

## **Presenters Bios & Abstracts**

### **Topic 1A Behavior & National Security**

Richard Andres  
Institute for  
National Strategic  
Studies

The Plan to Create a Green  
Military Culture

In December of 2008 the Secretary of the Air Force signed an order calling on the force to develop a culture of energy consciousness for its half million members. Shortly thereafter the Army followed suit adding a million more service men and women to the effort. Although creating green cultures is nothing new for business, this is the first time something of this nature has been attempted by a military. Since militaries have vastly more control over their members than most other organizations, this has the potential to be something new in the field of organizational behavior modification as applied to energy and environment and the number of people involved likely makes this the largest green acculturation project in history. The author of this abstract has been charged with developing the plan to implement the Air Force's energy culture program. While the plan is still in its early stages, it includes a comprehensive approach from basic training to advanced officer education and includes such instruments as changing promotion incentive structures and widespread management of symbols. This BECC presentation will describe the plan and its potential effects over the next few decades as the US military spins off millions of highly competent energy aware service people into American society.

Mike Aimone  
Assistant USAir Force  
Deputy Chief of Staff

Drexel Kleber  
Director of Strategic  
Operations, Power Surety  
Task Force

### **Topic 1B Buildings & the Built Environment**

Ann Olsen

VANDERBILT  
UNIVERSITY

Diffusion of Practice  
Innovation: The Case of  
the LEED Green

Building Rating System™

Buildings have been estimated to contribute as much as 40% of this country's greenhouse gas emissions – yet there are also many cost-effective (if not cost-neutral or -beneficial) ways to design new buildings or retrofit existing buildings to reduce their carbon footprints. The U.S. Green Building Council launched the Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ in 2000. By May 2008, almost 12,000 projects had been certified or registered in our 50 states and DC. Yet, when viewed by state, we see dramatic variation in the numbers of LEED projects, variation not explained simply by differences in levels of population or economic activity. For example, examining the cumulative number of projects registered for possible LEED-NC certification by state from 2000 through 2006 reveals a range from less than 2 per million residents in Oklahoma to almost 44 in Oregon. This research seeks to show empirically that the dispersion of LEED-NC certified and registered projects results from a combination of the economic benefits of energy efficiency (proxied by the price of electricity in each state), measures intended to capture the “environmentality” of the state's population, and factors that facilitate knowledge spillovers supportive of green building within each state. Implications for the adoption of other environmental management innovations are explored.

Marcel Harmon  
M.E. Group, Inc.

The Decision to Go Green:  
Individual vs. Group  
Influences on Our  
Likelihood to Build  
Sustainability

Recent studies by researchers affiliated with the Center for Research on Environmental Decisions (CRED) have demonstrated that the long term benefits that result from green, sustainable design, are given more weight by groups as opposed to individuals. Our evolutionary past, with its focus on daily survival, has designed our individual analytical and emotional decision making systems to focus on short-term costs/benefits as well as those “threats” that have an immediate impact on our daily lives. Pressing work deadlines, job loss, etc., have more meaning to us than melting polar ice caps or invisible gases in the atmosphere. But in cohesive groups, decisions are more likely to be made with respect to the common good; and when the common good coincides with the delayed benefits obtained from sustainable design, groups are more likely to go “green” than individuals.

In the building construction industry, short term benefits often outweigh long-term benefits when making decisions on how green to be. Following the above line of reasoning, this suggests that individuals or small groups whose common good does not coincide with green's delayed benefits are the primary decision makers involved. This is tested by comparing a dataset of LEED, non-LEED but green, and conventionally designed facilities with respect to the decision makers – who they were, their demographic make-up, and their core values. The results should provide insight into the challenges faced in greening our built environment and the solutions needed to ensure a more rapid move to sustainability.

**Topic 1C Civic Participation & Climate Change**

Roger Stephenson

Clean Air --  
Cool Planet

Global Warming in  
the First Primary  
State: Getting to

Roger has over 20 years of experience providing public relations expertise and counsel to corporate management, government agencies and non-profit executives regarding internal communications, stakeholder relations, coalition building, strategic public campaigns, grassroots organizing, branding and fundraising strategies. Roger is a signatory to the codes of ethical practice of the Public Relations Society of America (PRSA) and conducts work in accordance to the principles set forth in these codes. As an accredited member (APR) of PRSA, he has demonstrated broad knowledge, strategic perspective, and sound professional judgment in the field of public relations

Roger joined Clean Air-Cool Planet in 2006 to prepare a global warming education campaign in New Hampshire ahead of the 2008 presidential primary. Prior to a successful 5-year stint as an independent public relations practitioner, Roger was a consultant in the public relations and management consulting firm Jackson, Jackson and Wagner. From 1995 through 1999 he served as Special Assistant to the Secretary of the Interior and served in the White House Council on Environmental Quality to help manage overall program and policy development for the American Heritage River Initiative. Before serving in the Clinton administrations Roger was National Field Director for the League of Conservation Voters and later executive director of the LCV Education Fund.

His presentations include those made at: the American Farmland Trust Leadership Conference; international conferences of the Public Relations Society of America (3); Northeast Climate Action and Education Workshop; International Trails and Greenways Conference

James Cole	CIEE	<p>The Transition Initiative Movement-Community Self Reliance in Response to Global Warming, Peak Oil and Economic Uncertainty</p>	<p>The authors describe how concerned citizens in 160+ cities in the US and globally, and 700+ more in the “mulling” stage, are implementing the Transition process (<a href="http://www.transitiontowns.org">www.transitiontowns.org</a>) in their communities to respond to global warming, peak oil and growing economic uncertainty by moving away from dependence on fossil fuels and creating local organic food networks, energy-efficient transportation and building, and renewable energy initiatives. These strategies increase community self-reliance—the capacity to meet essential needs locally—and strengthening resilience to economic and energy shocks. Transition/relocalization engages government and business in these initiatives as well as the process of developing a comprehensive Energy Descent Action Plan for the entire community.</p> <p>The authors describe their ongoing experiences in working with local citizens to launch and guide Transition Initiatives in the Portland (OR) and the cities within Boulder (CO) and San Luis Obispo (CA) counties.</p> <p>Authors Brownlee and Johnson also serve on the leadership team for Transition US and lead regional Training for Transition workshops. They will describe how the leadership of Transition US and global Transition Network are supporting the growth of the Transition movement.</p> <p>The presentation will include: a description of the underlying principles of the Transition movement and the 12-step process being implemented in a typical local Transition initiative; examples of energy descent planning; projects that stimulate local organic food production, energy efficient transportation and building, and renewable energy; the underlying awareness-raising and social networking approach and support systems that mobilize the creativity of local citizens to design, plan and implement these relocalization initiatives.</p>
John Motsinger Environmental Defense Fund	83	<p>Climate for Community: A demonstration project for aggregating greenhouse gas emission reductions for emerging carbon markets</p>	<p>California’s Global Warming Solutions Act establishes a cap-and-trade approach to reduce statewide greenhouse gas emissions from major economic sectors. Under cap and trade, large polluters will have an economic incentive to slash their emissions. These same incentives could be equitably and efficiently used to engage communities to search for ways to reduce polluting air emissions in their own neighborhoods.</p> <p>Climate for Community is a pilot project, developed by Environmental Defense Fund and San Francisco Community Power, which examines the potential to aggregate small, dispersed emission reductions from households and small businesses for sale in the carbon market. By enabling low income families and businesses to participate in emissions allowance trading markets, this approach would establish an ongoing, dynamic mechanism for combating global warming in communities that have the fewest resources, suffer the worst pollution, and face the greatest risks from a changing climate.</p>

As part of the pilot program, low-income households received a climate change audit and emission-reducing technologies that provide avenues for using less energy and water, reducing solid waste, and driving less. During a follow-up visit, participants will complete a survey that documents behavioral changes that may have emerged as a result of the intervention.

Based in part on pilot results, a technical advisory committee will help develop a protocol for evaluating household and small business emission reductions and assess the potential for aggregating reductions across a community. The committee will evaluate key allowance crediting hurdles, including additionality, verifiability, and ownership, producing a comprehensive analysis summarizing the scope of the opportunities and challenges. Estimated emission reductions from the pilot project will be tabulated, and a framework for including aggregated community-scale reductions into a cap-and-trade market will be outlined.

## **Topic 1D New Media Strategies**

Lynn Clement  
Wisconsin Energy  
Conservation Corp

How "Tweet" It Is

As technology advances and changes our way of life, many marketers are finding it increasingly difficult to reach their customers. While “old-media” approaches like newspaper, radio and in-store marketing remain key drivers for the promotion of energy efficiency programs, more and more consumers are turning to the Internet for their news and information.

Wisconsin Energy Conservation Corporation (WECC), through the Focus on Energy programs, employs online and electronic marketing to increase awareness of its programs, promotions and campaigns. In April 2009, WECC launched “Ask Focus on Energy”—an interactive online service that brings Wisconsin residents and businesses expert advice from top energy professionals. Visitors can search the site’s online database for answers to their energy efficiency and renewable energy questions, and submit questions of their own. The experts will respond to consumers’ questions with professional advice to help them save energy, save money and protect the environment.

Focus promotes the service using the Internet and social marketing tools, together with radio advertising and public relations.

This ongoing campaign is a great example of how program implementers can integrate social marketing elements (Twitter, Facebook, videos, blogging, etc.) into their marketing efforts to reach more energy consumers and enhance the perception of their brands.

This paper outlines the “Ask Focus” social marketing campaign and its results—including consumer impressions; page ranking; number of visits, unique visits, and duration of visits; referral URLs; number of questions asked; most popular questions and answers per user rankings; and more.

Brian Keane

SmartPower

It's A Teenage Wasteland!  
Bringing Energy  
Efficiency to the  
FaceBook Generation!

College students today are considered the biggest wasters of energy. Literally, they are plugged into everything – their iPods, their computers, their cell phones – you name it, these guys are plugged in and using power constantly.

The challenge becomes how can we effectively get today’s Echo-Boomers to actually reduce their energy demand? And how can we get this key demographic onto the “food chain of sustainability” so that they actually become purchasers of energy efficiency and clean energy products?

This multimedia presentation will walk the audience through some of the latest cutting edge technology designed to break through the on-line clutter and speak directly to teenagers and college students. By demonstrating the on-line tools, America’s Greenest Campus and America’s Greenest City, the Presenter will demonstrate how today’s biggest wasters are rapidly becoming part of the climate change solution. And more, the presenter will show how this key demographic group is rapidly becoming the best “customer” of clean energy and energy efficiency technologies.

The highlight of the presentation will be the viewing of the "Top Ten" videos from the EnergySmart Ad Challenge. After ten months of soliciting cutting edge advertisements in partnership with the Internet behemoth You Tube, this presentation will present the "Top Ten" Advertisement to the audience. The online media interest generated from this presentation should be quite extensive and should add to the excitement of the entire conference.

Linda Silverman  
Department of Energy

Linda Silverman will discuss actions that DOE’s Office of Energy Efficiency and Renewable Energy is taking – using conventional and new media -- to influence behavior, particularly of kids and young adults, to become sustainable energy users.

Annalisa Schilla

CALIFORNIA AIR 300  
RESOURCES  
BOARD

CoolCalifornia.org: The  
One-Stop-Shop for  
Californians to Save  
Money (and Reduce  
Greenhouse Gas  
Emissions)

As part of the statewide effort to engage Californians in reducing greenhouse gas emissions, the CoolCalifornia.org partner organizations have developed a one-stop-shop to help all Californians save money and reduce greenhouse gas emissions. The CoolCalifornia.org site provides tools and resources for all Californians, and the Small Business and Local Government toolkits were formally approved the Air Resources Board. The California-specific carbon calculator is the centerpiece of the toolkit for California households, and concludes with a personal climate action plan that users can print out and take away with them. Input from stakeholders and the general public has been solicited through surveys and focus groups to shape the tools, resources and social networking features that comprise the site, and site visit information is gleaned from Google Analytics. The CoolCalifornia.org partners (California Air Resources Board, Next10, Berkeley Institute of the Environment, Lawrence Berkeley National Lab, California Energy Commission, and California Public Utilities Commission) launched a new, improved version of the site in Spring 2009 reflecting the expansion and improvement of the site over the last year. We will discuss the greenhouse gas emissions reductions that are attributable to CoolCalifornia.org and other measures of success, plans to spread awareness of this online resource among Californians, report on the site's evolution over the last year and the results of the stakeholder outreach, user surveys, focus groups and Google Analytics data which are shaping the site, and discuss how the CoolCalifornia.org site fits in to the landscape of California's climate change efforts (online and otherwise).

### **Topic 1E Green Marketing & Energy Efficiency: Drivers of Efficiency Products & Conservation Practices**

Moderator

LeAnn Head

Gwynne Rogers

### **Topic 1F Quantifying Behavior Impacts**

Moderator Paul Stern, National Research Council

Karen Ehrhardt-Martinez

American Council  
for an Energy-  
Efficient Economy

Examining the Scale of  
the Behavior Energy  
Efficiency Continuum

In this paper we highlight the size and scope of potential energy savings and carbon dioxide reductions associated with changed habits, lifestyles and technology-based behaviors within the United States for the residential sector. We explore the level of potential savings along what we call a Behavior Energy Response Continuum. The research begins by identifying the range of potential energy-saving actions that can be taken in the residential sector. These actions are then mapped along a Continuum based on the frequency of the behavior, the degree to which behavior is dependent on the adoption of new technologies, and the level of investment associated with adopting new technologies. Our findings suggests that changed behaviors might reduce household use of energy by about 20-30 percent over the next 5-8 years within the United States. In the presentation we talk about the importance of recognizing the national-level scale of potential behavior-related savings so as to highlight the importance of behavioral considerations at the policy level. We also discuss how this approach has been applied to estimate the potential behavior-related energy savings for the state of Wisconsin.

Chris Jones  
Berkeley Institute of  
the Environment,  
UC Berkeley

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Consumption-based  
carbon footprint  
accounting tools

Consumption is widely recognized as a primary driver of climate change. Virtually every dollar spent by consumers leads to emission of greenhouse gases, and essentially all emissions of greenhouse gases can ultimately be traced to consumer demand. While methods for allocating consumer responsibility are familiar in sustainable consumption literature, tools available to consumers to help them assess their personal contribution to climate change overwhelmingly fail to include all relevant household activities, including indirect emissions associated with consumption of food, goods and services.

A review of relevant literature suggests that well-constructed consumer-oriented tools must not only be accurate, transparent and credible, but must present information in a way that motivates pro-environmental behavior for a broad audience, with different consumption profiles, beliefs, norms, habits, and social and political constraints. A self-selection process may initially limit the dissemination of carbon footprint information to individuals that are already inclined to reduce their carbon footprints. For this audience, consumption-based accounting tools can lead to more comprehensive pro-environmental household decision-making, prevent rebound effects and other unintended consequences associated with a more limited view of consumer responsibility and allow for the internalization of external costs related to consumption.

As a case study we present methodological choices for development of a consumption-based calculator that provides U.S. households with benchmark carbon footprints based on location, household size and income. Potential climate actions are ranked based on financial and greenhouse gas savings. We find that the effectiveness of actions households can take to reduce their carbon

footprints varies dramatically by location, household size and income.

Results from 700 respondents to a user survey initially confirm the value of consumption-based carbon footprint tools and suggest direction for future development.

Zeke Hausfather  
Efficiency 2.0

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A bottom-up statistical regression model of residential energy consumption at a zipcode level

We develop a high-resolution model of home space heating, cooling, water heating, and appliance energy use for every U.S. zip code. The energy use modeling is based on a multivariate regression analysis of 2005 Department of Energy RECs data adjusted by sampling weights to identify factors significant in determining total energy use for each category. The model identified 13 significant variables predicting 84 percent of the variability in home heating energy use. Similarly, the model used 8 significant variables to predict 61 percent of the variability in home water heating energy use, 9 significant variables to predict 73 percent of the variability in home cooling energy use, and 23 significant variables to predict 62 percent of the variability in home appliance energy use. The resulting regression functions were applied to every zip code in the United States using granular default values obtained from the U.S. Census, further regressions on RECs data, and a network of 185 geographically distributed weather stations for every variable found to be significant in the initial regression model. NERC subregion emissions factors and transmission losses were used to derive zip-code level carbon emissions from residential energy use. Results were independently validated by comparing the results on both the state and national level to residential electricity, natural gas, and fuel oil sales data. The model outputs can be used to assess the major constituents of home energy use in different parts of the country to discern the effectiveness of targeted end-use efficiency programs, examine the relationship between population density, urban form, and residential energy use, and numerous other applications.

**Topic 2A BECC Research & Policy Agenda**

Moderator: Jerry Dion, Office of Energy & Renewable Energy, US DOE

Ed Vine

Full title: What do We Know About Behavior and Energy? Lessons Learned and Recommendations for Future Research, Improved Program Design and Implementation, and Creative Policymaking.

During the past year, the California Public Utilities Commission commissioned a series of white papers examining a variety of technical and policy issues related to behavior and energy:

1. Energy efficiency potential studies & behavior
2. Measurement & evaluation of energy savings & non-energy impacts from energy efficiency behaviors
3. Process evaluation's insights on energy efficiency program implementation
4. Behavioral assumptions underlying energy efficiency nonresidential programs
5. Behavioral assumptions underlying energy efficiency residential programs
6. Market segmentation & energy efficiency program design
7. Experimental design for energy efficiency programs
8. Motivating policymakers, program administrators, & program implementers to pursue behavioral change strategies
9. Encouraging greater innovation in the production of energy-efficient technologies & services

The white papers were essentially "review papers" that examined a particular topic, reviewing past and recent work, and then suggesting additional research to fill in research gaps and recommending policies for ensuring that behavioral issues are considered by energy efficiency policymakers. This presentation provides a concise summary of what has been learned in each of these topical areas and identifies a set of recommendations for researchers, program managers, and regulatory staff. Given the urgency to address global climate change, the findings from these papers will help to create a more comprehensive framework for promoting energy efficiency (as well as renewable energy) which goes beyond the development of new technologies.

We are proposing a session—actually, two—on the topic of “Setting the Research Agenda for Energy, Behavior, and Climate Change.”

Our overall goal is to create a research agenda for behavior, energy, and climate change that identifies critical questions about energy and behavior, engage potential funders, and then launch the research needed to provide critical information to policy and other decision makers.

Our proposed three-step strategy is to 1) convene a group of leading BECC researchers, policy makers, and research funders, and have them identify key questions and players in the energy arena, e.g., building owners, land-use planners, procurement officers, home buyers, etc., 2) interview these user groups about their behavior questions, and 3) develop a research agenda to address the research questions identified.

We define Behavior Research across a wide range of contributing disciplines, from macro-level areas such as economics, anthropology, and sociology, to individual, person-focused work, such as behavioral psychology and human factors engineering. The question of “Whose Behavior?” is key, as we want to look at the spectrum of players who have an impact on energy.

While our preliminary focus is on buildings, we are interested in the linkages to transportation, urban- and land-use planning, building practices, and financial lending policies, as well as the connections to smart grid, smart buildings and information technologies.

Our ideal scenario would be to convene back-to-back sessions:

Session #1: The Researchers Perspective. Three prominent energy and behavior researchers give their views on the critical behavior research needs.

Session #2: The Policy and Funders Perspective: Three representatives from federal, state, and local government present their needs for behavioral research, and ideally, make reference to the recommendations in the previous session.

Such a scenario will require a fair amount of coordination and planning, which we propose to undertake, including getting draft material from the participants distributed prior to the conference so they can review each other’s remarks.

## **Topic 2B Technology & Design**

Moderator: Alan Meir, Energy Efficiency Center

Keith Halper  
Tai Stillwater  
Tom Sanquist

## **Topic 2C Buildings & Real Estate**

Moderator Karl Brown

Rachael Shwom

Rutgers  
University

Green  
Spotches:  
Explaining  
Uneven  
Development  
of Green  
Spaces &  
Places in New  
Jersey  
Residential  
Development

Though remaining fairly distinct efforts, the momentum behind both the green building and smart growth movements has grown over the last decade. The green buildings movement has focused on the environmental impact of a building or home advancing the market through certification programs like LEED or Energy Star Homes. Meanwhile, the smart growth movement has sought to influence overall patterns of development emphasizing where things are built. At the nexus of these two movements are real estate developers who decide where and what they build with large implications for subsequent home and transportation energy use. In this paper, we use the state of New Jersey to explore the factors that drive real estate developer decisions of where and what to build, the interactions between the two, and its implications for energy and climate change. Building on recent findings that document a shift in New Jersey development from building on the suburban outskirts toward re-building the inner core, this paper seeks to identify the potential decision factors that account for differential uptake of green building and smart growth goals by residential real estate developers. Estimates of achieved and potential greenhouse gas emissions reductions for the adoption of green building and smart growth goals will be calculated. The paper will conclude with a discussion of how the green building and smart growth movements' goals may be synchronized within the real estate developer's decision-making process when building new homes.

Amy Wolfe

Oak Ridge National 250  
Laboratory

Commercial/industrial  
building retrofits: Evolving  
lessons about factors that  
promote or impede the  
realization of energy savings  
goals

This presentation analyzes real-world experiences in retrofitting and installing meters in commercial/industrial buildings to provide information about the decisions and actions that affect realized energy savings. There are considerable documented and anecdotal indications that energy savings actually achieved fall short of design objectives. The aim of these analyses is to move toward greater match between designed and actual energy savings, by deepening understanding or why these 'failures' may or may not occur. Our discussion will focus on Oak Ridge National Laboratory, with 4,400 employees and 3,000 guest researchers annually, as a natural experiment. Although there is much new construction at ORNL, its stock of aging buildings pose numerous energy-efficiency challenges that mirror the challenges faced in many other commercial settings. ORNL currently is in the midst of a major transformation, and has launched an ambitious Sustainable Campus for the year 2018 Initiative. The \$89M Energy Service Performance Contract in association with the TEAM effort is just one component of this larger Sustainable Campus Initiative. This presentation

discusses interim findings from information elicited from parties responsible for (a) deciding which energy conservation measures (ECMs) to install in different ORNL campus locations, (b) installing ECMs, (c) maintaining and repairing ECMs, and (d) using or co-existing with the ECMs (building occupants). The purpose of this information gathering is to identify decisions and actions that, separately or in combination, promote or inhibit the realization of designed energy savings.

Jenny Palm  
Linköping  
University

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Home-owners decision-making process when building a new house – a matter of practical, symbolic, and material conditions

While reports from the International Panel on Climate Change (IPCC) suggest that a 50-80 percent reduction of green house gasses needs to be accomplished by 2050 and stresses the need to act swiftly, different kind of actors need to take action. The housing sector accounts for approximately 40 percent of total energy demand in Western European countries, including Sweden, which make energy efficiency a vital issue for the whole sector.

This paper focuses on home-owners that within the last three years have built a new house and in this building process faced several energy related issues. Energy use in households is a result of different constructions of the material and the cultural spheres and energy use is interwoven into everyday life. In this study we will discuss not only how households perceive and understand their energy use, but also how they approach energy-related technology and the possibilities they had to enable energy efficient behaviour when deciding on how to design and construct their new house. We will also discuss how municipal policy making and the building constructor's building standard have been integrated (or not integrated) into the home-owners decision-making process and everyday energy use. The paper is based on in-depth interviews with 17 home-owners, municipal politicians and officials in two Swedish municipalities and the building constructors involved. The paper will discuss how practical, symbolic and material conditions are involved in the home-owners decision-making process when building a house and lessons to be learned about how to approach households.

## **Topic 2D Social Marketing**

**Moderator: P. Wesley Schultz, California State University, San Marcos**

William A. Smith

Arien Korteland

BC Hydro

Social Marketing Theory applied: entering into a relationship with customers

BC Hydro channels its energy conservation initiatives through Team Power Smart, a program that is built on the key elements of the social marketing construct and that carries resemblance to customer loyalty programs. By joining online, participants commit to use 10% less electricity over the next 12 months. Member benefits include:

- Feedback tools (compare your consumption to others, consumption graphs, tracking tools and an in-depth “Analyse My Home”)
- Special offers
- Subscription to a free monthly eNewsletter
- A magazine (recently tested for its effectiveness in engaging participants)
- Regular communications through welcome letters, mid-term report cards, etc.
- Rewards and other incentives

The program stimulates participants to change behaviour and form new habits. Analysis through billing analysis and various surveys shows significant energy savings.

This presentation provides an overview of Team Power Smart, why a relational framework was chosen, how the key elements of the social marketing construct are applied, and what savings were achieved to date. In addition, a dedicated Ambassador strategy is currently being developed for the ‘elite’ members of Team Power Smart (with the highest level of savings and/or the lowest level of consumption), and the first results of this initiative will be included in the presentation.

Bruce Cenicerros  
SMUD

Results from the  
SMUD/Positive Energy  
Bill Comparison Experiment

In October, 2009, a third-party consultant completed their analysis of the energy savings impacts of Home Electricity Reports pilot program. The Reports were distributed monthly or quarterly by mail to 35,000 randomly selected customers for one year. They utilized a normative message comparing each recipient’s monthly and 12-month energy use to a “neighbor” peer group (100 nearby homes of similar size and with the same heating fuel source) and a comparison of the recipient’s energy use that month with the same month in the previous year.

While the evaluation confirmed previous analyses showing approximately two percent average kWh savings on recipients’ total electric bill, the most interesting outcomes of the study concerned how to better understand what recipients did that led to this savings and lessons-learned that will improve future evaluations of behavior-change programs such as:

- Determining attribution of savings to behavioral vs. equipment changes
- Understanding the interactions between social science-based behavior programs and other utility programs in motivating customers to save energy.
- Avoiding double-counting of energy savings for participants in multiple programs

- The challenges of measuring small amounts of savings and small differences in actions taken at the margin in a population.
- Methods of identifying target groups that saved the most, and groups to avoid, and the limitations of these methods.

## **Topic 2E Recent Sociological Research & Insights for Reducing Energy Use**

Elizabeth L. Malone, Joint Global Change Research Institute, PNNL

Kathryn Janda  
Oxford University

The Social Organization of  
Energy Research: A  
Review of Recent  
Initiatives

In response to concerns about climate change, many countries are ratcheting up their carbon emissions reduction targets. In the UK, for example, the target in 2006 was a 60% reduction by 2050, but in 2008 the target increased to 80%. One effect of such enormous carbon reduction targets is that it seems increasingly unlikely that technologies alone will save the day. The deployment of efficient, renewable, and zero-carbon technologies at scale sufficient to achieve this reduction would be unprecedented, and will probably not go unnoticed by the general public. In fact, how to garner public support for a transition to a more sustainable future has become a hot topic, which is discussed and debated in the media, in town halls, on street corners, and in the academic literature. Within the last decade, a number of initiatives (e.g., research programmes, conferences, and workshops) have been launched by governments, international organizations, universities, research groups, and non-profits to consider the social dimensions of energy production and consumption. This presentation reviews and characterizes these initiatives, with a particular (but not exclusive) focus on research programmes that address social aspects of consumption and efficiency in the United Kingdom. Examples from the United States and elsewhere are also discussed. The review shows that different institutions are approaching the question of energy use as a social problem in very different ways. In their analysis and discussion, the authors develop a schematic model to map the landscape of issues addressed by these initiatives. In conclusion, the presentation suggests that further coordination and ongoing comparative study of these initiatives could foster innovation, reduce replication, and increase their impact.

Laura Mamo

Pamela Jull

Comparing Attitudes  
and Practices Across  
Communities

In 2005, King County, Washington developed a comprehensive index of people's behaviors that programs run by the Department of Natural Resources and Parks seek to impact. Dubbed the "Environmental Behavior Index" (EBI), the measures were designed to inform a wide range of programs and helped consolidate survey research evaluation efforts that were being undertaken by each program independently.

The EBI tracks residential behaviors across water quality, solid waste, and energy and climate change related behaviors. The 2008 EBI of 24 measures assessed the behavior of selected segments of the residential population including less educated residents, and those in apartments or rural areas.

For each behavior, people were generally asked three questions:  
What do you do? (Both improper and proper behaviors are provided as options)  
How often do you do it that way? (Most of the time/some of the time)  
Have you ever considered doing it differently? (Describe the proper behavior)

This line of questioning enabled analysts to place people in one of four behavioral stages strongly related to the transtheoretical model of behavior change: precontemplation, contemplation/preparation, action, or maintenance.

The EBI has attracted the attention of the Environmental Protection Agency as a potential model for standardizing environmental behavior measurement across geographic areas. Standardized measurement could lead to the discovery of best practices, consolidate and maximize resources used for such research and more effectively inform national and regional agendas on programmatic behavior change issues.

## **Topic 2F Behavior & Energy Modeling**

Moderator: Priya Sreedharan, US EPA

Danny Cullenward

Stanford University 203

How Do Energy Models Represent Energy Efficiency? An Examination of the U.S. Government's Energy Model, NEMS

Energy policy analysis relies heavily on modeling and forecasting. Although rarely discussed, the representation of consumer behavior in energy models can influence policy analysis in striking ways. I present a case study of how one model, the National Energy Modeling System (NEMS), conceptualizes consumer behavior.

NEMS is a particularly important model to explore in depth, as the U.S. Government uses it for federal energy policy analysis (e.g., EIA 1998). In addition, NEMS is used to create a standard reference scenario for future energy consumption (e.g., EIA 2009), used widely by policymakers, academics, corporations, and non-profits. Hence, NEMS shapes experts' perception of U.S. energy strategy.

In addition to documenting how NEMS models consumer behavior, I show how the model can be modified to explore alternative scenarios. These techniques should enable behavioral scientists to integrate their insights into the federal energy policy process.

Patricia Thompson

Sageview  
Associates

Modeling Electric Vehicle  
Purchasing Behavior and  
Strategic Implications

Consumer adoption of electric vehicles is becoming an increasingly strategic issue to utilities. Significant long term risk or reward may exist, depending on how this adoption is managed. This analysis shows the results of a significant research effort to develop robust planning methods and tools to help predict, and plan for, likely electric vehicle adoption clusters and desired charging behaviors or times. Choice experiments are conducted using, various car features including (Maximum Speed, Incentives, “fueling” ability, time, milage, brand, car type and price). Share forecasts on electric vehicle adoption are developed, and also clustered into actionable segments (e.g. retirees with disposable income, homeowners with high property values etc.) Critically, analysis of early adoption clusters can be locally mapped to identify local areas of potential strategic risk for the utility. Methodological innovations include the integration of several valuation and planning tools, including Bass model market forecasting, consumer choice simulations, clustering analysis of customer preferences, geospatial forecasting analysis, and financial valuation of capacity risk.

Carol Shay Lenox  
EPA

Energy efficient  
technologies in the U.S.  
buildings sector and the  
benefits for carbon dioxide  
reduction (an analysis  
using the MARKAL  
model)

Residential and commercial buildings contribute around forty percent of the carbon dioxide emissions in the United States when you account for both direct emissions and indirect emissions from the use of electricity, more than the total carbon dioxide emissions from the transportation sector. This analysis looks at various technologies and conservation measures available to the residential and commercial buildings market and at the impacts, particularly the timing of their implementation, which these technologies and measures could have on total U.S. carbon dioxide emissions.

The U.S. Environmental Protection Agency’s Air Pollution, Prevention, and Control Division’s Energy and Climate Assessment Team is using the MARKAL energy system model to estimate future-year technology penetrations and their associated emissions. This analysis utilizes a MARKAL database representing the U.S. energy system at a national level developed by the Energy and Climate Assessment Team, with a reference case calibrated to the results of the Department of Energy (DOE) Annual Energy Outlook (AEO) for 2008.

In summary, our analysis looks at the benefits of a rapid deployment of a variety of energy efficient technologies and measures, and shows these technologies and measures can make an important contribution to carbon dioxide emission reductions.

## **Spotlight Sessions**

### **Behavior & Federal Policy**

Holmes Hummel, US Department of Energy, Policy & International Affairs  
Maria Tirkoff Vargas, US Environmental Protection Agency, Energy Star  
Dan Beard, CAO, US House of Representatives

Claire Broido Johnson, US Department of Energy

This panel will explore the role of the social and behavioral sciences in federal and climate policy development.

**Smart Grid & Feedback**

Carrie Armel, Stanford, Precourt Energy Efficiency Center

Omar Khan, Google.org, Google's Power Meter Program

Gregory Abowd, Georgia Tech, School of Interactive Computing

Matthew Trevithick, Verrock

This session envisions how to leverage sensor data-smart meter and home area network data-with behavioral techniques & information technologies to reduce and shift energy use.

**Decision Making & Consensus Building**

Jonathan Raab Raab Associates

Elke Weber, Columbia University Center for Research on Environmental Decisions

The speakers will discuss current thinking in decision-making and consensus building research, their application to energy and environmental policy and their implications for accelerating energy savings and GHG reductions.