



Hearings: Subcommittee on Research & Science Education

September 25, 2007

The Contribution of the Social Sciences to the Energy Challenge



**U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON RESEARCH AND SCIENCE EDUCATION
HEARING CHARTER**

The Contribution of the Social Sciences to the Energy Challenge

Tuesday, September 25, 2007

10:00 a.m. - 12:00 p.m.

2318 Rayburn House Office Building

1. Purpose

On Tuesday, September 25, 2007, the Subcommittee on Research and Science Education of the House Committee on Science and Technology will hold a hearing to examine how research in the social sciences, including the behavioral and economic sciences, contributes to the design, implementation and evaluation of effective policies for energy conservation and efficiency.

2. Witnesses

Dr. Robert Bordley, Technical Fellow, Vehicle Development Research Laboratory, General Motors Corporation

Dr. Robert Cialdini, Regents' Professor of Psychology and Marketing, Arizona State University

Dr. Jerry Ellig, Senior Research Fellow, Mercatus Center, George Mason University

Mr. John “Skip” Laitner, Visiting Fellow and Senior Economist, American Council for an Energy Efficient Economy

Dr. Duane Wegener, Professor of Psychological Sciences, Purdue University

3. Overarching Questions

- What contribution do the social sciences make to our ability to predict or evaluate the effectiveness of public policies in changing individual and collective behavior related to energy use?
- What new and continuing areas of basic research in the social sciences could significantly improve our ability to design effective policies? What new technologies and methodologies are enabling advances in the research? Are there promising research opportunities that are not being adequately addressed?
- To what extent are policies (both private and government) to influence energy consumption patterns actually being shaped by what has been learned from the social sciences?

4. Federal Spending on Social, Behavioral and Economic Sciences

Basic and applied research in the social, behavioral and economic (SBE) sciences is funded out of a number of federal agencies, including the National Science Foundation (NSF), the National Institutes of Health (NIH) as well as other agencies within the Departments of Health and Human Services, Agriculture, Commerce, Defense, Education, Homeland Security, Housing and Urban Development, Interior, Justice, Labor, State and Transportation. The National Endowment for the Humanities and the Smithsonian Institution also provide some funding in these areas. Notably, given the topic of this hearing, the Department of Energy does not have a program of social science research applied to the energy challenge.

According to research funding statistics compiled by NSF¹, a total of just over \$1 billion was obligated to basic and applied research in all social sciences for fiscal year 2004 (FY04), including \$200 million for economics. Psychology was counted separately, and was funded at a total of \$1.85 billion in FY04, of which \$1.7 billion was funded by NIH and over \$90 million was funded by DOD and Veterans Affairs. The primary interest of those three agencies is the medical aspect of psychology.

The main support for basic research in the social sciences comes from the SBE Directorate at NSF. Overall, NSF accounts for 61 percent of federal support for basic research in anthropology, social psychology and the social sciences at U.S. colleges and universities. In some fields, including archaeology, political science, linguistics, and non-medical aspects of anthropology, psychology, and sociology, NSF is the predominant or exclusive source of federal basic research support. The NSF SBE budget request for fiscal year 2008 (FY08) is \$220 million, an increase of 3.9 percent over FY07. In addition to funding basic research in the social, behavioral and economic sciences, NSF's SBE Directorate funds the collection and analysis of data on science and engineering research, education and workforce trends (including the data presented here), resulting in the biannual “S&E Indicators.” This activity accounts for \$31 million in FY08, or approximately 15 percent of the SBE Directorate budget.

¹ Data are based on self-reporting by agencies. In many cases, especially where there is interdisciplinary work, it is hard to tally exact dollars spent on one field or another, so these values are at best an estimate.

5. Social, Behavioral and Economic Sciences and the Energy Challenge

A key part of the solution to our energy challenge is the development of more efficient, cleaner energy technologies. This is a primary mission of the Department of Energy. However, while it may be impossible to quantify, individual and collective behavior also plays an important role, not just through direct use of energy, but also by creating or failing to create market demand for more energy efficient technologies. Individuals across the United States make decisions every day about what vehicle or appliance to purchase, whether to drive or take public transportation, what light bulbs to install, whether to shut down their computers at night. Each one of these decisions, from turning off the computer to buying a 35 mpg sedan versus a 15 mpg SUV, has an impact on the supply and demand curve that drives both energy prices and energy technology development, has some environmental footprint, and in the case of oil and natural gas, may have an impact on national security.

These impacts are generally quantified in the aggregate, based on data collected by the Energy Information Administration. In 2005, U.S. households consumed 21 quadrillion BTU (quad) of primary energy, accounting for 21 percent of total U.S. energy consumption. To put this in perspective, people in the United States consume 2.4 times as much energy at home as those in Western Europe, in large part because our homes are twice as large and not designed for energy efficiency, despite the availability of affordable technologies to make them so. Household vehicles account for an additional 14 quad or 14 percent of primary energy, resulting in an overall household total of more than one-third of annual U.S. energy consumption.

In 2005, the National Academy of Sciences (NAS) produced a report on “Decision Making for the Environment: Social and Behavioral Science Research Priorities.” Much of the research called for in the report is of an applied nature- for example, quantifying the environmental or economic impact of every minute action, such as running the clothes dryer during peak hours instead of off-peak hours. Information such as this might help policy makers prioritize efforts and could even stimulate technological innovation, but it isn’t clear that such information would actually influence consumer behavior. In the chapter on *Environmentally Significant Individual Behavior*, the NAS panel states that, “A basic understanding of how information, incentives, and various kinds of constraints and opportunities, in combination with individuals’ values, beliefs, and social contexts, shape consumer choice in complex real-world contexts would provide an essential knowledge base for understanding, anticipating, and developing policies for affecting environmentally significant consumer behavior.” Energy-related behavior is significant not just to the environment, but to the consumer’s own monthly expenses, to the economy as a whole, and to national security. The National Science Foundation is not responsible for generating the needed data on environmental and economic impact called for in the NAS report, or for sharing it with the public. However, NSF does fund the basic research in the social, behavioral and economic sciences that can help inform policymakers at all levels in the development, implementation and evaluation of information campaigns, incentives programs, regulations and other public policies to change how we use energy in this country.

A similar story can be seen in the recent history of smoking in the United States. Changing societal norms resulted in a society that is now hostile to smokers and as such have greatly reduced the number of smokers, resulting in reduced health risks for individuals and a reduced burden on our collective health system. But linking smoking to lung and other cancers was not sufficient to bring about this decrease. Nor was the knowledge that second-hand smoke was harmful to others. Advertising by tobacco companies still made smoking look “sexy” just as car company advertisements make large SUV’s look very appealing to the typical consumer. In addition to laws restricting advertising, and the near elimination of smoking from movies and television (the characters who light up in today’s movies are typically the “bad guys”), public officials and non-profit organizations launched major information campaigns targeted at different populations. Many of those information campaigns failed to influence smoking behavior, in particular among youth.

Social and behavioral researchers eventually helped to determine what kinds of advertisements and other antismoking campaigns work for which target populations.

There are many parallels to behavior and persuasion in the energy challenge. A 2003 survey commissioned by the Alliance to Save Energy found that an overwhelming majority of consumers (92 percent) agree that business, government, and consumers have an equal responsibility to reduce energy use. But attitudes have not translated into action. Social science researchers can help create and provide information in an understandable manner, a particularly challenging task in the case of energy; determine how information interacts with all of the other factors listed by the NAS panel to affect consumer behavior; understand variation in these interactions across subsets of the population; and work with policy makers to help shape targeted information campaigns and policies. The Department of Energy launched an “Energy Hog” energy efficiency campaign in 2004. The Energy Hog website provides useful information to consumers about how to save energy without spending a lot of money. Such information, however, is primarily reaching those self-selecting consumers who actively seek it. The majority of Americans, despite concern for both the environment and rising energy prices, simply don’t consider energy in their own behavior or in that of their neighbors. The purpose of this hearing is to explore the basic research that could help policy makers understand why attitudes about energy don’t currently translate into action.

6. Questions for Witnesses

Dr. Robert Bordley

- Please describe the type of market research you do for GM and how your background and experience as a social scientist influences your work.
- What has social science research revealed about factors that influence an individual’s vehicle purchasing decisions? What questions remain unanswered? Have you looked specifically at the issue of fuel economy?
- How are recent breakthroughs in research incorporated into marketing or business strategies? What role might the National Science Foundation play in building bridges between academic social science researchers and government and industry policy makers?

Dr. Robert Cialdini

- Please describe the work you have done recently on individual behavior and energy conservation. What have you learned about what influences the decisions individuals make with respect to energy use?
- How can this research be used more effectively to inform policy? Do you as a researcher reach out to policy makers or others in a position to influence policy? If not, how would you propose that these connections be made? Can the National Science Foundation play a role?
- What basic social psychology research questions relevant to the energy challenge remain unanswered? Do social scientists have all of the tools they need to answer these questions and adequate resources to pursue promising research directions? Are there as of yet undeveloped or underdeveloped technologies or methodologies that would help advance this research?

Dr. Jerry Ellig

- How predictive is a purely economic approach to evaluating the impact of energy policy on individual and communal behavior? What factors other than price signals need to be considered when developing and applying economic models to energy-related behaviors?
- To what extent are policies to influence individual and community energy use being shaped by what has been learned from research in the social sciences, including economics?
- What tools and methodologies are most appropriate for evaluating the effectiveness of policies to incentivize consumer behavior with respect to energy use? What kinds of basic research questions underlie the development of such tools and methodologies?

Mr. John "Skip" Laitner

- How predictive is a purely economic approach to evaluating the impact of energy policy on individual and communal behavior? What other factors need to be considered to match economic theory to empirical data? To what extent are such data even available? That is, to what extent are relevant energy policies being evaluated for effectiveness?
- To what extent are policies to influence individual and community energy use being shaped by what has been learned from research in the social sciences, including economics? Are you aware of particular sectors of industry or government that make more of an effort to incorporate the results of such research into the design and evaluation of policy?
- Please describe the purpose and scope of the first-ever Behavior, Energy and Climate Change Conference being organized by ACEEE. What do you hope to achieve through this conference? How much interest have you seen from industry, government officials, and others in a position to influence policy?

Dr. Duane Wegener

- Please describe your involvement in the Purdue Energy Center, and in particular the mission and goals of the Social, Economic, and Political Aspects of Energy Use and Policy team of the Center. How and to what degree does your team interact and collaborate with the technology teams at the Center?
- How much support do you and your colleagues in this area get from federal funding agencies? Have you sought any support from or partnerships with public or private utilities or other non-governmental entities?
- What has social science research revealed about factors that influence how Americans form attitudes relevant to energy use and policy? How can this research be used more effectively to inform policy?
- What basic social psychology research questions relevant to the energy challenge remain unanswered? Do social scientists have all of the tools they need to answer these questions and adequate resources to pursue promising research directions? Are there as of yet undeveloped or underdeveloped technologies or methodologies that would help advance this research?