

EXECUTIVE SUMMARY

The United States can reap a wealth of cost-effective energy savings and reduce our contribution to global greenhouse gas emissions by providing the tools, technologies, education, information, and motivation needed to help all types of Americans change their energy consumption patterns and behaviors. Importantly, however, Americans are more likely to be successful in achieving these savings and in achieving them sooner if they are empowered by effective programs and policies that can help them to:

1. see more clearly the size of our current energy service demands, how those demands are currently met, and the implications for ourselves, our neighbors, and our children,
2. understand the range of energy options and choices from household to nation state,
3. imagine what a different energy future might look like,
4. prioritize social and governmental goals based on a long-term energy vision, and
5. make smart energy choices for their own household, business, or industry.

Currently scholars throughout the scientific community acknowledge that our nation's ability to achieve energy security and reduce our impact on the global climate will require that we tap into *multiple* sources of potential energy savings. Moreover, inefficient patterns of human behavior represent a large, untapped reserve that could (according to several estimates) potentially reduce current levels of energy consumption by 20-25%, and do so in ways that save money (Gardner and Stern 2008, Laitner et al. 2009). And the time is right for mobilizing the behavioral resource: energy use is at an all time high and energy service demands are even higher; people are increasingly concerned about climate change and high energy prices; new information and communications technologies are available for providing individuals, households, and businesses with a wide variety of previously unavailable information and feedback about their energy use patterns (and those of others); and the nation has experienced a notable shift in worldviews with an unprecedented proportion recognizing the need to moderate the human impact on the environment. In short, there is a real need to change our current patterns of energy use, and the vast majority of people agree that it is the right thing to do.¹

Given this unique backdrop, we are faced with two important questions: (1) why aren't people currently acting on their beliefs and actively changing their energy consumption behaviors, and (2) what can be done to help them achieve these goals and accelerate our nation's transition to a low-carbon society?

The Behavior, Energy and Climate Change (BECC) Conference, held in November 2007, was a first attempt to address these concerns systematically in a conference setting. The BECC Conference, co-convened by the California Institute for Energy and Environment (CIEE), the American Council for an Energy-Efficient Economy (ACEEE), and the Precourt Institute for Energy Efficiency (PIEE) brought together more than 500 people to explore the topic, share their research, and consider potential program and policy options. This report seeks to build on that highly successful event by accomplishing two specific tasks: to provide a thoughtful framework for moving beyond the typical "rational economic actor" model as a means of understanding human behavior; and to explore some of the more prominent policy, program, and research topics that emerged from the BECC Conference.

¹ See the 2007 Gallup Poll that reports that nearly 4 out of 5 Americans believe that they should ride mass transit whenever possible and spend several thousand dollars to make their homes more energy efficient. The same poll indicates that approximately 70% of Americans believe that they should install a solar panel to produce energy for their home and use only fluorescent light bulbs. And a majority of Americans report that they should buy a hybrid car (62%) and unplug electronic equipment when not using it (57%) (Carroll 2007).

Frameworks and Core Theories

Efforts to understand human behavior must start with the recognition that people are motivated to action as a result of both economic and non-economic factors. As such, efforts that seek to maximize energy efficiency and conservation could substantially increase their effectiveness by integrating a broader set of social, cultural, political, and ethical factors that shape individual, household, commercial, and industrial energy service demands. This is not to say that energy prices, income, and other economic measures aren't important for understanding decision-making and behavior, but that a broader and more integrated approach is likely to provide a more accurate assessment of potential cost-effective energy savings as well as increase the effectiveness of programs and policies aimed at reducing energy consumption (Wilson and Dowlatabi 2007, Lutzenhiser 1993, Stern and Aronson 1984).

Economic and Non-Economic Factors

Currently, the predominant view of energy consumption and energy efficiency explains the problem as a function of consumer choices, technology adoption, and economic rationality. This framework identifies the individual in terms of his/her role as a rational economic actor making rational choices regarding the adoption of more or less efficient technologies and behaviors. A second approach constructs the problem by recognizing the broader social and cultural context in which decisions are made and behaviors are defined. This social/cultural framework situates the individual within the larger context, seeking to identify the ways in which social and cultural variables determine, and are determined by, energy-use behaviors. Of particular importance, this approach recognizes the significant influence of non-economic factors and the ways in which they shape and constrain individual behavior. Among the non-economic factors of interest are measures of social status, social norms, social institutions, and social movements.

A third approach constructs the problem primarily in political terms. Here the focus is on formal and informal political processes. Individual behavior is most effective via its ability to generate widespread change through the expression of political opinions and via the legislative process including the development and support of new laws, policies, and standards. From this vantage point, the media also plays a critical role in influencing public opinion, awareness, and concern regarding energy and climate issues. Finally, a fourth approach constructs the problem as a moral issue. The moral framework identifies the individual in terms of his/her philosophies, beliefs, and worldviews and seeks to understand how personal values shape behavior and energy consumption.

When combined with an assessment of structural and institutional barriers, the more complex representation of the multiple dimensions of human behavior can help ensure the development of more effective policy models, energy programs, and climate change policy. The remainder of this section summarizes important insights from selected policies, programs, and research as presented during the Behavior, Energy and Climate Change Conference. Various combinations of the frameworks discussed in Section IV provide the basis for many of these approaches.

Effective Policies

Far-reaching policies are essential for ensuring the effectiveness of efforts to change individual, household, and organizational behavior. Policies can make inconvenient behaviors convenient, they can make expensive behaviors less expensive, and they can remove structural, institutional, and legal barriers to behavioral change. Not surprisingly then, the effectiveness of behavioral interventions has been found to increase when combined with various policy instruments. Interestingly, however, policy models often fail to adequately integrate the social and behavioral determinants of energy

consumption and energy efficiency. The results are problematic for several reasons. Primary among these is the fact that potential, behavior-based energy savings are generally underestimated or assumed to be zero, while the behavioral opportunities often go unrecognized. Of course, unrecognized opportunities remain invisible to potential funders and unfunded programs have little impact on patterns of energy consumption.

Importantly then, until existing policies adequately recognize and pursue potential behavior-based energy resources, these important resources will continue to be underestimated and much of the potential savings will be left unrealized. As such, more research is needed to better document the size and scale of existing behavioral resources, measure their persistence over time, reduce the technology biases that are built into existing measurement and evaluation methodologies, and incorporate potential behavior-based energy savings into leading policy models. Also of utmost importance is the need for policies to recognize and accommodate the diversity that exists across the population in terms of energy use, social and cultural constraints and resources, and values, norms, and ideals. Although the “one size fits all” policies that are commonly used today may be cheaper, they also tend to be much less effective than those that seek to identify and address existing patterns of energy use and efficiency constraints. As such, cheaper approaches may also be less effective and less cost-effective. Moreover, in order to maximize the potential energy savings that we can achieve, we must also actively and systematically apply current social and psychological insights in ways that improve the likelihood that people will be successful in making smart energy choices. Too much information can be just as disabling as a lack of information, but the conscious structuring of choice architecture can go a long way toward helping individuals successfully navigate the many options that they face. Finally, we must also recognize that individuals do not make choices in a social vacuum. Insights from the study of organizational behavior and the experiences of trade allies are likely to be particularly valuable for expanding our current understanding of existing energy use patterns. Ultimately, we must strive to enable and facilitate smart energy choices and behaviors in a way that recognizes the diverse human and social circumstances in which those choices are made.

Behavior-Oriented Programs

Interest in behavior-oriented programs has resurged in recent years, but the programs that are evolving differ from prior attempts to change patterns of energy consumption in important ways. Of particular note, recent efforts are more innovative, more sophisticated, and more likely to effectively address the non-economic drivers of human behavior. These new programs borrow theories, ideas, and approaches from a variety of disciplines including public health, communications, sociology, anthropology, psychology, human ecology, public policy, business, and marketing, among others.

Among the methods used in the field of public health are entertainment-based approaches that allow people to learn new behaviors by vicariously experiencing the actions of other people through a process known as social learning. Many of these applications also employ sophisticated methodologies that require knowledge of the audience, the media, and the local resources. Similarly, efforts that use a social marketing approach often use competitions, social pressure, and social norms to favorably shape the behaviors of individuals and organizations, while other approaches study heuristic devices, persuasion mechanisms, and new high-tech modes of networking as well as their potential impact on energy consumption. Finally carbon labels and feedback devices are among the new tools being employed in some of the new, behavior-based energy programs.

Future program efforts should continue to innovate and experiment by drawing on lessons learned from other disciplines. In order to do so, programs need to be less risk adverse and more willing to “think outside the box.” Some specific suggestions include the use of innovation inducement prizes, new branding and rating systems, community-wide programs, shareholder incentives, and home

energy rating systems. Programs should also emphasize the need for human-centered design and innovation that recognizes the complexities of human life and human decision-making, and produce technologies that meet both the explicit and latent needs of the individuals using them.

Behavioral Research

While there has been a notable re-emergence of interest in and work on behavior and energy issues, the lack of research since the mid-1980s has resulted in significant gaps in our knowledge regarding effective behavioral approaches. As such, there is no doubt that behavior-based efforts aimed at expediting our nation's transition to an energy-efficient, low-carbon economy will require a concerted and coordinated research effort. The good news is that a behavioral approach can provide a readily available and largely untapped source of significant energy savings. However, the danger lies in the potential for faulty assumptions and beliefs that understanding human behavior is simply an exercise in understanding the obvious. Instead, the timely development of useful knowledge will require the creation of a new research mechanism that (1) allows for the speedy accumulation of knowledge, (2) minimizes the duplication of effort, (3) maximizes the use of financial and human resources, and (4) provides a means of facilitating broad access to research findings.

Unfortunately, most current data collection efforts are disjointed and data are disbursed across a wide range of utilities, nonprofit organizations, government-run labs, and other organizations. Moreover, much of the data that has been collected is limited in scope and often out-of-date. Currently, a large portion of the data that are available has been collected at the program level and offer little insight into consumer and producer motivations and behaviors. Instead, research in this area would benefit greatly from studies focused on investigating how and why people adopt particular energy consumption and/or efficiency behaviors as well as studies that explain both the trends and the variation that exists among individuals and groups. A national energy efficiency data center could accomplish all of these objectives.

In terms of behavioral research topics, a number of areas deserve prompt attention. Of particular note is the need to reveal the important patterns and trends in energy consumption and energy conservation as they exist across specific segments of the population. Past efforts have focused on understanding "the average consumer" and are particularly problematic because they mask the dramatic levels of variation that exist among groups and/or segments of the population (see Lutzenhiser and Bender 2008). As a result, programs that target the average consumer will consistently miss their mark and be ineffective at reducing energy consumption. By studying the variation in patterns, programs will be more effective and efficient in their strategies.

New research efforts should also explore the importance of social context and social motivations and their impact on individual and organizational behavior. Contrary to prior beliefs, growing evidence suggests that people frequently fail to act in accordance with economic self-interests alone. In fact, people often find it difficult to do so. As such, it is important that new research adopts alternative models of human behavior and explores the ways in which social rules, resources, and contexts influence attitudes, preferences, and ultimately behaviors.

Finally, a concerted research effort is needed to explore a range of other important research topics including:

1. the impact of consumption choices and the energy embodied in the products that we consume,
2. the importance of symbolism, identity, and rebound in shaping energy consumption patterns and the persistence of savings,

3. the ways in which the variation in the visibility of energy and modern, urban lifestyles can shape energy consumption patterns,
4. the importance of choice points and the impact of choice architecture and trade allies on energy consumption,
5. the impact of behavior and social structure on patterns of energy consumption in businesses and industry, and
6. the best means of accelerating innovative behavior and the effectiveness of new technologies in reducing energy consumption.

These findings suggest that behavior-based programs and policies can dramatically reduce energy consumption whether in households, industries, commercial buildings, or cars. However, achieving these savings will require specialized knowledge, research funding and coordination, experimentation, innovation, and imagination. Given the challenges of climate change and dwindling energy resources, now is the time to tap into the existing reserve of behavior-based energy savings.