2005 DOE Hydrogen, Fuel Cells & Infrastructure Technologies Program Review:

Baseline Knowledge Assessment

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Overview

Timeline	Barriers
FY03: Plan, search, draft FY04: Obtain OMB approval; conduct surveys; analyze results	Lack of awareness Institutional barriers and access to audiences Regional differences
Budget	**Partners**
2004, $265,716 2005, $0	Contacts with national and international organizations to obtain clarifications and data

Objectives

- To measure the current level of awareness and understanding of hydrogen and fuel cell technologies and the hydrogen economy in four target populations:
  - General public
  - Students
  - State and local government agencies
  - Potential large-scale users
- To establish a baseline for comparison of future evaluations of public awareness, knowledge, and opinion

Approach

- Review existing literature on hydrogen or fuel cell knowledge and attitudes
- Design survey instruments that are targeted to specific populations
- Obtain approval from the Office of Management and Budget (OMB) to conduct the surveys
- Conduct surveys and analyze data to establish a baseline of knowledge and opinions for each target population
- Publish Baseline Knowledge Assessment report

Technical Accomplishments/Progress

1

- Completed literature review (published Oct 2003)
- Published 60-day and 30-day Federal Register Notices concerning surveys (Aug 2003; Jan 2004)
- Obtained OMB approval to conduct surveys
- Completed survey instruments for public, student and educator, state and local government, and large-scale user populations (Mar 2004)

Technical Accomplishments/Progress

2A

- Conduct surveys (2004)
  - General public: 1,000 adults
  - Students: 1,000; educators: 100-150
  - State and local agencies: about 100
  - Large-scale users: about 50

Technical Accomplishments/Progress

2B

- Responses to questions that assess knowledge levels will guide the emphasis of the education program and help determine the program's starting level
- Responses to questions that evaluate attitudes will influence how to present the education program and how to prioritize activities
- Responses to questions about experience levels could impact the delivery of special programs (e.g., high-school teacher enrichment courses)

Technical Accomplishments/Progress

2C

- Ensure technical defensibility
  - Sampling must be representative
  - Estimates computed from survey results must be unbiased and qualified in terms of statistical variability
  - All methods must be repeatable in future surveys

Technical Accomplishments/Progress

2D

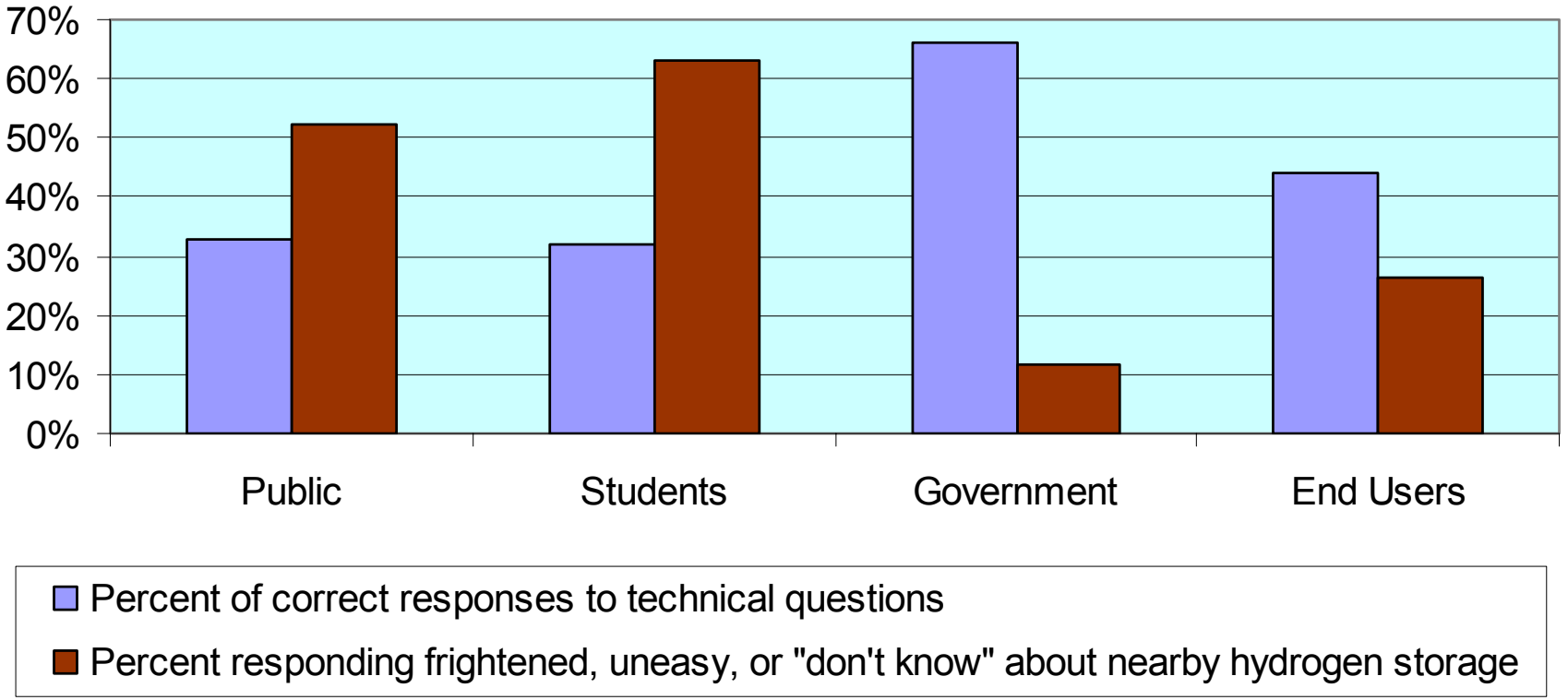
- Analyze results of surveys (adjust for sampling weights) and produce report
  - Estimate proportions of each target population responding to the various questions in various ways (to establish a baseline)
  - For each target population, identify subject areas where hydrogen knowledge is lacking; assess attitudes toward safety; characterize opinions; and evaluate experience levels
  - Use cross-tab analyses to explore data generally (investigate relationships between responses and age, gender, geographic region, and race, when appropriate)
  - Identify barriers that prevent target audiences from receiving instruction or becoming informed
  - Identify the avenues by which different target populations are most likely to obtain information

Technical Accomplishments/Progress

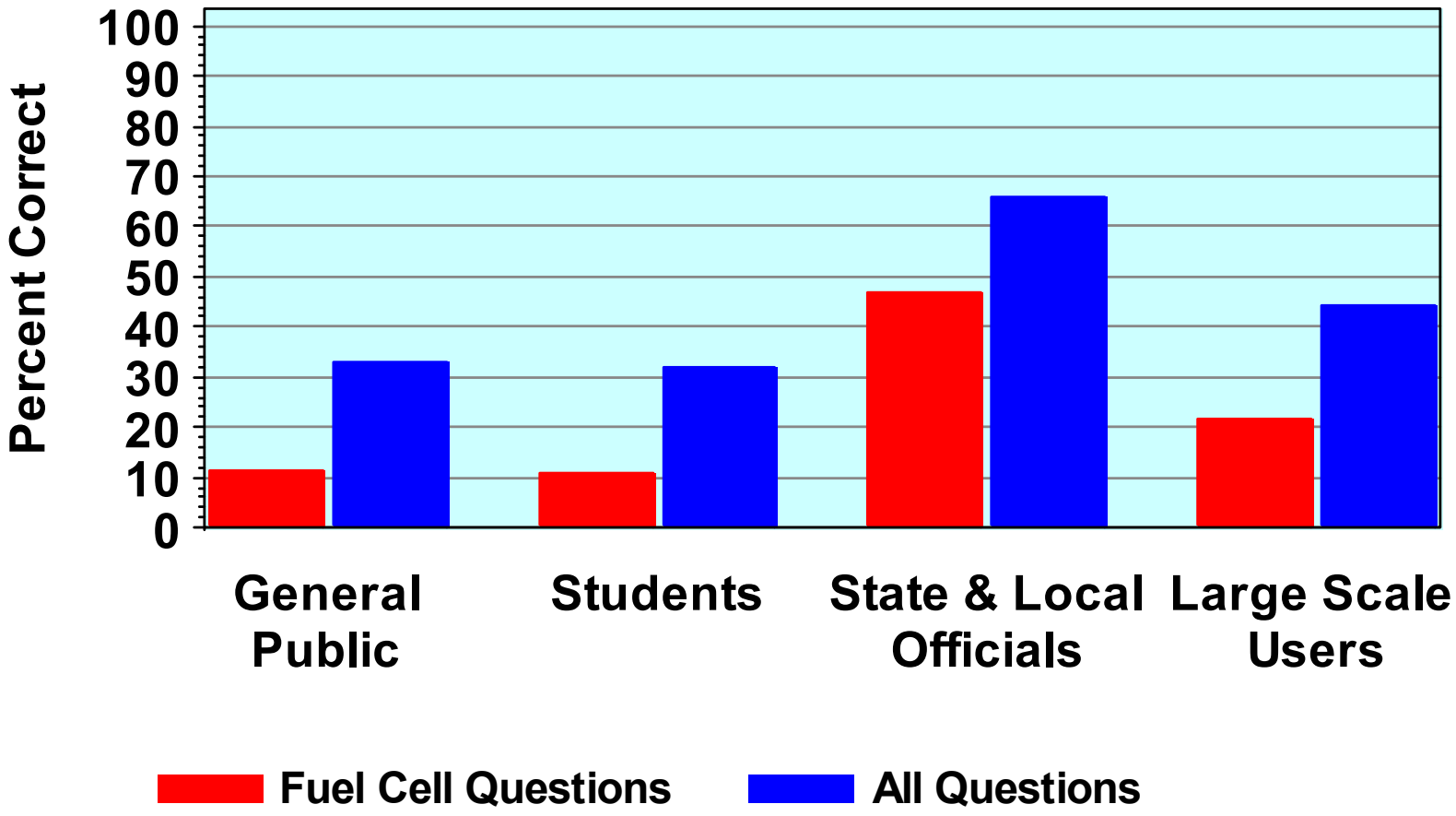
3A

- In every population, people who knew the most about hydrogen and fuel cells had the least fear about their safety
- For every population, people know less about fuel cells than they do about hydrogen
- The general public and large-scale end users responded with "Don't know" to over 40% of the technical questions
- Government officials had the highest scores of any population on the knowledge questions and also provided fewer "Don't know" responses
- Only about half of the general public felt that hydrogen and fuel cell technologies are as safe as current technologies
- Almost 40% of the students thought that hydrogen gas is toxic, and 45% thought that it is too dangerous for everyday use by the public

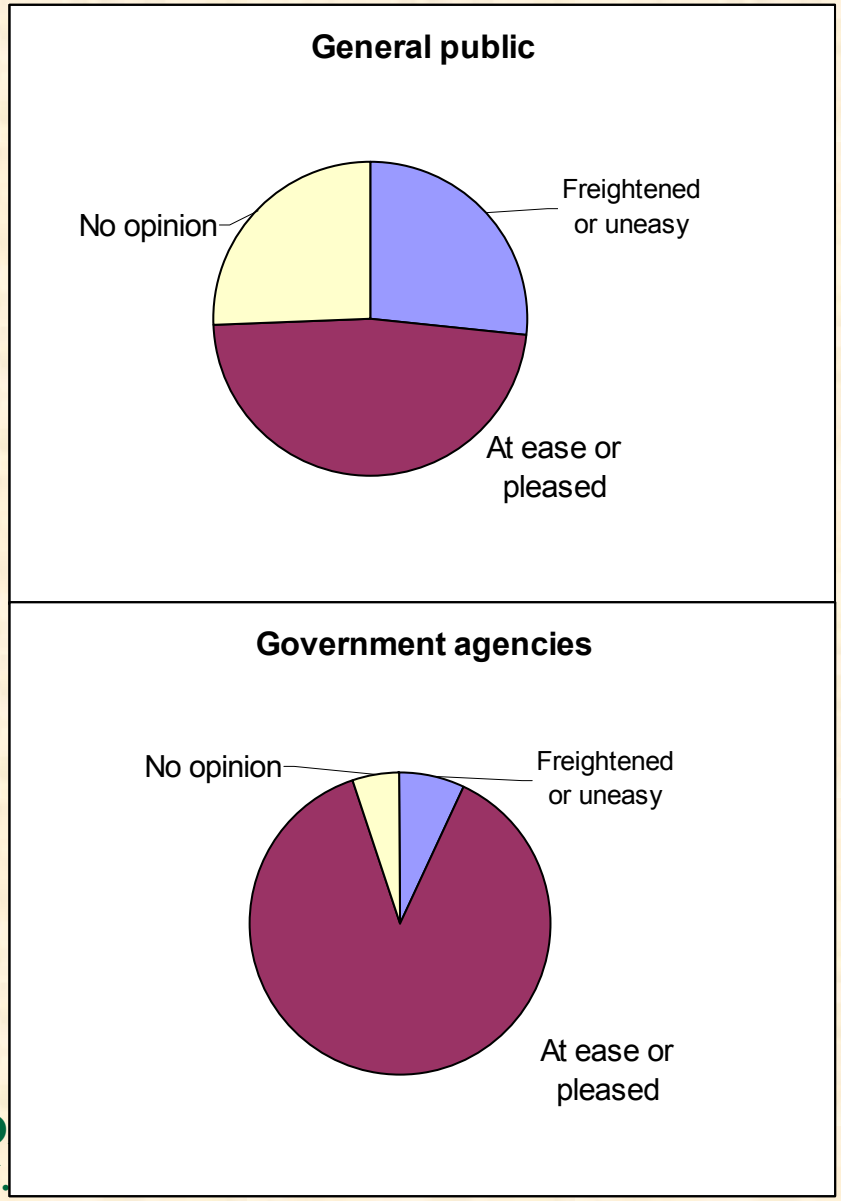
People who know the least about hydrogen technologies have the greatest fears and insecurities

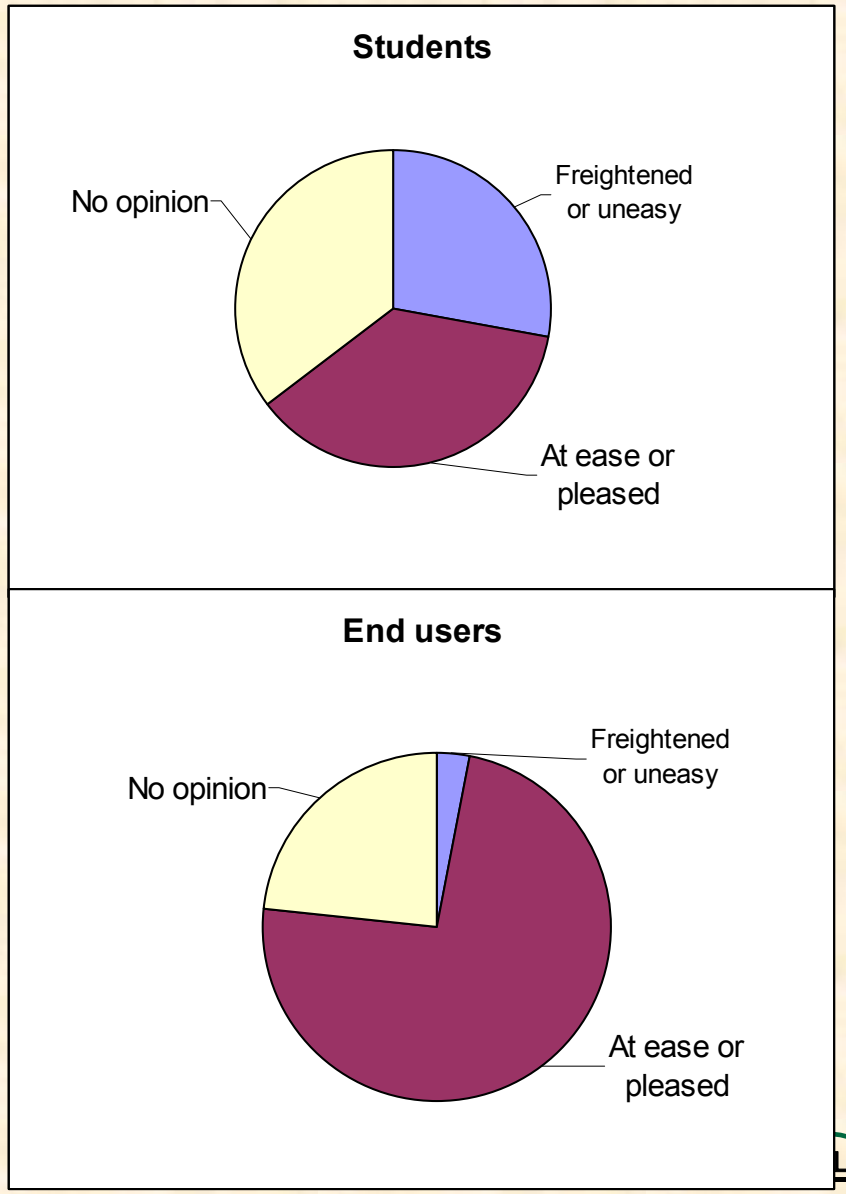


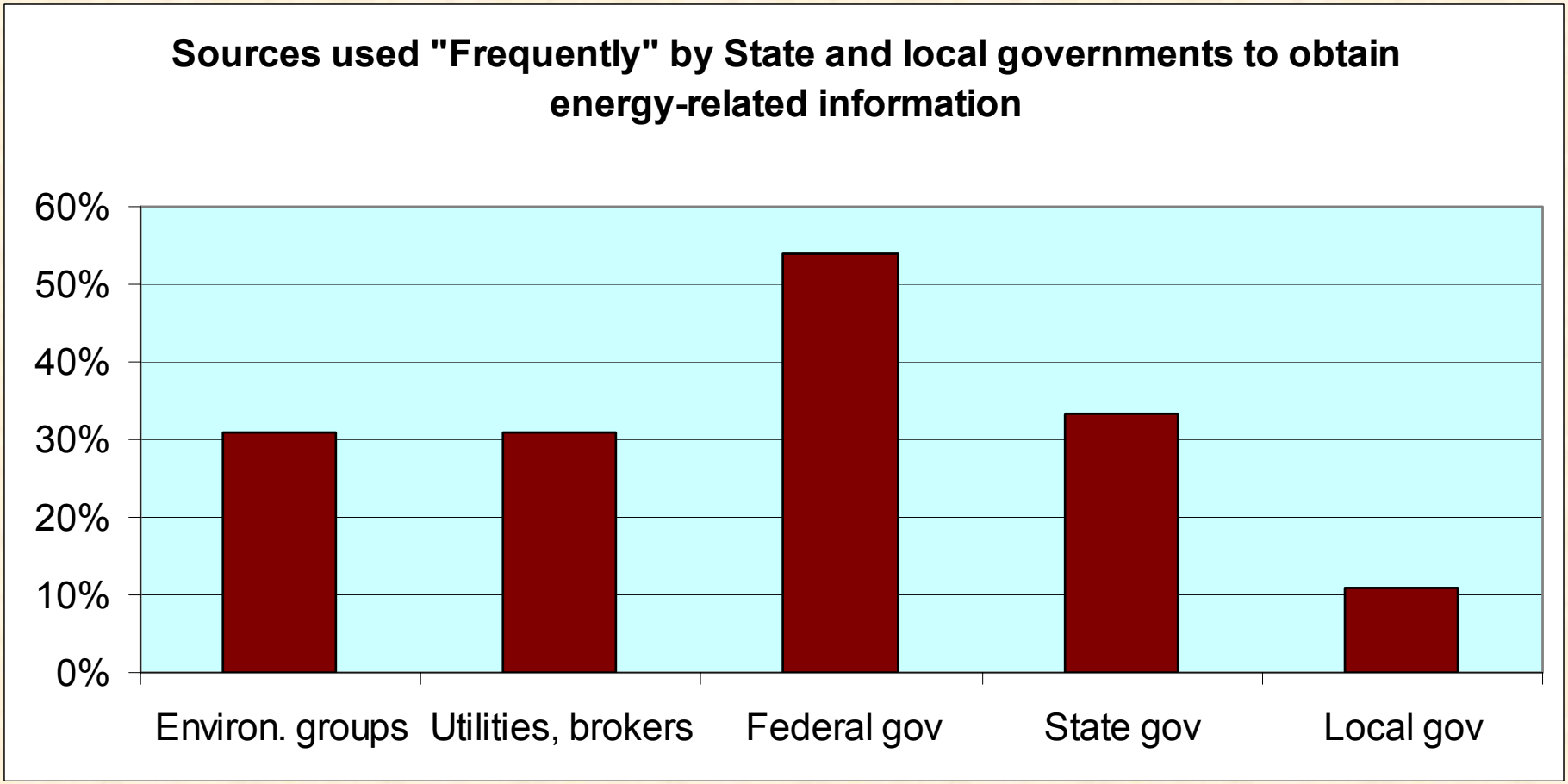
People know less about fuel cells than hydrogen in general



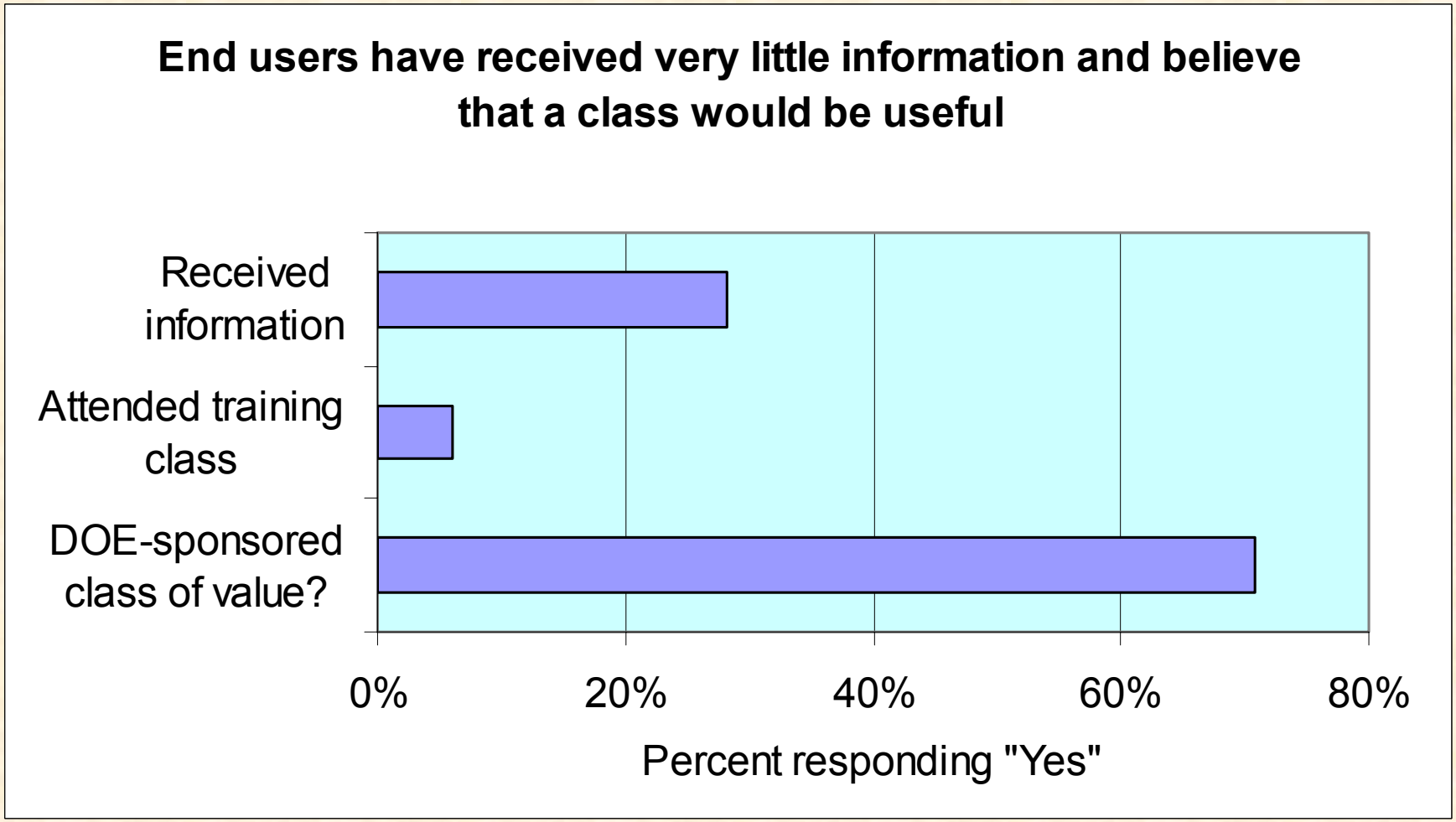
How would you feel if your local gas station sold hydrogen?



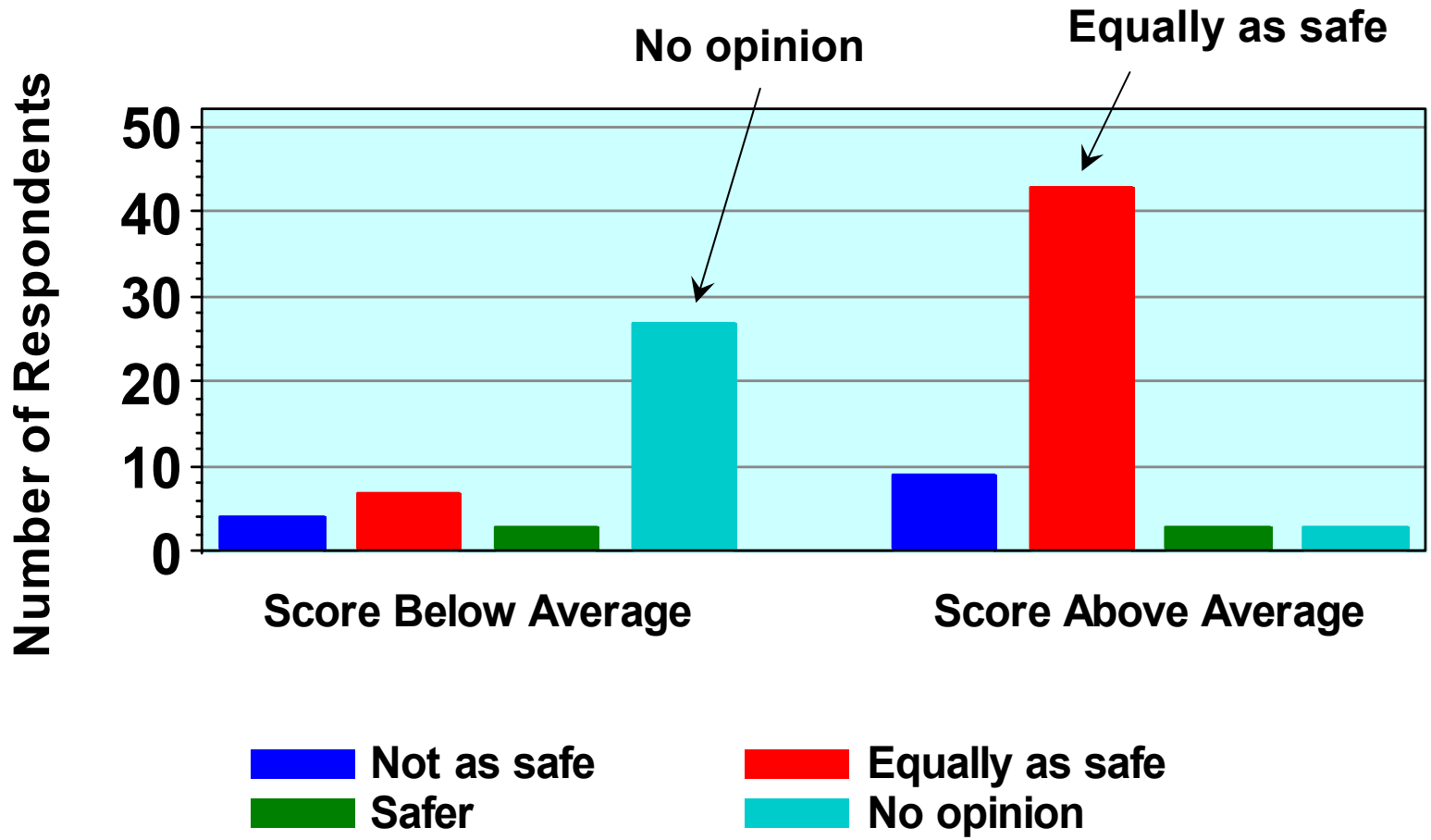



Sources used "Frequently" by State and local governments to obtain energy-related information
60%
50%
40%
30%
20%
10%
0%
Environ. groups
Utilities, brokers
Federal gov
State gov
Local gov

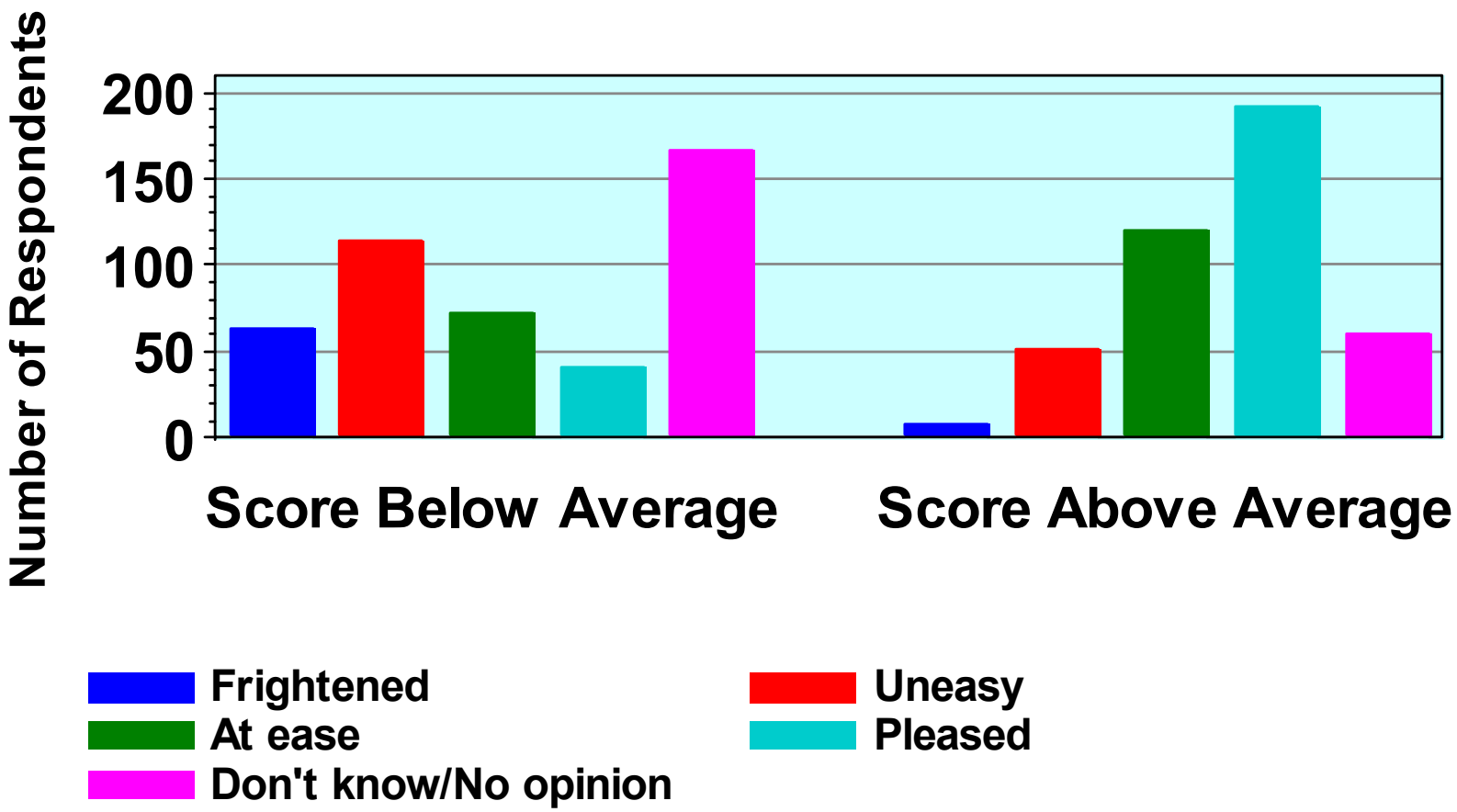
Large-scale end users thought that a DOE-sponsored class or workshop would be valuable



Large-scale end users: opinions about hydrogen and fuel cell safety for onsite power for the home



Technical knowledge and technology acceptance in the general public
How would you feel if your local gas station also sold hydrogen?



Future Work

- Archive 2004 survey data, programs, and documents
- Repeat surveys in 2007 and again in 2010

Publications and Presentations

- ***Literature Review for the Baseline Knowledge Assessment of the Hydrogen, Fuel Cells, and Infrastructure Technologies Program*, ORNL/TM-2003/258, October 2003**
- **"2004 DOE Hydrogen, Fuel Cells & Infrastructure Technologies Program Review: Baseline Knowledge Assessment," May 2004**
- ***Results of the 2004 Knowledge and Opinions Surveys for the Baseline Knowledge Assessment of the Hydrogen, Fuel Cells, and Infrastructure Technologies Program*, by R. L. Schmoyer and Tykey Truett, Oak Ridge National Laboratory, and Christy Cooper, U.S. Department of Energy**

Project Safety

- There are no technical hazards related to equipment, operations, or processes for the Baseline Knowledge Assessment
- An awareness and understanding of hydrogen and fuel cell safety, however, is an integral part of the education program
- The surveys will assess the safety consciousness of the target populations