 01-03]

05 Carbon dioxide
06 Nitrous oxides
07 Heat
08 Or, all of these
99 Don't know/No opinion

Q6 Hydrogen can be produced using which of the following sources of energy?
[READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. ROTATE 01-03]

05 Natural gas
06 Sunlight
07 Organic matter
08 Or, all of these
100 Don't know/No opinion

Q7A-Q7D OMITTED

Q8 How would you feel if your local gas station also sold hydrogen? Would you say ...
[READ ENTIRE LIST BEFORE RECORDING ONE ANSWER]

05 Frightened
06 Uneasy
07 At ease
08 Or, pleased
100 Don't know/No opinion

Q8A How would you feel if your school's electricity and heat were provided by a fuel cell located on school grounds? Would you say ...
[READ ENTIRE LIST BEFORE RECORDING ONE ANSWER]

01 Frightened
02 Uneasy
03 At ease
04 Or, pleased
99 Don't know/No opinion

Q9 Please tell me if you believe the following statement is true, if it is false, or if you don't know.

"Hydrogen is too dangerous for everyday use by the general public."

03 TRUE
04 FALSE
99 DON'T KNOW/NO OPINION

Q10 Next, I am going to read several statements about potential benefits of using hydrogen as a VEHICLE FUEL. For each, please tell me if you disagree, are neutral, agree or if you have no opinion? [ROTATE STATEMENTS]

04 Disagree
05 Are neutral
06 Agree
100 No opinion

A. Using hydrogen will reduce U.S. dependence on foreign oil
B. Using hydrogen will reduce emissions and improve air quality
C. Hydrogen is as safe to use in my car as gasoline and diesel fuels

Q11-Q12 OMITTED

Q13 For the following applications, please rate the safety of using hydrogen and fuel cells, in comparison with technology in use today.

Is it not as safe, equally as safe or safer to use hydrogen and fuel cells for…
[ROTATE STATEMENTS]

01 Not as safe
02 Equally as safe
03 Safer
99 No opinion

A. Personal cars and trucks
B. Buses and commercial vehicles
C. Large power plants
D. Small portable devices such as laptop computers or cell phones
E. Onsite power for the home
F. Onsite power for buildings such as hospitals and schools

Q14-Q19 OMITTED

Q20 I am going to read several characteristics of new vehicles. Please imagine that you are shopping for an automobile, and rank each of the following characteristics for its importance to you. Would you say it is not important, you are neutral, it is important or you don't have an opinion? [ROTATE STATEMENTS]

01 Not important
02 Neutral
03 Important
99 No opinion

A. Cost of vehicle at the point of sale
B. Gas mileage
C. Power and speed
E. Reliability
F. Safety
G. Impact on the environment, or emissions produced

I am going to ask several questions regarding science topics that you may have learned about at school or home or by some other method, for example, church, scouts, the Internet, etc.

ASK QUESTIONS Q21-Q23 IN SEQUENCE FOR A-G

Q21 Have you . . .
[ROTATE STATEMENTS]

01 YES
02 NO
99 DON'T KNOW

A. Received instruction on or otherwise learned about energy use, fuels, and emissions
B. Received instruction on or otherwise learned about hydrogen and fuel cells
C. Ever used a demonstration kit to produce hydrogen
D. Ever used a model fuel cell science kit
E. Ever seen or used a hydrogen fuel cell model car
F. Participated in a fuel cell vehicle design competition
G. Participated in a science bowl or other science competition

[ASK FOR EACH Q21A-G (01)]

Q22 Did the learning or activity take place at school?
[IF ASKED, INDICATE THAT "AT SCHOOL" INCLUDES HOME-SCHOOLED ACTIVITIES FOR STUDENTS WHO RECEIVE ALL THEIR EDUCATION VIA HOME SCHOOLING]

01 YES
02 NO
99 DON'T KNOW

A. Received instruction on or otherwise learned about energy use, fuels, and emissions
B. Received instruction on or otherwise learned about hydrogen and fuel cells
C. Ever used a demonstration kit to produce hydrogen
D. Ever used a model fuel cell science kit
E. Ever seen or used a hydrogen fuel cell model car
F. Participated in a fuel cell vehicle design competition
G. Participated in a science bowl or other science competition

[ASK FOR EACH Q22A-G (02-99)]

Q23 If not at school, where did the learning take place?
[DO NOT READ LIST. RECORD ONE ANSWER]

01 HOME [FAMILY ACTIVITY, NOT HOME-SCHOOL]
02 CHURCH/TEMPLE/RELIGIOUS ORGANIZATION
03 SCOUTS
04 THE INTERNET
195 OTHER [SPECIFY]
199 DON'T KNOW

A. Received instruction on or otherwise learned about energy use, fuels, and emissions
B. Received instruction on or otherwise learned about hydrogen and fuel cells
C. Ever used a demonstration kit to produce hydrogen
D. Ever used a model fuel cell science kit
E. Ever seen or used a hydrogen fuel cell model car
F. Participated in a fuel cell vehicle design competition
G. Participated in a science bowl or other science competition

Q24 How often do you get ENERGY information from different types of mass media? Would you say that you never, sometimes, or frequently get energy information from …
[ROTATE STATEMENTS]

01 Never
02 Sometimes
03 Frequently
99 DON'T KNOW

A. Television
B. Radio
C. The Internet
D. Newspapers and general interest magazines
E. Science and technology magazines and journals
F. Classroom instructions
G. General discussions with family and/or friends

I have a few questions about you and your household for statistical purposes only.

Q25 What was the last grade of school you completed?

01 4TH OR LESS
02 5
03 6
04 7
05 8
06 9
07 10
08 11
09 12
10 FIRST YEAR OF COLLEGE OR MORE
11 HOME SCHOOLED
99 REFUSED/NR

Q26 Which of the following best describes you?
[READ LIST. RECORD AS MANY AS APPLY]

01 White/Caucasian
02 Black/African-American
03 Hispanic
04 Asian/Asian-American
05 American Indian/Native Alaskan
06 Some other race
99 REFUSED/NR

Q27 How many total telephone numbers does your household have that a person can answer? Please do not include extension phones, cell phones or telephone lines that are used only for a fax or a modem.

01 ONE
02 TWO
03 THREE
04 FOUR
05 FIVE OR MORE
99 DON'T KNOW/REFUSED

Q28 INTERVIEWER – DO NOT ASK: WAS THIS SURVEY CONDUCTED MOSTLY IN

01 ENGLISH
02 SPANISH

That's all the questions we have today. Thank you very much for your time.

CONFIRM PHONE NUMBER

A.3. STATE AND LOCAL GOVERNMENT AGENCIES

OPINION RESEARCH CORPORATION

FEBRUARY 2008

HYDROGEN-STATE AND LOCAL GOVERNMENT AGENCIES

ORC # 35948

BALLOT #
TELEPHONE #
SURVEY #
CALL

QUOTA CELLS/TARGETS

XXX total respondents

TELEPHONE NUMBER: (____)_____ TIME ENDED: _____

TIME STARTED:_____

LENGTH:_____(MINUTES)

DATE:_____

INTERVIEWER:_____

I.D.:_____

INTERVIEWERS: MAKE SURE YOU HAVE THE FOLLOWING TO GIVE TO RESPONDENTS AS NEEDED OR IF REQUESTED:
- OMB CONTROL NUMBER: 1910-5124
- HFCIT WEBSITE URL: http://www1.eere.energy.gov/hydrogenandfuelcells/education/
- IF ASKED AT ANY POINT DURING THE SURVEY, THE INTERVIEWER SHOULD TELL THE RESPONDENT THAT THERE ARE NO TRICK QUESTIONS

AT INTRO SCREEN, DISPLAY INFO FOR INTERVIEWER: RESPONDENT NAME, TITLE AND AGENCY CONTACTED

SA May I please speak to [INSERT RESPONDENT NAME FROM SAMPLE]?

01	YES	-->CONTINUE
02	NOT AVAILABLE NOW	-->SCHEDULE CALLBACK
03	NO LONGER AT AGENCY	-->SKIP TO S2
99	REFUSED	-->THANK AND RECORD AS REFUSED (SA)

(READ ONCE RESPONDENT IS ON THE PHONE)
Hello, my name is ____ calling from Opinion Research Corporation on behalf of the U.S. Department of Energy. Your agency has been selected for an important national research survey about new energy sources. You have (your office has) been sent a letter from JoAnn Milliken, Program Manager of DOE's Hydrogen Program, which explained the purpose and importance of this survey. The survey takes about 12 minutes to complete.

S1 01 CONTINUE WITH SURVEY -->SKIP TO TEXT BEFORE Q1
02 DID NOT RECEIVE LETTER/NEED MORE INFORMATION -->CONTINUE
03 NOT CONVENIENT NOW -->SET CALL BACK APPOINTMENT
04 NOT APPROPRIATE PERSON TO CONDUCT INTERVIEW-->SKIP TO S2
99 REFUSED -->THANK AND RECORD AS REFUSED
(S1)

[ASK IF S1(02)]
S1A The Department of Energy is sponsoring a survey of state and local agencies and your agency has been selected for this important national research about new energy sources. Your responses are confidential and your agency's name will not be associated with the survey results. While your responses are voluntary, every response is extremely important because the results to this survey will be used to guide the development of The Department of Energy's hydrogen education activities.

01 CONTINUE WITH SURVEY -->SKIP TO TEXT BEFORE Q1
02 NOT CONVENIENT NOW -->SET CALL BACK APPOINTMENT
03 NOT APPROPRIATE PERSON TO CONDUCT INTERVIEW-->CONTINUE TO S2
99 REFUSED -->THANK AND RECORD AS REFUSED (S1A)

S2 [IF SA (03) READ] Can you please give me the name, title and telephone number of the person who now fills the position vacated by [INSERT RESPONDENT NAME]?

[IF S1 (04) OR S1A (03) READ] Can you please give me the name, title and telephone number of the person who is best suited to represent your agency for this survey?

01 YES -->CONTINUE
99 NO/REFUSED -->THANK AND RECORD AS REFUSED (S2)

FIELDS FOR RECORDING CONTACT INFORMATION
Full Name: 2a- First name, 2b- Last name
Title: 2c
Telephone number: 2d

S2VER [CONFIRM INFORMATION- READ BACK TO THEM FOR ACCURACY]

01 FIRST NAME INCORRECT/CHANGE
02 LAST NAME INCORRECT/CHANGE
03 TITLE INCORRECT/CHANGE
04 TELEPHONE NUMBER INCORRECT/CHANGE
05 ALL INFORMATION CORRECT
99 REFUSED -->THANK AND RECORD AS REFUSED (S2VER)

INTERVIEWER: IF NEW CONTACT WOULD LIKE TO CONDUCT INTERVIEW NOW, GO BACK TO TEXT BEFORE S1.
OTHERWISE, IF PROVIDED NEW CONTACT INFO, S2[1], S2VER[05] SCHEDULE CALLBACK.

Before we get started, I want to mention that there are both technical and opinion questions in the survey. Tell me what you think or believe, but keep in mind that "no opinion" or "don't know" are perfectly acceptable responses.

First of all . . .

Q1 Please rate your familiarity with hydrogen and fuel cell technologies. Are you... [READ LIST. RECORD ONE ANSWER]

10 Not at all familiar – You know nothing about hydrogen and fuel cell technologies
11 Slightly familiar – You've heard about hydrogen and fuel cell technologies, read an article or watched a television feature about the technology, or participated in a casual conversation about the technology
12 Familiar – You've had limited experience with hydrogen and fuel cell technologies, researched the subject for school, work, or personal interest, or learned about the technology in a class or workshop
13 Very familiar – You consider yourself an expert in hydrogen and fuel cell technologies

Q2 I am going to read several statements. After each one, please tell me if you believe the statement is true, if it is false, or if you don't know. [ROTATE STATEMENTS]

05 True
06 False
99 Don't know/No opinion

A. Hydrogen gas is toxic
B. Fuel cells produce electricity through hydrogen combustion
C. Hydrogen is lighter than air
D. Hydrogen has a distinct odor

Q3 Which of the following can fuel cells provide power to? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. ROTATE 01-03]

07 Your home
08 Your car
09 Your laptop computer
08 All of these
09 Or, none of these
99 Don't know/No opinion

Q4 In which state or condition can hydrogen be stored? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. ROTATE 01-02]

09 Chemical compound
10 Liquid
11 Both of these
12 Or, neither of these
99 Don't know/No opinion

Q5 When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. ROTATE 01-03]

09 Carbon dioxide
10 Nitrous oxides
11 Heat
12 Or, all of these
99 Don't know/No opinion

Q6 Hydrogen can be produced using which of the following sources of energy? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. ROTATE 01-03]

09 Natural gas
10 Sunlight
11 Organic matter
12 Or, all of these
101 Don't know/No opinion

Q7A For the next question, I will ask you to rank five items. It may be easier if you write them down. Do you need a moment to get something to write with?

The factors are: [READ AND ROTATE FACTORS]. Now, please tell me which factor is MOST important to you, personally, when selecting a fuel for your vehicle or power supply for your home or business? [RE-READ ENTIRE LIST AS NEEDED BEFORE RECORDING ONE ANSWER]

01 Safety
02 Low cost
03 Environmental impact
04 Convenience
05 Performance
99 DON'T KNOW/REFUSED/NO RESPONSE

[IF Q7A (01-05) MENTIONED, ASK FOR EACH NOT MENTIONED IN Q7A]
Q7B Now, from the remaining factors, which one of the following is MOST IMPORTANT to you when selecting a fuel for your vehicle or power supply for your home or business? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER]

01 Safety
02 Low cost
03 Environmental impact
04 Convenience
05 Performance
99 DON'T KNOW/REFUSED/NO RESPONSE

[IF Q7B (01-05) MENTIONED, ASK FOR EACH NOT MENTIONED IN Q7A AND Q7B]

Q7C Now, from the remaining factors, which one of the following is MOST IMPORTANT to you when selecting a fuel for your vehicle or power supply for your home or business? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER]

01 Safety
02 Low cost
03 Environmental impact
04 Convenience
05 Performance
99 DON'T KNOW/REFUSED/NO RESPONSE

[IF Q7C (01-05) MENTIONED, ASK FOR EACH NOT MENTIONED IN Q7A, Q7B, AND Q7C]

Q7D Finally, which of the following factors is MORE IMPORTANT to you when selecting a fuel for your vehicle or power supply for your home or business? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER]

01 Safety
02 Low cost
03 Environmental impact
04 Convenience
05 Performance
99 DON'T KNOW/REFUSED/NO RESPONSE

Q8 How would you feel if your local gas station also sold hydrogen? Would you say ... [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER.]

09 Frightened
10 Uneasy
11 At ease
12 Or, pleased
101 Don’t know/No opinion

Q9 Please tell me if you believe the following statement is true, if it is false, or if you don’t know.

“Hydrogen is too dangerous for everyday use by the general public.”

05 TRUE
06 FALSE
99 DON’T KNOW/NO OPINION

Q10 Next, I am going to read several statements about potential benefits of using hydrogen as a VEHICLE FUEL. For each, tell me if you disagree, are neutral, agree or if you have no opinion? [ROTATE STATEMENTS]

07 Disagree
08 Are neutral
09 Agree
101 No opinion

A. Using hydrogen will reduce U.S. dependence on foreign oil
B. Using hydrogen will reduce emissions and improve air quality
C. Hydrogen is as safe to use in my car as gasoline and diesel fuels

Q11 OMITTED

Q12 OMITTED

Q13 For the following applications, please rate the safety of using hydrogen and fuel cells, in comparison with technology in use today.

Is it not as safe, equally as safe or safer to use hydrogen and fuel cells for… [ROTATE STATEMENTS]

01 Not as safe
02 Equally as safe
03 Safer
99 No opinion

A. Personal cars and trucks
B. Buses and commercial vehicles
C. Large power plants
D. Small portable devices such as laptop computers or cell phones
E. Onsite power for the home
F. Onsite power for buildings such as hospitals and schools

Q13G If fuel cell vehicles were available today at a cost competitive to gasoline internal combustion engine vehicles, would you recommend buying or leasing them for your organization's or a stakeholder's vehicle fleet?

01 YES
02 NO
99 DON'T KNOW/NO OPINION

Q13H If stationary fuel cells were available today at a cost competitive to traditional power systems, would you recommend buying one to help meet the power needs of your facility or a stakeholder's facility?

01 YES
02 NO
99 DON'T KNOW/NO OPINION

Q13I I am going to read several statements. Please select the ONE that BEST describes how you feel about using hydrogen and fuel cell technology to meet your organization's energy needs. [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER]

01 I know enough to seriously consider it if products are available
02 I am considering it but need more information
03 I am going to wait to see how the market develops
04 There is no way I'll consider it anytime soon
99 DON'T KNOW/NO OPINION

Q14 The next question is about your use of information sources that can help you make decisions about energy costs and safety. How often do you use each of the following sources for energy information? Would you say never, sometimes, or frequently? [DO NOT ROTATE STATEMENTS]

01 Never
02 Sometimes
03 Frequently
99 DON'T KNOW

A. Teachers and schools
B. Friends and family members
C. Environmental and conservation groups
D. Utility companies or brokers, for example, gas or electricity providers
E. Industry or trade associations or non-profit organizations
F. Federal government
G. State government
H. Local government

Q15 How often do you get ENERGY information from different types of mass media? Would you say that you never, sometimes, or frequently get energy information from … [ROTATE STATEMENTS]

01 Never
02 Sometimes
03 Frequently
99 DON'T KNOW

A. Television
B. Radio
C. The Internet
D. Newspapers and general interest magazines
E. Science and technology magazines and journals
F. Business or trade magazines

Q16-Q19 OMITTED

Q20 Does your agency operate any hydrogen vehicles?

01 YES
02 NO
99 DON'T KNOW

Q21 Do you know of any other organization that operates hydrogen-powered buses or other fleet vehicles in the area covered by your geographic jurisdiction?

01 YES
02 NO
99 DON'T KNOW

Q22 Does your agency own or operate any stationary fuel cells?

01 YES
02 NO
99 DON'T KNOW

Q23 Do you know of any other organization that operates stationary fuel cells in the area covered by your geographic jurisdiction?

01 YES
02 NO
99 DON'T KNOW

Q24 Does your agency have plans to use hydrogen or fuel cells in the future?

01 YES
02 NO
99 DON'T KNOW

[ASK IF Q24 (01)]
Q25 What is the time frame for plans to use hydrogen or fuel cells? [READ LIST. RECORD ONE ANSWER]

01 Within the next year
02 1-5 years
03 Over 5 years
99 DON'T KNOW

Q26 Have you ever received information about hydrogen and fuel cell technologies?

01 YES
02 NO
99 DON'T KNOW

[ASK IF Q26 (02-99)]
Q27 Would information about hydrogen and fuel cell technologies be valuable to you?

01 YES
02 NO
99 DON'T KNOW

Q28 Have you attended any of the following events? [ROTATE ITEMS]

01 YES
02 NO
99 DON'T KNOW

A. A training class on hydrogen or fuel cells
B. A press conference concerning the use of hydrogen or fuel cells
C. A conference or workshop that included a session on hydrogen or fuel cells

Q29 Would you like to participate in a class on hydrogen or fuel cells?

01 YES
02 NO
99 DON'T KNOW

[ASK IF Q29 (01)]
Q30 Which class format is MOST useful to you? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER]

01 In-person class at a local facility
02 In-person class in conjunction with a relevant conference or event
03 Web-based class
99 DON'T KNOW/NO OPINION

That's all the questions we have today. Thank you very much for your time.

CONFIRM PHONE NUMBER.

A.4. END USER SURVEY

OPINION RESEARCH CORPORATION

APRIL 2008

HYDROGEN-LARGE SCALE END USERS

ORC # 36015

BALLOT #
TELEPHONE #
SURVEY #
CALL

QUOTA CELLS/TARGETS

XXX total respondents

TELEPHONE NUMBER: (____)_____ TIME ENDED: _____

TIME STARTED:_____

LENGTH:_____(MINUTES)

DATE:_____

INTERVIEWER:_____

I.D.:_____

INTERVIEWERS: MAKE SURE YOU HAVE THE FOLLOWING TO GIVE TO RESPONDENTS AS NEEDED OR IF REQUESTED:
- OMB CONTROL NUMBER: 1910-5124
- HFCIT WEBSITE URL: http://www1.eere.energy.gov/hydrogenandfuelcells/education/
- IF ASKED AT ANY POINT DURING THE SURVEY, THE INTERVIEWER SHOULD TELL THE RESPONDENT THAT THERE ARE NO TRICK QUESTIONS

[AT SWITCHBOARD]

SA May I please speak to the person who is most responsible for energy-related decisions at this location?

04 YES -->CONTINUE
05 NOT AVAILABLE NOW -->SCHEDULE CALLBACK
100 REFUSED -->THANK AND RECORD AS REFUSED (SA)

(READ ONCE RESPONDENT IS ON THE PHONE)
Hello, my name is ____ calling from Opinion Research Corporation on behalf of the U.S. Department of Energy. The DOE is sponsoring a survey about energy sources with business leaders in your sector. Each company we contact is an important part of the survey process and we urge you or someone within your organization to participate. While your responses are voluntary, every response is valuable in this survey because the results will be used to help design the hydrogen education program for the Department of Energy. Are you the person most responsible for energy related decisions at this location?

S1
01 YES, CONTINUE WITH SURVEY -->SKIP TO TEXT BEFORE Q1
02 NOT CONVENIENT NOW -->SET CALL BACK APPOINTMENT
03 NOT APPROPRIATE PERSON TO CONDUCT INTERVIEW-->CONTINUE TO S2
99 REFUSED -->THANK AND RECORD AS REFUSED
(S1)

S2 Can you please give me the name, title and telephone number of the person who is best suited to represent your organization for this survey?

01 YES -->RECORD INFORMATION AND ARRANGE CALLBACK
100 NO/REFUSED -->THANK AND RECORD AS REFUSED (S2)

Before we get started, I want to mention that there are both technical and opinion questions in the survey. Tell me what you think or believe, but keep in mind that "no opinion" or "don't know" are perfectly acceptable responses. I would like you to know that your responses are confidential and you and your company name will not be associated with the results. It should take about 12 minutes to complete.

First of all . . .

Q1 Please rate your familiarity with hydrogen and fuel cell technologies. Are you...
[READ LIST. RECORD ONE ANSWER]

14 Not at all familiar – You know nothing about hydrogen and fuel cell technologies
15 Slightly familiar – You've heard about hydrogen and fuel cell technologies, read an article or watched a television feature about the technology, or participated in a casual conversation about the technology
16 Familiar – You've had limited experience with hydrogen and fuel cell technologies, researched the subject for school, work, or personal interest, or learned about the technology in a class or workshop
17 Very familiar – You consider yourself an expert in hydrogen and fuel cell technologies

Q2 I am going to read several job titles -- please tell me which one applies to you.
[READ LIST. RECORD ONE ANSWER]

01 Fleet manager
02 Plant or facility manager
03 Operations manager
04 Financial manager
05 Energy manager
06 CEO
195 Something else [SPECIFY]
199 DON'T KNOW/REFUSED

Q3 How many years have you held this position?
[READ LIST. RECORD ONE ANSWER]

01 Less than one year
02 Between one and five years
03 Over five years
99 DON'T KNOW/REFUSED

[ASK IF RESPONDENT IS IN "TRANSPORTATION" SECTOR]
Q4A How many vehicles are in the GROUND-BASED fleet operated by your organization or agency?
[DO NOT READ LIST. RECORD ONE ANSWER]

01 LESS THAN 100
02 100-1,000
03 1,001-10,000
04 OVER 10,000
99 DON'T KNOW/REFUSED

[ASK IF RESPONDENT IS IN "NEEDS UNINTERRUPTED POWER" OR "LARGE POWER REQUIREMENTS" SECTOR]

Q4B What is the average annual cost of electrical energy for your organization or agency?
[DO NOT READ LIST. RECORD ONE ANSWER]

01 UNDER $100,000
02 $100,000 TO $1,000,000
03 $1,000,001 TO $2,000,000
04 OVER $2,000,000
99 DON'T KNOW/REFUSED

Q5 I am going to read several statements. After each one, please tell me if you believe the statement is true, if it is false, or if you don't know.
[ROTATE STATEMENTS]

07 True
08 False
99 DON'T KNOW/NO OPINION

A. Hydrogen gas is toxic
B. Fuel cells produce electricity through hydrogen combustion
C. Hydrogen is lighter than air
D. Hydrogen has a distinct odor

Q6 Which of the following can fuel cells provide power to?
[READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. ROTATE 01-03]

10 Your home
11 Your car
12 Your laptop computer
10 All of these
11 Or, none of these
99 DON'T KNOW/NO OPINION

Q7 In which state or condition can hydrogen be stored?
[READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. ROTATE 01-02]

13 Chemical compound
14 Liquid
15 Both of these
16 Or, neither of these
99 DON'T KNOW/NO OPINION

Q8 When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else?
[READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. ROTATE 01-03]

13 Carbon dioxide
14 Nitrous oxides
15 Heat
16 Or, all of these
99 DON'T KNOW/NO OPINION

Q9 Hydrogen can be produced using which of the following sources of energy?
[READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. ROTATE 01-03]

13 Natural gas
14 Sunlight
15 Organic matter
16 Or, all of these
102 DON'T KNOW/NO OPINION

Q10 I am going to read some characteristics of fuels or power supplies. Please rate the importance of each characteristic for your facility, using a scale of low, medium, high or no opinion.
[ROTATE STATEMENTS]

01 Low
02 Medium
03 High
99 NO OPINION

A. System installation cost
B. System maintenance cost
C. Fuel cost
D. Dependability
E. Safety
F. Environmental impact
G. Uninterrupted availability

Q11 How would you feel if your local gas station also sold hydrogen? Would you say ...
[READ ENTIRE LIST BEFORE RECORDING ONE ANSWER.]

13 Frightened
14 Uneasy
15 At ease
16 Or, pleased
102 DON'T KNOW/NO OPINION

Q12 Please tell me if you believe the following statement is true, if it is false, or if you don't know.

"Hydrogen is too dangerous for everyday use by the general public."

07 TRUE
08 FALSE
99 DON'T KNOW/NO OPINION

Q13 Next, I am going to read several statements about potential benefits of using hydrogen as a VEHICLE FUEL. For each, tell me if you disagree, are neutral, agree or if you have no opinion? [ROTATE STATEMENTS]

10 Disagree
11 Are neutral
12 Agree
102 NO OPINION

A. Using hydrogen will reduce U.S. dependence on foreign oil
B. Using hydrogen will reduce emissions and improve air quality
C. Hydrogen is as safe to use in my car as gasoline and diesel fuels

Q14 For the following applications, please rate the safety of using hydrogen and fuel cells, in comparison with technology in use today.

Is it not as safe, equally as safe or safer to use hydrogen and fuel cells for…
[ROTATE STATEMENTS]

01 Not as safe
02 Equally as safe
03 Safer
99 NO OPINION

A. Personal cars and trucks
B. Buses and commercial vehicles
C. Large power plants
D. Small portable devices such as laptop computers or cell phones
E. Onsite power for the home
F. Onsite power for buildings such as hospitals and schools

Q15 If fuel cell vehicles were available today at a cost competitive to gasoline internal combustion engine vehicles, would you recommend buying or leasing them for your organization's vehicle fleet?

03 YES
04 NO
99 DON'T KNOW/NO OPINION

Q16 If stationary fuel cells were available today at a cost competitive to traditional power systems, would you buy or recommend buying one to help meet your facility's needs?

03 YES
04 NO
99 DON'T KNOW/NO OPINION

Q17 I am going to read several statements. Please select the ONE that BEST describes how you feel about using hydrogen and fuel cell technology to meet your organization's energy needs. [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER]

05 I know enough to seriously consider it if products are available
06 I am considering it but need more information
07 I am going to wait and see how the market develops
08 There is no way I'll consider it anytime soon
100 DON'T KNOW/NO OPINION

Q18 The next question is about your use of information sources that can help you make decisions about energy costs and safety. How often do you use each of the following sources for energy information? Would you say never, sometimes, or frequently? [DO NOT ROTATE STATEMENTS]

01 Never
02 Sometimes
03 Frequently
99 DON'T KNOW

A. Teachers and schools
B. Friends and family members
C. Environmental and conservation groups
D. Utility companies or brokers, for example, gas or electricity providers
E. Industry or trade associations or non-profit organizations
F. Federal government
G. State government
H. Local government

Q19 How often do you get ENERGY information from different types of mass media? Would you say that you never, sometimes, or frequently get energy information from … [ROTATE STATEMENTS]

01 Never
02 Sometimes
03 Frequently
99 DON'T KNOW

A. Television
B. Radio
C. The Internet
D. Newspapers and general interest magazines
E. Science and technology magazines and journals
F. Business or trade magazines

Q20 Have you received information at your workplace concerning hydrogen and/or fuel cells?

03 YES
04 NO
100 DON'T KNOW

[ASK IF Q20 (02-99)]
Q21 Would information about hydrogen and fuel cell technologies be valuable to you?

03 YES
04 NO
100 DON'T KNOW

Q22 Would a "Hydrogen 101" class, or training at a conference, be of value to you?

03 YES
04 NO
100 DON'T KNOW

[ASK IF Q22 (01)]
Q23 Which class format is MOST useful to you?
[READ ENTIRE LIST BEFORE RECORDING ONE ANSWER]

04 In-person class at a local facility
05 In-person class in conjunction with a relevant conference or event
06 Web-based class
100 DON'T KNOW/NO OPINION

Q24 Does your organization use hydrogen and/or fuel cells for any purpose?

01 YES
02 NO
99 DON'T KNOW

[ASK IF Q24 (01)]
Q25 What is the PRIMARY function of the hydrogen and/or fuel cells used by your organization?
[READ ENTIRE LIST BEFORE RECORDING ONE ANSWER]

01 To power buses
02 To power vehicles other than buses
03 To provide stationary on-site power
04 To provide power for small portable equipment
05 To provide back-up power
195 OTHER [SPECIFY]
199 DON'T KNOW/REFUSED

[ASK IF Q24 (02, 99)]
Q26 Does your organization have plans to use hydrogen and/or fuel cells in the future?

01 YES
02 NO
99 DON'T KNOW

[ASK IF Q26 (01)]

Q27 What is the time frame for plans to use hydrogen and/or fuel cells?
[READ LIST. RECORD ONE ANSWER]

04 Within the next year
05 1-5 years
06 Over 5 years
100 DON'T KNOW

CONFIRM PHONE NUMBER.

That's all the questions we have today. Thank you very much for your time.

A.5 SAFETY AND CODES OFFICIALS SURVEY

OPINION RESEARCH CORPORATION

MAY 2009

HYDROGEN-SAFETY AND CODES OFFICIALS

ORC # 36386

BALLOT #
TELEPHONE #
SURVEY #
CALL

QUOTA CELLS/TARGETS

200 total respondents

TELEPHONE NUMBER: (____)_____ TIME ENDED: _____

TIME STARTED:_____

LENGTH:_____(MINUTES)

DATE:_____

INTERVIEWER:_____

I.D.:_____

INTERVIEWERS: MAKE SURE YOU HAVE THE FOLLOWING TO GIVE TO RESPONDENTS AS NEEDED OR IF REQUESTED:
- OMB CONTROL NUMBER: 1910-5140
- HFCIT WEBSITE URL: http://hydrogenenergy.gov/
- IF ASKED AT ANY POINT DURING THE SURVEY, THE INTERVIEWER SHOULD TELL THE RESPONDENT THAT THERE ARE NO TRICK QUESTIONS

AT INTRO SCREEN, DISPLAY INFO FOR INTERVIEWER: RESPONDENT NAME, TITLE AND AGENCY CONTACTED

SA May I please speak to [INSERT RESPONDENT NAME FROM SAMPLE]?

06	YES	-->CONTINUE
07	NOT AVAILABLE NOW	-->SCHEDULE CALLBACK [SIDEBAR]
08	NO LONGER AT AGENCY	-->SKIP TO S2
101	REFUSED	-->THANK AND RECORD AS REFUSED (SA)

(READ ONCE RESPONDENT IS ON THE PHONE)
Hello, my name is ____ calling from Opinion Research Corporation on behalf of the U.S. Department of Energy. Your agency has been selected for an important national research survey about new energy sources. You have (your office has) been sent a letter from Sunita Satyapal, Acting Program Manager of the DOE Hydrogen Program, which explained the purpose and importance of this survey. The survey takes about 12 minutes to complete.

S1 01 CONTINUE WITH SURVEY -->SKIP TO TEXT BEFORE Q1
02 DID NOT RECEIVE LETTER/NEED MORE INFORMATION -->CONTINUE
03 NOT CONVENIENT NOW -->SET CALL BACK APPOINTMENT [SIDEBAR]
04 NOT APPROPRIATE PERSON TO CONDUCT INTERVIEW-->SKIP TO S2
99 REFUSED -->THANK AND RECORD AS REFUSED
(S1)

[ASK IF S1(02)]
S1A The Department of Energy is sponsoring a survey of safety and codes officials and your agency has been selected for this important national research about new energy sources. Your responses are confidential and your agency's name will not be associated with the survey results. While your responses are voluntary, every response is extremely important because the results to this survey will be used to guide the development of The Department of Energy's hydrogen education activities.

01 CONTINUE WITH SURVEY -->SKIP TO TEXT BEFORE Q1
02 NOT CONVENIENT NOW -->SET CALL BACK APPOINTMENT [SIDEBAR]
03 NOT APPROPRIATE PERSON TO CONDUCT INTERVIEW-->CONTINUE TO S2
99 REFUSED -->THANK AND RECORD AS REFUSED (S1A)

S2 [IF SA (03) READ] Can you please give me the name, title and telephone number of the person who now fills the position vacated by [INSERT RESPONDENT NAME]?

[IF S1 (04) OR S1A (03) READ] Can you please give me the name, title and telephone number of the person who is best suited to represent your agency for this survey?

01 YES -->CONTINUE
101 NO/REFUSED -->THANK AND RECORD AS REFUSED (S2)

DISPLAY INFORMATION FROM S2 TO VERIFY ACCURACY.

S2VER [CONFIRM INFORMATION- READ BACK TO THEM FOR ACCURACY]

06 CORRECT_____-->CONTINUE
07 INCORRECT_____-->RETURN TO S2
99 REFUSED_____-->THANK AND RECORD AS REFUSED (S2VER)

S3 INTERVIEWER: HOW WILL THE INTERVIEW BE COMPLETED?

01 CONTINUE WITH THE PERSON ON THE PHONE
02 SCHEDULE CALLBACK WITH NEW PERSON

Before we get started, I want to mention that there are both technical and opinion questions in the survey. Tell me what you think or believe, but keep in mind that "no opinion" or "don't know" are perfectly acceptable responses.

First of all . . .

Q1 Please rate your familiarity with hydrogen and fuel cell technologies. Are you... [READ LIST. RECORD ONE ANSWER]

18 Not at all familiar – You know nothing about hydrogen and fuel cell technologies
19 Slightly familiar – You've heard about hydrogen and fuel cell technologies, read an article or watched a television feature about the technology, or participated in a casual conversation about the technology
20 Familiar – You've had limited experience with hydrogen and fuel cell technologies, researched the subject for school, work, or personal interest, or learned about the technology in a class or workshop
21 Very familiar – You consider yourself an expert in hydrogen and fuel cell technologies

Q2 I am going to read several statements. After each one, please tell me if you believe the statement is true, if it is false, or if you don't know. [RANDOMIZE STATEMENTS]

09 TRUE
10 FALSE
99 DON'T KNOW/NO OPINION

A. Hydrogen gas is toxic
B. Fuel cells produce electricity through hydrogen combustion
C. Hydrogen is lighter than air
D. Hydrogen has a distinct odor

Q3 Which of the following can fuel cells provide power to? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. RANDOMIZE 01-03]

13 Your home
14 Your car
15 Your laptop computer
12 All of these
13 Or, none of these
99 DON'T KNOW

Q4 In which state or condition can hydrogen be stored? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. ROTATE 01-02]

17 Chemical compound
18 Liquid
19 Both of these
20 Or, neither of these
99 DON'T KNOW

Q5 When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. RANDOMIZE 01-03]

17 Carbon dioxide
18 Nitrous oxides
19 Heat
20 Or, all of these
99 DON'T KNOW

Q6 Hydrogen can be produced using which of the following sources of energy? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER. RANDOMIZE 01-03]

17 Natural gas
18 Sunlight
19 Organic matter
20 Or, all of these
103 DON'T KNOW

Q7A For the next question, I will ask you to rank five items. It may be easier if you write them down. Do you need a moment to get something to write with?

The factors are: [READ AND RANDOMIZE FACTORS]. Now, please tell me which factor is MOST important to you, personally, when selecting a fuel for your vehicle or power supply for your home or business? [RE-READ ENTIRE LIST AS NEEDED BEFORE RECORDING ONE ANSWER]

01 Safety
02 Low cost
03 Environmental impact
04 Convenience
05 Performance
99 DON'T KNOW/NO OPINION

[IF Q7A (01-05) MENTIONED, ASK FOR EACH NOT MENTIONED IN Q7A]
Q7B Now, from the remaining factors, which one of the following is MOST IMPORTANT to you when selecting a fuel for your vehicle or power supply for your home or business? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER]

01 Safety
02 Low cost
03 Environmental impact
04 Convenience
05 Performance
99 DON'T KNOW/NO OPINION

[IF Q7B (01-05) MENTIONED, ASK FOR EACH NOT MENTIONED IN Q7A AND Q7B]

Q7C Now, from the remaining factors, which one of the following is MOST IMPORTANT to you when selecting a fuel for your vehicle or power supply for your home or business? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER]

01 Safety
02 Low cost
03 Environmental impact
04 Convenience
05 Performance
99 DON'T KNOW/NO OPINION

[IF Q7C (01-05) MENTIONED, ASK FOR EACH NOT MENTIONED IN Q7A, Q7B, AND Q7C]

Q7D Finally, which of the following factors is MORE IMPORTANT to you when selecting a fuel for your vehicle or power supply for your home or business? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER]

01 Safety
02 Low cost
03 Environmental impact
04 Convenience
05 Performance
99 DON'T KNOW/NO OPINION

Q8 How would you feel if your local gas station also sold hydrogen? Would you say ... [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER.]

17 Frightened
18 Uneasy
19 At ease
20 Or, pleased
103 DON'T KNOW/NO OPINION

Q9 Please tell me if you believe the following statement is true, if it is false, or if you don't know.

"Hydrogen is too dangerous for everyday use by the general public."

09 TRUE
10 FALSE
99 DON'T KNOW/NO OPINION

Q10 Next, I am going to read several statements about potential benefits of using hydrogen as a VEHICLE FUEL. For each, tell me if you disagree, are neutral, agree or if you have no opinion? [RANDOMIZE STATEMENTS]

13 DISAGREE
14 ARE NEUTRAL
15 AGREE
103 NO OPINION

A. Using hydrogen will reduce U.S. dependence on foreign oil
B. Using hydrogen will reduce emissions and improve air quality
C. Hydrogen is as safe to use in my car as gasoline and diesel fuels

Q11 OMITTED

Q12 OMITTED

Q13 For the following applications, please rate the safety of using hydrogen and fuel cells, in comparison with technology in use today.

Is it not as safe, equally as safe or safer to use hydrogen and fuel cells for… [RANDOMIZE STATEMENTS]

01 NOT AS SAFE
02 EQUALLY AS SAFE
03 SAFER
99 NO OPINION

A. Personal cars and trucks
B. Buses and commercial vehicles
C. Large power plants
D. Small portable devices such as laptop computers or cell phones
E. Onsite power for the home
F. Onsite power for buildings such as hospitals and schools

Q13G, H, I OMITTED

Q14 The next question is about your use of information sources that can help you make decisions about energy costs and safety. How often do you use each of the following sources for energy information? Would you say never, sometimes, or frequently? [DO NOT ROTATE STATEMENTS]

01 NEVER
02 SOMETIMES
03 FREQUENTLY
99 DON'T KNOW

A. Teachers and schools
B. Friends and family members
C. Environmental and conservation groups
D. Utility companies or brokers, for example, gas or electricity providers
E. Industry or trade associations or non-profit organizations
F. Federal government
G. State government
H. Local government

Q15 How often do you get ENERGY information from different types of mass media? Would you say that you never, sometimes, or frequently get energy information from … [RANDOMIZE STATEMENTS]

01 NEVER
02 SOMETIMES
03 FREQUENTLY
99 DON'T KNOW

A. Television
B. Radio
C. The Internet
D. Newspapers and general interest magazines
E. Science and technology magazines and journals
F. Business or trade magazines

Q16-19 OMITTED

Q20-25 OMITTED

Q25A Have you ever been involved in permitting a stationary fuel cell installation, hydrogen fueling station, or other hydrogen fuel cell project?

01 YES
02 NO
99 DON'T KNOW

Q25B Do you know anyone or have any of your colleagues or peers been involved in permitting a stationary fuel cell, hydrogen fueling station, or other hydrogen fuel cell project?

01 YES
02 NO
99 DON'T KNOW

Q26 Have you ever received information about hydrogen and fuel cell technologies?

05 YES
06 NO
101 DON'T KNOW

Q27-28 OMITTED

Q28A Have you ever participated in a training class about hydrogen and fuel cell technologies?

01 YES
02 NO
a. DON'T KNOW

[ASK IF Q28A (01)]
Q28B Was the class useful?

01 YES
02 NO
99 DON'T KNOW/NO OPINION

[ASK IF Q28A (02, 99)]
Q29 Would you like to participate in a class on hydrogen or fuel cells?

05 YES
06 NO
101 DON'T KNOW/NO OPINION

[ASK IF Q29 (01)]
Q30 Which class format is MOST useful to you? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER]

07 In-person class at a local facility
08 In-person class in conjunction with a relevant conference or event
09 Web-based class
101 DON'T KNOW/NO OPINION

Q31 If you were asked to review a request for a stationary fuel cell permit, would you have the information to do so?

01 YES
02 NO
99 DON'T KNOW/NO OPINION

Q32 If you were asked to review a request for a stationary fuel cell permit, how would you feel about conducting the review? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER.]

01 Uneasy
02 Curious
03 Or, comfortable
99 DON'T KNOW/NO OPINION

Q33 If you were asked to review a request for a hydrogen fueling station permit, would you have the information to do so?

01 YES
02 NO
99 DON'T KNOW

Q34 If you were asked to review a request for a hydrogen fueling station permit, how would you feel about conducting the review? [READ ENTIRE LIST BEFORE RECORDING ONE ANSWER.]

01 Uneasy
02 Curious
03 Or, comfortable
99 DON'T KNOW/NO OPINION

Q35 If you need information about hydrogen and fuel cell technologies in order to review an application for a stationary fuel cell or hydrogen fueling station, where would you seek that information?
[READ LIST. RECORD AS MANY AS APPLY. WAIT FOR YES OR NO FOR EACH]

01 Peers
02 Federal government
03 State government
04 Nonprofit organization
05 Industry source
06 National organization
07 Local agency's regulations
99 DON'T KNOW/NO OPINION

That's all the questions we have today. Thank you very much for your time.

APPENDIX B
FEDERAL REGISTER NOTICES

General Public, Students, Government Agencies, and End Users

B.1. Sixty-day Federal Register Notice. *Federal Register,* Vol. 71, No. 222, Friday, November 17, 2006, page 66943 (*http://www.access.gpo.gov/su_docs/fedreg/a061117c.html*)

B.2. Thirty-day Federal Register Notice. *Federal Register,* Vol. 72, No. 50, Thursday, March 15, 2007, page 12169 (*http://www.access.gpo.gov/su_docs/fedreg/a070315c.html*)

Safety and Codes Officials

B.3. Sixty-day Federal Register Notice. *Federal Register,* Vol. 73, No. 2, Thursday, January 3, 2008, page 482 (*http://www.access.gpo.gov/su_docs/fedreg/a080103c.html*)

B.4. Thirty-day Federal Register Notice. *Federal Register,* Vol. 73, No. 84, Wednesday, April 30, 2008, pages 23453-23454 (*http://www.access.gpo.gov/su_docs/fedreg/a080430c.html*)

B.1 FEDERAL REGISTER, NOVEMBER 17, 2006

experts or individuals with appropriate expertise to review the substantive content of the products and services; the percentage of products and services deemed to be of high relevance to educational and early intervention policy or practice by an independent review panel of qualified members of the target audiences of the technical assistance and dissemination; and the percentage of all products and services deemed to be of high usefulness by target audiences to improve educational or early intervention policy or practice.

VII. Agency Contact

FOR FURTHER INFORMATION CONTACT: Gail Houle, U.S. Department of Education, 400 Maryland Avenue, SW., Room 4061, Potomac Center Plaza, Washington, DC 20202–2600. Telephone: (202) 245–7381.

If you use a telecommunications device for the deaf (TDD), you may call the Federal Relay Service (FRS) at 1–800–877–8339.

Individuals with disabilities may obtain this document in an alternative format (*e.g.*, Braille, large print, audiotape, or computer diskette) on request by contacting the following office: The Grants and Contracts Services Team, U.S. Department of Education, 400 Maryland Avenue, SW., Potomac Center Plaza, Washington, DC 20202–2550. Telephone: (202) 245–7363.

VIII. Other Information

Electronic Access to This Document:

You may view this document, as well as all other documents of this Department published in the **Federal Register**, in text or Adobe Portable Document Format (PDF) on the Internet at the following site: *http://www.ed.gov/news/fedregister*.

To use PDF you must have Adobe Acrobat Reader, which is available free at this site. If you have questions about using PDF, call the U.S. Government Printing Office (GPO), toll free, at 1–888–293–6498; or in the Washington, DC, area at (202) 512–1530.

Note: The official version of this document is the document published in the **Federal Register**. Free Internet access to the official edition of the **Federal Register** and the Code of Federal Regulations is available on GPO Access at: *http://www.gpoaccess.gov/nara/index.html*.

Dated: November 13, 2006.

John H. Hager,

Assistant Secretary for Special, Education and Rehabilitative, Services.

[FR Doc. E6–19498 Filed 11–16–06; 8:45 am]

BILLING CODE 4000–01–P

DEPARTMENT OF ENERGY

Agency Information Collection Extension

AGENCY: Department of Energy.

ACTION: Notice and request for comments.

SUMMARY: The Department of Energy (DOE), pursuant to the Paperwork Reduction Act of 1995, intends to extend for three years the information collection packages listed at the end of this notice. Comments are invited on: (a) Whether the extended information collections are necessary for the proper performance of the functions of the agency, including whether the information has practical utility; (b) the accuracy of the agency's estimate of the burden of the information collections, including the validity of the methodology and assumptions used; (c) ways to enhance the quality, utility, and clarity of the information to be collected; and (d) ways to minimize the burden of the information collections on respondents, including through the use of automated collection techniques or other forms of information technology. Comments submitted in response to this notice will be summarized and included in the request for Office of Management and Budget review and approval of these information collections; they also will become a matter of public record.

DATES: Comments regarding these proposed information collections must be received on or before January 16, 2007. If you anticipate difficulty in submitting comments within that period, contact the person listed below as soon as possible.

ADDRESSES: Written comments may be sent to: Jeffrey Martus, IM–11/Germantown Building, U.S. Department of Energy, 1000 Independence Ave SW., Washington, DC 20585–1290. or by fax at 301–903–9061 or by e-mail at *Jeffrey.martus@hq.doe.gov*.

FOR FURTHER INFORMATION CONTACT: Requests for additional information or copies of the information collection instrument and instructions should be directed to Jeffrey Martus at the address listed above in **ADDRESSES**.

SUPPLEMENTARY INFORMATION: The information collection packages listed in this notice for public comment include the following:

1. (1) OMB No.: 1910–1400. (2) Package Title: Compliance Statement: Energy/Water Conservation Standards for Appliances. (3) Type of Review: Renewal. (4) Purpose: This information collection provides the Department with the information from manufacturers necessary for verifying that products covered under the Energy Policy and Conservation Act comply with required energy and water conservation standards prior to distribution. (5) Respondents: 48. (6) Estimated Number of Burden Hours: 1,347.

2. (1) OMB No.: 1910–5124. (2) Package Title: Hydrogen, Fuel Cells, and Infrastructure Technologies Program Baseline Knowledge Assessment. (3) Type of Review: Renewal. (4) Purpose: This information is necessary to assess the current knowledge and opinions of the general public concerning hydrogen, fuel cells, and the hydrogen economy. (5) Respondents: 5,495. (6) Estimated Burden Hours: 816.

3. (1) OMB No.: 1910–5125. (2) Package Title: Work for Others by DOE Management and Operating Contractors. (3) Type of Review: Renewal. (4) Purpose: This collection is required by the Department to ensure that programmatic and administrative management requirements and resources are managed efficiently and effectively. (5) Respondents: 20. (6) Estimated Number of Burden Hours: 100.

4. (1) OMB No.: 1910–5115. (2) Package Title: Contractor Legal Requirements. (3) Type of Review: Renewal. (4) Purpose: This collection is necessary to provide a basis for DOE decisions on requests from applicable contractors for reimbursement of litigation and other legal expenses. (5) Respondents: 36. (6) Estimated Number of Burden Hours: 515.

Statutory Authority: Department of Energy Organization Act, Public Law 95–91.

Issued in Washington, DC on November 8, 2006.

Lorretta D. Bryant,

Acting Director, Records Management Division, Office of the Chief Information Officer.

[FR Doc. E6–19476 Filed 11–16–06; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY

Proposed Agency Information Collection

AGENCY: Department of Energy.

ACTION: Notice and request for comments.

SUMMARY: The Department of Energy invites public comment on a proposed collection of information that the Department is developing for submission to the Office of Management and Budget (OMB) pursuant to the Paperwork Reduction Act of 1995. The

Washington, DC 20585. Phone: 202–586–1023.

SUPPLEMENTARY INFORMATION:

Purpose of the Committee: The purpose of the Methane Hydrate Advisory Committee is to provide advice on potential applications of methane hydrate to the Secretary of Energy, and assist in developing recommendations and priorities for the Department of Energy Methane Hydrate Research and Development Program.

Tentative Agenda

Tuesday, April 24

• Report and discussion of meeting with Deputy Secretary of Energy and congressional committees.
• Reports and discussion of key Department of Energy-supported field projects.
• Report and discussion of code comparison for various reservoir simulators.
• Report and discussion of University of Mississippi seafloor observatory.
• Report and discussion of International activities.
• Final critique of 5-year plan and preparation of 2007 report to Congress.

Wednesday, April 25

• Continue preparation of report to Congress.
• Fast Track, Environmental and International Subcommittee discussions.
• Wrap-up and discussion of action items.
• Adjourn.

Public Participation: The meeting is open to the public. The Chairman of the Committee will conduct the meeting to facilitate the orderly conduct of business. If you would like to file a written statement with the Committee, you may do so either before or after the meeting. If you would like to make oral statements regarding any of the items on the agenda, you should contact Edith Allison at the address or telephone number listed above. You must make your request for an oral statement at least five business days prior to the meeting, and reasonable provisions will be made to include the presentation on the agenda. Public comment will follow the 10-minute rule.

Minutes: The minutes of this meeting will be available for public review and copying within 60 days at the Freedom of Information Public Reading Room, Room 1E–190, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC, between 9 a.m. and 4 p.m., Monday through Friday, except Federal holidays.

Issued at Washington, DC, on March 9, 2007.

Rachel M. Samuel,

Deputy Advisory Committee Management Officer.

[FR Doc. E7–4756 Filed 3–14–07; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY

Office of Energy Efficiency and Renewable Energy

Agency Information Collection Revision

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Submission for Office of Management and Budget (OMB) review; comment request.

SUMMARY: The Department of Energy (DOE) has submitted an information collection revision package to OMB for review under the provisions of the Paperwork Reduction Act of 1995. The package requests revision of the information collection listed at the end of this notice. Comments are invited on: (a) Whether the revised information collections are necessary for the proper performance of the functions of the agency, including whether the information has practical utility; (b) the accuracy of the agency's estimate of the burden of the information collections, including the validity of the methodology and assumptions used; (c) ways to enhance the quality, utility, and clarity of the information to be collected; and (d) ways to minimize the burden of the information collections on respondents, including through the use of automated collection techniques or other forms of information technology.

DATES: Comments regarding this collection must be received on or before April 16, 2007. If you anticipate that you will be submitting comments, but find it difficult to do so within the period of time allowed by this notice, please advise the OMB Desk Officer of your intention to make a submission as soon as possible. The Desk Officer may be telephoned at 202–395–4650.

ADDRESSES: Written comments should be sent to: Christy Cooper, Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy, EE–2H, 1000 Independence Avenue, SW., Washington, DC 20585, or by fax at 202–586–9811 or by e-mail at *Christy.cooper@ee.doe.gov*.

FOR FURTHER INFORMATION CONTACT:

Requests for additional information or copies of the information collection instrument and instructions should be directed to Christy Cooper at the address listed above in **ADDRESSES**.

SUPPLEMENTARY INFORMATION: The information collection package listed in this notice for public comment include the following:

(1) *OMB No.:* 1910–5124. (2) *Package Title:* U.S. Department of Energy Hydrogen Program Assessment of Knowledge and Opinions on Hydrogen and Fuel Cell Technologies. (3) *Type of Review:* Revision of currently approved information collection. (4) *Purpose:* This information collection provides the Department with the information necessary to measure current knowledge and opinions concerning hydrogen and fuel cell technologies in the United States and to compare this measurement against a baseline established in 2004. (5) *Respondents:* 3,246. (6) *Estimated Number of Burden Hours:* 702.

Statutory Authority: Department of Energy Organization Act, Public Law 95–91.

Issued in Washington, DC, on March 7, 2007.

Alexander A. Karsner,

Assistant Secretary, Energy Efficiency and Renewable Energy.

[FR Doc. E7–4755 Filed 3–14–07; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

[Docket No. RP07–340–000]

Columbia Gas Transmission Corporation; Notice of Proposed Changes in FERC Gas Tariff

March 9, 2007.

Take notice that on March 6, 2007, Columbia Gas Transmission Corporation (Columbia) tendered for filing as part of its FERC Gas Tariff, Second Revised Volume No. 1, the following revised tariff sheets with a proposed effective date of June 1, 2007:

Fifth Revised Sheet No. 390
Original Sheet No. 390A
Sixth Revised Sheet No. 391
Second Revised Sheet No. 392

Any person desiring to intervene or to protest this filing must file in accordance with Rules 211 and 214 of the Commission's Rules of Practice and Procedure (18 CFR 385.211 and 385.214). Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make protestants parties to the proceeding. Any person wishing to become a party must file a notice of intervention or motion to intervene, as

percentage of grantees that show a measurable increase in the percentage of target students who disapprove of alcohol abuse. These three measures constitute the Department's indicators of success for this program. Consequently, applicants for a grant under this program are advised to give careful consideration to these three measures in conceptualizing the design, implementation, and evaluation of their proposed project. If funded, applicants will be asked to collect and report data in their annual performance reports about progress toward these goals.

VII. Agency Contact

For Further Information Contact: Amalia Cuervo, U.S. Department of Education, 400 Maryland Avenue, SW., room 3E342, Washington, DC 20202–6450. Telephone: (202)205–2855, or by e-mail: *amalia.cuervo@ed.gov.*

If you use a TDD, call the FRS, toll free, at 1–800–877–8339.

VIII. Other Information

Alternative Format: Individuals with disabilities can obtain this document and a copy of the application package in an alternative format (e.g., Braille, large print, audiotape, or computer diskette) on request to the program contact person listed under *For Further Information Contact* in section VII in this notice.

Electronic Access to This Document: You can view this document, as well as all other documents of this Department published in the **Federal Register**, in text or Adobe Portable Document Format (PDF) on the Internet at the following site: *http://www.ed.gov/news/fedregister.*

To use PDF you must have Adobe Acrobat Reader, which is available free at this site. If you have questions about using PDF, call the U.S. Government Printing Office (GPO), toll free, at 1–888–293–6498; or in the Washington, DC, area at (202) 512–1530.

Note: The official version of this document is the document published in the **Federal Register**. Free Internet access to the official edition of the **Federal Register** and the Code of Federal Regulations is available on GPO Access at: *http://www.gpoaccess.gov/nara/index.html.*

Dated: December 28, 2007.

Deborah A. Price,

Assistant Deputy Secretary for Safe and Drug-Free Schools.

[FR Doc. E7–25587 Filed 1–2–08; 8:45 am]

BILLING CODE 4000–01–P

DEPARTMENT OF ENERGY

Proposed Agency Information Collection

AGENCY: Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy.

ACTION: Notice and Request for Comments.

SUMMARY: The Department of Energy (DOE) invites public comment on a proposed collection of information that DOE is developing for submission to the Office of Management and Budget (OMB) pursuant to the Paperwork Reduction Act of 1995. Comments are invited on: (a) Whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information shall have practical utility; (b) the accuracy of the agency's estimate of the burden of the proposed collection of information, including the validity of the methodology and assumptions used; (c) ways to enhance the quality, utility, and clarity of the information to be collected; and (d) ways to minimize the burden of the collection of information on respondents, including through the use of automated collection techniques or other forms of information technology.

DATES: Comments regarding this proposed information collection must be received on or before March 3, 2008. If you anticipate difficulty in submitting comments within that period, contact the person listed below as soon as possible.

ADDRESSES: Comments may be sent to: Ms. Andrea Chew, Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy, EE–2H, 1000 Independence Avenue, SW., Washington, DC 20585, by phone at 202–586–1145, fax at 202–586–9811, or e-mail at *andrea.chew@ee.doe.gov.*

FOR FURTHER INFORMATION CONTACT:

Requests for additional information or copies of the information collection instrument and instructions should be directed to Ms. Andrea Chew using the contact information listed above.

SUPPLEMENTARY INFORMATION: This package contains:

(1) *OMB No.:* New.

(2) *Package Title:* Hydrogen and Fuel Cells Knowledge and Opinions Survey of Safety and Code Officials.

(3) *Type of Review:* New collection.

(4) *Purpose:* The Knowledge and Opinions Survey of Safety and Codes Officials will measure the levels of awareness and understanding of hydrogen and fuel cell technologies within this population. Information gathered in this assessment will assist DOE's Hydrogen Education Program in formulating an overall education plan for hydrogen technologies. Changes relative to baseline knowledge levels will be determined when, after three years, the population will be surveyed again using the same survey instrument and methodology.

(5) *Respondents:* Interviews with 200 total officials will be conducted using computer-assisted telephone interview technology. Lists of persons responsible for safety and codes will be compiled from the following universe: agencies responsible for developing codes related to hydrogen and fuel cell technologies, including members of the International Code Council and the National Fire Protection Association; and safety officials responsible for adopting, enacting, and/or enforcing codes related to buildings and fire safety, including members of the National Association of State Fire Marshals who are responsible for fire prevention and the International Association of State Fire Chiefs who are responsible for fire protection.

(6) *Estimated Number of Burden Hours:* 40 hours (12 minutes per interview times 200 respondents).

Statutory Authority: Department of Energy Organization Act, Public Law 95–91.

Issued in Washington, DC, on December 18, 2007.

Alexander A. Karsner,

Assistant Secretary, Energy Efficiency and Renewable Energy.

[FR Doc. E7–25567 Filed 1–2–08; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

Combined Notice of Filings #1

December 27, 2007.

Take notice that the Commission received the following electric rate filings:

Docket Numbers: ER94–389–027; ER02–2509–006; ER00–840–007; ER01–137–005; ER98–1767–010; ER99–2992–007; ER99–3165–007; ER02–1942–006; ER01–596–005; ER01–2690–009; ER02–77–009; ER00–1780–007; ER99–415–014; ER01–389–007; ER01–2641–011; ER01–558–010; ER01–557–010; ER01–560–010; ER01–559–010; ER02–24–009; ER02–26–008; ER02–25–008; ER05–524–003; ER02–963–008.

Applicants: Tenaska Power Services Co.; Kiowa Power Partners, LLC; Tenaska Alabama Partners, L.P.;

use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 1–800–877–8339.

[FR Doc. E8–9423 Filed 4–29–08; 8:45 am]

BILLING CODE 4000–01–P

DEPARTMENT OF EDUCATION

Notice of Proposed Information Collection Requests

AGENCY: Department of Education.

SUMMARY: The IC Clearance Official, Regulatory Information Management Services, Office of Management, invites comments on the proposed information collection requests as required by the Paperwork Reduction Act of 1995.

DATES: Interested persons are invited to submit comments on or before June 30, 2008.

SUPPLEMENTARY INFORMATION: Section 3506 of the Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires that the Office of Management and Budget (OMB) provide interested Federal agencies and the public an early opportunity to comment on information collection requests. OMB may amend or waive the requirement for public consultation to the extent that public participation in the approval process would defeat the purpose of the information collection, violate State or Federal law, or substantially interfere with any agency's ability to perform its statutory obligations. The IC Clearance Official, Regulatory Information Management Services, Office of Management, publishes that notice containing proposed information collection requests prior to submission of these requests to OMB. Each proposed information collection, grouped by office, contains the following: (1) Type of review requested, e.g. new, revision, extension, existing or reinstatement; (2) Title; (3) Summary of the collection; (4) Description of the need for, and proposed use of, the information; (5) Respondents and frequency of collection; and (6) Reporting and/or Recordkeeping burden. OMB invites public comment. The Department of Education is especially interested in public comment addressing the following issues: (1) Is this collection necessary to the proper functions of the Department; (2) will this information be processed and used in a timely manner; (3) is the estimate of burden accurate; (4) how might the Department enhance the quality, utility, and clarity of the information to be collected; and (5) how might the Department minimize the burden of this collection on the respondents, including through the use of information technology.

Dated: April 24, 2008.

Angela C. Arrington,

IC Clearance Official, Regulatory Information Management Services, Office of Management.

Federal Student Aid

Type of Review: Extension.

Title: Experimental Sites Initiative—Data Collection Instrument.

Frequency: Annually.

Affected Public: Not-for-profit institutions; Federal Government.

Reporting and Recordkeeping Hour Burden:

Responses: 109.

Burden Hours: 1,650.

Abstract: This data collection instrument will be used to collect specific information/performance data for the analysis of eight experiments. This effort will assist ED/Federal Student Aid in obtaining and compiling information to help determine change in the administration and delivery of Title IV programs. The experiments cover major financial aid processes. Institutions are given the flexibility to test different procedures to carry out the intent of regulations, whereby the Department can analyze the data and obtain information for Title IV regulatory and legislative changes. Thus, the Department needs this information in its on-going initiative to improve the financial aid delivery services to students and the postsecondary institutions they attend. Additionally, working with Congress, the Department can use this data to make informed decisions for future reauthorization.

Requests for copies of the proposed information collection request may be accessed from *http://edicsweb.ed.gov*, by selecting the ''Browse Pending Collections'' link and by clicking on link number 3674. When you access the information collection, click on ''Download Attachments'' to view. Written requests for information should be addressed to U.S. Department of Education, 400 Maryland Avenue, SW., LBJ, Washington, DC 20202–4537. Requests may also be electronically mailed to *ICDocketMgr@ed.gov* or faxed to 202–401–0920. Please specify the complete title of the information collection when making your request. Comments regarding burden and/or the collection activity requirements should be electronically mailed to *ICDocketMgr@ed.gov*. Individuals who use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 1–800–877–8339.

[FR Doc. E8–9424 Filed 4–29–08; 8:45 am]

BILLING CODE 4000–01–P

DEPARTMENT OF EDUCATION

Notice of Proposed Information Collection Requests; Comment Request

AGENCY: Department of Education.

ACTION: Correction Notice.

SUMMARY: On February 12, 2008, the Department of Education published a comment period notice in the **Federal Register** (Page 8037, Column 1) for the information collection, ''Binational Migrant Education Program (BMEP) State MEP Director Survey''. The title is hereby corrected to ''Survey on Key Demographics and Needs of the Binational Migratory Children'' and the Type of Review is corrected to New. The IC Clearance Official, Regulatory Information Management Services, Office of Management, hereby issues a correction notice as required by the Paperwork Reduction Act of 1995.

Dated: April 24, 2008.

Angela C. Arrington,

IC Clearance Official, Regulatory Information Management Services, Office of Management.

[FR Doc. E8–9442 Filed 4–29–08; 8:45 am]

BILLING CODE 4000–01–P

DEPARTMENT OF ENERGY

Proposed Agency Information Collection

AGENCY: Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy.

ACTION: Submission for Office of Management and Budget (OMB) review; notice and request for comments.

SUMMARY: The Department of Energy (DOE) has submitted an information collection package to OMB for review under the provisions of the Paperwork Reduction Act of 1995. The package requests approval of the information collection described in this notice. Comments are invited on: (a) Whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information shall have practical utility; (b) the accuracy of the agency's estimate of the burden of the proposed collection of information, including the validity of the methodology and assumptions used; (c) ways to enhance the quality, utility, and

clarity of the information to be collected; and (d) ways to minimize the burden of the collection of information on respondents, including through the use of automated collection techniques or other forms of information technology.

DATES: Comments regarding this proposed information collection must be received on or before May 30, 2008. If you anticipate difficulty in submitting comments within the period of time allowed by this notice, please advise the OMB Desk Officer of your intention to make a submission as soon as possible. The Desk Officer may be telephoned at 202–395–4650.

ADDRESSES: Comments may be sent to: DOE Desk Officer, Office of Management and Budget, New Executive Office Building, Room 10102, 735 17th Street, NW., Washington, DC 20503,
and to:
Ms. Christy Cooper, Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy, EE–2H, 1000 Independence Avenue, SW., Washington, DC 20585,
by phone at 202–586–1885, fax at 202–586–9811, or e-mail at *christy.cooper@ee.doe.gov.*

FOR FURTHER INFORMATION CONTACT:
Requests for additional information or copies of the information collection instrument and instructions should be directed to Ms. Christy Cooper using the contact information listed above.

SUPPLEMENTARY INFORMATION: The information collection package listed in this notice for public comment include the following:
(1) *OMB No.:* New.
(2) *Package Title:* Hydrogen and Fuel Cells Knowledge and Opinions Survey of Safety and Code Officials.
(3) *Type of Review:* New collection.
(4) *Purpose:* The Knowledge and Opinions Survey of Safety and Codes Officials will measure the levels of awareness and understanding of hydrogen and fuel cell technologies within this population. Information gathered in this assessment will assist DOE's Hydrogen Education Program in formulating an overall education plan for hydrogen technologies. Changes in knowledge levels will be determined when, after three years, the population will be surveyed again using the same survey instrument and methodology.
(5) *Respondents:* Interviews with 200 total officials will be conducted using computer-assisted telephone interview technology. Lists of persons responsible for safety and codes will be compiled from the following universe: agencies responsible for developing codes related to hydrogen and fuel cell technologies, including members of the International Code Council and the National Fire Protection Association; and safety officials responsible for adopting, enacting, and/or enforcing codes related to buildings and fire safety, including members of the National Association of State Fire Marshals, who are responsible for fire prevention, and the International Association of Fire Chiefs, who are responsible for fire protection.
(6) *Estimated Number of Burden Hours:* 40 hours (12 minutes per interview times 200 respondents).

Statutory Authority: Department of Energy Organization Act, Public Law 95–91.

Issued in Washington, DC, on April 22, 2008.

John Mizroch,
Principal Deputy Assistant Secretary, Energy Efficiency and Renewable Energy.

[FR Doc. E8–9468 Filed 4–29–08; 8:45 am]
BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY
Federal Energy Regulatory Commission
[Docket No. CP08–151–000]
Stingray Pipeline Company, L.L.C.; Notice of Application

April 23, 2008.

Take notice that on April 14, 2008, Stingray Pipeline Company, L.L.C. (Stingray), 1100 Louisiana, Suite 3300, Houston, Texas 77002, filed in Docket No. CP08–151–000, an application under section 7 of the Natural Gas Act (NGA) and Part 157 of the Federal Energy Regulatory Commission's (Commission) regulations for a certificate of public convenience and necessity authorizing the abandonment of eight compressor units at Stingray Compressor Stations 701 and 702. Stingray's proposal is more fully described as set forth in the application that is on file with the Commission and open to public inspection. The instant filing may be also viewed on the Web at *http://www.ferc.gov* using the ''eLibrary'' link. Enter the docket number excluding the last three digits in the docket number field to access the document. For assistance, call (866) 208–3676 or TTY, (202) 502–8659.

Any questions regarding the application should be directed to: Cynthia A. Corcoran, Vice President—Regulatory Affairs, Stingray Pipeline Company, L.L.C., 1100 Louisiana, Suite 3300, Houston, Texas 77002 at (713) 821–2265 or by fax at (713) 353–1742.

Pursuant to section 157.9 of the Commission's rules, 18 CFR 157.9, within 90 days of this Notice the Commission staff will either: Complete its environmental assessment (EA) and place it into the Commission's public record (eLibrary) for this proceeding, or issue a Notice of Schedule for Environmental Review. If a Notice of Schedule for Environmental Review is issued, it will indicate, among other milestones, the anticipated date for the Commission staff's issuance of the final environmental impact statement (FEIS) or EA for this proposal. The filing of the EA in the Commission's public record for this proceeding or the issuance of a Notice of Schedule for Environmental Review will serve to notify federal and state agencies of the timing for the completion of all necessary reviews, and the subsequent need to complete all federal authorizations within 90 days of the date of issuance of the Commission staff's FEIS or EA.

There are two ways to become involved in the Commission's review of this project. First, any person wishing to obtain legal status by becoming a party to the proceedings for this project should, on or before the below listed comment date, file with the Federal Energy Regulatory Commission, 888 First Street, NE., Washington, DC 20426, a motion to intervene in accordance with the requirements of the Commission's Rules of Practice and Procedure (18 CFR 385.214 or 385.211) and the Regulations under the NGA (18 CFR 157.10). A person obtaining party status will be placed on the service list maintained by the Secretary of the Commission and will receive copies of all documents filed by the applicant and by all other parties. A party must submit 14 copies of filings made with the Commission and must mail a copy to the applicant and to every other party in the proceeding. Only parties to the proceeding can ask for court review of Commission orders in the proceeding.

However, a person does not have to intervene in order to have comments considered. The second way to participate is by filing with the Secretary of the Commission, as soon as possible, an original and two copies of comments in support of or in opposition to this project. The Commission will consider these comments in determining the appropriate action to be taken, but the filing of a comment alone will not serve to make the filer a party to the proceeding. The Commission's rules require that persons filing comments in opposition to the project provide copies of their protests only to the party or parties directly involved in the protest.

APPENDIX C
TOTAL COUNTS FOR EACH SURVEY QUESTION WITH WEIGHTS AND STANDARD ERRORS

C.1 SUMMARY OF RESPONSES TO THE GENERAL PUBLIC SURVEY
C.2 SUMMARY OF RESPONSES TO THE STUDENT SURVEY
C.3 SUMMARY OF RESPONSES TO THE STATE AND LOCAL GOVERNMENT SURVEY
C.4 SUMMARY OF RESPONSES TO THE END USER SURVEY
C.5 SUMMARY OF RESPONSES TO THE SAFETY AND CODES OFFICIALS SURVEY

C.1. SUMMARY OF RESPONSES TO THE GENERAL PUBLIC SURVEY

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Sex					
Male	500	484.1	23.7	48.4	2.03
Female	500	515.9	24.2	51.6	2.03
Total for Sex	1,000	999.9	25.3	100	0.00
Age					
18-44	309	487.6	31.0	49.8	2.04
45+	668	490.7	12.4	50.2	2.04
Total for Age	977	978.2	25.1	100	0.00
Region					
Northeast	187	187.4	8.9	18.7	0.85
Midwest	223	223.1	8.5	22.3	0.85
South	365	364.8	17.0	36.5	1.28
West	225	224.7	14.1	22.5	1.19
Total for Region	1,000	999.9	25.3	100	0.00
Degree					
No degree	507	539.5	27.1	54.6	1.99
Degree	481	447.7	19.7	45.4	1.99
Total for Degree	988	987.2	25.2	100	0.00
Education					
8th grade or less	22	18.8	4.8	1.88	0.48
High school incomplete	42	58.4	12.5	5.84	1.21

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
High school complete	279	286.6	20.8	28.7	1.88
Some college, no degree	164	175.7	17.4	17.6	1.64
Associates degree	67	69.7	11.9	6.97	1.15
Bachelors degree	247	235.7	15.2	23.6	1.56
Postgraduate degree	167	142.3	11.9	14.2	1.23
Refused	12	12.7	4.3	1.27	0.43
Total for Education	1,000	999.9	25.3	100	0.00
Above Average?					
Score Below Average	458	472.7	25.8	47.3	2.04
Score Above Average	542	527.2	22.0	52.7	2.04
Total for Above Average?	1,000	999.9	25.3	100	0.00
Q1. Familiarity with hydrogen/FC technologies					
Not at all familiar	461	476.7	24.7	47.7	2.03
Slightly familiar	446	441.2	22.8	44.1	2.01
Familiar	73	64.2	8.2	6.42	0.83
Very familiar	20	17.8	4.4	1.78	0.45
Total for Q1	1,000	999.9	25.3	100	0.00
Q2A. Hydrogen gas is toxic					
True	182	204.7	19.7	20.5	1.80
False	432	428.7	22.2	42.9	2.01
Don't know	386	366.5	20.3	36.7	1.93
Total for Q2A	1,000	999.9	25.3	100	0.00

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Q2B. Fuel cells produce electricity through hydrogen combustion					
True	300	294.3	18.4	29.4	1.78
False	129	112.5	11.0	11.2	1.12
Don't know	571	593.1	26.9	59.3	1.92
Total for Q2B	1,000	999.9	25.3	100	0.00
Q2C. Hydrogen is lighter than air					
True	539	518.3	22.4	51.8	2.04
False	81	82.9	10.6	8.29	1.05
Don't know	380	398.7	24.4	39.9	2.04
Total for Q2C	1,000	999.9	25.3	100	0.00
Q2D. Hydrogen has a distinct odor					
True	80	80.8	10.4	8.08	1.04
False	514	496.1	21.6	49.6	2.04
Don't know	406	423.0	25.5	42.3	2.07
Total for Q2D	1,000	999.9	25.3	100	0.00
Q3. Which of the following can fuel cells provide power to?					
Your home	44	55.9	13.5	5.59	1.30
Your car	184	187.0	17.7	18.7	1.66
Your laptop computer	5	3.5	1.6	0.35	0.16
All of these	475	462.4	19.6	46.2	1.98
None of these	50	48.2	8.1	4.82	0.81
Don't know	242	242.8	19.3	24.3	1.78
Total for Q3	1,000	999.9	25.3	100	0.00

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Q4. In which state or condition can hydrogen be stored?					
Chemical compound	24	26.6	6.3	2.66	0.62
Liquid	262	245.6	17.3	24.6	1.68
Both of these	288	292.0	19.3	29.2	1.82
Neither of these	50	53.1	8.6	5.31	0.85
Don't know	376	382.6	23.7	38.3	2.01
Total for Q4	1,000	999.9	25.3	100	0.00
Q5. When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else?					
Carbon dioxide	74	77.0	10.2	7.70	1.01
Nitrous oxides	30	30.4	6.3	3.05	0.63
Heat	230	221.3	15.7	22.1	1.56
All of these	117	117.7	11.9	11.8	1.19
Don't know	549	553.4	27.2	55.3	1.98
Total for Q5	1,000	999.9	25.3	100	0.00
Q6. Hydrogen can be produced using which of the following sources of energy?					
Natural gas	63	60.7	9.7	6.07	0.96
Sunlight	40	49.2	9.6	4.92	0.95
Organic matter	93	92.5	10.6	9.25	1.06
All of these	312	296.4	17.2	29.6	1.74
Don't know	492	501.1	26.5	50.1	2.04
Total for Q6	1,000	999.9	25.3	100	0.00
Q7A. First					

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Safety	282	287.6	20.0	28.8	1.85
Low cost	366	377.0	23.6	37.7	2.03
Environmental impact	161	150.4	12.9	15.0	1.31
Convenience	76	74.0	9.5	7.40	0.95
Performance	100	96.9	12.6	9.69	1.23
Don't know	15	14.1	4.0	1.41	0.40
Total for Q7A	1,000	999.9	25.3	100	0.00
Q7B. Second					
Safety	212	221.7	19.3	22.5	1.80
Low cost	268	270.8	19.9	27.5	1.86
Environmental impact	214	212.1	16.5	21.5	1.63
Convenience	134	135.1	13.0	13.7	1.31
Performance	154	141.4	14.1	14.3	1.40
Don't know	3	4.7	3.5	0.47	0.35
Total for Q7B	985	985.8	25.2	100	0.00
Q7C. Third					
Safety	242	230.7	17.5	23.5	1.71
Low cost	158	153.2	13.6	15.6	1.39
Environmental impact	189	202.9	19.4	20.7	1.81
Convenience	156	152.7	15.2	15.6	1.50
Performance	226	233.6	17.9	23.8	1.74
Don't know	11	8.1	2.6	0.82	0.26
Total for Q7C	982	981.1	25.1	100	0.00

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Q7D. Fourth					
Safety	177	171.3	15.3	17.6	1.54
Low cost	114	98.4	10.0	10.1	1.05
Environmental impact	182	189.4	17.3	19.5	1.68
Convenience	214	227.9	19.0	23.4	1.80
Performance	279	278.6	19.6	28.6	1.87
Don't know	5	7.4	4.9	0.76	0.50
Total for Q7D	971	973.1	25.1	100	0.00
Q7E. Fifth					
Safety	65	66.1	9.4	6.85	0.97
Low cost	76	84.4	11.6	8.74	1.18
Environmental impact	220	210.8	16.7	21.8	1.67
Convenience	391	379.5	22.1	39.3	2.03
Performance	214	224.9	18.3	23.3	1.77
Total for Q7E	966	965.7	24.8	100	0.00
Q8. How would you feel if your local gas station also sold hydrogen?					
Frightened	27	29.8	7.3	2.98	0.72
Uneasy	110	99.0	10.3	9.90	1.04
At ease	212	204.9	15.4	20.5	1.53
Pleased	352	322.4	16.7	32.2	1.75
Don't know	299	343.8	26.3	34.4	2.12
Total for Q8	1,000	999.9	25.3	100	0.00
Q9. Hydrogen is too dangerous for everyday use by the general public					

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
True	155	139.0	12.3	13.9	1.25
False	464	449.5	20.8	45.0	1.99
Don't know	381	411.4	25.8	41.1	2.06
Total for Q9	1,000	999.9	25.3	100	0.00
Q10A. Using hydrogen will reduce U.S. dependence on foreign oil					
Disagree	52	52.0	8.2	5.20	0.82
Are neutral	52	66.5	14.0	6.65	1.34
Agree	712	664.6	20.2	66.5	2.10
Don't know	184	216.8	21.7	21.7	1.92
Total for Q10A	1,000	999.9	25.3	100	0.00
Q10B. Using hydrogen will reduce emissions and improve air quality					
Disagree	27	33.2	7.2	3.32	0.72
Are neutral	67	72.7	12.1	7.27	1.18
Agree	623	604.5	22.4	60.5	2.05
Don't know	283	289.4	22.1	28.9	1.95
Total for Q10B	1,000	999.9	25.3	100	0.00
Q10C. Hydrogen is as safe to use in my car as gasoline and diesel fuels					
Disagree	98	99.3	12.3	9.93	1.21
Are neutral	79	90.9	13.8	9.09	1.33
Agree	429	410.6	20.2	41.1	1.96
Don't know	394	399.1	23.5	39.9	2.01
Total for Q10C	1,000	999.9	25.3	100	0.00

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Q11. Shopping for a new car...buy a fuel cell vehicle at the same price, would you?					
Yes	610	623.0	25.3	62.3	1.96
No	205	185.0	15.2	18.5	1.49
Don't know	185	191.9	17.5	19.2	1.65
Total for Q11	1,000	999.9	25.3	100	0.00
Q12. How would you feel if a school, hospital, or other building in your neighborhood was powered by a fuel cell located					
Frightened	14	17.2	5.6	1.72	0.56
Uneasy	126	117.2	11.5	11.7	1.17
At ease	326	327.5	20.9	32.7	1.91
Pleased	298	282.1	16.8	28.2	1.69
Don't know	236	256.0	22.3	25.6	1.96
Total for Q12	1,000	999.9	25.3	100	0.00
Q13A. Personal cars and trucks					
Not as safe	106	94.9	10.8	9.49	1.08
Equally as safe	418	412.7	22.4	41.3	1.99
Safer	135	144.6	13.9	14.5	1.37
Don't know	341	347.7	22.5	34.8	1.97
Total for Q13A	1,000	999.9	25.3	100	0.00
Q13B. Buses and commercial vehicles					
Not as safe	93	95.8	13.4	9.58	1.29
Equally as safe	420	395.7	19.8	39.6	1.94
Safer	127	137.2	13.7	13.7	1.35
Don't know	360	371.3	23.8	37.1	2.03

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Total for Q13B	1,000	999.9	25.3	100	0.00
Q13C. Large power plants					
Not as safe	87	96.1	13.8	9.61	1.33
Equally as safe	383	358.4	18.3	35.8	1.86
Safer	154	163.7	16.2	16.4	1.54
Don't know	376	381.7	23.4	38.2	2.01
Total for Q13C	1,000	999.9	25.3	100	0.00
Q13D. Small portable devices such as laptop computers or cell phones					
Not as safe	133	137.7	16.1	13.8	1.52
Equally as safe	284	295.5	20.8	29.6	1.89
Safer	90	101.8	12.4	10.2	1.22
Don't know	493	464.9	21.4	46.5	2.00
Total for Q13D	1,000	999.9	25.3	100	0.00
Q13E. Onsite power for the home					
Not as safe	115	113.8	12.2	11.4	1.21
Equally as safe	383	367.7	19.5	36.8	1.90
Safer	110	117.8	12.8	11.8	1.26
Don't know	392	400.5	25.0	40.1	2.05
Total for Q13E	1,000	999.9	25.3	100	0.00
Q13F. Onsite power for buildings such as hospitals and schools					
Not as safe	92	87.6	10.8	8.76	1.07
Equally as safe	416	406.9	21.6	40.7	1.98

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Safer	126	132.9	14.8	13.3	1.43
Don't know	366	372.6	22.9	37.3	2.00
Total for Q13F	1,000	999.9	25.3	100	0.00
Q14A. Teachers and schools					
Never	673	630.4	21.9	63.0	2.06
Sometimes	221	248.1	21.4	24.8	1.90
Frequently	80	98.2	14.3	9.82	1.38
Don't know	26	23.3	5.5	2.33	0.55
Total for Q14A	1,000	999.9	25.3	100	0.00
Q14B. Friends and family members					
Never	277	277.0	19.4	27.7	1.81
Sometimes	497	484.8	23.7	48.5	2.04
Frequently	207	223.4	18.3	22.3	1.71
Don't know	19	14.7	3.8	1.47	0.38
Total for Q14B	1,000	999.9	25.3	100	0.00
Q14C. Environmental and conservation groups					
Never	458	503.2	27.1	50.3	2.03
Sometimes	377	346.2	18.2	34.6	1.84
Frequently	140	132.1	13.1	13.2	1.29
Don't know	25	18.4	4.0	1.84	0.41
Total for Q14C	1,000	999.9	25.3	100	0.00
Q14D. Utility companies or brokers, for example, gas or electricity providers					

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Never	365	373.1	23.5	37.3	2.01
Sometimes	483	483.5	22.9	48.4	2.03
Frequently	142	135.6	12.9	13.6	1.28
Don't know	10	7.8	2.6	0.78	0.26
Total for Q14D	1,000	999.9	25.3	100	0.00
Q14E. Industry or trade associations or non-profit organizations					
Never	487	523.9	26.5	52.4	2.00
Sometimes	375	358.2	20.2	35.8	1.90
Frequently	112	97.9	9.7	9.79	0.99
Don't know	26	19.8	4.1	1.99	0.41
Total for Q14E	1,000	999.9	25.3	100	0.00
Q14F. Federal government					
Never	440	478.2	26.3	47.8	2.04
Sometimes	430	401.9	19.8	40.2	1.93
Frequently	111	105.7	12.0	10.6	1.19
Don't know	19	14.1	3.3	1.41	0.34
Total for Q14F	1,000	999.9	25.3	100	0.00
Q14G. State government					
Never	448	485.9	26.3	48.6	2.04
Sometimes	437	405.4	19.9	40.5	1.94
Frequently	92	90.1	11.5	9.01	1.14
Don't know	23	18.5	4.2	1.85	0.42
Total for Q14G	1,000	999.9	25.3	100	0.00

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Q14H. Local government					
Never	491	518.3	26.4	51.8	2.03
Sometimes	402	368.8	18.2	36.9	1.87
Frequently	86	95.5	13.8	9.55	1.33
Don't know	21	17.3	4.1	1.73	0.41
Total for Q14H	1,000	999.9	25.3	100	0.00
Q15A. Television					
Never	148	165.3	19.1	16.5	1.75
Sometimes	554	541.2	22.8	54.1	2.03
Frequently	288	286.9	18.6	28.7	1.78
Don't know	10	6.6	2.1	0.66	0.21
Total for Q15A	1,000	999.9	25.3	100	0.00
Q15B. Radio					
Never	377	381.4	24.1	38.1	2.04
Sometimes	472	474.4	22.6	47.4	2.03
Frequently	146	140.6	12.8	14.1	1.28
Don't know	5	3.5	1.6	0.35	0.16
Total for Q15B	1,000	999.9	25.3	100	0.00
Q15C. The Internet					
Never	397	353.1	20.2	35.3	1.88
Sometimes	346	378.9	21.8	37.9	1.96
Frequently	250	262.8	20.0	26.3	1.84

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Don't know	7	5.0	1.9	0.50	0.19
Total for Q15C	1,000	999.9	25.3	100	0.00
Q15D. Newspapers and general interest magazines					
Never	221	235.0	20.2	23.5	1.83
Sometimes	524	529.5	24.5	53.0	2.03
Frequently	248	230.5	15.7	23.0	1.58
Don't know	7	5.0	1.9	0.50	0.19
Total for Q15D	1,000	999.9	25.3	100	0.00
Q15E. Science and technology magazines and journals					
Never	530	548.0	26.4	54.8	1.99
Sometimes	328	311.7	18.6	31.2	1.80
Frequently	134	133.0	13.0	13.3	1.29
Don't know	8	7.3	2.8	0.73	0.28
Total for Q15E	1,000	999.9	25.3	100	0.00
Q15F. Business or trade magazines					
Never	553	580.7	27.8	58.1	1.94
Sometimes	328	318.8	18.1	31.9	1.80
Frequently	111	94.8	9.6	9.48	0.98
Don't know	8	5.6	2.0	0.56	0.20
Total for Q15F	1,000	999.9	25.3	100	0.00
Safety					
1	282	287.6	19.9	29.4	1.89

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
2	212	221.7	19.3	22.7	1.81
3	242	230.7	17.5	23.6	1.72
4	177	171.3	15.3	17.5	1.53
5	65	66.1	9.4	6.76	0.95
Total for Safety	978	977.3	25.1	100	0.00
Cost					
1	366	377.0	23.6	38.3	2.05
2	268	270.8	19.9	27.5	1.86
3	158	153.2	13.6	15.6	1.38
4	114	98.4	10.0	10.0	1.04
5	76	84.4	11.6	8.58	1.16
Total for Cost	982	983.7	25.2	100	0.00
Environment					
1	161	150.4	12.9	15.6	1.35
2	214	212.1	16.5	22.0	1.66
3	189	202.9	19.4	21.0	1.84
4	182	189.4	17.3	19.6	1.69
5	220	210.8	16.7	21.8	1.67
Total for Environment	966	965.7	24.8	100	0.00
Convenience					
1	76	74.0	9.5	7.63	0.98
2	134	135.1	13.0	13.9	1.33
3	156	152.7	15.2	15.8	1.51

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
4	214	227.9	19.0	23.5	1.81
5	391	379.5	22.2	39.2	2.03
Total for Convenience	971	969.3	24.8	100	0.00
Performance					
1	100	96.9	12.6	9.93	1.26
2	154	141.4	14.1	14.5	1.42
3	226	233.6	17.9	23.9	1.75
4	279	278.6	19.6	28.6	1.87
5	214	224.9	18.3	23.1	1.76
Total for Performance	973	975.3	25.1	100	0.00
Partial					
Complete	966	965.7	25.5	96.6	0.76
Partial	34	34.2	7.7	3.42	0.76
Total for Partial	1,000	999.9	25.3	100	0.00
Safety > Cost?					
No	565	565.1	25.5	56.5	2.01
Yes	435	434.8	22.1	43.5	2.01
Total for Safety > Cost?	1,000	999.9	25.3	100	0.00
Safety > Environment?					
No	409	398.8	19.9	39.9	1.93
Yes	591	601.1	26.9	60.1	1.93
Total for Safety > Environment?	1,000	999.9	25.3	100	0.00

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Safety > Convenience?					
No	293	290.6	18.9	29.1	1.80
Yes	707	709.4	26.3	70.9	1.80
Total for Safety > Convenience?	1,000	999.9	25.3	100	0.00
Safety > Performance?					
No	328	312.4	19.9	31.2	1.86
Yes	672	687.5	26.0	68.8	1.86
Total for Safety > Performance?	1,000	999.9	25.3	100	0.00
Cost > Environment?					
No	364	351.8	18.9	35.2	1.86
Yes	636	648.1	27.1	64.8	1.86
Total for Cost > Environment?	1,000	999.9	25.3	100	0.00
Cost > Convenience?					
No	220	225.8	17.1	22.6	1.65
Yes	780	774.2	26.4	77.4	1.65
Total for Cost > Convenience?	1,000	999.9	25.3	100	0.00
Cost > Performance?					
No	307	294.8	19.0	29.5	1.82
Yes	693	705.1	26.6	70.5	1.82

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Total for Cost > Performance?	1,000	999.9	25.3	100	0.00
Environment > Convenience?					
No	395	393.7	21.2	39.4	1.96
Yes	605	606.2	25.9	60.6	1.96
Total for Environment > Convenience?	1,000	999.9	25.3	100	0.00
Environment > Performance?					
No	452	441.8	22.6	44.2	2.02
Yes	548	558.1	25.1	55.8	2.02
Total for Environment > Performance?	1,000	999.9	25.3	100	0.00
Convenience > Performance?					
No	597	584.6	25.2	58.5	2.00
Yes	403	415.3	22.3	41.5	2.00
Total for Convenience > Performance?	1,000	999.9	25.3	100	0.00

General Public Survey Technical Question Summary

Question	Number of Responses	Weighted Percent Correct	Lower 95% Confidence Bound	Upper 95% Confidence Bound
2A. Hydrogen gas is toxic (false)	1,000	42.87	38.92	46.82
2B. Fuel cells produce electricity through hydrogen combustion (false)	1,000	11.25	9.05	13.45
2C. Hydrogen is lighter than air (true)	1,000	51.83	47.83	55.83
2D. Hydrogen has a distinct odor (false)	1,000	49.62	45.61	53.63
4. In which state or condition can hydrogen be stored? (chemical compound, liquid)	1,000	29.20	25.64	32.77
5. When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else? (heat)	1,000	22.13	19.07	25.20
6. Hydrogen can be produced using which of the following sources of energy? (natural gas, sunlight, organic matter)	1,000	29.65	26.23	33.06
9. Hydrogen is too dangerous for everyday use by the general public (false)	1,000	44.95	41.05	48.85
Overall Average	1,000	35.19	33.17	37.21

General Public Survey Summary of Importance Ranking

Question	Number of Responses	Weighted Average Rank	Lower 95% Confidence Bound	Upper 95% Confidence Bound
Safety	978	2.50	2.40	2.59
Cost	982	2.23	2.13	2.33
Environment	966	3.10	3.00	3.21
Convenience	971	3.73	3.63	3.83
Performance	973	3.40	3.30	3.51

C.2. SUMMARY OF RESPONSES TO THE STUDENT SURVEY

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Sex					
Males	503	509.3	16.3	50.9	1.59
Females	501	490.7	15.8	49.1	1.59
Total for Sex	1,004	999.9	4.7	100	0.00
Region					
Northeast	186	181.6	2.1	18.2	0.19
Midwest	215	211.5	2.0	21.1	0.18
South	356	368.0	2.7	36.8	0.22
West	247	238.9	2.6	23.9	0.22
Total for Region	1,004	999.9	4.7	100	0.00
Urban/Non-Urban					
Urban	493	486.9	3.4	48.7	0.24
Non-Urban	511	513.0	3.3	51.3	0.24
Total for Urban/Non-Urban	1,004	999.9	4.7	100	0.00
Above Average?					
Score Below Average	581	576.2	15.9	57.6	1.57
Score Above Average	423	423.7	15.9	42.4	1.57
Total for Above Average?	1,004	999.9	4.7	100	0.00
Q1. Familiarity with hydrogen/FC technologies					
Not at all familiar	452	446.6	15.8	44.7	1.57

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Slightly familiar	424	422.9	15.8	42.3	1.57
Familiar	113	114.9	10.3	11.5	1.03
Very familiar	15	15.5	4.0	1.55	0.40
Total for Q1	1,004	999.9	4.7	100	0.00
Q2A. Hydrogen gas is toxic					
True	343	339.6	15.0	34.0	1.49
False	469	468.3	16.0	46.8	1.59
Don't know	192	192.0	12.7	19.2	1.26
Total for Q2A	1,004	999.9	4.7	100	0.00
Q2B. Fuel cells produce electricity through hydrogen combustion					
True	408	408.1	15.8	40.8	1.56
False	158	160.2	11.9	16.0	1.18
Don't know	438	431.6	15.7	43.2	1.57
Total for Q2B	1,004	999.9	4.7	100	0.00
Q2C. Hydrogen is lighter than air					
True	508	508.7	16.0	50.9	1.58
False	296	293.1	14.5	29.3	1.45
Don't know	200	198.1	12.7	19.8	1.27
Total for Q2C	1,004	999.9	4.7	100	0.00
Q2D. Hydrogen has a distinct odor					
True	212	209.0	12.9	20.9	1.29
False	569	569.7	16.1	57.0	1.58

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Don't know	223	221.2	13.3	22.1	1.33
Total for Q2D	1,004	999.9	4.7	100	0.00
Q3. Which of the following can fuel cells provide power to?					
Your home	64	62.1	7.5	6.22	0.75
Your car	233	231.1	13.4	23.1	1.34
Your laptop computer	15	14.4	3.7	1.44	0.38
All of these	481	479.6	16.2	48.0	1.59
None of these	60	60.2	7.7	6.02	0.77
Don't know	151	152.5	11.5	15.2	1.15
Total for Q3	1,004	999.9	4.7	100	0.00
Q4. In which state or condition can hydrogen be stored?					
Chemical compound	199	197.4	12.6	19.7	1.26
Liquid	141	143.7	11.4	14.4	1.13
Both of these	390	389.3	15.7	38.9	1.56
Neither of these	109	106.5	9.7	10.7	0.97
Don't know	165	163.0	11.8	16.3	1.18
Total for Q4	1,004	999.9	4.7	100	0.00
Q5. When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else?					
Carbon dioxide	203	201.1	12.9	20.1	1.28
Nitrous oxides	44	43.6	6.4	4.36	0.64
Heat	202	205.4	13.0	20.5	1.29
All of these	243	241.7	13.6	24.2	1.36
Don't know	312	308.1	14.6	30.8	1.46

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Total for Q5	1,004	999.9	4.7	100	0.00
Q6. Hydrogen can be produced using which of the following sources of energy?					
Natural gas	229	227.0	13.4	22.7	1.34
Sunlight	117	116.4	10.3	11.6	1.03
Organic matter	100	97.8	9.4	9.78	0.94
All of these	339	337.4	15.1	33.7	1.51
Don't know	219	221.3	13.5	22.1	1.34
Total for Q6	1,004	999.9	4.7	100	0.00
Q8. How would you feel if your local gas station also sold hydrogen?					
Frightened	58	57.5	7.5	5.75	0.75
Uneasy	120	119.9	10.5	12.0	1.05
At ease	266	265.5	14.1	26.6	1.40
Pleased	300	301.1	14.6	30.1	1.45
Don't know	260	255.9	13.9	25.6	1.39
Total for Q8	1,004	999.9	4.7	100	0.00
Q8A. How would you feel if your school's electricity and heat were provided by a fuel cell located on school grounds?					
Frightened	90	89.1	9.2	8.92	0.91
Uneasy	197	196.0	12.6	19.6	1.26
At ease	300	296.8	14.4	29.7	1.45
Pleased	274	276.8	14.4	27.7	1.43
Don't know	143	141.2	11.1	14.1	1.11
Total for Q8A	1,004	999.9	4.7	100	0.00

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Q9. Hydrogen is too dangerous for everyday use by the general public.					
True	240	237.1	13.6	23.7	1.35
False	546	548.2	16.1	54.8	1.57
Don't know	218	214.6	13.0	21.5	1.30
Total for Q9	1,004	999.9	4.7	100	0.00
Q10A. Using hydrogen will reduce U.S. dependence on foreign oil					
Disagree	84	83.8	8.9	8.38	0.89
Are neutral	130	128.0	10.6	12.8	1.06
Agree	605	606.5	16.0	60.7	1.55
Don't know	185	181.7	12.2	18.2	1.22
Total for Q10A	1,004	999.9	4.7	100	0.00
Q10B. Using hydrogen will reduce emissions and improve air quality					
Disagree	143	139.2	10.9	13.9	1.09
Are neutral	137	137.9	11.1	13.8	1.11
Agree	555	556.4	16.2	55.6	1.58
Don't know	169	166.4	11.9	16.6	1.19
Total for Q10B	1,004	999.9	4.7	100	0.00
Q10C. Hydrogen is as safe to use in my car as gasoline and diesel fuels					
Disagree	183	180.8	12.1	18.1	1.21
Are neutral	168	165.3	11.8	16.5	1.18
Agree	436	438.7	15.9	43.9	1.57
Don't know	217	215.1	13.1	21.5	1.31
Total for Q10C	1,004	999.9	4.7	100	0.00

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Q13A. Personal cars and trucks					
Not as safe	170	167.6	11.9	16.8	1.19
Equally as safe	369	367.4	15.4	36.7	1.53
Safer	300	300.0	14.7	30.0	1.46
Don't know	165	165.0	11.9	16.5	1.18
Total for Q13A	1,004	999.9	4.7	100	0.00
Q13B. Buses and commercial vehicles					
Not as safe	174	171.1	12.1	17.1	1.21
Equally as safe	343	344.3	15.4	34.4	1.52
Safer	323	322.1	15.1	32.2	1.50
Don't know	164	162.3	11.7	16.2	1.17
Total for Q13B	1,004	999.9	4.7	100	0.00
Q13C. Large power plants					
Not as safe	230	229.4	13.5	22.9	1.35
Equally as safe	266	262.8	13.8	26.3	1.38
Safer	312	312.5	15.0	31.3	1.49
Don't know	196	195.2	12.6	19.5	1.26
Total for Q13C	1,004	999.9	4.7	100	0.00
Q13D. Small portable devices such as laptop computers or cell phones					
Not as safe	275	273.2	14.3	27.3	1.43
Equally as safe	345	342.3	15.1	34.2	1.51
Safer	189	190.0	12.6	19.0	1.25

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Don't know	195	194.5	12.6	19.4	1.26
Total for Q13D	1,004	999.9	4.7	100	0.00
Q13E. Onsite power for the home					
Not as safe	203	201.4	12.8	20.1	1.27
Equally as safe	342	342.8	15.3	34.3	1.52
Safer	290	286.7	14.3	28.7	1.43
Don't know	169	169.0	11.9	16.9	1.19
Total for Q13E	1,004	999.9	4.7	100	0.00
Q13F. Onsite power for buildings such as hospitals and schools					
Not as safe	240	234.5	13.4	23.5	1.34
Equally as safe	311	313.2	15.0	31.3	1.49
Safer	283	283.1	14.6	28.3	1.45
Don't know	170	169.2	11.9	16.9	1.19
Total for Q13F	1,004	999.9	4.7	100	0.00
Q20A. Cost of vehicle at the point of sale					
Not important	87	86.4	9.0	8.64	0.89
Neutral	162	160.7	11.7	16.1	1.17
Important	690	687.3	15.0	68.7	1.47
Don't know	65	65.5	7.9	6.55	0.79
Total for Q20A	1,004	999.9	4.7	100	0.00
Q20B. Gas mileage					
Not important	28	28.1	5.3	2.81	0.53

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Neutral	63	61.8	7.6	6.18	0.76
Important	872	867.2	11.4	86.7	1.10
Don't know	41	42.8	6.7	4.28	0.67
Total for Q20B	1,004	999.9	4.7	100	0.00
Q20C. Power and speed					
Not important	226	222.9	13.1	22.3	1.32
Neutral	304	303.5	14.7	30.3	1.46
Important	424	423.1	16.1	42.3	1.59
Don't know	50	50.5	7.0	5.05	0.70
Total for Q20C	1,004	999.9	4.7	100	0.00
Q20E. Reliability					
Not important	23	23.9	5.1	2.39	0.51
Neutral	86	85.9	9.0	8.59	0.90
Important	836	831.7	12.5	83.2	1.21
Don't know	59	58.3	7.5	5.83	0.75
Total for Q20E	1,004	999.9	4.7	100	0.00
Q20F. Safety					
Not important	15	15.2	3.9	1.52	0.39
Neutral	52	52.4	7.1	5.24	0.71
Important	906	900.9	10.3	90.1	0.95
Don't know	31	31.4	5.7	3.14	0.57
Total for Q20F	1,004	999.9	4.7	100	0.00

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Q20G. Impact on the environment, or emissions produced					
Not important	55	56.4	7.5	5.64	0.75
Neutral	134	132.4	10.7	13.2	1.07
Important	753	749.7	14.2	75.0	1.38
Don't know	62	61.4	7.6	6.14	0.76
Total for Q20G	1,004	999.9	4.7	100	0.00
Q21A. Received instruction on or otherwise learned about energy use, fuels, and emissions					
Yes	664	660.7	15.3	66.1	1.51
No	316	316.8	15.1	31.7	1.49
Don't know	24	22.4	4.5	2.24	0.46
Total for Q21A	1,004	999.9	4.7	100	0.00
Q21B. Received instruction on or otherwise learned about hydrogen and fuel cells					
Yes	487	484.6	16.1	48.5	1.60
No	498	496.7	16.2	49.7	1.60
Don't know	19	18.6	4.2	1.86	0.42
Total for Q21B	1,004	999.9	4.7	100	0.00
Q21C. Ever used a demonstration kit to produce hydrogen					
Yes	97	97.3	9.5	9.73	0.94
No	880	875.8	11.1	87.6	1.05
Don't know	27	26.8	5.2	2.68	0.52
Total for Q21C	1,004	999.9	4.7	100	0.00
Q21D. Ever used a model fuel cell science kit					

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Yes	64	64.3	8.0	6.43	0.80
No	909	904.9	10.3	90.5	0.95
Don't know	31	30.7	5.5	3.07	0.55
Total for Q21D	1,004	999.9	4.7	100	0.00
Q21E. Ever seen or used a hydrogen fuel cell model car					
Yes	134	136.8	11.2	13.7	1.12
No	844	838.5	12.2	83.9	1.19
Don't know	26	24.6	4.8	2.46	0.48
Total for Q21E	1,004	999.9	4.7	100	0.00
Q21F. Participated in a fuel cell vehicle design competition					
Yes	26	25.7	5.0	2.57	0.50
No	970	966.7	7.3	96.7	0.56
Don't know	8	7.5	2.7	0.75	0.27
Total for Q21F	1,004	999.9	4.7	100	0.00
Q21G. Participated in a science bowl or other science competition					
Yes	356	356.3	15.4	35.6	1.53
No	644	639.5	15.5	64.0	1.53
Don't know	4	4.0	2.0	0.40	0.20
Total for Q21G	1,004	999.9	4.7	100	0.00
Q22A. Received instruction on or otherwise learned about energy use, fuels, and emissions					
Yes	606	603.0	7.9	91.3	1.10
No	54	53.4	7.0	8.08	1.06

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Don't know	4	4.3	2.2	0.66	0.33
Total for Q22A	664	660.7	3.6	100	0.00
Q22B. Received instruction on or otherwise learned about hydrogen and fuel cells					
Yes	428	426.3	7.9	88.0	1.50
No	52	51.8	6.9	10.7	1.43
Don't know	7	6.5	2.5	1.35	0.51
Total for Q22B	487	484.6	3.3	100	0.00
Q22C. Ever used a demonstration kit to produce hydrogen					
Yes	94	94.0	2.3	96.6	1.99
No	2	2.4	1.7	2.43	1.76
Don't know	1	0.9	0.9	0.94	0.94
Total for Q22C	97	97.3	1.5	100	0.00
Q22D. Ever used a model fuel cell science kit					
Yes	56	56.8	3.0	88.3	4.18
No	7	6.5	2.5	10.2	3.88
Don't know	1	1.0	1.0	1.52	1.52
Total for Q22D	64	64.3	1.2	100	0.00
Q22E. Ever seen or used a hydrogen fuel cell model car					
Yes	58	57.4	5.5	42.0	4.14
No	74	77.4	6.0	56.6	4.10
Don't know	2	1.9	1.3	1.37	0.97
Total for Q22E	134	136.8	2.0	100	0.00

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Q22F. Participated in a fuel cell vehicle design competition					
Yes	17	16.5	1.7	64.4	6.65
No	9	9.2	1.7	35.6	6.65
Total for Q22F	26	25.7	0.1	100	0.00
Q22G. Participated in a science bowl or other science competition					
Yes	348	348.3	4.0	97.7	0.81
No	7	7.0	2.7	1.97	0.75
Don't know	1	1.0	1.0	0.29	0.29
Total for Q22G	356	356.3	2.9	100	0.00
Q23A. Received instruction on or otherwise learned about energy use, fuels, and emissions					
Home	22	22.4	3.8	38.9	6.44
Scouts	3	2.9	1.7	5.03	2.91
The internet	12	11.5	3.0	19.9	5.21
Other	14	13.9	3.4	24.2	5.80
Don't know	7	7.0	2.5	12.1	4.36
Total for Q23A	58	57.7	1.1	100	0.00
Q23B. Received instruction on or otherwise learned about hydrogen and fuel cells					
Home	22	22.0	2.7	37.6	4.74
Scouts	3	3.0	1.7	5.09	2.95
The internet	17	16.4	2.5	28.1	4.39
Other	9	9.5	2.8	16.3	4.76
Don't know	8	7.5	2.3	12.9	3.92

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Total for Q23B	59	58.3	0.6	100	0.00
Q23C. Ever used a demonstration kit to produce hydrogen					
Home	1	1.5		44.4	
The internet	2	1.8		55.6	
Total for Q23C	3	3.3		100	0.00
Q23D. Ever used a model fuel cell science kit					
Home	4	3.9		52.3	
Scouts	1	1.0		12.9	
The internet	1	0.8		10.6	
Other	1	1.0		13.0	
Don't know	1	0.8		11.3	
Total for Q23D	8	7.5		100	0.00
Q23E. Ever seen or used a hydrogen fuel cell model car					
Home	23	24.0	4.0	30.3	5.01
Church	1	1.0	1.0	1.22	1.22
The internet	13	13.8	3.4	17.5	4.34
Other	34	35.1	4.1	44.3	5.13
Don't know	5	5.3	2.4	6.71	3.04
Total for Q23E	76	79.3	1.7	100	0.00
Q23F. Participated in a fuel cell vehicle design competition					
Home	2	1.9	1.1	21.2	12.3
Scouts	2	2.4	0.0	26.3	0.18

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Other	4	4.0	1.2	43.2	12.5
Don't know	1	0.8	0.0	9.24	0.06
Total for Q23F	9	9.2	0.1	100	0.00
Q23G. Participated in a science bowl or other science competition					
Home	3	3.5	0.0	43.3	0.58
The internet	1	1.0	0.0	12.0	0.16
Don't know	4	3.6	0.1	44.7	0.74
Total for Q23G	8	8.0	0.1	100	0.00
Q24A. Television					
Never	217	216.2	13.2	21.6	1.32
Sometimes	560	555.5	16.0	55.6	1.58
Frequently	219	220.6	13.4	22.1	1.33
Don't know	8	7.6	2.7	0.76	0.27
Total for Q24A	1,004	999.9	4.7	100	0.00
Q24B. Radio					
Never	563	556.1	16.0	55.6	1.60
Sometimes	370	371.0	15.6	37.1	1.55
Frequently	61	63.3	8.0	6.33	0.80
Don't know	10	9.5	3.0	0.95	0.30
Total for Q24B	1,004	999.9	4.7	100	0.00
Q24C. The Internet					
Never	356	354.1	15.3	35.4	1.52

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Sometimes	467	466.7	16.1	46.7	1.59
Frequently	175	173.5	11.9	17.4	1.19
Don't know	6	5.6	2.3	0.56	0.23
Total for Q24C	1,004	999.9	4.7	100	0.00
Q24D. Newspapers and general interest magazines					
Never	385	379.3	15.3	37.9	1.53
Sometimes	484	486.7	16.1	48.7	1.58
Frequently	123	122.8	10.4	12.3	1.04
Don't know	12	11.1	3.2	1.11	0.32
Total for Q24D	1,004	999.9	4.7	100	0.00
Q24E. Science and technology magazines and journals					
Never	422	420.3	15.8	42.0	1.57
Sometimes	364	364.4	15.4	36.4	1.53
Frequently	201	199.0	12.6	19.9	1.25
Don't know	17	16.2	3.9	1.62	0.39
Total for Q24E	1,004	999.9	4.7	100	0.00
Q24F. Classroom instructions					
Never	226	227.9	13.5	22.8	1.34
Sometimes	546	541.8	16.0	54.2	1.59
Frequently	215	213.7	13.2	21.4	1.32
Don't know	17	16.5	4.0	1.65	0.40
Total for Q24F	1,004	999.9	4.7	100	0.00

Question/Metric	Unweighted Frequency	Weighted Frequency	Standard Deviation of Weighted Frequency	Weighted Percent	Standard Error of Weighted Percent
Q24G. General discussions with family and/or friends					
Never	443	437.4	15.8	43.7	1.58
Sometimes	448	448.7	16.2	44.9	1.60
Frequently	106	107.1	9.9	10.7	0.99
Don't know	7	6.7	2.5	0.67	0.25
Total for Q24G	1,004	999.9	4.7	100	0.00
Q25. What was the last grade of school you completed?					
4th or less	2	1.8	1.3	0.18	0.13
5	24	24.4	5.0	2.44	0.50
6	144	143.0	11.3	14.3	1.12
7	153	148.2	11.1	14.8	1.11
8	175	169.3	11.8	16.9	1.18
9	170	169.9	11.9	17.0	1.19
10	130	133.7	11.0	13.4	1.09
11	149	153.9	11.8	15.4	1.17
12	35	34.2	5.8	3.42	0.58
College	12	11.5	3.3	1.15	0.33
Home schooled	5	5.6	2.5	0.56	0.25
Refused	5	4.5	2.0	0.45	0.20
Total for Q25	1,004	999.9	4.7	100	0.00

Student Survey Technical Question Summary

Question	Number of Responses	Weighted Percent Correct	Lower 95% Confidence Bound	Upper 95% Confidence Bound
2A. Hydrogen gas is toxic (false)	1,004	46.83	43.72	49.95
2B. Fuel cells produce electricity through hydrogen combustion (false)	1,004	16.02	13.71	18.33
2C. Hydrogen is lighter than air (true)	1,004	50.87	47.77	53.97
2D. Hydrogen has a distinct odor (false)	1,004	56.98	53.87	60.09
4. In which state or condition can hydrogen be stored? (chemical compound, liquid)	1,004	38.93	35.88	41.98
5. When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else? (heat)	1,004	20.55	18.01	23.08
6. Hydrogen can be produced using which of the following sources of energy? (natural gas, sunlight, organic matter)	1,004	33.74	30.78	36.71
9. Hydrogen is too dangerous for everyday use by the general public (false)	1,004	54.83	51.75	57.91
Overall Average	1,004	39.84	38.51	41.18

C.3. SUMMARY OF RESPONSES TO THE STATE AND LOCAL GOVERNMENT AGENCIES SURVEY

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Function				
DOT (State)	47	6.1	21.4	2.77
SEO (State)	47	6.1	21.4	2.77
DEP (State)	42	5.8	19.1	2.66
City	40	5.7	18.2	2.61
County	44	5.9	20.0	2.70
Total for Function	220	0.0	100	0.00
Above Average?				
Score Below Average	110	2.3	50.0	1.02
Score Above Average	110	2.3	50.0	1.02
Total for Above Average?	220	0.0	100	0.00
Q1. Please rate your familiarity with hydrogen and fuel cell technologies.				
Not at all familiar	16	1.2	7.27	0.54
Slightly familiar	112	2.4	50.9	1.07
Familiar	73	2.2	33.2	1.02
Very familiar	19	1.3	8.64	0.60
Total for Q1	220	0.0	100	0.00
Q2A. Hydrogen gas is toxic				
True	19	1.4	8.64	0.62
False	147	2.3	66.8	1.04
Don't know	54	2.1	24.5	0.95
Total for Q2A	220	0.0	100	0.00

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Q2B. Fuel cells produce electricity through hydrogen combustion				
True	78	2.2	35.5	1.02
False	95	2.3	43.2	1.03
Don't know	47	1.9	21.4	0.88
Total for Q2B	220	0.0	100	0.00
Q2C. Hydrogen is lighter than air				
True	172	1.9	78.2	0.87
False	13	1.1	5.91	0.51
Don't know	35	1.7	15.9	0.76
Total for Q2C	220	0.0	100	0.00
Q2D. Hydrogen has a distinct odor				
True	3	0.6	1.36	0.25
False	162	2.1	73.6	0.95
Don't know	55	2.1	25.0	0.94
Total for Q2D	220	0.0	100	0.00
Q3. Which of the following can fuel cells provide power to?				
Your home	4	0.5	1.82	0.22
Your car	29	1.5	13.2	0.69
Your laptop computer	2	0.6	0.91	0.26
All of these	175	1.8	79.5	0.82
None of these	5	0.5	2.27	0.24
Don't know	5	0.7	2.27	0.30
Total for Q3	220	0.0	100	0.00

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Q4. In which state or condition can hydrogen be stored?				
Chemical compound	5	0.6	2.27	0.26
Liquid	50	2.0	22.7	0.91
Both of these	133	2.2	60.5	1.02
Neither of these	10	0.8	4.55	0.38
Don't know	22	1.3	10.0	0.61
Total for Q4	220	0.0	100	0.00
Q5. When using pure hydrogen, fuel cell vehicles generate electricity, water, and what el se?				
Carbon dioxide	16	1.3	7.27	0.61
Nitrous oxides	5	0.7	2.27	0.33
Heat	140	2.3	63.6	1.04
All of these	9	0.9	4.09	0.43
Don't know	50	1.9	22.7	0.87
Total for Q5	220	0.0	100	0.00
Q6. Hydrogen can be produced using which of the following sources of energy?				
Natural gas	19	1.4	8.64	0.62
Sunlight	3	0.6	1.36	0.26
Organic matter	12	1.1	5.45	0.51
All of these	143	2.2	65.0	1.02
Don't know	43	1.8	19.5	0.83
Total for Q6	220	0.0	100	0.00
Q7A. First				

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Safety	58	2.2	26.4	0.98
Cost	70	2.2	31.8	1.00
Environment	43	1.9	19.5	0.88
Convenience	26	1.5	11.8	0.69
Performance	22	1.3	10.0	0.60
Don't know	1	0.2	0.45	0.11
Total for Q7A	220	0.0	100	0.00
Q7B. Second				
Safety	40	1.9	18.3	0.86
Cost	55	2.1	25.1	0.95
Environment	46	1.9	21.0	0.88
Convenience	38	1.7	17.4	0.79
Performance	40	1.9	18.3	0.86
Total for Q7B	219	0.0	100	0.00
Q7C. Third				
Safety	49	2.0	22.4	0.92
Cost	44	1.9	20.1	0.87
Environment	43	2.0	19.6	0.89
Convenience	37	1.7	16.9	0.80
Performance	44	1.9	20.1	0.87
Don't know	2	0.4	0.91	0.17
Total for Q7C	219	0.0	100	0.00
Q7D. Fourth				
Safety	43	1.8	19.7	0.81

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Cost	28	1.6	12.8	0.74
Environment	48	2.0	22.0	0.90
Convenience	43	1.9	19.7	0.89
Performance	56	2.1	25.7	0.98
Total for Q7D	218	0.0	100	0.00
Q8. How would you feel if your local gas station also sold hydrogen?				
Uneasy	10	1.0	4.55	0.46
At ease	48	1.9	21.8	0.89
Pleased	148	2.2	67.3	1.02
Don't know	14	1.2	6.36	0.56
Total for Q8	220	0.0	100	0.00
Q9. Hydrogen is too dangerous for everyday use by the general public.				
True	19	1.3	8.64	0.58
False	181	1.8	82.3	0.83
Don't know	20	1.4	9.09	0.66
Total for Q9	220	0.0	100	0.00
Q10A. Using hydrogen will reduce U.S. dependence on foreign oil				
Disagree	9	0.9	4.09	0.39
Are neutral	17	1.4	7.73	0.62
Agree	186	1.8	84.5	0.81
Don't know	8	1.0	3.64	0.45
Total for Q10A	220	0.0	100	0.00
Q10B. Using hydrogen will reduce emissions and improve air quality				

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Disagree	7	0.8	3.18	0.38
Are neutral	8	1.0	3.64	0.45
Agree	195	1.6	88.6	0.72
Don't know	10	1.1	4.55	0.48
Total for Q10B	220	0.0	100	0.00
Q10C. Hydrogen is as safe to use in my car as gasoline and diesel fuels				
Disagree	22	1.4	10.0	0.63
Are neutral	31	1.7	14.1	0.78
Agree	142	2.3	64.5	1.04
Don't know	25	1.6	11.4	0.72
Total for Q10C	220	0.0	100	0.00
Q13A. Personal cars and trucks				
Not as safe	19	1.3	8.64	0.58
Equally as safe	143	2.3	65.0	1.05
Safer	30	1.7	13.6	0.77
Don't know	28	1.7	12.7	0.78
Total for Q13A	220	0.0	100	0.00
Q13B. Buses and commercial vehicles				
Not as safe	14	1.1	6.36	0.50
Equally as safe	148	2.3	67.3	1.04
Safer	30	1.7	13.6	0.77
Don't know	28	1.7	12.7	0.78
Total for Q13B	220	0.0	100	0.00

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Q13C. Large power plants				
Not as safe	13	1.1	5.91	0.51
Equally as safe	126	2.4	57.3	1.07
Safer	42	1.9	19.1	0.85
Don't know	39	1.9	17.7	0.87
Total for Q13C	220	0.0	100	0.00
Q13D. Small portable devices such as laptop computers or cell phones				
Not as safe	38	1.8	17.3	0.83
Equally as safe	113	2.4	51.4	1.08
Safer	10	1.0	4.55	0.44
Don't know	59	2.1	26.8	0.97
Total for Q13D	220	0.0	100	0.00
Q13E. Onsite power for the home				
Not as safe	28	1.5	12.7	0.69
Equally as safe	142	2.3	64.5	1.05
Safer	16	1.4	7.27	0.63
Don't know	34	1.8	15.5	0.83
Total for Q13E	220	0.0	100	0.00
Q13F. Onsite power for buildings such as hospitals and schools				
Not as safe	15	1.1	6.82	0.50
Equally as safe	146	2.3	66.4	1.04
Safer	26	1.6	11.8	0.72
Don't know	33	1.8	15.0	0.83
Total for Q13F	220	0.0	100	0.00

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Q13G. Would you recommend buying or leasing fuel cells for a vehicle fleet?				
Yes	175	1.9	79.5	0.88
No	15	1.1	6.82	0.52
Don't know	30	1.7	13.6	0.77
Total for Q13G	220	0.0	100	0.00
Q13H. Would you recommend buying a stationary fuel cell?				
Yes	181	1.9	82.3	0.84
No	10	0.9	4.55	0.41
Don't know	29	1.7	13.2	0.77
Total for Q13H	220	0.0	100	0.00
Q13I. How you feel about hydrogen and fuel cells to meet your organization's energy ne eds.				
I know enough to seriously consider it if products are available	46	1.9	20.9	0.89
I am considering it but need more information	64	2.2	29.1	1.00
I am going to wait to see how the market develops	105	2.4	47.7	1.08
There is no way I'll consider it anytime soon	4	0.6	1.82	0.27
	1	0.3	0.45	0.13
Total for Q13I	220	0.0	100	0.00
Q14A. Teachers and schools				
Never	112	2.4	50.9	1.09

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Sometimes	91	2.4	41.4	1.07
Frequently	15	1.1	6.82	0.51
Don't know	2	0.5	0.91	0.21
Total for Q14A	220	0.0	100	0.00
Q14B. Friends and family members				
Never	60	2.2	27.3	0.98
Sometimes	136	2.3	61.8	1.05
Frequently	23	1.3	10.5	0.60
Don't know	1	0.2	0.45	0.11
Total for Q14B	220	0.0	100	0.00
Q14C. Environmental and conservation groups				
Never	11	0.9	5.00	0.42
Sometimes	115	2.3	52.3	1.04
Frequently	93	2.3	42.3	1.03
Don't know	1	0.3	0.45	0.13
Total for Q14C	220	0.0	100	0.00
Q14D. Utility companies or brokers, for example, gas or electricity providers				
Never	20	1.2	9.09	0.56
Sometimes	133	2.3	60.5	1.04
Frequently	67	2.2	30.5	0.99
Total for Q14D	220	0.0	100	0.00
Q14E. Industry or trade associations or non-profit organizations				
Never	9	1.0	4.09	0.46

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Sometimes	103	2.3	46.8	1.06
Frequently	107	2.3	48.6	1.05
Don't know	1	0.2	0.45	0.11
Total for Q14E	220	0.0	100	0.00
Q14F. Federal government				
Never	13	1.2	5.91	0.53
Sometimes	101	2.4	45.9	1.07
Frequently	106	2.3	48.2	1.07
Total for Q14F	220	0.0	100	0.00
Q14G. State government				
Never	10	1.0	4.55	0.45
Sometimes	100	2.4	45.5	1.08
Frequently	110	2.4	50.0	1.07
Total for Q14G	220	0.0	100	0.00
Q14H. Local government				
Never	67	2.1	30.5	0.94
Sometimes	106	2.4	48.2	1.08
Frequently	47	1.9	21.4	0.85
Total for Q14H	220	0.0	100	0.00
Q15A. Television				
Never	45	1.9	20.5	0.86
Sometimes	146	2.2	66.4	1.01
Frequently	29	1.6	13.2	0.70

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Total for Q15A	220	0.0	100	0.00
Q15B. Radio				
Never	74	2.3	33.6	1.03
Sometimes	119	2.4	54.1	1.09
Frequently	27	1.6	12.3	0.74
Total for Q15B	220	0.0	100	0.00
Q15C. The Internet				
Never	12	1.1	5.45	0.50
Sometimes	63	2.1	28.6	0.96
Frequently	145	2.2	65.9	1.00
Total for Q15C	220	0.0	100	0.00
Q15D. Newspapers and general interest magazines				
Never	20	1.4	9.09	0.66
Sometimes	116	2.4	52.7	1.09
Frequently	84	2.3	38.2	1.07
Total for Q15D	220	0.0	100	0.00
Q15E. Science and technology magazines and journals				
Never	20	1.4	9.09	0.64
Sometimes	97	2.4	44.1	1.07
Frequently	103	2.4	46.8	1.07
Total for Q15E	220	0.0	100	0.00
Q15F. Business or trade magazines				

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Never	29	1.7	13.2	0.78
Sometimes	96	2.4	43.6	1.08
Frequently	95	2.3	43.2	1.06
Total for Q15F	220	0.0	100	0.00
Q20. Does your agency operate any hydrogen vehicles?				
Yes	12	1.1	5.45	0.49
No	197	1.5	89.5	0.69
Don't know	11	1.2	5.00	0.52
Total for Q20	220	0.0	100	0.00
Q21. Any other organization that operates hydrogen-powered buses or other fleet vehicles in the area covered by your geo				
Yes	63	2.2	28.6	0.98
No	142	2.3	64.5	1.04
Don't know	15	1.2	6.82	0.55
Total for Q21	220	0.0	100	0.00
Q22. Does your agency own or operate any stationary fuel cells?				
Yes	17	1.2	7.73	0.56
No	184	1.8	83.6	0.81
Don't know	19	1.4	8.64	0.64
Total for Q22	220	0.0	100	0.00
Q23. Any other organization that operates stationary fuel cells in the area covered by your geographic jurisdiction?				
Yes	66	2.1	30.0	0.97
No	138	2.3	62.7	1.04

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Don't know	16	1.2	7.27	0.56
Total for Q23	220	0.0	100	0.00
Q24. Does your agency have plans to use hydrogen or fuel cells in the future?				
Yes	74	2.2	33.6	0.99
No	106	2.4	48.2	1.07
Don't know	40	1.9	18.2	0.86
Total for Q24	220	0.0	100	0.00
Q25. What is the time frame for plans to use hydrogen or fuel cells?				
Within the next year	10	1.0	13.5	1.36
1-5 years	35	1.4	47.3	1.85
Over 5 years	26	1.3	35.1	1.72
Don't know	3	0.6	4.05	0.74
Total for Q25	74	0.0	100	0.00
Q26. Have you ever received information about hydrogen and fuel cell technologies?				
Yes	155	2.1	70.5	0.98
No	64	2.1	29.1	0.97
Don't know	1	0.4	0.45	0.19
Total for Q26	220	0.0	100	0.00
Q27. Would information about hydrogen and fuel cell technologies be valuable to you?				
Yes	59	0.8	90.8	1.25
No	4	0.6	6.15	0.93
Don't know	2	0.5	3.08	0.84
Total for Q27	65	0.0	100	0.00

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Q28A. A training class on hydrogen or fuel cells				
Yes	40	1.7	18.2	0.79
No	178	1.8	80.9	0.81
Don't know	2	0.5	0.91	0.23
Total for Q28A	220	0.0	100	0.00
Q28B. A press conference concerning the use of hydrogen or fuel cells				
Yes	48	1.9	21.8	0.88
No	172	1.9	78.2	0.88
Total for Q28B	220	0.0	100	0.00
Q28C. A conference or workshop that included a session on hydrogen or fuel cells				
Yes	115	2.3	52.3	1.06
No	104	2.3	47.3	1.06
Don't know	1	0.4	0.45	0.19
Total for Q28C	220	0.0	100	0.00
Q29. Would you like to participate in a class on hydrogen or fuel cells?				
Yes	152	2.2	69.1	1.02
No	61	2.2	27.7	0.99
Don't know	7	0.9	3.18	0.42
Total for Q29	220	0.0	100	0.00
Q30. Which class format is MOST useful to you?				
In-person	35	1.6	23.0	1.08

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
In-person class in conjunction with a re	64	1.9	42.1	1.26
	50	1.8	32.9	1.20
	3	0.5	1.97	0.31
Total for Q30	152	0.0	100	0.00
Sex				
Males	172	2.0	78.2	0.89
Females	48	2.0	21.8	0.89
Total for Sex	220	0.0	100	0.00

State and Local Officials Survey Technical Question Summary

Question	Number of Responses	Percent Correct	Lower 95% Confidence Bound	Upper 95% Confidence Bound
2A. Hydrogen gas is toxic (false)	220	66.82	64.77	68.86
2B. Fuel cells produce electricity through hydrogen combustion (false)	220	43.18	41.15	45.21
2C. Hydrogen is lighter than air (true)	220	78.18	76.46	79.91
2D. Hydrogen has a distinct odor (false)	220	73.64	71.76	75.51
4. In which state or condition can hydrogen be stored? (chemical compound, liquid)	220	60.45	58.45	62.46
5. When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else? (heat)	220	63.64	61.59	65.68
6. Hydrogen can be produced using which of the following sources of energy? (natural gas, sunlight, organic matter)	220	65.00	62.99	67.01
9. Hydrogen is too dangerous for everyday use by the general public (false)	220	82.27	80.63	83.92
Overall Average	220	66.65	65.60	67.69

State and Local Officials Survey Summary of Importance Ranking

Question	Number of Responses	Average Rank	Lower 95% Confidence Bound	Upper 95% Confidence Bound
Safety	219	2.75	2.69	2.81
Cost	218	2.43	2.37	2.48
Environment	218	2.96	2.90	3.02
Convenience	218	3.46	3.40	3.52
Performance	217	3.38	3.32	3.43

C.4. SUMMARY OF RESPONSES TO THE END USER SURVEY

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Category				
Transportation	200	11.6	33.3	1.92
Uninterrupted supply users	201	11.6	33.4	1.93
Large power users	200	11.6	33.3	1.92
Total for Category	601	0.0	100	0.00
Subcategory				
Trucking	93	6.3	15.5	1.05
Transit	24	4.1	3.99	0.69
Postal service	20	3.8	3.33	0.63
Couriers & messengers	2	1.3	0.33	0.21
Automotive rental/leasing	10	2.8	1.66	0.46
Police	16	3.4	2.66	0.57
Fire	21	3.9	3.49	0.65
Garbage	2	1.3	0.33	0.21
Private fleets	10	2.8	1.66	0.46
Airports	2	1.3	0.33	0.21
Farms	4	1.9	0.67	0.32
Financial institutions	16	3.7	2.66	0.62
Educational services	132	6.5	22.0	1.08
Hospitals/residential care	10	3.0	1.66	0.49
Communications	4	1.9	0.67	0.32
National security	1	1.0	0.17	0.16
Utilities	5	2.1	0.83	0.35
Shopping centers	14	3.5	2.33	0.58
Government Services	15	3.6	2.50	0.60

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Industry	200	0.0	33.3	0.00
Total for Subcategory	601	0.0	100	0.00
Region				
Northeast	109	8.8	18.1	1.46
Midwest	177	10.4	29.5	1.72
South	200	10.7	33.3	1.79
West	115	9.0	19.1	1.50
Total for Region	601	0.0	100	0.00
Sex				
Male	519	7.9	86.4	1.31
Female	82	7.9	13.6	1.31
Total for Sex	601	0.0	100	0.00
Above Average?				
Score Below Average	269	11.3	44.8	1.88
Score Above Average	332	11.3	55.2	1.88
Total for Above Average?	601	0.0	100	0.00
Q1. Please rate your familiarity with hydrogen and fuel cell technologies				
Not at all familiar	162	10.2	27.0	1.69
Slightly familiar	333	11.4	55.4	1.90
Familiar	84	8.0	14.0	1.32
Very familiar	22	4.4	3.66	0.72
Total for Q1	601	0.0	100	0.00

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Q2. Job title				
Fleet manager	46	5.9	7.65	0.97
Plant or facility manager	129	9.4	21.5	1.56
Operations manager	55	6.5	9.15	1.09
Financial manager	19	4.0	3.16	0.67
Energy manager	110	8.7	18.3	1.44
CEO	35	5.3	5.82	0.88
Other	207	10.8	34.4	1.81
Total for Q2	601	0.0	100	0.00
Q3. Years you held this position?				
Less than one year	48	6.2	7.99	1.04
Between one and five years	190	10.7	31.6	1.77
Over five years	363	11.2	60.4	1.86
Total for Q3	601	0.0	100	0.00
Q4A. How many vehicles are in the GROUND-BASED fleet operated by your organization or agency?				
Less than 100	64	5.9	32.0	2.96
100-1,000	96	6.3	48.0	3.17
1,001-10,000	23	4.0	11.5	2.02
Over 10,000	8	2.5	4.00	1.24
Don't know/refused	9	2.6	4.50	1.31
Total for Q4A	200	0.0	100	0.00
Q4B. What is the average annual cost of electrical energy for your organization or agency?				
Under $100,000	22	4.4	5.49	1.09

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
$100,000 to $1,000,000	72	7.3	18.0	1.82
$1,000,001 to $2,000,000	48	6.2	12.0	1.55
Over $2,000,000	148	9.2	36.9	2.29
Don't know/refused	111	8.6	27.7	2.14
Total for Q4B	401	0.0	100	0.00
Q5A. Hydrogen gas is toxic				
True	69	7.2	11.5	1.21
False	332	11.3	55.2	1.89
Don't know	200	10.8	33.3	1.80
Total for Q5A	601	0.0	100	0.00
Q5B. Fuel cells produce electricity through hydrogen combustion				
True	184	10.6	30.6	1.76
False	135	9.5	22.5	1.58
Don't know	282	11.3	46.9	1.89
Total for Q5B	601	0.0	100	0.00
Q5C. Hydrogen is lighter than air				
True	381	11.0	63.4	1.83
False	27	4.8	4.49	0.79
Don't know	193	10.7	32.1	1.78
Total for Q5C	601	0.0	100	0.00
Q5D. Hydrogen has a distinct odor				
True	16	3.7	2.66	0.62
False	361	11.1	60.1	1.85

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Don't know	224	11.0	37.3	1.83
Total for Q5D	601	0.0	100	0.00
Q6. Which of the following can fuel cells provide power to?				
Your home	7	2.5	1.16	0.41
Your car	100	8.5	16.6	1.41
Your laptop computer	3	1.6	0.50	0.27
All of these	416	10.5	69.2	1.75
None of these	13	3.4	2.16	0.56
Don't know	62	6.9	10.3	1.15
Total for Q6	601	0.0	100	0.00
Q7. In which state or condition can hydrogen be stored?				
Chemical compound	12	3.3	2.00	0.54
Liquid	145	9.8	24.1	1.64
Both of these	275	11.4	45.8	1.90
Neither of these	16	3.7	2.66	0.62
Don't know	153	9.9	25.5	1.65
Total for Q7	601	0.0	100	0.00
Q8. When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else?				
Carbon dioxide	50	6.4	8.32	1.06
Nitrous oxides	15	3.6	2.50	0.60
Heat	189	10.7	31.4	1.78
All of these	61	7.0	10.1	1.16
Don't know	286	11.4	47.6	1.90
Total for Q8	601	0.0	100	0.00

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Q9. Hydrogen can be produced using which of the following sources of energy?				
Natural gas	50	6.4	8.32	1.06
Sunlight	13	3.3	2.16	0.55
Organic matter	33	5.2	5.49	0.87
All of these	257	11.3	42.8	1.89
Don't know	248	11.2	41.3	1.87
Total for Q9	601	0.0	100	0.00
Q10A. System installation cost				
Low	30	5.0	4.99	0.83
Medium	207	10.9	34.4	1.81
High	308	11.4	51.2	1.90
Don't know	56	6.6	9.32	1.10
Total for Q10A	601	0.0	100	0.00
Q10B. System maintenance cost				
Low	32	5.2	5.32	0.86
Medium	197	10.7	32.8	1.79
High	317	11.4	52.7	1.90
Don't know	55	6.6	9.15	1.10
Total for Q10B	601	0.0	100	0.00
Q10C. Fuel cost				
Low	28	4.8	4.66	0.80
Medium	96	8.4	16.0	1.40
High	440	10.2	73.2	1.69

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Don't know	37	5.5	6.16	0.91
Total for Q10C	601	0.0	100	0.00
Q10D. Dependability				
Low	12	3.2	2.00	0.53
Medium	54	6.6	8.99	1.09
High	492	8.8	81.9	1.47
Don't know	43	5.9	7.15	0.98
Total for Q10D	601	0.0	100	0.00
Q10E. Safety				
Low	21	4.2	3.49	0.70
Medium	47	6.1	7.82	1.02
High	497	8.6	82.7	1.44
Don't know	36	5.4	5.99	0.90
Total for Q10E	601	0.0	100	0.00
Q10F. Environmental impact				
Low	63	7.0	10.5	1.17
Medium	175	10.4	29.1	1.73
High	329	11.3	54.7	1.89
Don't know	34	5.3	5.66	0.88
Total for Q10F	601	0.0	100	0.00
Q10G. Uninterrupted availability				
Low	23	4.4	3.83	0.74
Medium	77	7.7	12.8	1.28

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
High	453	9.9	75.4	1.65
Don't know	48	6.2	7.99	1.03
Total for Q10G	601	0.0	100	0.00
Q11. How would you feel if your local gas station also sold hydrogen?				
Frightened	7	2.4	1.16	0.41
Uneasy	46	6.1	7.65	1.02
At ease	151	10.0	25.1	1.66
Pleased	294	11.5	48.9	1.91
Don't know	103	8.6	17.1	1.43
Total for Q11	601	0.0	100	0.00
Q12. Hydrogen is too dangerous for everyday use by the general public.				
True	65	7.1	10.8	1.18
False	373	11.1	62.1	1.85
Don't know	163	10.1	27.1	1.69
Total for Q12	601	0.0	100	0.00
Q13A. Using hydrogen will reduce U.S. dependence on foreign oil				
Disagree	39	5.7	6.49	0.94
Are neutral	36	5.5	5.99	0.91
Agree	483	9.1	80.4	1.52
Don't know	43	5.9	7.15	0.99
Total for Q13A	601	0.0	100	0.00
Q13B. Using hydrogen will reduce emissions and improve air quality				
Disagree	17	3.8	2.83	0.64

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Are neutral	27	4.7	4.49	0.79
Agree	471	9.5	78.4	1.57
Don't know	86	8.0	14.3	1.34
Total for Q13B	601	0.0	100	0.00
Q13C. Hydrogen is as safe to use in my car as gasoline and diesel fuels				
Disagree	67	7.2	11.1	1.20
Are neutral	43	5.9	7.15	0.99
Agree	331	11.4	55.1	1.90
Don't know	160	10.1	26.6	1.68
Total for Q13C	601	0.0	100	0.00
Q14A. Personal cars and trucks				
Not as safe	61	6.9	10.1	1.16
Equally as safe	315	11.5	52.4	1.91
Safer	76	7.6	12.6	1.27
Don't know	149	9.9	24.8	1.64
Total for Q14A	601	0.0	100	0.00
Q14B. Buses and commercial vehicles				
Not as safe	45	6.0	7.49	1.00
Equally as safe	321	11.5	53.4	1.91
Safer	90	8.2	15.0	1.37
Don't know	145	9.8	24.1	1.62
Total for Q14B	601	0.0	100	0.00
Q14C. Large power plants				

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Not as safe	21	4.2	3.49	0.70
Equally as safe	297	11.5	49.4	1.91
Safer	90	8.2	15.0	1.37
Don't know	193	10.7	32.1	1.78
Total for Q14C	601	0.0	100	0.00
Q14D. Small portable devices such as laptop computers or cell phones				
Not as safe	112	9.0	18.6	1.49
Equally as safe	174	10.4	29.0	1.73
Safer	32	5.1	5.32	0.86
Don't know	283	11.5	47.1	1.91
Total for Q14D	601	0.0	100	0.00
Q14E. Onsite power for the home				
Not as safe	72	7.5	12.0	1.24
Equally as safe	283	11.5	47.1	1.91
Safer	67	7.2	11.1	1.20
Don't know	179	10.4	29.8	1.74
Total for Q14E	601	0.0	100	0.00
Q14F. Onsite power for buildings such as hospitals and schools				
Not as safe	43	5.9	7.15	0.98
Equally as safe	312	11.5	51.9	1.91
Safer	77	7.7	12.8	1.27
Don't know	169	10.3	28.1	1.71
Total for Q14F	601	0.0	100	0.00

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Q15. Would you recommend buying or leasing fuel cells for your organization's vehicle fleet?				
Yes	417	10.6	69.4	1.76
No	68	7.3	11.3	1.21
Don't know	116	9.0	19.3	1.50
Total for Q15	601	0.0	100	0.00
Q16. Would you buy or recommend buying a stationary fuel cell to help meet your facility's ne eds?				
Yes	451	9.9	75.0	1.65
No	38	5.6	6.32	0.94
Don't know	112	8.9	18.6	1.48
Total for Q16	601	0.0	100	0.00
Q17. How you feel about using hydrogen and fuel cell technology to meet your organization's energy needs.				
I know enough to seriously consider it if products are available	63	7.0	10.5	1.17
I am considering it but need more information	180	10.5	30.0	1.75
I am going to wait and see how the market develops	293	11.5	48.8	1.91
There is no way I'll consider it any time soon	25	4.6	4.16	0.76
Don't know	40	5.6	6.66	0.94
Total for Q17	601	0.0	100	0.00
Q18A. Teachers and schools				
Never	398	10.6	66.2	1.77
Sometimes	158	10.1	26.3	1.68

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Frequently	39	5.6	6.49	0.93
Don't know	6	2.3	1.00	0.38
Total for Q18A	601	0.0	100	0.00
Q18B. Friends and family members				
Never	256	11.3	42.6	1.88
Sometimes	283	11.4	47.1	1.90
Frequently	57	6.7	9.48	1.11
Don't know	5	2.1	0.83	0.35
Total for Q18B	601	0.0	100	0.00
Q18C. Environmental and conservation groups				
Never	168	10.3	28.0	1.71
Sometimes	312	11.5	51.9	1.91
Frequently	114	9.0	19.0	1.50
Don't know	7	2.4	1.16	0.40
Total for Q18C	601	0.0	100	0.00
Q18D. Utility companies or brokers, for example, gas or electricity providers				
Never	83	7.7	13.8	1.29
Sometimes	268	11.3	44.6	1.87
Frequently	241	10.8	40.1	1.80
Don't know	9	2.7	1.50	0.46
Total for Q18D	601	0.0	100	0.00
Q18E. Industry or trade associations or non-profit organizations				
Never	88	8.0	14.6	1.34

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Sometimes	246	11.3	40.9	1.88
Frequently	259	11.4	43.1	1.89
Don't know	8	2.6	1.33	0.44
Total for Q18E	601	0.0	100	0.00
Q18F. Federal government				
Never	100	8.6	16.6	1.42
Sometimes	331	11.4	55.1	1.90
Frequently	162	10.2	27.0	1.69
Don't know	8	2.6	1.33	0.44
Total for Q18F	601	0.0	100	0.00
Q18G. State government				
Never	131	9.4	21.8	1.57
Sometimes	336	11.4	55.9	1.90
Frequently	127	9.4	21.1	1.56
Don't know	7	2.5	1.16	0.41
Total for Q18G	601	0.0	100	0.00
Q18H. Local government				
Never	260	11.2	43.3	1.87
Sometimes	268	11.4	44.6	1.89
Frequently	65	7.1	10.8	1.18
Don't know	8	2.6	1.33	0.44
Total for Q18H	601	0.0	100	0.00
Q19A. Television				

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Never	133	9.5	22.1	1.59
Sometimes	381	11.1	63.4	1.84
Frequently	86	8.0	14.3	1.33
Don't know	1	0.9	0.17	0.15
Total for Q19A	601	0.0	100	0.00
Q19B. Radio				
Never	247	11.3	41.1	1.88
Sometimes	299	11.5	49.8	1.91
Frequently	54	6.6	8.99	1.09
Don't know	1	0.9	0.17	0.15
Total for Q19B	601	0.0	100	0.00
Q19C. The Internet				
Never	68	7.2	11.3	1.20
Sometimes	243	11.2	40.4	1.87
Frequently	288	11.4	47.9	1.89
Don't know	2	1.3	0.33	0.22
Total for Q19C	601	0.0	100	0.00
Q19D. Newspapers and general interest magazines				
Never	88	8.1	14.6	1.35
Sometimes	358	11.3	59.6	1.88
Frequently	154	10.0	25.6	1.67
Don't know	1	0.9	0.17	0.15
Total for Q19D	601	0.0	100	0.00

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Q19E. Science and technology magazines and journals				
Never	153	9.6	25.5	1.60
Sometimes	275	11.4	45.8	1.90
Frequently	170	10.3	28.3	1.71
Don't know	3	1.6	0.50	0.27
Total for Q19E	601	0.0	100	0.00
Q19F. Business or trade magazines				
Never	70	7.3	11.6	1.21
Sometimes	288	11.5	47.9	1.91
Frequently	241	11.3	40.1	1.87
Don't know	2	1.3	0.33	0.21
Total for Q19F	601	0.0	100	0.00
Q20. Have you received information at your workplace concerning hydrogen/fuel cells?				
Yes	177	10.5	29.5	1.74
No	410	10.7	68.2	1.78
Don't know	14	3.5	2.33	0.58
Total for Q20	601	0.0	100	0.00
Q21. Would information about hydrogen and fuel cell technologies be valuable to you?				
Yes	310	8.5	73.1	2.02
No	83	7.6	19.6	1.80
Don't know	31	5.0	7.31	1.18
Total for Q21	424	0.0	100	0.00
Q22. Would a "Hydrogen 101" class, or training at a conference, be of value to you?				

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Yes	425	10.4	70.7	1.73
No	148	9.9	24.6	1.64
Don't know	28	4.8	4.66	0.80
Total for Q22	601	0.0	100	0.00
Q23. Which class format is MOST useful to you?				
In-person class at a local facility	129	8.9	30.4	2.08
In-person class in conjunction with a relevant conference or event	134	9.0	31.5	2.12
Web-based class	142	9.0	33.4	2.11
Don’t know	20	4.1	4.71	0.96
Total for Q23	425	0.0	100	0.00
Q24. Does your organization use hydrogen and/or fuel cells for any purpose?				
Yes	47	6.2	7.82	1.03
No	521	7.8	86.7	1.30
Don't know	33	5.2	5.49	0.87
Total for Q24	601	0.0	100	0.00
Q25. What is the PRIMARY function of the hydrogen and/or fuel cells used by your organizat ion?				
To power buses	3	1.5	6.38	3.30
To power vehicles other than buses	16	3.0	34.0	6.29
To provide stationary on-site power	7	2.3	14.9	4.89
To provide power for small portable equipment	2	1.3	4.26	2.79
To provide back-up power	1	0.9	2.13	1.90

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Other	15	2.7	31.9	5.64
Don't know/refused	3	1.6	6.38	3.45
Total for Q25	47	0.0	100	0.00
Q26. Does your organization have plans to use hydrogen and/or fuel cells in the future?				
Yes	77	7.5	13.9	1.36
No	350	10.6	63.2	1.91
Don't know	127	9.3	22.9	1.67
Total for Q26	554	0.0	100	0.00
Q27. What is the time frame for plans to use hydrogen and/or fuel cells?				
Within the next year	4	1.8	5.19	2.31
1-5 years	29	4.0	37.7	5.13
Over 5 years	21	3.7	27.3	4.80
Don't know	23	3.7	29.9	4.77
Total for Q27	77	0.0	100	0.00

End User Survey Technical Question Summary

Question	Number of Responses	Percent Correct	Lower 95% Confidence Bound	Upper 95% Confidence Bound
5A. Hydrogen gas is toxic (false)	601	55.24	51.54	58.95
5B. Fuel cells produce electricity through hydrogen combustion (false)	601	22.46	19.35	25.57
5C. Hydrogen is lighter than air (true)	601	63.39	59.79	67.00
5D. Hydrogen has a distinct odor (false)	601	60.07	56.42	63.71
7. In which state or condition can hydrogen be stored? (chemical compound, liquid)	601	45.76	42.02	49.50
8. When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else? (heat)	601	31.45	27.96	34.93
9. Hydrogen can be produced using which of the following sources of energy? (natural gas, sunlight, organic matter)	601	42.76	39.05	46.47
12. Hydrogen is too dangerous for everyday use by the general public (false)	601	62.06	58.42	65.70
Overall Average	601	47.90	45.85	49.95

C.5. SUMMARY OF RESPONSES TO THE SAFETY AND CODES OFFICIALS SURVEY

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Above Average?				
Score Below Average	81	2.9	54.4	1.95
Score Above Average	68	2.9	45.6	1.95
Total for Above Average?	149	0.0	100	0.00
Q1. Familiarity with hydrogen/FC technologies				
Not at all familiar	22	2.0	14.8	1.33
Slightly familiar	93	2.7	62.4	1.83
Familiar	33	2.4	22.1	1.58
Very familiar	1	0.5	0.67	0.34
Total for Q1	149	0.0	100	0.00
Q2A. Hydrogen gas is toxic				
True	40	2.6	26.8	1.74
False	80	2.9	53.7	1.93
Don't know	29	2.3	19.5	1.52
Total for Q2A	149	0.0	100	0.00
Q2B. Fuel cells produce electricity through hydrogen combustion				
True	57	2.8	38.3	1.86
False	30	2.3	20.1	1.55
Don't know	62	2.8	41.6	1.88
Total for Q2B	149	0.0	100	0.00
Q2C. Hydrogen is lighter than air				

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
True	109	2.5	73.2	1.70
False	9	1.4	6.04	0.91
Don't know	31	2.3	20.8	1.55
Total for Q2C	149	0.0	100	0.00
Q2D. Hydrogen has a distinct odor				
True	12	1.6	8.05	1.04
False	94	2.8	63.1	1.86
Don't know	43	2.6	28.9	1.74
Total for Q2D	149	0.0	100	0.00
Q3. Which of the following can fuel cells provide power to?				
Your home	4	1.0	2.68	0.67
Your car	51	2.8	34.2	1.86
All of these	85	2.9	57.0	1.93
None of these	3	0.9	2.01	0.58
Don't know	6	1.2	4.03	0.78
Total for Q3	149	0.0	100	0.00
Q4. In which state or condition can hydrogen be stored?				
Chemical compound	4	1.0	2.68	0.67
Liquid	42	2.6	28.2	1.73
Both of these	65	2.9	43.6	1.93
Neither of these	7	1.2	4.70	0.81
Don't know	31	2.3	20.8	1.56
Total for Q4	149	0.0	100	0.00

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Q5. When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else?				
Carbon dioxide	18	1.9	12.1	1.28
Nitrous oxides	1	0.5	0.67	0.34
Heat	54	2.8	36.2	1.89
All of these	23	2.1	15.4	1.43
Don't know	53	2.8	35.6	1.87
Total for Q5	149	0.0	100	0.00
Q6. Hydrogen can be produced using which of the following sources of energy?				
Natural gas	10	1.5	6.71	1.00
Sunlight	2	0.7	1.34	0.45
Organic matter	13	1.6	8.72	1.07
All of these	72	2.9	48.3	1.93
Don't know	52	2.8	34.9	1.87
Total for Q6	149	0.0	100	0.00
Q7A. First				
Safety	55	2.8	36.9	1.88
Low cost	51	2.7	34.2	1.80
Environmental impact	11	1.5	7.38	1.00
Convenience	10	1.5	6.71	0.97
Performance	21	2.0	14.1	1.36
Don't know	1	0.4	0.67	0.27
Total for Q7A	149	0.0	100	0.00
Q7B. Second				
Safety	38	2.5	25.7	1.70

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Low cost	40	2.6	27.0	1.73
Environmental impact	24	2.1	16.2	1.44
Convenience	17	1.9	11.5	1.28
Performance	29	2.3	19.6	1.58
Total for Q7B	148	0.0	100	0.00
Q7C. Third				
Safety	26	2.2	17.6	1.49
Low cost	33	2.4	22.3	1.63
Environmental impact	19	2.0	12.8	1.34
Convenience	32	2.4	21.6	1.59
Performance	38	2.5	25.7	1.68
Total for Q7C	148	0.0	100	0.00
Q7D. Fourth				
Safety	19	1.8	12.8	1.24
Low cost	16	1.9	10.8	1.25
Environmental impact	39	2.5	26.4	1.69
Convenience	41	2.6	27.7	1.78
Performance	33	2.4	22.3	1.65
Total for Q7D	148	0.0	100	0.00
Q8. How would you feel if your local gas station also sold hydrogen?				
Frightened	2	0.6	1.34	0.41
Uneasy	16	1.8	10.7	1.19
At ease	58	2.9	38.9	1.92
Pleased	60	2.8	40.3	1.90

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Don't know	13	1.7	8.72	1.15
Total for Q8	149	0.0	100	0.00
Q9. Hydrogen is too dangerous for everyday use by the general public?				
True	16	1.8	10.7	1.22
False	110	2.5	73.8	1.69
Don't know	23	2.0	15.4	1.37
Total for Q9	149	0.0	100	0.00
Q10A. Using hydrogen will reduce U.S. dependence on foreign oil				
Disagree	8	1.4	5.37	0.91
Are neutral	6	1.1	4.03	0.77
Agree	127	2.1	85.2	1.38
No opinion	8	1.3	5.37	0.85
Total for Q10A	149	0.0	100	0.00
Q10B. Using hydrogen will reduce emissions and improve air quality				
Disagree	5	1.0	3.36	0.69
Are neutral	5	1.0	3.36	0.69
Agree	123	2.2	82.6	1.50
No opinion	16	1.8	10.7	1.23
Total for Q10B	149	0.0	100	0.00
Q10C. Hydrogen is as safe to use in my car as gasoline and diesel fuels				
Disagree	20	2.0	13.4	1.36
Are neutral	3	0.9	2.01	0.58
Agree	95	2.8	63.8	1.87

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
No opinion	31	2.3	20.8	1.55
Total for Q10C	149	0.0	100	0.00
Q13A. Personal cars and trucks				
Not as safe	23	2.1	15.4	1.43
Equally as safe	89	2.9	59.7	1.93
Safer	16	1.8	10.7	1.20
No opinion	21	2.0	14.1	1.37
Total for Q13A	149	0.0	100	0.00
Q13B. Buses and commercial vehicles				
Not as safe	14	1.7	9.40	1.17
Equally as safe	103	2.7	69.1	1.82
Safer	13	1.6	8.72	1.07
No opinion	19	1.9	12.8	1.31
Total for Q13B	149	0.0	100	0.00
Q13C. Large power plants				
Not as safe	5	1.1	3.36	0.75
Equally as safe	85	2.9	57.0	1.93
Safer	25	2.2	16.8	1.46
No opinion	34	2.4	22.8	1.62
Total for Q13C	149	0.0	100	0.00
Q13D. Small portable devices such as laptop computers or cell phones				
Not as safe	29	2.3	19.5	1.57
Equally as safe	42	2.6	28.2	1.77

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Safer	8	1.3	5.37	0.85
No opinion	70	2.9	47.0	1.94
Total for Q13D	149	0.0	100	0.00
Q13E. Onsite power for the home				
Not as safe	19	1.9	12.8	1.31
Equally as safe	84	2.9	56.4	1.95
Safer	13	1.6	8.72	1.10
No opinion	33	2.4	22.1	1.63
Total for Q13E	149	0.0	100	0.00
Q13F. Onsite power for buildings such as hospitals and schools				
Not as safe	12	1.6	8.05	1.09
Equally as safe	88	2.9	59.1	1.94
Safer	15	1.8	10.1	1.18
No opinion	34	2.5	22.8	1.65
Total for Q13F	149	0.0	100	0.00
Q14A. Teachers and schools				
Never	89	2.9	59.7	1.93
Sometimes	50	2.8	33.6	1.86
Frequently	9	1.4	6.04	0.91
Don't know	1	0.4	0.67	0.27
Total for Q14A	149	0.0	100	0.00
Q14B. Friends and family members				
Never	52	2.8	34.9	1.86

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Sometimes	74	2.9	49.7	1.95
Frequently	21	2.0	14.1	1.36
Don't know	2	0.6	1.34	0.41
Total for Q14B	149	0.0	100	0.00
Q14C. Environmental and conservation groups				
Never	51	2.8	34.2	1.85
Sometimes	79	2.9	53.0	1.97
Frequently	18	1.9	12.1	1.27
Don't know	1	0.5	0.67	0.30
Total for Q14C	149	0.0	100	0.00
Q14D. Utility companies or brokers, for example, gas or electricity providers				
Never	19	1.9	12.8	1.26
Sometimes	79	2.9	53.0	1.95
Frequently	49	2.7	32.9	1.83
Don't know	2	0.6	1.34	0.41
Total for Q14D	149	0.0	100	0.00
Q14E. Industry or trade associations or non-profit organizations				
Never	20	1.9	13.4	1.30
Sometimes	67	2.9	45.0	1.95
Frequently	61	2.9	40.9	1.92
Don't know	1	0.5	0.67	0.30
Total for Q14E	149	0.0	100	0.00
Q14F. Federal government				

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Never	19	2.0	12.8	1.31
Sometimes	83	2.9	55.7	1.94
Frequently	46	2.7	30.9	1.80
Don't know	1	0.5	0.67	0.30
Total for Q14F	149	0.0	100	0.00
Q14G. State government				
Never	19	2.0	12.8	1.31
Sometimes	80	2.9	53.7	1.96
Frequently	49	2.7	32.9	1.83
Don't know	1	0.5	0.67	0.30
Total for Q14G	149	0.0	100	0.00
Q14H. Local government				
Never	44	2.7	29.5	1.80
Sometimes	68	2.9	45.6	1.95
Frequently	36	2.5	24.2	1.67
Don't know	1	0.5	0.67	0.30
Total for Q14H	149	0.0	100	0.00
Q15A. Television				
Never	26	2.2	17.4	1.46
Sometimes	95	2.8	63.8	1.88
Frequently	28	2.3	18.8	1.53
Total for Q15A	149	0.0	100	0.00
Q15B. Radio				

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Never	62	2.8	41.6	1.89
Sometimes	71	2.8	47.7	1.89
Frequently	16	1.8	10.7	1.18
Total for Q15B	149	0.0	100	0.00
Q15C. The Internet				
Never	19	1.9	12.8	1.30
Sometimes	70	2.9	47.0	1.95
Frequently	60	2.9	40.3	1.91
Total for Q15C	149	0.0	100	0.00
Q15D. Newspapers and general interest magazines				
Never	26	2.2	17.4	1.47
Sometimes	92	2.8	61.7	1.89
Frequently	31	2.4	20.8	1.60
Total for Q15D	149	0.0	100	0.00
Q15E. Science and technology magazines and journals				
Never	35	2.5	23.5	1.66
Sometimes	80	2.9	53.7	1.96
Frequently	34	2.4	22.8	1.61
Total for Q15E	149	0.0	100	0.00
Q15F. Business or trade magazines				
Never	20	2.0	13.4	1.36
Sometimes	85	2.9	57.0	1.95
Frequently	44	2.7	29.5	1.79

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Total for Q15F	149	0.0	100	0.00
Q25A. Have you ever been involved in permitting a...hydrogen fuel cell project?				
Yes	19	1.9	12.8	1.28
No	130	1.9	87.2	1.28
Total for Q25A	149	0.0	100	0.00
Q25B. Do you know anyone...involved in permitting a...hydrogen fuel cell project?				
Yes	36	2.4	24.2	1.62
No	107	2.5	71.8	1.67
Don't know	6	1.1	4.03	0.71
Total for Q25B	149	0.0	100	0.00
Q26. Have you ever received information about hydrogen and fuel cell technologies?				
Yes	97	2.6	65.1	1.76
No	48	2.6	32.2	1.77
Don't know	4	1.0	2.68	0.66
Total for Q26	149	0.0	100	0.00
Q28A. Have you ever participated in a training class about hydrogen and fuel cell technologies?				
Yes	41	2.5	27.5	1.65
No	108	2.5	72.5	1.65
Total for Q28A	149	0.0	100	0.00
Q28B. Was the class useful?				
Yes	40	0.4	97.6	0.99
Don't know	1	0.4	2.44	0.99

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Total for Q28B	41	0.0	100	0.00
Q29. Would you like to participate in a class on hydrogen or fuel cells?				
Yes	84	2.0	77.8	1.84
No	21	1.9	19.4	1.76
Don't know	3	0.8	2.78	0.78
Total for Q29	108	0.0	100	0.00
Q30. Which class format is most useful to you?				
In-person class at a local facility	42	2.1	50.0	2.52
In-person class together with conference	20	1.9	23.8	2.24
Web-based class	22	1.9	26.2	2.30
Total for Q30	84	0.0	100	0.00
Q31. Asked to review a request for a stationary fuel cell permit, would you have the information to do so?				
Yes	56	2.7	37.6	1.83
No	91	2.7	61.1	1.84
Don't know	2	0.7	1.34	0.48
Total for Q31	149	0.0	100	0.00
Q32. Asked to review a request for a stationary fuel cell permit, how would you feel about conducting the review?				
Uneasy	61	2.7	40.9	1.80
Curious	49	2.7	32.9	1.83
Comfortable	37	2.4	24.8	1.63
Don't know	2	0.7	1.34	0.48

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Total for Q32	149	0.0	100	0.00
Q33. Asked to review a request for a hydrogen fueling station permit, would you have the information to do so?				
Yes	61	2.8	40.9	1.88
No	83	2.8	55.7	1.90
Don't know	5	1.1	3.36	0.72
Total for Q33	149	0.0	100	0.00
Q34. Asked to review a request for a hydrogen fueling station permit, how would you feel about conducting the review?				
Uneasy	58	2.7	38.9	1.84
Curious	50	2.7	33.6	1.84
Comfortable	40	2.6	26.8	1.71
Don't know	1	0.5	0.67	0.34
Total for Q34	149	0.0	100	0.00
Q351. Seek information from peers				
No	41	2.6	27.5	1.76
Yes	108	2.6	72.5	1.76
Total for Q351	149	0.0	100	0.00
Q352. Seek information from federal government				
No	32	2.4	21.5	1.62
Yes	117	2.4	78.5	1.62
Total for Q352	149	0.0	100	0.00
Q353. Seek information from state government				

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
No	31	2.4	20.8	1.59
Yes	118	2.4	79.2	1.59
Total for Q353	149	0.0	100	0.00
Q354. Seek information from nonprofit organization				
No	67	2.9	45.0	1.96
Yes	82	2.9	55.0	1.96
Total for Q354	149	0.0	100	0.00
Q355. Seek information from industry source				
No	11	1.5	7.38	1.04
Yes	138	1.5	92.6	1.04
Total for Q355	149	0.0	100	0.00
Q356. Seek information from national organization				
No	13	1.7	8.72	1.11
Yes	136	1.7	91.3	1.11
Total for Q356	149	0.0	100	0.00
Q357. Seek information from local agency's regulations				
No	34	2.4	22.8	1.62
Yes	115	2.4	77.2	1.62
Total for Q357	149	0.0	100	0.00
Q358. Seek information--Don't know				
No	148	0.5	99.3	0.34
Yes	1	0.5	0.67	0.34

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Total for Q358	149	0.0	100	0.00
Safety				
1	55	2.8	37.2	1.89
2	38	2.5	25.7	1.70
3	26	2.2	17.6	1.49
4	19	1.8	12.8	1.24
5	10	1.3	6.76	0.86
Total for Safety	148	0.0	100	0.00
Cost				
1	51	2.7	34.5	1.81
2	40	2.6	27.0	1.73
3	33	2.4	22.3	1.63
4	16	1.9	10.8	1.25
5	8	1.3	5.41	0.87
Total for Cost	148	0.0	100	0.00
Environment				
1	11	1.5	7.43	1.01
2	24	2.1	16.2	1.44
3	19	2.0	12.8	1.34
4	39	2.5	26.4	1.69
5	55	2.8	37.2	1.90
Total for Environment	148	0.0	100	0.00
Convenience				

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
1	10	1.5	6.76	0.98
2	17	1.9	11.5	1.28
3	32	2.4	21.6	1.59
4	41	2.6	27.7	1.78
5	48	2.7	32.4	1.85
Total for Convenience	148	0.0	100	0.00
Performance				
1	21	2.0	14.2	1.37
2	29	2.3	19.6	1.58
3	38	2.5	25.7	1.68
4	33	2.4	22.3	1.65
5	27	2.2	18.2	1.51
Total for Performance	148	0.0	100	0.00
Partial				
Complete	148	0.4	99.3	0.27
Partial	1	0.4	0.67	0.27
Total for Partial	149	0.0	100	0.00
Safety > Cost?				
No	75	2.9	50.3	1.92
Yes	74	2.9	49.7	1.92
Total for Safety > Cost?	149	0.0	100	0.00
Safety > Environment?				
No	33	2.2	22.1	1.50

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Yes	116	2.2	77.9	1.50
Total for Safety > Environment?	149	0.0	100	0.00
Safety > Convenience?				
No	37	2.4	24.8	1.62
Yes	112	2.4	75.2	1.62
Total for Safety > Convenience?	149	0.0	100	0.00
Safety > Performance?				
No	46	2.6	30.9	1.75
Yes	103	2.6	69.1	1.75
Total for Safety > Performance?	149	0.0	100	0.00
Cost > Environment?				
No	34	2.5	22.8	1.66
Yes	115	2.5	77.2	1.66
Total for Cost > Environment?	149	0.0	100	0.00
Cost > Convenience?				
No	31	2.3	20.8	1.56
Yes	118	2.3	79.2	1.56
Total for Cost > Convenience?	149	0.0	100	0.00
Cost > Performance?				
No	50	2.8	33.6	1.85
Yes	99	2.8	66.4	1.85
Total for Cost > Performance?	149	0.0	100	0.00

Question/Metric	Frequency	Standard Deviation of Frequency	Percent	Standard Error of Percent
Environment > Convenience?				
No	80	2.9	53.7	1.96
Yes	69	2.9	46.3	1.96
Total for Environment > Convenience?	149	0.0	100	0.00
Environment > Performance?				
No	90	2.9	60.4	1.92
Yes	59	2.9	39.6	1.92
Total for Environment > Performance?	149	0.0	100	0.00
Convenience > Performance?				
No	98	2.8	65.8	1.86
Yes	51	2.8	34.2	1.86
Total for Convenience > Performance?	149	0.0	100	0.00

Safety and Codes Officials Survey Technical Question Summary

Question	Number of Responses	Percent Correct	Lower 95% Confidence Bound	Upper 95% Confidence Bound
2A. Hydrogen gas is toxic (false)	149	53.69	49.87	57.51
2B. Fuel cells produce electricity through hydrogen combustion (false)	149	20.13	17.06	23.21
2C. Hydrogen is lighter than air (true)	149	73.15	69.79	76.52
2D. Hydrogen has a distinct odor (false)	149	63.09	59.40	66.77
4. In which state or condition can hydrogen be stored? (chemical compound, liquid)	149	43.62	39.82	47.43
5. When using pure hydrogen, fuel cell vehicles generate electricity, water, and what else? (heat)	149	36.24	32.50	39.98
6. Hydrogen can be produced using which of the following sources of energy? (natural gas, sunlight, organic matter)	149	48.32	44.51	52.14
9. Hydrogen is too dangerous for everyday use by the general public? (false)	149	73.83	70.48	77.17
Overall Average	149	51.51	49.68	53.34

Safety and Codes Officials Survey Summary of Importance Ranking

Question	Number of Responses	Average Rank	Lower 95% Confidence Bound	Upper 95% Confidence Bound
Safety	148	2.26	2.17	2.35
Cost	148	2.26	2.17	2.35
Environment	148	3.70	3.59	3.80
Convenience	148	3.68	3.58	3.77
Performance	148	3.11	3.01	3.21

APPENDIX D
NOTIFICATION LETTERS

D.1. STATE AND LOCAL GOVERNMENT AGENCIES
D.2. SAFETY AND CODES OFFICIALS

D.1. STATE AND LOCAL GOVERNMENT AGENCIES

Department of Energy
Washington, DC 20585

«Title» «First_Name» «Last_Name»
«Company_Name»
«Address_Line_1»
«Address_Line_2»
«City», «State» «ZIP_Code»

Dear «Title» «Last_Name»:

In support of its efforts to educate key target audiences about hydrogen and fuel cells, the U.S. Department of Energy (DOE) Hydrogen Program is conducting a survey to assess current levels of awareness of hydrogen and fuel cell technology and applications. Survey audiences include state and local government representatives, safety and code officials, potential end users, students, and the public. Data collected through the survey will inform and guide the development of DOE hydrogen education activities, as well as help to measure changes in knowledge over time. This survey effort follows a baseline survey conducted in 2004 (see www.hydrogenandfuelcells.energy.gov/hydrogen_publications.html for more information).

In the next few weeks, you, in your capacity as state agency representative, will be contacted by Opinion Research Corporation, an independent public opinion research firm located in Princeton, New Jersey, with a request for your input to the DOE survey. We encourage and appreciate your participation. The survey will be conducted over the phone and take approximately 10 minutes. Your responses are voluntary; however, every response is important. None of the responses will be associated with you or your office in any way, and the survey will be treated as confidential. There will be both knowledge and opinion questions; responses of "no opinion" or "don't know" are perfectly acceptable.

Notices of the surveys appeared in the *Federal Register* on November 17, 2006, and March 15, 2007. For more information about DOE's hydrogen and fuel cell activities, please visit www.hydrogenandfuelcells.energy.gov. If you have any questions, please contact Christy Cooper of my staff, at 202-586-1885 or Christy.Cooper@ee.doe.gov.

If you need to assign someone in your office to take the survey as the agency representative, please contact Janet Ulrich, Opinion Research Corporation, at 800-999-0213, ext. 5464 or by email at Janet.Ulrich@opinionresearch.com, and provide the name, title, and phone number of the person who will take the survey in your place. Thank you in advance for your participation in this extremely important effort.

Sincerely,

JoAnn Milliken
Program Manager

D.2. SAFETY AND CODES OFFICIALS

<<Date>>

«First_Name» «Last_Name», «Title»
«Company_Name»
«Address_Line_1»
«Address_Line_2»
«City», «State» «ZIP_Code»

Dear «First_Name» «Last_Name»:

In support of its efforts to educate key target audiences about hydrogen and fuel cells, the U.S. Department of Energy (DOE) Hydrogen Program is conducting a survey to assess current levels of awareness of hydrogen and fuel cell technology and applications. Survey audiences include safety and code officials, state and local government representatives, potential end users, students, and the public. Data collected through the survey will inform and guide the development of DOE hydrogen education activities, as well as help to measure changes in knowledge over time. This survey effort follows a baseline survey conducted in 2004 (for more information, see http://www1.eere.energy.gov/hydrogenandfuelcells/hydrogen_publications.html#h2_general).

In the next few weeks, you will be contacted by Opinion Research Corporation, an independent public opinion research firm located in Princeton, New Jersey, with a request for your input to the DOE survey. We encourage and appreciate your participation. The survey will be conducted over the phone and take approximately 10 minutes. Your responses are voluntary; however, every response is important. None of the responses will be associated with you or your office in any way. (Confidentiality of individual respondents will be maintained by deleting information identifying respondents and the organizations they work for, once each survey interview is completed.) There will be both knowledge and opinion questions; responses of "no opinion" or "don't know" are perfectly acceptable.

Notices of the surveys appeared in the *Federal Register* on January 3, 2008, and April 30, 2008. For more information about DOE's hydrogen and fuel cell activities, please visit http://hydrogen.energy.gov/. If you have any questions, please contact Andrea Chew of my staff, at 202-586-1145 or Andrea.Chew@ee.doe.gov.

If you need to assign someone in your office to take the survey as the agency representative, please contact Janet Ulrich, Opinion Research Corporation, at 800-999-0213, ext. 25464 or by email at SafetyCodeOfficialStudy@opinonresearch.com, and provide the name, title, and phone number of the person who will take the survey in your place. Thank you in advance for your participation in this extremely important effort.

Sincerely,

Sunita Satyapal
Acting Program Manager
DOE Hydrogen Program

APPENDIX E
OUTCOME RATES

E.1. GENERAL PUBLIC SURVEY OUTCOME RATES
E.2. STUDENT SURVEY OUTCOME RATES
E.3. STATE AND LOCAL GOVERNMENT SURVEY OUTCOME RATES
E.4. END USER SURVEY OUTCOME RATES
E.5. SAFETY AND CODES OFFICIALS SURVEY OUTCOME RATES

E.1. GENERAL PUBLIC SURVEY OUTCOME RATES

The AAPOR RR3 response rate is estimated from the general public survey outcome frequencies in Table E.1.

Table E.1. Outcome Frequencies for the General Public Survey	
Outcome type	**Frequency**
Complete interviews (I)	1,000
Partial interviews (P)	5
Refusals and break offs (R)	1,232
Non-contacts (NC)	279
Other eligible, non-interviews (O)*	1,048
Known eligible	**3,564**
Unknown households (UH)	2,819
Unknown others (UO)	0
Eligibility unknown	**2,819**
Known ineligible	**9,279**
Total phone numbers used	**15,662**
*This category is a catchall for various kinds of eligible non-interviews. See AAPOR (2004, page 39) for a complete listing of outcome categories.	

The eligibility rate is estimated as

$$\mathbf{e = Known\ eligible\ /\ (Known\ eligible + Known\ ineligible).}$$

This eligibility rate estimate **e** was applied to cases of unknown eligibility to estimate the number of those cases that were actually eligible. The AAPOR RR3 response rate is thus estimated as

$$\mathbf{Response\ rate = I/(I + P + R + NC + O + e\times(UH + UO)).}$$

For the general public survey

$$\mathbf{e = 3{,}564/(3{,}564 + 9{,}279) = .2775,}$$

and the response rate estimate is

$$\mathbf{1{,}000/(1{,}000+5+1{,}232+279+1{,}048+.2775\times(2{,}819+0)) = .2301.}$$

E.2. STUDENT SURVEY OUTCOME RATES

The AAPOR RR3 response rate is estimated from the student survey outcome frequencies in Table E.2.

Table E.2. Outcome Frequencies for the Student Survey	
Outcome Type	**Frequency**
Complete interviews (I)	1,004
Partial interviews (P)	136
Refusals and break offs (R)	902
Non-contacts (NC)	316
Other eligible, non-interviews (O)*	0
Known eligible	**2,358**
Unknown households (UH)	51,021
Unknown others (UO)	4,346
Eligibility unknown	**55,367**
Known ineligible	**122,983**
Total phone numbers used	**180,708**
*This category is a catchall for various kinds of eligible non-interviews. See AAPOR (2004, page 39) for a complete listing of outcome categories.	

The eligibility rate is estimated as

$$\mathbf{e = Known\ eligible / (Known\ eligible + Known\ ineligible).}$$

The eligibility rate estimate **e** was applied to cases of unknown eligibility to estimate the number of those cases that were actually eligible. The AAPOR RR3 response rate was then estimated as

$$\mathbf{Response\ rate = I/(I + P + R + NC + O + e \times (UH + UO)).}$$

For the student survey

$$\mathbf{e = 2{,}358/(2{,}358 + 122{,}983) = .0188,}$$

and the response rate estimate is

$$\mathbf{1{,}004/(1{,}004+136+902+316+.0188\times(51{,}021+4{,}346)) = .2953.}$$

E.3. STATE AND LOCAL GOVERNMENT SURVEY OUTCOME RATES

The survey of state and local government agencies differs from other survey components[55] in that attempts were made to sample the entire target population. That is, an attempt was made to contact fifty SEOs, fifty state DOTs, fifty state DEPs, and the twelve largest cities and twelve largest counties in each of the four Census Regions. As Table E.3 shows, that attempt came fairly close to succeeding.

Table E.3. Outcome Frequencies for the State and Local Government Survey

Government function	Number targeted	Number sampled	Response rate (%)
Cities	48	40	83.3
Counties	48	44	91.7
DEP	50	42	84.0
DOT	50	47	94.0
SEO	50	47	94.0
Total	**246**	**220**	**89.4**

E.4. END USER SURVEY OUTCOME RATES

The AAPOR RR3 response rate is estimated from the End User Survey outcome frequencies in Table E.4. The eligibility rate can be estimated as

$$\mathbf{e = Known\ eligible\ /\ (Known\ eligible + Known\ ineligible).}$$

The eligibility rate estimate **e** can be applied to cases of unknown eligibility to estimate the number of those cases that were actually eligible. The response rate can then be estimated (there are other ways) as

$$\mathbf{Response\ rate = I/(I + P + R + NC + O + e \times (UB + UO)).}$$

For the end user survey

$$\mathbf{e = 617/(617 + 360) = .6315,}$$

and the response rate estimate is

$$\mathbf{601/(601+16+0+0+0+.6315\times(1{,}140+3{,}479)) = .1701}.$$

[55] A similar process was used for the safety and code officials.

Table E.4. Outcome Frequencies for the End User Survey	
Outcome Type	**Frequency**
Complete interviews (I)	601
Partial interviews (P)	16
Refusals and break offs (R)	0
Non-contacts (NC)	0
Other eligible, non-interviews (O)*	0
Known eligible	**617**
Unknown user (UH)	1,140
Unknown other (UO)	3,479
Eligibility unknown (non-contact)	**4,619**
Quota Filled (QF)**	290
Other known ineligible (UO)	70
Known ineligible	**360**
Total phone numbers used	**5,596**
*This category is a catchall for various kinds of eligible non-interviews. See AAPOR (2008, page 45) for a complete listing of outcome categories. **After 200 respondents were obtained for any strata, further potential respondents in that strata were regarded as ineligible.	

E.5. SAFETY AND CODES OFFICIALS SURVEY OUTCOME RATES

The survey of safety and codes officials targeted four different codes organizations – the IAFC, ICC, NASFM, and the NFPA. Table E.5 shows that the response rate for surveying these organizations was very high.

Table E.5. Outcome Frequencies for the Survey of Safety and Codes Officials			
Organization	**Number targeted**	**Number sampled**	**Response rate (%)**
IAFC	50	36	72.0
ICC	49	41	83.7
NASFM	50	37	74.0
NFPA	44	35	79.5
Total	193	149	77.2