Overview of the Behavior, Energy and Climate Change conference Keynote Address "Setting the Stage: Why Behavior is Important" for California Senate legislation development related to a California Climate Change Research Institute

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The presentation is an overview of the connections between climate change problems and human behavior. Understanding behavior and decision-making is crucial to an understanding of the sources of climate change, the prospects for effective climate policies and programs, and the sources of resistance to change. In each of these areas, human activities and choices drive the consumption/emissions dynamic and shape the outcomes of interventions. Significant reductions in greenhouse gas (GHG) emissions will require changes in behavior—some easy and some very difficult—at a variety of scales—from individuals and households, to firms, communities and markets.

The State of California's commitments to reduce GHGs are extremely ambitious (e.g., the AB32, CPUC and CEC goals). In order to come close to the goals of significant carbon reductions by 2020 and 2050, significant new choices and actions (i.e., behavior change) will required in at least four areas:

(1) technology development and diffusion,
(2) voluntary action by consumers, governments and businesses,
(3) innovation in policies, markets and interventions, and
(4) improved analysis and modeling.

Knowledge Limitations

How well do we understand the roles humans play in these key areas? In the climate system in general? Not nearly well enough. New knowledge will be required—synthesized from existing sources (e.g., scientific literature, energy efficiency evaluation work) and from new research (e.g., via existing centers and new climate research initiatives at state, regional, national and international levels).

What do we know in a very general sense about humans and the climate system? We know that people design, sell, buy, consume, and discard technologies — cars, houses, appliances, office buildings, heating and cooling equipment. They manage and operate these systems in ways that create and maintain energy flows through those technologies (and produce emissions from them). Humans have made efforts to change those systems (e.g., through energy-efficiency programs/policies), with some success and some failure. And they have developed analytic models to help understand the system and how it might be changed.

What don't we know? A series of National Academies/National Research Council studies focusing on the "human dimensions" of energy use, consumption and environmental

decision-making have identified a range of unknowns with serious implications for effective climate change policy.

The NRC panels have concluded that systematic social science and interdisciplinary research is needed to investigate, map and better understand:

- the social determinants of environmentally significant consumption
- the various sources and processes of technological change
- the development of institutions for managing global change, and
- improved methods for decision making about global change (NRC 1997)

Specifically in terms of decision making and policy-development, supporting research needs have been identified in four areas:

- indicators/measures of environmentally significant consumption
- the organization and dynamics of information transmission systems
- ways to integrate improved information with regulatory and market-based policy instruments, and
- an improved fundamental understanding of consumer choice and constraint (NRC 2005)

Most recently, an NRC review of the U.S. interagency Climate Change Program noted with concern that "Progress in human dimensions research has lagged progress in natural climate science." (NRC 2007) It is important to note that the panel consisted largely of atmospheric scientists and climate policy experts.

Limits to Energy Efficiency Approaches and Ideas

We have learned a fair amount about energy and behavior from 40 years of energy system experience. But interest has waxed and waned with shifts in policy, from crisis conservation to demand-side management, deregulation and market transformation, to further crises and climate concerns. The array of energy efficiency (EE) policy tools available are limited and the benefits of institutional learning are uneven. There has been a very limited role for university-based research, and much of the knowledge generated from EE program implementation and evaluation is either proprietary or narrowly focused on measured savings and limited service delivery goals. The understanding of consumer choice and behavior has been limited and skewed toward rational action and self-interest models.

New Perspectives on California Consumers

The California electricity supply crisis of 2001-02 revealed a very different view of consumer action and choice. My research for the California Energy Commission focused on what energy users did in response to supply disruption, threatened (and actual) black-outs, conservation appeals, and expanded state and utility EE programs. There was an unexpected reduction in peak consumer demand (by 6,000+ MW). Conservation behavior was primarily responsible (not weather or new hardware). Motivations were not exclusively economic or self-interested, but included civic, moral and altruistic concerns.

A surprising number of households took dramatic action, such as turning off their air conditioners. Some conservation actions persisted a year after the crisis.

From detailed surveys and interviews with California consumers we learned that they were not unconcerned about energy and the environment. They were not overwhelmingly selfish or upset by the prospects that the energy system may have chronic problems. In fact, they often reported that conservation was not hard (it was part of normal everyday life), that they were willing to buy new hardware over time, but were often constrained in terms of knowledge/information, trust in suppliers, access to resources, etc. They view future energy and climate problems as real and serious. They strongly believe that lifestyle changes will be needed to address energy problems in the future, but they also see a need for leadership in action by business and government.

So there is some cause for optimism on the consumer behavior front. But we are trying to change a very complex system, with lots of moving parts. And it is not easily reduced to simple explanations (e.g., "it's technology not people" or "people are selfish") or simple policy approaches (e.g., "just get the prices right" or "it's just that financial incentives are needed"). And more than consumers are involved. The system also includes producers, vendors, installers, regulators, financiers, a long-lived built environment and technology stock, and a range of ideas (right and wrong) and motivations (positive and obstructive).

Need for a Research-Based Strategy that Incorporates Behavioral Knowledge and Behavior Change in Support of Policy

Research coupled with action is required to rapidly make change in the society/climate system. We have a starting knowledge base from social scientists and other energy researchers, and from social learning (often undocumented) in the energy system. We have made important hardware improvements (and can imagine others), and we have implemented leading-edge building codes, appliance standards, and EE programs. The result has been stable per capita electricity use in California (unlike the rest of the U.S. and many other states). And EE is generally acknowledged as a cost-competitive source of supply, backed up by sophisticated programs and evaluation. *But*, the EE industry and approach has never been asked to change behavior as a reliable energy resource, nor has it ever been asked to undertake *mass transformation* of buildings, equipment, vehicles, behaviors, land-use, infrastructure, and lifestyles. In fact, EE-based policy has rarely been asked to study the system in any detail, beyond aggregated forecasting.

So in EE we have a limited set of tools to understand and affect behavior change and rapid development of new technologies, buildings and practices. The social sciences can help, and they share a rigorous research-based approach to behavioral knowledge. But they are also divided into disciplines, with weak connections, differences in theory and method, and collectively only a partial view of energy and behavior (again, see the NRC studies that have reviewed these literatures, as well as sources such as Lutzenhiser 1993 and Wilson and Dowlatabadi 2007). So while there is a starting behavioral knowledge base that provides many insights into action and choice, there are no "off the shelf" solutions. And there are barriers to the needed interdisciplinary planning and execution of research in academic/scientific disciplines, colleges, and established research centers that are best

overcome by new cross-cutting and inclusive research institutions. Also, the energy/emissions and behavior domain has suffered from very limited funding—unlike other policy areas where the importance of behavioral knowledge has been long recognized and well-funded, which is evidenced by the body of research in these areas. They include: medicine, public health, education, criminal justice, public welfare, defense.

In the energy and climate change domain, we face a number of very complex problems that will require complex and coordinated solutions. We need to link and coordinate regulation + markets + voluntary action. We need to realize important behavior changes by persons, households, communities, and organizations. We need a suite of new (and rediscovered) technologies, practices, habits, and norms. And this will all require key contributions by government + business + university-based science + non-profit sector + citizens. This is all unprecedented and will require unprecedented improvements in our knowledge of human behavior.

With out this knowledge, we cannot not hope to:

- accelerate technology solutions – the design, commercialization, adoption and appropriate use of our buildings and hardware
- make policies and programs more effective and less costly
- produce climate-positive actions and decisions by individuals and business
- improve assumptions and analytic models on which policies and programs are based

And we cannot afford to miss this opportunity.

References

Lutzenhiser, Loren. 1993. "Social and Behavioral Aspects of Energy Use" *Annual Review of Energy and the Environment.* 18:247-89.

National Research Council, Committee on the Human Dimensions of Global Change. 1997. Paul Stern, Thomas Dietz, Vernon W. Ruttan, Robert H. Socolow, and James Sweeney, eds. *Environmentally Significant Consumption: Research Directions.* Washington, DC: National Academy Press.

National Research Council Committee on the Human Dimensions of Global Change. 2005. 2005. Gary Brewer and Paul Stern, eds. *Social and Behavioral Science Research Priorities for Environmental Decision Making.* Washington, DC: National Academies Press.

National Academies Committee on the U.S. Climate Change Science Program. 2007 (Sept. 13). Press Release: "U.S. Climate Change Science Program making good progress in documenting and understanding changes, but study of impacts on humans and communication with decision makers lag." http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=11934

Wilson, Charlie and Hadi Dowlatabadi. 2007. "Models of Decision Making and Residential Energy Use." *Annual Review of Environment and Resources*. 32: 169-203.