

11/5/2012

2012 BECC Abstracts

Session #: 5F

Speaker Brian Abelson, Harmony Institute

BEST FIT Topic:

Sector:

Presentation Title Strategies for Effectively Measuring the Influence of Documentary Films

Abstract Text Abstract Unavailable

Session #: 4A

Speaker Fahmida Ahmed, Stanford University

BEST FIT Topic: 1. Community-Based Programs

Sector: Consumption

Presentation Title **Creating Behavior Change and Institutionalizing Sustainability at Stanford**

Abstract Text Since the 1980s, Stanford has designed and implemented innovative, campus-wide programs to address environmental sustainability in energy, water, waste and building efficiency. Much of this work has remained behind-the-scenes, yet there is a huge demand on campus to learn more about how to engage in sustainability on a day-to-day basis. The Office of Sustainability identified this need for more outreach to the campus community and designed exciting and practical platforms to engage with them, sparking a transformation to sustainability as a core value and cultural norm. These engagement platforms include the creation of the Cardinal Green campaign series, a set of six annual behavior campaigns covering a variety of sustainability topics and structured around the goals of conserving resources, saving money, and engaging the campus community. Each campaign consists of clear messaging and advertising through typical university channels, a dedicated campaign website, a webinar and/or other educational training activity related to the campaign theme, timely publication of campaign results and metrics, and incentives and rewards for participation, pledges, and/or results. The campaigns are designed with quantifiable metrics in order to monitor campaign progress from year-to-year and to measure campaign impacts. One campaign example is “Turn Off for Break,” which encourages staff to save energy during the university’s annual winter closure, leading to more than \$266,000 in avoided operating costs in 2011. These campaigns not only engage the campus population in a fun and meaningful way, but also directly contribute to the bottom line and create lasting impacts on campus.

Session #: 5B

Speaker Martha Amram, WattzOn

BEST FIT Topic: 2. Marketing and Outreach

Sector: Building Energy

Presentation Title **Green Energy Match: Aligning Economic Development and Energy Savings**

Abstract Text Green Energy Match (GEM) engages San José, CA residents in behavior-based energy savings. The program's rationale and design are based on aligning energy savings and local economic development via retail spending. Energy savings increase household income; if spending patterns continue, the additional funds are largely spent in the local retail sector. Our analysis shows that every \$1 of residential energy savings leads to \$1.80 in local retail sales. San José residents spend \$600 million per year on energy. A 5% savings could lead to \$54 million in increased spending. Local energy savings can be a powerful, low-cost economic development tool. To catalyze the shift from energy savings to local spending, GEM offers two types of rewards: •Coupons with deep discounts to local merchants are awarded when residents meet savings goals; •Grants to local organizations are awarded when communities meet participation and savings goals. GEM's unique outreach approach illustrates the challenges and solutions in mounting a city-wide behavior change program in a city with no ethnic or linguistic majority. Outreach and engagement has been tailored to neighborhood specifics of language, technology access, and cultural understanding of energy. WattzOn's sophisticated web platform engages residents, rewards savings, and tracks results. Details on engagement and savings are presented by ethnic group and neighborhood. Early results show that 55-60% of participants are saving energy, with an average savings rate of 20%. We will detail our economic development argument, including how GEM's outreach has been designed to enhance and track this impact.

Session #: 4C

Speaker Jillian Anable, The Centre for Transport Research, University of Aberdeen

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Evaluation

Presentation Title **Evaluating Travel Behavior Policy Interventions: Where the Best Evidence is the Enemy of the Good,**

Abstract Text Three medium sized towns in England received dedicated investment to implement a programme of 'soft' measures from 2004 to 2009 intended to reduce car use. This paper presents the results of a two-year study which triangulated three sources of data to assess the impact on travel at household and town-wide levels. It examined the relationship between interventions and bus, car, cycle and walking changes 'on the ground' and whether these may have happened anyway given wider national trends. We conclude that the programmes were successful in achieving behavior change, particularly in reducing car trips and mileage travelled by residents, whilst encouraging substantial increases in other modes. The aggregate trends in traffic, bus use, walking and cycling in the towns were different from those in other medium-sized urban areas in England over the same period. There were indications of complex behaviour changes involving transfers between modes, changes of destinations and changes in trip numbers, and the biggest reduction in car driver distance came from changes to leisure trips, then shopping and work-related business. In the light of this study, we offer some thoughts on whether policy makers are justified in doubting the quality of the evidence relating to the potential impact of travel behaviour interventions. Whilst we acknowledge continued uncertainties, we offer a provocative alternative assessment of the evidence and suggest that the hallowed principle of evidence-based policy making can lead to policy and scientific blind-spots which, for soft transport interventions, is stifling methodological innovation and new contributions to knowledge.

Session #: 5B

Speaker Zach Anderson, Milepost Consulting

BEST FIT Topic: 2. Marketing and Outreach

Sector: Consumption

Presentation Title **Making It Easy To Engage: Translating Complex Research to Inspire Behavior Change**

Abstract Text The old adage, “you can’t manage what you don’t measure” holds true when trying to engage people and inspire behavior change. However, good data are only numbers without a compelling story, which is often hidden within spreadsheets and paragraphs thereby reducing its potential to impact people and move them toward action. Why does this happen – we design for ourselves rather than the end user. Info-graphics allow the data to tell a coherent and relatable story, making technical or complex data easily accessible to larger audiences and meaningful to the target audience. In 2010, the City of Seattle, King County and the Stockholm Environment Institute (SEI) developed a comprehensive consumption-based inventory of the emissions associated with all goods and services consumed by residents of King County. The end goal was to inform and inspire residents to reduce their consumption by accessing information presented in the Climate Action Plan. Unfortunately, the citizens of Seattle are, like many across the country, climate-fatigued and consumption-based action is unlikely. To overcome fatigue and inspire action, we developed person-centric infographics built upon the SEI inventory that communicate the story of how consumption impacts our environment and what can be done to reduce those impacts. This presentation will provide key strategies necessary to develop effective and engaging infographics. Best in class examples will be showcased and particular attention will be placed on the art of finding your target audience, knowing what data to include and creating a narrative within the graphic.

Session #: 2A

Speaker Hannah Arnold, Opinion Dynamics

BEST FIT Topic: 9. Management Decisions

Sector: Building Energy

Presentation Title **Solutions for Increasing Energy Smart Action in Commercial Organizations**

Abstract Text Within the business sector, the decision to engage in energy conservation behaviors is influenced by a myriad of factors such as operational (in)flexibility, load oversight, and staff management. This presentation will highlight two studies that reveal management and staffing barriers and successful solutions to overcome these barriers: a segmentation study in Ontario and an evaluation of a Midwest program specifically targeting management and staffing constraints. First, the presentation will highlight a Commercial Demand Response (DR) segmentation study that demonstrates not only that different commercial segments confront different barriers to engaging in low-carbon behavior, but also shows: 1) how certain segments are more susceptible to barriers overall; 2) how different types of barriers emerge as relevant or irrelevant by segment; and 3) how level of interest in DR program type differs by an organization's stated choice of DR program type. The presentation will then focus on how, despite these barriers, opportunities do exist to foster energy saving actions. Currently, utilities are implementing strategies to encourage behavior change among businesses by specifically addressing management and staffing constraints. By offering staffing grants, the utilities are directly confronting the lack of staff available to oversee energy management and energy saving projects in general. Based on research in Illinois, we will demonstrate the potential impact of these emerging initiatives and how to overcome barriers revealed in the segmentation study. This presentation will offer policy makers, industry experts and program implementers solutions for overcoming key barriers to behavior change within the business sector.

Session #: 6C
Speaker Kira Ashby, Consortium for Energy Efficiency

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Building Energy

Presentation Title **“Connected” Technologies and Behavioral Approaches in Efficiency Programs**

Abstract Text As energy efficiency programs apply behavioral approaches to increase savings, the use of two-way communication technologies has emerged as a potentially valuable tool to achieving this goal. We propose an oral presentation that would highlight innovative ways program administrators are leveraging new technologies to change energy use behavior. The discussion would focus on three different pilots currently underway in three distinct regions: the northeast, the west coast, and the south. These three pilots facilitate two-way interaction via a variety of different technologies including smart phone apps that encourage remote adjustment of thermostats, web portals that provide detailed energy-use information and compare customers’ usage to that of others, and real-time feedback provided through displays in customers’ homes or businesses. The programs all provide engaging information to the customer in a way that encourages changing behavior and/or providing information in return, with the goal of reducing energy consumption. The presentation will focus on how these technologies can change behavior, the methods program administrators have used to measure and evaluate these impacts, and some early insights on claiming savings from these programs. Attendees would come away from this presentation with a deeper understanding of the benefits of engaging customers to get “connected” using two-way devices and the lessons learned from these approaches. Additionally, the question and answer period would present an excellent opportunity for BECC attendees to provide input on these programs currently underway.

Session #: 2F

Speaker Jonn Axsen, Simon Fraser University

BEST FIT Topic: 4. Modeling Behavior

Sector: Transportation

Presentation Title "Will Electric Vehicle Buyers Want Green Electricity?"

Abstract Text The environmental benefits of plug-in electric vehicles (PEVs) will depend on the sources of electricity used, e.g. fossil fuels versus renewable ("green") energy. We explore the idea that PEV buyers may want to buy green electricity to recharge their vehicles. Our hypothesis is that PEVs and green electricity will be viewed as complementary goods—consumers that buy one would buy the other. Alternatively, consumers may see the goods as substitutes—purchasing one of the two is "good enough" to help the environment. We test our hypothesis via a web-based survey completed by over 1400 U.S. car buyers. Through a series of "design games," respondents were given options to pay extra to: i) design a PEV version of their next vehicle purchase, ii) design a "green" electricity program for their home using renewable energy sources, then iii) design a "combined package" of a PEV and a green-electricity program. Offering the "combined package" increased demand for PEVs by 7 to 20 percent, supporting our initial hypothesis of complementarity. However, across our sample respondents varied in viewing the goods as complements, substitutes, or simply unrelated. Further analysis indicates that the vast majority of respondents are generally ill-informed about energy and do not think about their electricity sources. We conclude that attempts to link demand for PEVs and green electricity will require a change in consumer consciousness, e.g. through shifts in awareness, social norms, or other factors. Such perceptual disconnections may extend to other cases of "life cycle" environmental impacts and policies.

Session #: 1D

Speaker Banny Banerjee, School of Design

BEST FIT Topic: 7. Gamification

Sector: Building Energy

Presentation Title **Design for Behavior Change: Technology-based Interactive Software for Energy Reduction Using a Transdisciplinary Process Combining Innovation Methodology and Behavior Change Theory**

Abstract Text The Stanford ChangeLabs aims to be the nexus of design methodologies and behavior change science research and practice. The Design Thinking process and principles integrated with social science research yield innovative approaches to consumer-oriented interventions. In the context of a DOE -ARPAe funded Energy and Behavior Initiative, we use this approach to examine whether motivation to reduce energy consumption is enhanced by interactive feedback systems tailored to an individual's primary motivational orientation. The results are three Facebook applications that allow individual preferences to be matched to venues for energy reduction practice. Kidogo, an affect based application turns energy savings to microfinance loans. Powerbar, utilizes power of cognitive engagement in self-monitoring, for energy reduction and financial savings, and PowerTower, leverages the power of social game play and competition in social networks to save energy. We present the combination of design thinking and social science research behind the interface design and results of two randomized controlled studies of video mock-ups of our applications. We present results on user's liking, perceived trust, credibility, and short term behavior change intentions along with the moderating effects of individual factors such as level of Need for Affection, Cognition, and Affiliation. This controlled trial is preceded by two studies of user reactions to potential Kidogo and Powerbar interfaces. Early results of the investigations of "live" Facebook applications on electricity reductions will also be presented. Is energy reduction enhanced by interactive feedback systems that best fits your primary motivational frame? We address this question.

Session #: 1B

Speaker Dorothy Barnett, Climate + Energy Project

BEST FIT Topic: 1. Community-Based Programs

Sector: Consumption

Presentation Title **Take Charge Challenge: Changing Efficiency from Sacrifice to "We Win"!**

Abstract Text Take Charge Challenge In 2011, the Take Charge Challenge utilized inter-city competition to save 110 billion BTUs of energy, substantially reducing carbon emissions, while promoting energy efficiency and changing behavior across the state of Kansas. Sixteen Kansas cities in four different regions of the state made small changes to their homes and businesses to save energy, save money, and help their communities win. Take Charge featured leadership teams - made up of influential community members and electric utility representatives. Teams strategized ways to harness each community's effort to save energy and beat their neighbor. This program's success was based on our ability to change efficiency from sacrifice to "we win"! CEP focused on core heartland values of frugality, saving money and conservation in the program design and messaging. The Challenge utilized natural rivalries between communities to generate excitement and interest. For nine months community leadership teams hosted a total of 1,093 events and presentations in an effort to save the most energy per capita within their region. The 4 regional winners each received a \$100,000 grant to implement a renewable energy or energy efficiency project for their city. Participants switched 309,154 incandescent bulbs, installed 5,022 programmable thermostats and volunteered 3,279 hours valued at \$55,743. 1,141 energy audits and 152 whole house retrofits were completed during the Challenge. Take Charge was a featured best practice in LBL's "Driving Demand for Home Energy Improvements" as well as a new Earth the Operator's Manual documentary "Energy Quest USA" premiering on PBS, April 22nd. BIO The Climate + Energy Project (CEP) is a Kansas based non-profit working in the Heartland states of KS, MO, NE, OK, AR, NM and the Panhandle of TX. We collaborate with a broad coalition of diverse partners interested in jobs, prosperity and security to find practical solutions for a clean energy future. One of our most successful programs is the Take Charge Challenge. Presenters include: Dorothy Barnett, Executive Director of CEP and Eileen Horn, Sustainability Coordinator for Lawrence, KS, one of the participating cities in the Take Charge Challenge.

Session #: 4A

Speaker Beth Beckel, Boulder County

BEST FIT Topic: 1. Community-Based Programs

Sector: Building Energy

Presentation Title **EnergySmart Social Marketing: Lessons from Boulder County**

Abstract Text Nearly two years into its program life, Boulder County, CO is continuing to experiment with community-based outreach strategies for our EnergySmart program. EnergySmart is an energy efficiency upgrade program, offering rebates, financing, and one-on-one advisor assistance. The program design has proven extremely effective at driving leads to upgrades with a >50% conversion rate. But how to get people in the door? EnergySmart is ARRA-funded through the Department of Energy's BetterBuildings Grant, and is administered by Boulder County and partnering governments. With limited marketing funds, relying on traditional television and newspaper campaigns is out! Instead, EnergySmart has used traditional print and online media to raise awareness, while staff focuses on face-to-face outreach to gain program enrollments. EnergySmart is on track to reach 10,000 homes and 3,000 businesses in its three-year program life. Come hear how. In this session, Boulder County staff will discuss best practices and lessons learned from a variety of strategies including: -☐Community Energy Parties -☐Phone and door-to-door messaging experiments -☐Discounts, coupons, and limited-time motivators -☐Integration into corporate Wellness Programs

Session #: 2F

Speaker Kadir Bedir, PHEV Research Center at UC Davis

BEST FIT Topic: 4. Modeling Behavior

Sector: Renewables

Presentation Title **Adapting Control Theory Approach for the Modeling of Pro-Environmental Consumer Behavior**

Abstract Text Several attempts have been made in the past to adapt mathematical control theory for describing some major issues in social sciences, e.g., Sociological Control Theory (Control Strategy Theory), Perceptual Control Theory (Choice Theory), Identity Control Theory, and Cognitive Control Theory. The common point of these studies is that every collective or individual behavior can be explained, and in some cases can be controlled, by pointing out the controlling factors. The controlling factors can be social conflicts, personal motivations, or some neurological activity depending on the application. In this study, the Control Theory Approach (CTA) is applied to the analysis of a survey data that is designed to evaluate decision making processes in adoption of electric vehicles and green electricity programs. The CTA based modeling provides a new approach for the pro-environmental consumer behavior phenomenon. The consumer motivations can be rated qualitatively, and the feedback based evaluation system can be represented in the model. The intuitive and cognitive thinking terminology of the Prospect Theory is also used in order to identify so called “rational” decisions where the Control Theory is applicable. The analysis shows that there is little association exists between the consumer motivations for electric vehicle and green electricity adoptions. The policy and marketing implications of the findings will be presented in the conclusion.

Session #: 6D

Speaker Ryan Bell, Alameda County

BEST FIT Topic: 9. Management Decisions

Sector: Government

Presentation Title **From Planning to Action: Involving Employees In Your Climate Action Plan**

Abstract Text Alameda County's Sustainability Program has been using social marketing principals in developing and implementing the County's Climate Action Plan for Government Services and Operations. These techniques are crucial, in light of financial and staffing limitations, for encouraging diverse agencies to internalize and develop a sense of ownership of these climate protection efforts, and for encouraging the individual behavior changes ultimately needed to reduce the County's carbon footprint. County staff will share their strategies for encouraging broad participation in climate action, including how we shifted our climate committee meetings from "discussing" to "collaboration and doing," which led to top-level commitments for specific actions, executive sponsorship, the targeted involvement of dozens of employees, and the creation of work plans for cross-functional teams working on specific emissions reduction programs. We will discuss the tools we have used to support this shift, including:

- Facilitation techniques (focused conversations; consensus workshops; touching the deeps),
- Peer interactions and behavior modeling (our green ambassadors program),
- Employee engagement (focus groups, surveys, events),
- Social norming (employee orientations, spotlighting actions), and
- A phased approach that balances thoughtful long-term planning with concrete actions with visible quick wins that build momentum for, and acceptance of, broader changes.

These processes and techniques will be illustrated through a discussion of how they have been used in our programs - focusing on the results seen and lessons learned. Through this session, participants will have a better understanding of how to create a participatory process for advancing climate protection within their organizations.

Session #: 5C

Speaker Stephen Bickel, D&R International

BEST FIT Topic: 5. Enabling Policies

Sector: Building Energy

Presentation Title **Retrofit 30 Million Homes by 2020: There Is a Behavioral Blueprint?**

Abstract Text There are big energy savings (Rosenfelds) from energy retrofits of residential homes and the sooner we capture them the greater the impact. But how does one induce tens millions of U.S. households to voluntarily invest in energy upgrades? Have U.S. households ever engaged in such an effort? The answer, surprisingly, is "Yes." In late 1941, facing the prospects of a national food shortage and with most farm laborers going off to war, the U.S. government launched the Victory Gardens program. By 1943, half of all U.S. households had Victory Gardens which generated 40 percent of all U.S. produce. These stunning results occurred because the Victory Gardens program, intentionally and unintentionally, leveraged a suite of powerful behavioral tools, employed a masterful organizational model, and leveraged existing resources and networks. This presentation will layout the components, including the suite of behavioral strategies, that contributed to the success of the Victory Gardens program. It will then show how this strategy can be used as a blueprint for a "Victory Homes" program aimed at stimulating million of U.S. households to upgrade their home's energy performance.

Session #: 7E

Speaker Dina Biscotti, University of California, Davis

BEST FIT Topic: 1. Community-Based Programs

Sector: Building Energy

Presentation Title **Political and Market Mobilization for Energy Efficiency in Two Interfaith Organizations**

Abstract Text We present research findings from our investigation of two national interfaith organizations that seek to mobilize member congregations to retrofit houses of worship, participate in political action to address climate change, and encourage energy-saving behaviors as stewardship of God’s creation: Greenfaith and Interfaith Power and Light. New Jersey-based Greenfaith provides training for clergy and lay leaders and a comprehensive religious-environmental certification program for houses of worship. California-based Interfaith Power and Light (IPL) has developed a network of over 10,000 member congregations across 38 U.S. states. These member congregations span the Buddhist, Muslim, Jewish, and Christian faith traditions. IPL employs a variety of mechanisms for diffusing knowledge of local innovations across this networked organization. Greenfaith and IPL emphasize moral and spiritual rationales for the adoption of energy-saving products and behaviors at both the congregational and household level. Unlike many mainstream energy efficiency programs which target individuals as opposed to groups of people within institutional settings, these interfaith organizations foster conditional cooperation—engagement in pro-social behavior based on the belief that like others are similarly engaged. By forging linkages and mutual awareness across faith communities, these social movement organizations help shift the perception of global climate change from an insurmountable problem to one that is being addressed in cooperation with other community members. Our work seeks to develop more socially-realistic models of technology adoption and behavior change.

Session #: 3A
Speaker Robert Blain, Natural Resources Canada

BEST FIT Topic: 5. Enabling Policies

Sector: Consumption

Presentation Title **ecoENERGY Efficiency**

Abstract Text Government of Canada's ecoENERGY Efficiency Program Canadians have improved their energy efficiency by 23.5% since 1990. These improvements reduced energy use by approximately 1,560 petajoules (PJ), decreased greenhouse gas emissions by 81.1 megatonnes (Mt) and saved Canadians \$26.8 billion in 2009. Canadians recognize the need for continued action. The Government of Canada's ecoENERGY Efficiency program is investing \$195 million over five years to further improve energy efficiency in Canada – at home, at work and on the road. The program targets market barriers to energy efficiency uptake and is constructed around three pillars of action: • Making the stock of housing, buildings, and energy-using products more efficient through regulation, codes and standards; • Making energy performance more visible in all sectors through labelling and benchmarking, training and information sharing to affect behaviour change; and • Making industrial, building, and vehicle operations more energy efficient. The Office of Energy Efficiency (OEE), part of the Department of Natural Resources Canada, developed and is implementing Canada's ecoENERGY Efficiency program. The OEE is also Canada's centre of excellence for energy efficiency information, data and analysis. This poster session will increase awareness of the Government of Canada's energy efficiency programming and the key role of the OEE. Topics to be covered include: • Energy efficiency trends in Canada; • Canada's ecoEnergy Efficiency program – How Canadians are being encouraged to improve energy efficiency in their everyday lives; • Key results to date; and, • Sources of Canadian federal government energy efficiency information and data.

Session #: 5B

Speaker Elaine D Blatt, NEEA

BEST FIT Topic: 2. Marketing and Outreach

Sector: Consumption

Presentation Title **It's A Good Place to Be: The NW's Collaborative EE Messaging Effort**

Abstract Text Could common regional energy efficiency messaging help “cut through the noise” and compel consumers in the Pacific Northwest to increase their energy efficiency behaviors? This was the question facing the Regional Marketing Coordinating Council, a group of utilities collaborating on the development of regional energy efficiency messaging and an associated marketing toolkit. Add to the mix – the toolkit had to be usable by the more than 130 utilities in the region, ranging from tiny rural co-ops, to large urban utilities. To answer this question, the group initiated work with a first-of-its-kind regional quantitative and qualitative survey using “macrotargeting” rather than microtargeting to find messages that resonate with a broad range of constituents based on a deeper understanding of consumer attitudes. The results of that study, together with the results of a ground-breaking research on the use of social media in the region, drove the development of creative material organized into an integrated PR model linked to an online consumer educational platform that is designed to grab consumers’ attention in a crowded market and appeal to the wide range of people in the Pacific NW. In this presentation, we will report on our research findings, present the messaging strategy based on that research, and provide examples of creative material developed for use by utilities in promoting energy efficiency programs. Finally, we will examine the early impact the toolkit is having in the Northwest, reporting both on utility uptake of materials and early indicators of messaging impact.

Session #: 1C

Speaker Lonny Blumenthal, U.S. Green Building Council

BEST FIT Topic: 3. Community Planning

Sector: Building Energy

Presentation Title **Engaging Building Occupants: LEED's Pilot Credit**

Abstract Text Buildings often use more than double as much energy and water than is predicted by statistical models. This discrepancy does not typically result from faulty modeling software, but from a single variable that is difficult to quantify: occupant behavior. The way occupants live and work in their buildings is critical to the overall performance of a building and is something that is often overlooked. This presentation will demonstrate how the U.S. Green Building Council (USGBC) is attempting to address the following question: how can we enable occupants to exhibit efficient behavior in commercial building spaces in order to improve overall building performance? By creating a pilot credit entitled, "Occupant Engagement", the USGBC seeks to create a framework within the LEED Rating Systems that will encourage a culture of sustainability and resource conservation for occupants in LEED certified projects. This credit rewards project teams for implementing innovative, occupant engagement mechanisms that systematically empower occupants to become aware of and responsible for their own energy consumption and other actions that affect the overall performance of the building.

Session #: 3A

Speaker Sam Borgeson, UC Berkeley (ERG)

BEST FIT Topic: 5. Enabling Policies

Sector: Building Energy

Presentation Title **How Quantifying Efficiency Distorts CA Programs**

Abstract Text The 40 year history of efficiency programs in California provides a window into very important institutional dynamics, particularly those between the CPUC and investor owned utilities, that are likely to shape the pursuit of widespread mitigation through efficiency (i.e. determine our ability to capture an efficiency wedge). This talk will explore how the laudable goal of measuring efficiency savings of California's programs and providing performance incentives based on the findings has created heated conflict and perverse incentives that have undermined overall program performance. This unexpected outcome contains lessons for efficiency advocates, students of institutional behavior, and proponents of climate mitigation policies that similarly attempt to quantify avoided emissions, with rewards based on measured outcomes. Public policy designed to encourage energy efficiency has always faced important tradeoffs related to how best to spend public money, but as the budgets grow (spending is up to several billion dollars a year and growing nationally) and the stakes are raised, it is more important than ever to ensure that programs are designed to be capable of delivering both short-term load reductions and far deeper long term savings. This will require a careful examination of the trust issues between regulators and the companies they regulate, the imperfect nature of savings estimates (direct impacts, free riders, spillover, and counterfactuals), and the many structural changes required to transform energy demand over the long term.

Session #: 4A

Speaker Hilary Boudet, Stanford University

BEST FIT Topic: 1. Community-Based Programs

Sector: Building Energy

Presentation Title **Girls Learning Environment and Energy (GLEE): Outcomes of an Experimental Community Trial of Energy Reduction**

Abstract Text Community youth groups, like the Girl Scouts, may provide an effective channel for climate change education and behavior modification, both among child participants and within the household. This study evaluates the effectiveness of a 5-meeting, theory-based climate education and behavior change program – Girls Learning Environment & Energy (GLEE) – for fourth- and fifth-grade Junior Girl Scouts. Thirty troops (~340 girls) were recruited and randomized into two treatment conditions. One set of troops received a curriculum on how to reduce household electricity and gas consumption (i.e., unplug unused electronics, monitor energy use through smart meter technology, request a home energy audit, etc). The other set of troops received a curriculum on how to reduce energy use through transportation and food choices (i.e., increase active commuting and carpooling, eat less meat, etc). Data collection and analysis, through both survey self-reports and objective energy use data, is in progress and will be complete by the conference date.

Session #: 2A

Speaker Thomas E. Bowman, Bowman Global Change

BEST FIT Topic: 9. Management Decisions

Sector: Work Place

Presentation Title **Effective Carbon Mitigation for Every Business**

Abstract Text Despite decades of warnings, increasingly solid evidence, and surprising changes in weather patterns, climate change remains a low priority on lists of top national issues. Some reasons for this are becoming widely known: each of us can only manage a “finite pool of worry” and we are hardwired to prioritize immediate, tangible dangers over abstract, seemingly distant threats. We are subject to a so-called “single action bias” that works against sustained, complex efforts. Yet, people actually do manage long-term, abstract risks routinely. One of the best examples occurs in business, where daily challenges are addressed in the context of long-term business goals and economy-wide dynamics. Businesses have a crucial role to play in mitigating climate change because rapid improvements in carbon emissions reduction through energy efficiency have been shown to improve business performance, reduce energy costs and demand, and buy time for society to shift to lower-carbon energy sources. Tom Bowman, winner of the Green Good Design Award in 2011 and whose company won a 2009 CoolCalifornia Small Business of the Year Award for implementing a successful carbon mitigation program, will present the case study and underlying principles that his company’s behavior shares with other small firms. The session will introduce strategies for engaging at the points where management breakdowns typically occur, both at the executive and middle management levels. Distinct from traditional approaches that focus on limited actions, this session will demonstrate how a clear, yet simple approach to enterprise-wide carbon reduction plans can yield large-scale results.

2012 BECC Abstracts

Session #: Spotlight

Speaker Alex Bozmoski, Energy and Enterprise Initiative

BEST FIT Topic:

Sector:

Presentation Title **Where the Conservative Movement is Heading on Energy and Climate Policy**

Abstract Text Abstract Unavailable

Session #: 1F

Speaker Sheryl Bunn, former Director of Community Environmental Services

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Waste

Presentation Title **Marketing, Peer Modeling, and Prompts: Examining Validity and Persistence in Waste Reduction/Recycling Programs**

Abstract Text Behavior change programs attempting to accelerate savings of energy, waste and water have focused on a variety of behavior-based program implementation strategies including: customer-directed incentives, peer-modeling, contests and educational campaigns, just to name a few. While some of these program strategies are documenting resource savings, it is unclear if the savings can be persistently maintained and do not include the impacts of unintended consequences (boomerang effect). Are such “behavior change” strategies reliably effective at really changing or disrupting behaviors and habits? And, more importantly, is it reasonable to duplicate such design while these bigger questions remain unanswered? Great results don’t always point to program design free from inconsistent or casual interactions. Community Environmental Services (CES) is a research unit within Portland State University in Portland, Oregon with experience delivering waste reduction programs of significant scale and impact for businesses across the Portland-Metro region. These programs utilize many of the traditional behavior strategies to influence waste prevention activities which have yielded mixed results. Program strategies could consider different models for effective behavior change by ensuring they are simple, consider attitudes of specific target audiences, and are anchored in the basis for which habits are formed or changed. By testing successful behavior change models utilized in the waste reduction industry, we will address issues of validity and reliability in program design. These examples will demonstrate that success occurs when program design contains key elements that can be tested for both their internal and external validity and have eliminated potential casual relationships.

Session #: 7C

Speaker Kim Burke, E Source

BEST FIT Topic: 2. Marketing and Outreach

Sector: Building Energy

Presentation Title **Moving Beyond Traditional Media to Encourage Behavior Change**

Abstract Text What's really interesting about behavior change programs is that it can be difficult to draw the line between what constitutes the program structure and what is marketing and outreach. This is because many behavior change programs are based on social marketing techniques—that is, they leverage the power of norms, rewards, competitions, and feedback (sometimes many of these in combination) to effect persistent behavior change towards a social good. In the case of electric and gas utilities, this is often to encourage consumers to use less energy, or to use it more wisely. That said, utilities are leveraging a wide range of channels to market behavior-change programs to their customers including traditional media such as TV, radio, print advertising, direct mail, bill inserts, their websites, earned media, and email campaigns. Utilities are also beginning to use more innovative techniques such as social media outlets, quick-response (QR) codes, engaging stakeholders and trusted partners to help spread the word, and word-of-mouth marketing through social networks. This presentation will provide a few case studies of utilities that are getting creative in an effort to build buzz around behavior-change programs and to engage their customers using channels such as Facebook, Twitter, blogs and YouTube. These examples will hopefully inspire other organizations to get out there and get social in order to meet their goals.

Session #: 7D

Speaker Michael A. Cacciatore, University of Wisconsin-Madison

BEST FIT Topic: 4. Modeling Behavior

Sector: Renewables

Presentation Title **Gaps in Biofuels Support: The Polarizing Effects of Political Media Use**

Abstract Text Despite large-scale investments in biofuels as well as government mandates to expand bioenergy infrastructure and development in the United States, we know very little of how the public views this alternative fuel technology. This study explores attitudes toward biofuels by analyzing data from a statewide public opinion telephone survey. Using regression analysis, we examine the impacts of knowledge and media attention on levels of support for this renewable energy source. First, our results suggest that increased knowledge about biofuels leads to less positive attitudes about the viability of fuel source in the U.S. This finding fails to support scientific literacy models that propose that an informed public is more likely to support scientific innovation. Second, we found that although there were no main effects of political and scientific media attention on overall biofuels evaluations, knowledge levels moderated the relationship between media attention and support. That is, the impacts of media use on biofuels support were found to vary based on respondent levels of biofuels-specific knowledge. Specifically, we found that respondents with low levels of biofuels knowledge became more supportive toward the industry as their political and scientific media attention increased, while this pattern was the opposite for respondents with high levels of biofuels knowledge. Moreover, we found that highly knowledgeable respondents react differently to science compared to political media content, with political media content depressing biofuels support to a much greater degree than science media content. Possible explanations for these findings and their implications for energy policy are discussed.

Session #: 7C

Speaker Nick Cavarra, Incite

BEST FIT Topic: 2. Marketing and Outreach

Sector: Consumption

Presentation Title **Engagement Marketing – Tactics Beyond Traditional Mass Media Reach and Frequency**

Abstract Text This presentation explores proven strategies and tactics beyond traditional mass media reach and frequency to effect sustained behavior change regarding conservation behaviors. We begin with a brief history of mass media – from its beginning as a broadcast vehicle with massive audiences and few channels to the current landscape of thousands of options and multiple mediums via the Internet. We then define The Transtheoretical Model of Health Behavior Change and its corresponding six stages of change: precontemplation, contemplation, preparation, action, maintenance, and termination. We then explore how traditional “awareness” marketing only targets the stages up to action, while “engagement marketing” incorporates the action step and follows through to completion. Traditional marketing campaigns utilize various media (i.e., TV, radio, online, outdoor), relying only on the audience reach of those mediums and simple messaging. This has not been effective. We are all “aware” we need to conserve energy, but the gap between awareness and action is wide. Engagement marketing employs the use of traditional marketing to raise awareness, but then integrates engagement tactics (events, social media interaction, blogs, websites, interactive emails, rich media etc.) to ensure the audience participates in new behaviors promoted. We finish with specific tactics and best practices to ensure behavior changes promoted become established social norms. Examples include: 1. Begin with awareness messaging, 2. Progress to messaging to drive target audiences to attend events designed to engage that audience in new behaviors, 3. Execute those events and include lead capturing tools to ensure continuation of the conversation about conservation, 4. Lastly, continue engaging the target audience with emails, websites and more events to reinforce the new conservation behaviors.

Session #: 2B
Speaker Bruce Cenicerros, Sacramento Municipal Utility District
BEST FIT Topic: 8. Social Norms
Sector: Building Energy
Presentation Title **New Insights for Home Energy Reports: Persistence, Targeting Effectiveness, and More**

Abstract Text In April, 2008, the Sacramento Municipal Utility District became the first utility to launch a Home Energy Reports program partnering with Opower. After an impact evaluation showed an average of 1.9% electricity savings for the 35,000 pilot participants, SMUD expanded the program to 54,000 customers and began testing refinements and alternative delivery strategies. By June, 2012, results will be released from a comprehensive third party program impact evaluation that will provide eagerly-anticipated answers to several outstanding questions about this approach. The study will quantify energy savings by quarter to reveal the degree of persistence of energy savings when residential customers receive reports continuously for three years. It will also measure the persistence of savings after reports were stopped to 7,000 customers who had been receiving them for two years. Another unique insight will be to measure the boost in energy savings that was achieved by three different targeting strategies intended to identify customers likely to save the most. We will compare the success of electronic versus paper delivery of the information in the reports, as well as the effectiveness of a “seasonal burst” strategy that delivers reports only during the peak cooling season in reducing peak demand. We will identify actions taken by participants as a result of receiving the reports that help explain the observed energy savings. We will also share insights from a December, 2011 survey and focus groups of participants regarding the program’s impact on customer satisfaction and suggestions for improving the program.

Session #: 7D

Speaker Sarah Jo Chadwick, Stanford University, ARP Ae

BEST FIT Topic: 8. Social Norms

Sector: Building Energy

Presentation Title **Development of the Motivational Interview**

Abstract Text Motivational Interviewing (MI) is a relatively new but much studied behavior change strategy that is a person-centered yet directive interview approach for enhancing intrinsic motivation by exploring and resolving resistance to change. Key principles include expressing empathy, developing discrepancy between what is currently done and what is more healthful (or energy efficient in our case), rolling with resistance, and supporting self- efficacy for change. MI also includes a feedback component to enhance the change process. In the research presented here we describe the development of Energy Reduction Motivational Interview (ERMI). This work is carried out in the context of a home energy data collection program incorporating whole home, circuit, and plug level data over four weeks. Approximately 50 home owners participate and all receive a one hour Energy Reduction MI. Using an action research model to develop the ERMI, we rolled out the equipment deployment, that stayed in the home for four week in stages of 7-8 homes at a time. During each roll-out stage, we modified the ERMI based on our analysis of interview transcriptions and participant feedback. Participants first received detailed home, appliance and device feedback and comparisons to similar homes. Next, the two energy counselors use the interviewing techniques of open-questions, affirmations, reflective listening and summary reflections (OARS) to support home owners perceived self-efficacy to create a tailored plan to reduce their home energy. Implications of the EMRI for home energy audit feedback, as well as transformations of the ERMI to video and online venue are discussed.

Session #: 5C

Speaker Tim Chatterton, University of the West of England

BEST FIT Topic: 5. Enabling Policies

Sector: Building Energy

Presentation Title **Developing a Broader Policy Understanding of Energy Behavior**

Abstract Text In 2010, Dr Tim Chatterton undertook a 12-month UK Energy Programme placement fellowship in the Department of Energy and Climate Change looking at “Individuals’ and Communities’ Energy Behaviour” with a remit to challenge and be challenged. Two key factors had a strong influence on his work in the Department. Firstly, at the point of arrival there was no social research capacity within the Department, and thus understanding of behavioural issues was quite basic. Secondly, the launch of the Institute for Government’s MINDSPACE report, and the election of the new coalition government led to a dominance of very individualist understandings of behaviour within the policy landscape. Attempts to achieve significant reductions in household energy use through individual-orientated approaches, often based on economic rationality (such as short-payback times for loft insulation) have failed to achieve the desired effects. Within the UK two very different approaches to understanding behaviour have come to prominence recently. Firstly, psychological approaches based on ‘values and frames’ which consider the influence of societal and cultural values on pro-social and pro-environmental behaviour. Secondly, sociological theories of practice, which relocate the focus of behavioural studies away from the individual and on to a number of societal ‘elements’ such as materials/infrastructure, meanings/ideas, and competencies/procedures. This presentation will discuss the challenges and opportunities of introducing these new ways of thinking into the UK energy policy domain. (A continuation of the work is currently underway to extend the learning with additional government departments involved in Transport, Planning and the Environment).

Session #: 4A

Speaker Colin Clark, Ecology Action

BEST FIT Topic: 1. Community-Based Programs

Sector: Building Energy

Presentation Title **Community-Based Social Marketing: The Homeowner Workshop Model**

Abstract Text Residential retrofits that combine multiple measures through building science have been shown to maximize energy and monetary savings for homeowners. However, several barriers continue to discourage homeowners from taking an integrated, holistic approach to residential energy. Primary obstacles are a lack of understanding of the value of energy efficiency and the “whole-house” concept. To address these barriers, Ecology Action led a community-based social marketing and outreach program that relied on an in-depth and interactive workshop model targeting homeowners, real estate professionals and contractors. Workshops were designed to educate and engage all stakeholders about energy efficiency. This integrated outreach program was able to create robust knowledge, facilitate an exchange of information, drive demand for home retrofits and participation in Energy Upgrade California (EUC). A study of Ecology Action’s model validated this approach. Post-workshop analysis found: high levels of sharing program information and researching additional information on EUC and energy efficiency; 50% of attendees contacted a Participating Contractor; 45% scheduled a home energy assessment; 38% completed an assessment; 23% reported they have started on an EUC project. The Ecology Action community-based social marketing and outreach model effectively created partnerships in the retrofit marketplace and drove program uptake by addressing and breaking down barriers to participation. Using a comprehensive outreach approach to multiple stakeholders, Ecology Action has transformed market norms and demonstrated measurable behavioral change. The presentation will discuss program design, a summary of outcomes, model replication and market transformation impacts.

Session #: 2B

Speaker Paul Cole, Tendril

BEST FIT Topic: 4. Modeling Behavior

Sector: Building Energy

Presentation Title **Tendril's Behavioral Approach Results in Sustained Savings of 9.2% and Weekly Engagement in a 2.5 Year, Real-Time, Home Energy Monitoring, Customer Study.**

Abstract Text Persistence is a critical issue in evaluating behavioral-based approaches to energy efficiency. This paper describes Tendril's product, its behavioral approach to home energy management and the findings from a 2.5 half year study. In 2010, PA Consulting conducted a six month study of Cape Light Compact's 100 home, real-time energy monitoring pilot. Tendril conducted a follow-up study to see if the initial findings were persistent. The findings show both high levels of savings and engagement over the time and it demonstrates a correlation between the two factors. The paper will pull from a rich set of data that has been collected over time with this customer. The analysis begins by looking at the relationship between standard factors such as energy consumption, size of home, number of occupants and energy savings over time. It goes further to look at the relationship between energy savings and factors such as savings goals set and level and type of end-user content created and social interactions. Finally it looks at the relationship between energy savings and prior energy efficiency experiences and attitudes, based on pre and post surveys.

2012 BECC Abstracts

Session #: Spotlight
Speaker Allison Cook, Story of Stuff Project
BEST FIT Topic: Spotlight
Sector: Spotlight
Presentation Title **Turning a Movie into a Movement: The Story of Stuff and Online Media Activism**

Abstract Text Working in partnership with Free Range Studios, the Story of Stuff Project has pioneered online storytelling; connecting the dots between the Stuff in our day-to-day lives and the environmental, social and economic challenges we face. With seven animated shorts taking on everything from climate change, to lead in lipstick, and corporate influence in our democracy, the Story of Stuff movies have been viewed by over 15 million people and become a robust online community of more than 350,000 people worldwide. Come join Allison Cook, the Story of Stuff's Director of Special Projects, to discuss how to leverage online media and resources to change the way we make, use and throw away Stuff.

Session #: 7F

Speaker Thomas Cook, Oberlin College

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Building Energy

Presentation Title **Outside the Urban Glow: Metrics of Sustainability for Towns and Small Cities**

Abstract Text Recent efforts to develop a standard set of indicators that can be used to assess progress towards sustainability and carbon neutrality have been largely informed by the experience of medium to large cities and may not reflect the priorities of smaller towns outside the urban core. Further, several proposed social, health and economic indicators are not readily available for smaller towns and thus alternatives are needed. With a quarter of the US population residing outside a Metropolitan Statistical Area, relevant metrics are needed to measure change across these diverse rural, small town and ex-urban settings. Behavior change has been proposed as a key short-term strategy to reduce carbon emissions and small towns can serve as laboratories to assess behavioral interventions, particularly as household consumption represents a relatively high proportion of total energy use. Evaluation in these settings also minimizes the “noise” of adjacent areas and may be well-suited for detecting smaller effects. Indicators developed for large cities make it difficult to distinguish among countervailing trends and the true impact of local interventions. This talk will present examples of how existing indicators may not fully capture change at the local level in the context of a small town committed to achieving carbon neutrality. We will share results from a community-wide evaluation strategy using resident survey data and local indicators to cross-validate measures compared to other indicators used for larger cities with a focus on metrics related to social and economic transformation indicators.

Session #: 3B

Speaker Marilyn Cornelius, Stanford University

BEST FIT Topic: 10. Trans-Disciplinary Research

Sector: Building Energy

Presentation Title **Promising Options for Deep and Widespread Residential Energy Savings**

Abstract Text Substantial energy consumption in the residential sector is anomalous, save for developed countries in recent history. A number of groups have compiled lists of actions that program designers can use to encourage energy savings in this sector. To achieve the largest possible energy savings, however, viable energy saving actions, products, services and home adaptations must be widely adopted. Therefore, we explore a methodology for discovering the most promising options for the most important end uses such as space heating and cooling, water heating, lighting, plug loads, and others. Combining approaches from the social and behavioral sciences and design thinking, we set out to explore the ways in which “extreme users” accomplish their needs and desires with less energy than mainstream westerners. Our goal is to glean practices and principles that could be adapted to achieve deep and widespread energy savings in modern day developed countries without sacrificing quality of life. These extreme users include energy experts, household historians, carbon chefs, forensic sanitarians, Do-it-Yourselfers or “energy hacks,” and concerned people aiming for 90% energy reductions. We also interview individuals from various contemporary and historical societies, biologists studying human acclimatization and animal adaptation, and others. We augment interview data with secondary research. Our results consist of descriptions of energy saving actions, products, services and home adaptations organized by end use as well as emergent themes. We hope that this work will offer new insights for the development of more effective energy saving programs.

Session #: 5D

Speaker Dan Curry, Clean Energy Durham

BEST FIT Topic: 1. Community-Based Programs

Sector: Building Energy

Presentation Title **Pete Street™, Where Neighbors Get Energy Savings™: A Viral, Volunteer-Driven Model that Engages Neighborhoods in Continuous Energy Savings**

Abstract Text Several US communities use neighborhood-based approaches to reduce residential energy use. These approaches primarily involve door-to-door canvassing using neighbors or challenges where neighborhoods compete against each other. Clean Energy Durham has taken a different approach. Its goal is to create sustained networks of neighbors teaching each other about energy. Over the last five years, Clean Energy Durham has worked in 36 neighborhoods in Durham NC and in neighboring rural areas. Its approach is simple. Neighbors attend a workshop to learn energy-saving behaviors and techniques. They go home and do techniques they learned, then teach other neighbors. A core Clean Energy Durham program is the in-home, Hands-On Workshop taught for groups of neighbors. Clean Energy Durham followed up with 57 households who attended 13 Hands-On Workshops during February and March 2011. It obtained data from 44 of these households. • 39 of them (89%) did one or more of the projects they learned at the workshop in their own homes; • 32 of them (73%) changed their behavior as a result of the workshop; • 23 of them (52%) taught something they learned to another neighbor. In fact, combined, these 23 people reported teaching a total of an additional 117 people something they learned from the workshop. Another core Clean Energy Durham workshop is the Basic Energy Education workshop. Clean Energy Durham taught one workshop in a low-wealth neighborhood in Durham. Over the next six months, the eight attendees taught another 44 neighbors what they had learned in the workshop.

Session #: 1F

Speaker Elliot Dale, Colorado State University

BEST FIT Topic: 1. Community-Based Programs

Sector: Waste

Presentation Title **Rocky Mountain National Park Waste Audit and Recycling Behavioral Change Intervention Initiative**

Abstract Text Many federal, regional, and local municipalities and organizations have identified solid waste management, with a focus on landfill waste reduction, to be a core component of their sustainability operations. Rocky Mountain National Park (RMNP) is one such organization seeking to achieve increased sustainability through improved landfill diversion. RMNP conducted a park-wide waste audit, identifying Family Campgrounds as the locations with the greatest opportunity to increase recycling rates and decrease trash volumes. Moraine Park Campground, the largest campground in RMNP, was selected for a two-year behavior change campaign and study. Community-based Social Marketing (CBSM) was used as the framework to identify strategies to increase recycling behaviors of park visitors. In accordance with CBSM, observations of waste disposal behaviors and intercept interviews with Moraine Park Campground visitors were conducted. Analysis of this data was performed using two qualitative data analysis techniques: Template Analysis and Constant Comparison. Such analyses identified the barriers to recycling to be awareness, convenience, and commitment. Analyses identified recycling benefits to include general environmental benefits, a connection to place, cleanliness, and the preservation of the environment for future generations. Utilizing CBSM tools for strategy development, strategies to promote recycling behaviors included gaining commitments, facility improvements for added convenience, and the use of multiple prompts for increased awareness. In the summer of 2012 the project will conclude with strategy implementation and outcome evaluation – a second waste audit at the test site. Behavior change results will be included in the outcome evaluation. Key Words: waste reduction, recycling, Community-based Social Marketing, sustainable behavior change, mixed methods research approach

Session #: 1C
Speaker Lucas Davis, Haas School of Business

BEST FIT Topic: 4. Modeling Behavior

Sector: Consumption

Presentation Title **Bill Confusion**

Abstract Text Electricity is one of the most important, but least understood goods consumed by households. Most people do not know how much electricity is used for different end-uses, or how that usage is affected by changes in behavior. Moreover, electricity pricing is difficult to understand, particularly where electricity is priced using multiple-tiered rates. Recent evidence from Ito (2011) indicates that households do respond to changes in electricity prices, but that consumption responds to the average price of electricity (i.e., the total bill) rather than to marginal price as would be implied by a neoclassical economic model. In this paper we push this result farther, comparing households that receive a single bill for both electricity and natural gas to households that receive two separate bills. Our preliminary results suggest that households that receive combined bills have difficulty distinguishing between electricity and natural gas. In particular, preliminary results suggest that when natural gas prices go up, these households reduce their electricity consumption. This is inconsistent with the neoclassical model which predicts that households should be substituting toward electricity. Indeed for households that receive separate bills we observe a positive cross-price elasticity. The paper concludes by discussing the implications of this “bill confusion” for the efficiency of electricity markets.

2012 BECC Abstracts

Session #: Spotlight
Speaker Sandra de Castro Buffington, Director of Hollywood, Health & Society, USC
BEST FIT Topic: Spotlight
Sector: Spotlight
Presentation Title **Hollywood, Health & Society: Inspiring Hollywood's Writers and Producers to Create Storylines that Change Lives**

Abstract Text Hollywood's scriptwriters are the master storytellers of our time. Their stories can create our collective future. Hollywood, Health & Society's (HH&S) research shows health storylines on television, film and new media have profound impact on viewers' knowledge and behavior. The most popular TV storylines can reach up to 20 million viewers in an hour in the US and over 400 million viewers in 100 countries. Who inspires and informs the storytellers? Experts, in partnership with HH&S, tell real stories of real people and present case studies to Hollywood's writers and producers on critical public health and climate change topics. Our signature storybus tours give Hollywood's creative community direct access to local storytellers on the ground. Overseas trips offer writers and producers a chance to learn about global health and climate change in a local context. The results: HH&S inspired and informed more than 380 TV health storylines that aired on major shows in the span of two years from 2010-2012.

Session #: 5E

Speaker Linda Dethman, The Cadmus Group

BEST FIT Topic: 9. Management Decisions

Sector: Building Energy

Presentation Title **Segmenting the Multi-Family Market to Achieve Greater Savings**

Abstract Text Motivating multi-family property owners and managers to improve energy efficiency at their properties is a continuing challenge. Savings opportunities are huge but remain elusive. We have long known about the impact of split-incentives and the need to give owners a strong return on investment. However, our recent research with the California statewide multi-family program suggests many other issues are important to understand if we are to serve this complex market effectively. This research, which combined surveys, focus groups, and in-depth interviews with some of the largest multi-family property owners in the state, revealed important structural and attitudinal/behavioral market elements that need to be considered. On the structural side, we characterized decision-making by organizational size and type, the allocation of authority, and by the type of management. We also looked at the socio-economic status and lifestyles of tenants, and types and size of ownership. On the behavioral side, we asked a series of attitudinal and behavioral questions that allowed us to place hundreds of multi-family owners on a continuum that progresses from awareness, through taking action (the akAB model). This work lead us to develop a typology of decision-making that can serve to usefully segment the complex multi-family market, allowing more targeted and successful marketing, messaging, and program design. This paper can be a single presentation, but could also be presented with two other papers applied the akAB model: Digging Deeper into Differences Program and Non-Program Appliance Purchasers and Targeting and Evaluating Behavior Programs Using an akAB Theory.

Session #: 3E

Speaker Rick Diamond, LBNL

BEST FIT Topic: 9. Management Decisions

Sector: Work Place

Presentation Title **Designing Enduring Organizational Change—A Participatory Roundtable**

Abstract Text In this interactive roundtable, the organizers will first present eight basic principles of enduring organizational change and the “Roles, Rules, and Tools” model for implementing those principles, illustrated by 2-3 case studies drawn from the public and private sector. Participants will be assigned to teams that represent different organization types to engage in structured group exercises to explore the principles in either pre-assigned situations, e.g., developing new rules for green procurement, establishing sustainable transit options for staff, empowering building operators to adopt sustainable practices, etc., or areas of focus that they select. Team members will then apply the “Roles, Rules, and Tools” model to their team situation, and develop plans for achieving lasting change in their team’s organization. Participants can use examples from the previously presented case studies, their own experiences, or other sources. After brief reports from the teams, participants will be able to share their ideas for how they will improve their own efforts in making sustainability “business as usual” for their organization. Note: A similar format for a roundtable session, was conducted successfully at BECC 2010. The previous 90-minute workshop, focusing on social science R&D needs, had over 40 participants in eight teams.

Session #: 7A

Speaker Tawanna Dillahunt, Carnegie Mellon University

BEST FIT Topic: 3. Community Planning

Sector: Building Energy

Presentation Title **Social Sharing and Engagement Around Community Energy Monitoring**

Abstract Text We discuss the preliminary results of a deployment of a home-energy monitoring application that allows community members to engage with one another to share knowledge and information; to compare electricity consumption; and to build community. Our deployment was staggered across 4-11 weeks in two locations with 14 households and investigated the interactions effect of social engagement on the interaction among households. We also wanted to learn whether neighbors could help one another monitor and control their energy use more effectively. More specifically, we wanted to understand the impact of engagement around social sharing and community energy monitoring in residential communities. In addition to discussing energy-related and personal concerns that emerged from our deployment, we also identify design implications for home-energy applications that share consumption data among community members.

Session #: 1A

Speaker Scott Dimetrosky, Apex Analytics LLC

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Building Energy

Presentation Title **Are Savings from Behavior Programs Ready for TRM Prime Time?**

Abstract Text More and more regions are developing Technical Reference Manuals (TRMs) as a way to provide more consistent savings assumptions across different program administrators. These TRMs have also become critical tools for assessing how program administrators have performed against program goals. TRM values, therefore, are increasingly becoming deemed values for assessing program performance. To date, most TRMs have focused on efficiency measures such as lighting, HVAC, and motors products. A number of regions, however, are beginning to introduce savings from behavior programs into their TRMs. The nature of behavior programs, however, has led to complexities as the savings are introduced into TRMs. For example, most TRMs are focused on gross savings, and most evaluations of behavior programs tend to rely on billing analysis, which provides a net number. In addition, behavior programs often serve as “feeder” programs into other efficient programs, and thus TRMs need to address how not to double count the savings. Finally, behavior programs cover a wide “net” of delivery strategies offered by a number of program implementation contractors, and TRMs universally do not vary savings based on the contractor. The presentation will provide a thorough review of TRMs in North America, examining whether or not they include behavior savings, are planning on including behavior savings, or have chosen to exclude behavior programs. The presentation will discuss how TRMs that have chosen to include behavior programs have addressed these complexities, and present additional ideas for how regions that have not yet included behavior savings can do so.

Session #: 7B

Speaker Brenda Dix, MTC

BEST FIT Topic: 5. Enabling Policies

Sector: Transportation

Presentation Title **Approaches to Reducing GHG Emissions from Transportation in the San Francisco Bay Area**

Abstract Text With the passing of AB32, the California Global Warming Solutions Act, and supporting legislation SB 375, the Sustainable Communities Strategy, California Metropolitan Planning Organizations (MPOs) are mandated to coordinate regional land use and transportation planning to reduce greenhouse gas (GHG) emissions. The San Francisco Bay Area was assigned targets of reducing emissions 7% per capita by 2020 and 15% by 2035. Achieving those targets did not prove to be an easy task. Throughout the planning process subtleties in connecting jobs, housing, and transit in a meaningful way were discovered; however, this was not enough to change commute modes and reduce emissions to meet the targets. In addition to connecting land use and transportation the Bay Area was required to seek more creative programs to close the gap and accomplish the 15% GHG emissions reductions. Some of the strategies traditionally thought to reduce driving such as building more bicycle lanes proved to be less successful at reducing emissions while new vehicle technologies such as encouraging electric vehicle adoption, car sharing, smart driving, and others are anticipated to be more effective at moving the needle. Ultimately, the Bay Area developed a suite of strategies to coordinate land use and transportation, reduce driving, and clean up the vehicle fleet in order to meet the GHG emission reduction targets established by the state and to promote a more sustainable and vibrant Bay Area.

Session #: 3B

Speaker Anne Dougherty, Opinion Dynamics

BEST FIT Topic: 10. Trans-Disciplinary Research

Sector: Consumption

Presentation Title **Examining Drivers to Energy Savings Growth; Leveraging Modeling Techniques in Human Development to Examine the Predictors of Program Success**

Abstract Text Despite their popularity, few program implementers and evaluators understand how behavioral programs generate savings or what predicts differences in usage patterns among program participants. While the industry has attempted to create approaches to measure program impacts, there is a dearth of approaches to examining how, why, and how long energy savings persist. Looking to other fields, this presentation will detail how the authors leveraged human development modeling techniques to examine the predictors of behavioral program savings, savings persistence, and decay using four years of data across two utility territories. This presentation will provide results from an innovative behavioral program evaluation that leveraged path model techniques from human development to disaggregate behavioral program customer usage into distinct “growth curves.” Typically used to measure drivers to human growth and cognitive development, this presentation will demonstrate how the same path model approaches relied on for human development can be and were used to examine growth patterns in energy consumption among program participants. In doing so, the presentation will demonstrate how the research unearthed usage growth, decay, and persistence trends over time and how human factors predict and drive different usage curves. With four years of energy usage information, program participant databases as well as housing stock and demographic data, this presentation will detail first-of-its-kind insight into energy usage patterns and savings persistence, essentially illuminating how, why, for whom, and how long savings persist among program participants.

Session #: 1A

Speaker Jamie Drakos, The Cadmus Group, Inc.

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Building Energy

Presentation Title **Successes in Energy-Efficiency Education Targeted to Low-Income Households**

Abstract Text Low-income households pay two to five times more of their income towards home energy expenses than median income households. In an effort to help reduce the burden on these households, low-income energy-efficiency programs provide many services to customers in need. Often these programs will include an energy-conservation education component. This education is designed to equip households with information about their energy usage and provide them with low-cost ways of mitigating their energy burden. Organizations providing energy-conservation education use a multitude of approaches to encourage households to adopt energy-efficient behaviors, including: in-home education, workshops, pamphlets dropped off with or mailed to customers, training neighborhood ambassadors, and working with residents to develop a plan and secure commitments to change energy-use behaviors. Over the past five years, our organization has evaluated more than 15 different programs offering energy-conservation education to low-income households. These programs have been offered by utilities and non-profit organizations spanning ten states and two Canadian provinces. While several programs take similar approaches to energy-conservation education, all generate unique outcomes both in customer actions taken in the home and energy savings achieved. This presentation will provide an overview of the different styles, designs, and methods of delivery for energy-conservation education. It will also showcase the results of our evaluation research, including: which recommendations households recall most often, what behaviors they have changed, and, to what extent they were engaged in energy-conserving behavior prior to the education initiative. Finally, we will highlight the most innovative and effective programs we have researched.

Session #: 1E

Speaker David DuBois, The Social Design Group

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Work Place

Presentation Title **Using 'Design Thinking' in the Development of Engagement Strategies for Sustainability**

Abstract Text A wide range of behavioral strategies have been deployed toward achieving energy efficiency and related environmental sustainability goals within organizations. Commonly used approaches include community based social marketing, choice architecture, goal setting, positive psychology, organizational development, incentives, and shaping social norms. But which approach to choose, under what circumstances? The research literature lacks definitive guidance regarding the relative efficacy of various approaches or the circumstances in which a given approach is most effective. Yet sustainability managers and others charged with sustainability program responsibilities require such guidance, as they make daily decisions regarding which behavioral methodologies to use, and in what sequence, to successfully embed sustainability behaviors deeply into their organizations. To address this challenge we borrow from architecture, software engineering, industrial design, bio-mimicry, and other design disciplines to explore the possibilities inherent in taking an integrated systems view to behavioral system design. Similar to building retrofit design (Rocky Mountain Institute, 2012), we look for synergies that provide opportunities to “tunnel through the cost barriers” and the inertia barriers in deploying organizational sustainability programs. Application of design thinking to social systems within organization offers a unique perspective for how to not only overcome barriers to behavior change, but to reach the hearts and minds of organizational members. To illustrate the effectiveness of social design, we draw from our sustainability circle work with numerous organizations that range in size from small to large, and span government, service and industry sectors. Both quantitative and qualitative data will be used to present success stories.

Session #: 5E
Speaker Amanda Dwelley, Opinion Dynamics

BEST FIT Topic: 4. Modeling Behavior

Sector: Building Energy

Presentation Title **Segmentation: Using Revealed Actions & Behaviors to Predict Participation**

Abstract Text Energy efficiency and Renewables programs are continually evolving, with new offerings emerging each year, many with the aspiration of attracting customers who have not yet engaged with traditional programs. Further, established programs are faced with ever-increasing enrollment and savings goals, yet lack clear indicators of who to contact next. Fortunately, program teams have a wealth of behavioral information at their disposal that can be leveraged to better target and predict the behavior of potential participants. The presenters will discuss how program planners and marketing staff can build an action-oriented targeting scheme, built on the rich data they already have by describing modeling processes to identify specific customers most likely to engage with over 20 different types of utility program offerings. Drawing on a multi-stage research, data mining, and statistical modeling approach, we describe how customer characteristics in every utility's database - like billing preferences, online behavior, and past program participation - can contribute to a segmentation and targeting scheme that can be used for multiple purposes across an organization. The presentation will detail how propensity scores were established for existing and emerging programs for utility staff to (a) select the best customers for targeted marketing, (b) understand motivations and barriers to refine offerings, and (c) determine how to bundle or cross-market offerings for deeper engagement. While the end result was a highly customized utility customer database, the end-to-end process can be applied to other organizations interested in engaging more customers in behavioral change.

Session #: 2B

Speaker Karen Ehrhardt-Martinez, Garrison Institute

BEST FIT Topic: 10. Trans-Disciplinary Research

Sector: Building Energy

Presentation Title **Connecting Feedback Type to Specific Changes in Energy Use Practices**

Abstract Text Advanced metering devices and new feedback technologies are opening up a wide range of novel opportunities for making energy consumption more visible and for engaging individuals in more thoughtful energy use practices. Several recent studies suggest that feedback-induced energy savings can be significant (Darby 2006, EPRI 2009) ranging from 4 to 12 percent depending on the technologies employed, the characteristics of the program, and other relevant factors (Ehrhardt-Martinez et al. 2010). However few studies have explored 1) the range of behaviors that underlie the energy savings that feedback typically achieves, 2) useful ways of categorizing feedback-induced behaviors, 3) the propensity of households to engage in certain behaviors over others, and most importantly 4) the degree to which certain types of behaviors are more or less likely to occur in response to specific types of feedback. This presentation explores these questions using data from three different feedback initiatives. Research findings suggest that feedback-induced behaviors tend to fall into seven distinct categories and that the types of energy saving behaviors engaged in by households tends to correspond to the type of feedback received. Data from three types of feedback are assessed: monthly home energy reports, daily/weekly (online) feedback, and real-time in-home displays.

Session #: 6B

Speaker Aurelia Esteve, EDF R&D

BEST FIT Topic: 4. Modeling Behavior

Sector: Consumption

Presentation Title **Domestic Appliances: Ever-Growing Efficiencies Versus Ever-Changing Behaviors**

Abstract Text Electrical appliances are becoming more and more efficient due to the reinforcement of standards such as Energy Star. Theoretically, the impact of such improvements should be noticeable in the coming years. However, behavioral shifts could drastically undermine any expected gains. The ability to model and to assess both technical and behavioral changes has become a key point of interest in the world of energy efficiency research. Given such a context, we propose a dynamic bottom-up model whose aim is to enable us to represent a stock of appliances and its related energy consumption for the coming years through the construction of various scenarios. This model takes into account a wide range of parameters such as realistic appliance lifespans, technical data (techno-explicit segmentation and on-mode and stand-by power consumptions) and users' habits (time of use, rebound effect, and increase in the number of identical appliance units per household). Historical years are fitted with external data such as sales figures and results from energy consumption field studies. The structure of this model has been adapted to light bulbs and TV sets for the French housing stock and has been implemented with data from Gfk and field studies carried out by EDF. For both appliances, we built technological scenarios which consequently drive different behavioral responses in order to measure their impact on energy consumption. The critical question remains to be resolved: to what point do these behavioral responses challenge the potential energy gains?

2012 BECC Abstracts

Session #: 3F

Speaker Benjamin Finkelor, University of California Davis

BEST FIT Topic:

Sector:

Presentation Title **West Village: How UC Davis is Creating the Largest Zero Net Energy Development in the U.S.**

Abstract Text Abstract Unavailable

Session #: 2C

Speaker Ryan Firestone, Navigant Consulting

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Building Energy

Presentation Title **The Paradox of Residential Behavior Program Impacts: Precise, Yet Unknown**

Abstract Text Residential behavior-based programs paradoxically represent some of the most precisely known savings and the least understood savings in the energy efficiency (EE) industry. Experimental design of home-energy report programs has allowed for billing analyses that provide precise estimates of average household savings. However, research to date offers no conclusions on what actions occupants are doing to achieve these savings. For example, are people turning off lights or replacing light bulbs? Without this understanding of what actions are leading to savings, it is impossible to forecast the potential for behavioral programs going forward as they compete with other energy efficiency delivery channels such as codes and standards – especially the Energy Independence and Security Act lighting standards – and incentive-based EE programs. These issues came to light for the authors in their recent modeling of energy savings potential in California. This paper reviews findings from Opower home energy report impact evaluations, identifies the key uncertainties that must be resolved to forecast savings potential, and discusses possible research approaches to addressing these uncertainties.

Session #: 3A

Speaker Barry Fischer, Opower

BEST FIT Topic: 8. Social Norms

Sector: Consumption

Presentation Title The "One-Percenters" of Energy Usage

Abstract Text Unlocking the “power” of big data: analyzing energy consumption across 40 million US households

Opower, the global leader in the field of energy information and analysis, works with 75 utility companies worldwide to give families context, insights, and advice about how to save energy. With access to an unprecedented (and still growing) amount of energy data -- currently drawn from 40 million US homes -- Opower is uncovering unique trends in how people are using energy at home. This presentation will provide background on the structure and scale of the Opower dataset, and then highlight how we have used storytelling, visualizations, and data journalism to make the results of big-data analysis interesting and accessible to the public (drawing upon Opower’s big-data energy blog, which has been featured in Scientific American, LA Times, and Gizmodo). We will explore Opower’s big-data investigations such as: Who uses more electricity—Gmail users or Yahoo users? How does the energy consumption of homes with swimming pools compare to homes without pools? What do hour-by-hour energy usage patterns look like on a 100-degree day, and how does it affect the power grid? By answering these questions, Opower is leveraging big data to raise public awareness and boost citizen engagement around energy, the environment, and big data itself.

Session #: 7B

Speaker Elizabeth Floyd, Arlington Transportation Partners

BEST FIT Topic: 9. Management Decisions

Sector: Transportation

Presentation Title **Making Transportation Simple**

Abstract Text The work done by Arlington Transportation Partners has demonstrated how education and engagement has significantly improved commuting habits and reduced dependency on single-occupancy vehicles in Arlington County, Virginia. Arlington Transportation Partners (ATP) is a program within Arlington County Commuter Services (ACCS), a division of Arlington County's Department of Environmental Services. Since 1989, ACCS has met its goals of encouraging the use of non-single occupant (SOV) travel; lessening congestion, air pollution, and energy consumption; improving accessibility; and enhancing quality of life. In 2011, ACCS published the findings of an extensive research and evaluation program to measure its success, and to document the environmental and travel impacts of mode changes influenced by transportation demand management (TDM) services. The report found that 40,100 daily vehicle trips were eliminated by helping people shift from driving alone to transit, car-and vanpooling, walking, bicycling, or teleworking. In addition, more than 79,750 tons of air pollution were eliminated and nearly 28,250 gallons of gasoline were saved each day. Arlington Transportation Partners is ACCS' business-to-business transportation consulting organization, and works closely with employers, property managers, residential properties, hotels, developers, and associations to minimize transportation problems, provide a competitive edge for employers, and achieve work-life balance. ATP has assisted over 670 businesses, 320 residential communities, 43 hotels, and 33 site plan properties located in Arlington County to improve their transportation amenities and benefits. The presentation will illustrate free and low-cost incentives provided to employers to encourage employees to take advantage of transit benefits. ATP makes transportation simple!

2012 BECC Abstracts

Session #: 6F

Speaker Siobian Foley, California Center for Sustainable Energy

BEST FIT Topic:

Sector:

Presentation Title Energy Upgrade California: Taking It to the Next Level

Abstract Text Abstract Unavailable

Session #: 7A

Speaker Wendy Foslien, Honeywell

BEST FIT Topic: 4. Modeling Behavior

Sector: Building Energy

Presentation Title **Information From The Integrated Home – Context Aware Smart Home Energy Manager**

Abstract Text The situational understanding gained by the integration of energy devices in a residence has the potential to shape homeowner behavior through constructive feedback tailored to that homeowner, their home, and their habits. A key technical challenge is creating an infrastructure for such an integrated home that includes addressing device communications as standards are evolving and providing a unified user experience with the devices. Under the DOE-sponsored Context Aware Smart Home Energy Manager (CASHEM) project, Honeywell and its home automation partners have developed an integration platform for HVAC, appliance, pool pump and electrical meter data. The team is currently in the process of deploying the system to test homes for evaluation. The CASHEM platform offers integrated control for the end user through a flexible interface, and also stores data about the usage of devices that can be processed into information to guide the homeowner in managing energy use. The processed information is provided back to the user via the same integrated interface, eliminating the need for the user go outside the integrated environment for guidance suggestions. The system acts as a trusted advisor for the homeowner, using collected data to sense occupancy, compare to schedules for automated devices and assess energy usage patterns. The CASHEM system strives to balance automation with user engagement to reduce overall energy consumption in the home. This presentation will focus on the user interaction findings from a field test of the CASHEM system.

Session #: 6A

Speaker Jillian Frater, University of Canterbury

BEST FIT Topic: 4. Modeling Behavior

Sector: Transportation

Presentation Title **Using Theories of Behaviour Change to Explain Teenagers' Attitudes to Cycling**

Abstract Text Similar to trends in other countries such as the United States and Australia, a noticeable trend highlighted in the New Zealand Census is the large decrease in cycling to work between 1991 and 2006 in the 15-19 year age group – from 18% in 1991 to 6.5% in 2006. The New Zealand Household Travel Survey also shows travel to school by motor vehicle for ages 13-17 increased significantly between 1989/90 and 1997/98. For a number of reasons, including climate change, peak oil and health, it is highly desirable to change these trends. Understanding the reasons why teenagers choose not to cycle can help identify the key policies that might reverse these trends. One approach to understanding travel behavior is through the use of Theories of Behaviour Change. In particular, the Theory of Planned Behaviour as proposed by Azjen concludes people's behavioural intentions are determined by attitudes. i.e. a person's overall evaluations of the behavior; subjective norms – perceived social pressure to act in a certain way; and perceived behavioural control – the perceived ease or difficulty of engaging in a behaviour. In addition, the Prototype Willingness Model is a theory that has been used to investigate adolescent risk taking and may also provide useful insights into teenagers' travel choices. My presentation will outline my proposed research to examine the contribution of the potential barriers to cycling for teenagers using Theories of Behaviour Change.

Session #: 1F

Speaker Juri Freeman, SERA

BEST FIT Topic: 1. Community-Based Programs

Sector: Waste

Presentation Title **Using Social Marketing Prompts, Feedback, and Incentives to Change Trash Behaviors – It Really Works!**

Abstract Text Social marketing includes a number of key “tools” to encourage behavior modification. The authors analyzed – and measured – the impacts of special can / bag systems (incorporating prompts, norms, feedback, and incentives) in getting residential and commercial customers to: • Increase recycling • Increase composting • Source reduce, and • Reduce trash volumes and weights. The authors gathered data from dozens of communities around the US that had implemented residential “recycle and save” programs, and others using “points” programs -- and used surveys, curbside measurement, quantitative analysis (pre/post and regression work), as well as interviews to examine the impacts of these programs, their relative performance, and the potential for expansion to other communities. These classes of programs have been implemented in a variety of ways, and we use data across communities to help isolate the impact of each main type of program based on its design, in isolation from the varying demographics and “other factors” that may affect the program’s performance. The results of our analysis show that both “recycle and save” and “points-based” programs can be extremely effective at changing behavior – and at very low relative cost to communities, haulers, and citizens. We provide quantitative results, and discuss behavior uptake, retention, and design lessons identified from the analysis.

Session #: 5A

Speaker Jon Froehlich, University of Maryland, College Park

BEST FIT Topic: 7. Gamification

Sector: Consumption

Presentation Title **Applying Iterative Design to the Eco-Feedback Design Process**

Abstract Text Although randomized controlled trials are the gold standard in evaluating the effectiveness of eco-feedback systems on reducing consumption behaviors, such trials are resource intensive and costly. As such, it is crucial that the intervention—the eco-feedback artifact—is well designed before effort is invested in a longitudinal study. In this talk, I will discuss the application of iterative design to eco-feedback systems. Iterative design is a design methodology based on a cyclic process of prototyping, user testing, and analysis, the results of which are then used to inform a new round of prototyping (and the cycle continues). Through an 18-month design process of a prototype eco-feedback display (Froehlich, 2011), I will describe how iterative design was used to evaluate and refine the aesthetic, usability, understandability, and educational potential of an eco-feedback system before a field deployment. I will highlight the role of massive online surveys in evaluating early eco-feedback design ideas and the role of in-home interviews in evaluating higher-fidelity (more refined) designs. Finally, I will close the talk with a discussion of low-cost methods to deploy and test eco-feedback designs in the field even when underlying resource sensing systems (e.g., smart meters) are unavailable. These methods can be used to evaluate how the eco-feedback system may fit into domestic space, explore differences in perspective and preference across household members, and evaluate how the system affects household dynamics (e.g., if the design provokes privacy concerns) before behavioral trials are conducted in earnest. Froehlich, J. (2011). Sensing and Feedback of Everyday Activities to Promote Environmental Behaviors. University of Washington Doctoral Dissertation 2011.

Session #: 2B

Speaker Arhan Gunel, Opower

BEST FIT Topic: 8. Social Norms

Sector: Consumption

Presentation Title **The Halo Effect: Using Behavior to Upgrade Technology**

Abstract Text Many stakeholders in the energy sector are interested in increasing participation in utility and state funded energy efficiency programs, such as rebates for installed measures. Promoting these programs via traditional marketing channels is generally costly and inefficient, and participation rates are low. Opower, an energy management software company, has discovered an unexpected method of increasing those numbers. Opower deploys a cross-channel, opt-out behavioral energy efficiency program to over 70 utilities across the United States, resulting in measurable, repeatable, and predictable recommended energy-saving behavioral changes: unplug unused electronics, turn down thermostats in the winter, turn off lights when leaving a room, etc. Opower has discovered that customers also will take additional, unprompted efficient actions, including investing in efficient technologies in their homes, often via utility and state funded programs. This spillover from behavior change to behavior induced technology change is deemed the “halo” effect. The halo effect has powerful, consistent evidence. Analysis of over 30 programs at 15 utilities shows that consumers who receive the Opower program participate in additional Energy Efficiency programs at a rate about 20% higher than a statistically equivalent control population that does not receive the Opower program. This increase occurs when no utility program or rebate information is available through Opower communications; the addition of program information increases the effect. This presentation will include a discussion of theoretical explanations of the energy efficiency halo effect, and will conclude with takeaways for energy sector stakeholders seeking to cost-effectively promote installed measures programs.

Session #: 1A

Speaker Mohammad Halimi, State University of New York

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Consumption

Presentation Title **Energy Efficiency and Rebound Effects: Unveiling the Puzzle**

Abstract Text Improving energy efficiency is usually considered a sound public policy to reduce energy use and GHG emissions. The idea is simple. A drop in energy consumption means a drop in pollution and lower energy bills; but the savings can also encourage consumers to change their behavior and to use more energy. Such feedbacks are known as the rebound effects. The importance of efficiency rebound effects has been the focus of a long-running dispute within energy and environmental studies. The question is whether improvements in the technical efficiency of energy use can be expected to reduce energy consumption by the amount predicted by engineering calculations? Efficiency advocates say: YES; Economic theory suggests that it will NOT. For many decades, rebound effect has been an academic and theoretical dispute in discussions around the role of energy efficiency in global economies. Then, the debate has spread from the pages of academic energy economic journals in the early 90s to the pages of the leading US science journals, (e.g. Science and Nature) through to the newspapers such as the New York Times in recent years. This paper tries to review disputes around efficiency rebound effects from a historical perspective and uncover theoretical and methodological disputes of the topic. A literature of this issue in general science publications (e.g. Nature and Science), the more theoretical journals in the field (e.g. Journal of Energy Policy and Energy Journal), and public policy journals and reports (e.g. Resources for the Future and Rocky Mountain Institute) would be reviewed. A key conclusion is that promoting energy efficiency remains an effective way of reducing energy consumption and emissions, but failure to taking account of the significance of behavioral aspects of rebound effects could contribute to shortfalls in the achievement of environmental policy goals.

Session #: 4E

Speaker Julie Hayes, Milepost Consulting

BEST FIT Topic: 4. Modeling Behavior

Sector: Consumption

Presentation Title **Climate Change and 12 Step Framework of Alcoholics Anonymous**

Abstract Text A working group review of community engagement strategy and behavior change best practice presentations shared at the Climate, Mind and Behavior Symposium in Garrison, NY identified a commonality between current approaches to climate related behavior change strategy and the 12 Steps of Alcoholics Anonymous Framework. Alcoholics Anonymous is a 77 year old behavior change program that has become widely known as one of the most successful frameworks in the world (50% + success rate for those who attend meetings for at least 1 year,) providing a proven path out of the grip and destruction that comes with addiction. In its current state, The 12 Steps have expanded far beyond alcohol to include more than 54 fellowships, ranging from drug addiction to food, money, sex and gambling. While the 12 Steps provide a methodical path towards serenity, the framework is considerably broader and includes engagement tools, local community customization, traditions, sponsorship, daily spiritual practice, and continuous, open dialogue all under the heading of “attraction rather than promotion” or modeling. An intriguing question is: “How can energy efficiency program and climate change practitioners leverage such a successful model? This presentation will provide a compare and contrast between energy efficiency and climate change behavior best practices: a stepped approach, a clear simple path, percent-centric design, delivery by a trusted source, reward and compelling visual story-telling to carry the message. Recommendations will be shared on how this proven framework could be leveraged to support community based energy efficiency and climate change program design.

Session #: 4D

Speaker Meredith Herr, The Resource Innovation Group

BEST FIT Topic: 2. Marketing and Outreach

Sector: Government

Presentation Title **The Climate Access Practitioner Network: Sharing What Works**

Abstract Text Engaging the public in support of policies and programs that help us make the transition to low-carbon, resilient communities is the most critical issue of our time. Practitioners who communicate about climate change on behalf of nonprofits and government agencies are looking for research-based recommendations that they can easily apply to their public engagement efforts, as well as opportunities to consult with peers and experts on messaging and outreach strategies. In October 2011, The Resource Innovation Group's Social Capital Project launched Climate Access (www.climateaccess.org), an online network for climate and energy practitioners. Climate Access serves as a bridge between research and action by providing a synthesis and analysis of climate communications and behavior change best practices. The network is also a space for peer-based collaboration and hands-on problem-solving opportunities. In the first six months since its inception, Climate Access has built a growing membership of high caliber practitioners from around the world who are taking advantage of the platform's content. Meredith Herr, webmaster of Climate Access, will provide information on Climate Access' offerings, including collections of polling and research materials, user-friendly tip sheets, a gallery of public engagement campaigns, discussion forums, and a monthly webinar series with leading experts in the field of climate communications and behavior change. Meredith will share how BECC participants can become involved with the network to gain access to tools and resources that will help them encourage the public to embrace sustainable behaviors and support strong climate policies.

Session #: 5E

Speaker Nancy Hersh, Opower

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Consumption

Presentation Title **Let There Be Light: Moving from Behavior-Blind Customer Segmentation to Informed Segment Creation to Drive Key Utility Business Outcomes**

Abstract Text Let There Be Light! Moving From Behavior-Blind Customer Segmentation to Informed Segment Creation to Drive Key Utility Business Outcomes Historically, utilities have had minimal communication with customers, leading to less-informed segmentation efforts for designing and marketing programs. With a limited view of customer behaviors, utilities minimize the opportunity to increase efficiencies in utility marketing campaigns. Access to comprehensive customer engagement profiles allows utilities to design customized programs for different components of their service territories, ensuring that each customer receives the most relevant information regarding energy use, program promotions and various other utility initiatives. So what do utilities do to achieve informed segmentation? As utilities expand their programs and customer outreach, they begin to collect customer data to which they previously did not have access. By merging this newly available data with the self-reported behaviors and attitudes obtained from survey sources, this holistic research approach provides utilities with a fuller view of their customers. These findings allow utilities to improve program participation, provide more targeted energy saving recommendations, and increase customer satisfaction. This presentation will:

- Present case studies of 10+ utility companies across the country conducting a Customer Engagement Tracker survey. These utilities are using the survey to create behavior-informed segments within all geographies and demographics, and using these segments to create impactful program designs.
- Highlight the results of these enhanced marketing campaigns

Speakers:

- Opower
- Laura Lewellyn, Sr. Manager, Consumer Insights Laura.lewellyn@opower.com
- Utility Executive TBD

Session #: 6C

Speaker Karen Herter, Herter Energy Research Solutions

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Consumption

Presentation Title **SMUD's Residential Summer Solutions: Real-Time Energy Feedback with Dynamic Rates and AC Automation**

Abstract Text SMUD's 2011-2012 Residential Summer Solutions Study was designed to investigate the effects of real-time data on residential energy use and peak demand in the presence of an optional dynamic TOU-CPP rate and voluntary direct load control program. The primary objective of this work was to determine the effects of real-time home and appliance-level energy information on residential electricity use. A secondary objective was to compare electricity use between participants in the four self-selected program option groups: the TOU-CPP rate (only), AC load control (only), both options, and neither option (i.e. standard rate only). All 265 participants were given smart thermostats and advice on how to save energy and reduce peak electric demand - every day and during the 12 summer events. One-third of participants were provided real-time energy data at the home level, and one-third were provided real-time energy data at the appliance level. Mixed effects modeling indicates statistically significant energy savings, daily peak savings, and event-based load shed in all groups. This presentation will provide an overview of the differential effects of real-time home energy information, real-time appliance energy information, rate, and AC load control on these savings, and offer recommendations for future programs based on these findings. SMUD's residential Summer Solutions study was designed and managed by Herter Energy Research Solutions and co-funded by the Sacramento Municipal Utility District (SMUD) and the Demand Response Research Center at Lawrence Berkeley National Laboratory.

Session #: 1A

Speaker Ben Huntington, DNV KEMA Energy and Sustainability

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Consumption

Presentation Title **Impact of Information on Energy Consumptive Behavior: Testing and Measuring Innovative Approaches**

Abstract Text Pacific Gas and Electric Company's (PG&E) Innovator Pilots Program (IPP) provides competitive funding to communities to test, measure, and demonstrate creative approaches to delivering energy savings and greenhouse gas (GHG) reductions in their community. The IPP projects are selected based on the likelihood of being scalable and replicable throughout the state. ☐ Although the pilots are diverse in scope—from community-based social marketing to energy management tools—a central research theme driving innovation is understanding how delivering information related to energy usage impacts energy consumptive behavior. The IPP provides an opportunity to explore the impact of information on behavior, something that is often overlooked by energy efficiency programs that are typically focused only on quantifying energy savings. ☐ PG&E is partnering with DNV KEMA to perform assessments that examine the design of the IPP projects, including the application of appropriate metrics to measure a pilot's impact on participants' energy usage behavior. The program assessments aim to assist PG&E in determining which pilot projects should be expanded upon and considered for inclusion in future energy efficiency program portfolio proposals to the California Public Utility Commission. ☐ This presentation will highlight different methods to test and measure the impact of energy usage information on motivating participants to change their energy consumptive behavior. The discussion will draw from several pilot projects in different stages of implementation. Presenters will share results from the application of DNV KEMA's assessments to demonstrate how innovative approaches to conveying energy use information may get participants to change their behavior and save energy.

Session #: 1A

Speaker Katrina Jessoe, Dept. ARE, UC Davis

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Consumption

Presentation Title **Knowledge is (Less) Power: Experimental Evidence from Residential Energy Use**

Abstract Text This paper presents experimental evidence that information feedback dramatically increases the price elasticity of demand in a setting where signals about quantity consumed are traditionally coarse and infrequent. In a randomized controlled trial, residential electricity customers are exposed to price increases, with some households also receiving displays that transmit high-frequency information about usage and prices. This substantially lowers information acquisition costs and allows us to identify the marginal information effect. Households only experiencing price increases reduce demand by 0 to 7 percent whereas those also exposed to information feedback exhibit a usage reduction of 8 to 22 percent, depending on the amount of advance notice. The differential response across treatments is significant and robust to the awareness of price changes. Conservation extends beyond the treatment window, providing evidence of habit formation, spillovers, and greenhouse gas abatement. Results suggest that information about the quantity consumed facilitates learning, which likely drives the treatment differential.

2012 BECC Abstracts

Session #: 6F

Speaker Chris Jones, UC Berkeley

BEST FIT Topic:

Sector:

Presentation Title The "Californians are Cool" Campaign

Abstract Text Abstract Unavailable

Session #: 6A

Speaker Hannah Kapell, Alta Planning and Design

BEST FIT Topic: 2. Marketing and Outreach

Sector: Transportation

Presentation Title **How to Develop a Regional Youth Outreach Program**

Abstract Text In 1969, about half of all students walked or bicycled to school. Today, however, fewer than 15 percent of all school trips are made by walking or bicycling and over half of all children arrive at school in private automobiles. The consequences of this behavior on our children, on their health and on the environment are extensive. Educating youth and their families on the impacts that their transportation choices have, while also providing them with safe travel alternatives, will help to reverse this trend. In order to address this troubling trend in the Bay Area, in mid-2011, MTC, BAAQMD along with our consultant, Alta Planning + Design, began work on a four-year, regionwide effort focused on educating children and their families on the impacts that vehicle-related emissions have on the environment. Branded “Spare the Air Youth”, the program aims to reduce GHG emissions by inspiring youth and their families to make transportation-related behavior changes and empowering youth to educate their peers on the effects of GHG emissions from transportation sources. The program is occurring in two phases over four years. Phase I (through late-2012) will identify and test specific elements for inclusion in the three-year Phase II (2012 – 2015), the implementation phase. Prior to the end of the four-year timeframe, MTC will evaluate the program in order to create a potential recommendation for its continuation and/or expansion. At this year’s BECC, we would like to share lessons learned, including how we developed the program’s scope, the evaluation of the pilot programs and how we created the program used for Phase II.

Session #: 1A

Speaker Beth Karlin, University of California Irvine

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Building Energy

Presentation Title **Beyond kWh: A New Tool for Assessing Energy Feedback Programs**

Abstract Text Decades of research support feedback as an effective intervention to promote energy conservation, but results of empirical studies vary significantly, suggesting that the effectiveness of feedback depends on both what information is given to consumers and how it is presented. Most studies have used the amount of energy use (measured in kWh) as the dependent variable for measuring the effectiveness of feedback. Although this is a vital measure to include in the testing of any energy conservation measure, additional information about the subjective experience of using feedback could add significantly to our understanding about not only whether different types of feedback work, but how they work. This paper introduces a new tool for assessing the effectiveness of energy feedback, which includes multiple components to allow for the assessment of user comprehension, perception, and behavioral intention. It builds on the success of the System Usability Scale (Brooke, 1986) to measure perceptions of feedback and adds a cognitive component to measure respondents' ability to: (1) accurately perceive information; (2) integrate data with previous knowledge; and (3) translate knowledge into actionable behavior. The instrument was pilot tested in Spring 2011 and results of scale validity and reliability will be presented. It is hoped that this instrument can be used widely in order to improve our overall knowledge about potential mediators of the effectiveness of energy feedback on consumers.

Session #: 1A

Speaker Michelle Katchuck, University of Hawaii

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Consumption

Presentation Title **What Really Motivates Behavior Change?**

Abstract Text Many efforts to change energy behavior assume that prizes (extrinsic motivators) are a successful tool for behavior change or habit formation, without qualification. Could it really be that simple? Some research indicates that extrinsic rewards can actually reduce intrinsic motivations in a variety of tasks, while a conflicting line of research finds that extrinsic rewards do not negatively impact intrinsic motivations in most practical situations. Some researchers claim that the whole intrinsic/extrinsic categorization itself is a false dichotomy, and that to understand motivation one must take a multifaceted approach. What's an energy-change program designer to do? In this presentation, I will review the research surrounding motivation and present my approach to understanding the motivation of students participating in a dorm energy competition at the University of Hawaii. My ongoing research is intended to address the facets of motivation for behavior change during future iterations of this UH energy saving program.

Session #: 3F

Speaker Brian F. Keane, SmartPower

BEST FIT Topic: 1. Community-Based Programs

Sector: Renewables

Presentation Title **The Arizona Solar Challenge: Using Community Organizing and Behavior Change Marketing to Build Residential Solar Markets**

Abstract Text BECC 2012 Abstract Presenter: Brian F. Keane Title: The Arizona Solar Challenge: Using Community Organizing and Behavior Change Marketing to Build Residential Solar Markets Abstract: The Arizona Solar Challenge is a residential solar campaign that challenges communities across Arizona to install solar on 5% of owner-occupied homes by the year 2015. Created in partnership with Arizona Public Service (APS), the campaign leverages grassroots community organizing, stakeholder relationships and the passion of existing solar customers to spur residential solar adoption. The ultimate goal of the Challenge is to transform Arizona into the solar capital of the United States. This presentation will walk the audience through the Challenge and its rollout in 14 communities across the state by Arizona SmartPower (www.azsmartpower.org), a non-profit organization whose mission is to help residents make smart energy choices. Brian will discuss the campaign elements – including a Solar Coach who walks prospective solar customers from interest to installation – and tell the story of solar activism through photos, videos and testimonials from Solar Ambassadors, volunteer solar advocates who encourage their friends and neighbors to go solar. In addition to presenting some staggering results from participating communities, Brian will share survey results of how installing solar power results in behavioral changes in the way that solar homeowners use energy once they've installed solar. Brian will also provide best practice insights from customer satisfaction surveys, demonstrating how to shorten the decision-making timeline for residential solar installation through research-based consumer marketing.

2012 BECC Abstracts

Session #: Spotlight

Speaker Drexel Kleber, EnerGOP.us

BEST FIT Topic:

Sector:

Presentation Title Energy and the Republican Party: Conservative Values in Action

Abstract Text Abstract Unavailable

Session #: 5A

Speaker Mary Klos, Klos Energy Consulting

BEST FIT Topic: 8. Social Norms

Sector: Consumption

Presentation Title **Creating Habits that Will Last with Hourly Pricing**

Abstract Text Conventional wisdom says that residential customers can't handle market pricing for electricity. How can they stay aware of changing hourly prices and react to the information? It would take too much time to be checking their electric rates every hour, even if they had their smart phone in hand 24/7. Plus, they can't change their electric usage unless they are home to do it, or they install expensive automatic controllers. Well, conventional wisdom has been proven wrong. Real-time pricing has been available to Illinois electric customers for the last five years and over 20,000 have participated in the opt-in rate. Bill savings have averaged 11% and peak load reduction is 0.45 kW per customer. And, these impressive results are based entirely on behavioral changes – no technology added. How is it done? The program relies on education. Customers are given simple rules of thumb to follow, reinforced with reminders and tips every season and monthly feedback reports on savings. Alerts of high prices are also sent out the evening before based on day-ahead prices. This package of communication helps participants develop energy use habits that have been proven to last season after season. In fact, the behavior becomes so habitual that reductions continue to occur on hot summer afternoons even during summers with low energy prices. This presentation will present the details of how this change in electric use behavior was accomplished, as well as the evidence that the behavior has become habit and is on-going.

2012 BECC Abstracts

Session #: Spotlight

Speaker Brian Knutson, Stanford University

BEST FIT Topic:

Sector:

Presentation Title Leveraging Neuroeconomic Tools to Explore Environmental Valuation

Abstract Text

Session #: 3D

Speaker Kathy Kuntz, Cool Choices

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Transportation

Presentation Title **It's Iterative: Using Evaluations to Create Stronger Games**

Abstract Text Cool Choices aims to facilitate environmentally sustainable behaviors—related to energy and water usage as well as transportation, waste and food choices—by making change fun, social and easy via games. Efficacy depends, though, on how the program looks and functions from the participant perspective: actions that seem fun and easy to us may feel like difficult drudgery to our target audiences. Accordingly, we put a strong emphasis on continuous formal and information evaluations where findings are used to make real-time adjustments to our approach. We deploy user surveys, solicit input from opinion leaders and do more formal participant evaluations via third parties. Importantly, we also work with analysts who can dig deep into our data—to find the correlations that participants do not report. Taken together, all of these methods enable us to refine our games and improve effectiveness in each iteration. In this presentation we will talk about how we have used this approach, sharing strategies that other organizations can use to both generate useful feedback and then to act on that information. We will talk about what kinds of information can be useful, potential partners for gathering and analyzing the information and our approach to ensuring that we pay attention to the findings and modify our approach accordingly. This presentation will be useful to program implementers as well as the evaluators who hope to work with those program implementers.

Session #: 2F

Speaker Ken Kurani, University of California, Davis

BEST FIT Topic: 2. Marketing and Outreach

Sector: Renewables

Presentation Title **Can Renewable Electricity Accelerate Electric Vehicle Demand**

Abstract Text Can market growth of green electricity and electric vehicles (EVs) be accelerated by linking them? This question is relevant to producers of green electricity and EVs. Vehicle manufacturers might increase the value proposition to consumers by bundling their EV products with green electricity services. This question is relevant to policymakers as producers of vehicles or electricity will seek credit for meeting regulatory goals if they can exploit a connection between consumers of both. Explicitly linking EVs to renewable electricity furthers the necessary exploration of how recharging EVs confounds traditional distinctions between “car” and “home” energy use. Focus groups were conducted with i) EV drivers, ii) participants in green electricity programs, and iii) people who do neither. Themes extracted from the focus groups provide language for, and direction to, education and outreach programs. We heard mixed affinity for green electricity among the EV drivers. A few had made large commitments to green electricity in the form of home photovoltaic systems; others saw no added value in paying more for green electricity. Green electricity buyers expressed skepticism about the environmental credentials of EVs. Still, if 1) a trusted source of information makes the link for them and 2) their concerns are allayed, then perhaps they would be open to EVs. Households who are not presently driving EVs or participating in green electricity are not sufficiently engaged with either to deeply consider their combination. Initial findings also shape hypotheses to be tested in an on-line survey—those results will be reported elsewhere.

Session #: 1D

Speaker Nicholas Lange, VEIC (Vermont Energy Investment Corp)

BEST FIT Topic: 7. Gamification

Sector: Consumption

Presentation Title **Vermontivate!**

Abstract Text Vermontivate! is an ongoing experiment in gameful engagement and scalable community influence. Liberated by volunteerism and driven by the allure and potent pleasures of challenge and intrinsic rewards, a group of volunteer citizen activists, artists, students, and energy professionals developed a 6-week town vs. town challenge for the spring of 2012. Fed up by many lifetimes' worth of preaching *to* the choir, the architects of this game believe that superior impacts come from reaching and teaching *through* the choir. Built on shared design elements of positivity, creativity, and social exploration, we will tell the story of the inaugural round of Vermontivate: a 6-week competition between towns to discover and strengthen community energy networks. Led by Jill, a mysterious but approachable cow in a top hat, player participants were provided a structured experience to explore beyond the limits of typical energy games. Rather than focusing on the cramped and relatively static world of a player's individual energy usage, Vermontivate's sandbox-style of gameplay facilitates community interaction with friends and family, co-workers and neighbors to increase the dimensions of challenge and scope of achievement. We will share the highs and lows, insights and blindsides we've experienced in this significant departure from conventional energy efficiency work. With a Ben and Jerry's sponsored town ice cream party on the line, higher stakes are hard to fathom. What happened and what can we learn from it? We don't yet know (the competition will begin in mid-May and end on June 30th) but we soon will!

Session #: 1E

Speaker David Lehrer, Center for the Built Environment

BEST FIT Topic: 2. Marketing and Outreach

Sector: Work Place

Presentation Title **Using Segmentation Strategies to Create Targeted Climate Change Messaging for Office Workers**

Abstract Text Engagement programs for office workers usually present the same information to everyone. Meanwhile, recent research has shown that workers would prefer information about their personal relationship to energy use (see: http://www.cbe.berkeley.edu/research/pdf_files/Lehrer-Vasudev2011-energy-information-experts-occupants.pdf.) This talk will describe a segmentation-based approach to creating individualized engagement messaging about energy and the communication style and topics preferred by different groups of workers. Results are based on a survey conducted spring 2012 by the Center for the Built Environment at the University of California, Berkeley. The research team polled a randomly selected, national sample of office workers about their energy information preferences and energy-related behaviors at work. Respondents were segmented into six groups according to their interest in climate change and energy, using the segmentation strategy designed by Maibach, et al. (see: <http://environment.yale.edu/climate/files/SixAmericasMay2011.pdf>.) The segments range from those alarmed about global warming to those that are dismissive of it. The results suggest unique approaches are needed to engage each group, but that all can likely be engaged to differing degrees. These results represent the first random, national sample of office workers surveyed about energy use and resource efficiency messaging. The results may be useful for future engagement programs seeking to match occupant preferences with targeted energy feedback and messaging.

Session #: 1C

Speaker Brennan Less, LBNL

BEST FIT Topic: 3. Community Planning

Sector: Building Energy

Presentation Title **Occupant Behavior Effects in California Deep Energy Retrofits**

Abstract Text Deep Energy Retrofits (DERs) are residential remodeling projects that aim to reduce household energy consumption by 70% or more. These comprehensive efforts to reduce waste are a varied blend of building technologies and behavioral solutions. 10 DER case studies have been compiled in Northern California by researchers in the LBNL Residential Building Systems group, and all energy end-uses were monitored for one year in each home. These projects will be used to explore the behavioral issues below. All homeowners who undergo a DER can be considered “super-motivated” to reduce energy usage. Yet, there seem to be two types of deep retrofit occupants: (1) active energy conservationists, and (2) those that see their role as more passive, relying on building technology to reduce energy, as opposed to behavior. In reality, occupants exist on a spectrum between these two. Both types of occupants have been shown to achieve deep energy reductions, using a blend of efficiency, conservation and renewable generation. The role of occupant conservation in a DER varies greatly, with some projects investing modestly in building technology and others achieving the highest possible levels of technical performance. The variability in user-driven energy conservation and retrofit performance is large. Occupants use widely varying temperature set-points, plug loads and lighting energy. Motivated occupants still make poor decisions that limit potential reductions, such as multiple refrigerators, large A/V equipment loads and electric resistance space heat. This presentation will explore how behavior affects monitored energy performance in DERs.

Session #: 6C

Speaker Neil Lessem, The Brattle Group

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Consumption

Presentation Title **A Study in Persistence: Analysis of Customer Behavior in a Four-Year Dynamic Pricing Experiment**

Abstract Text Pilots with dynamic pricing and enabling technology have a rich history. In the past decade, more than two dozen involving more than 120 treatments have been carried out in three continents.¹ Experimental designs have varied from being scientific to those with no control groups and the results have had varying degrees of internal and external validity. If we focus on the pilots with the best experimental design, we find that demand response moves positively with the peak to off-peak price ratio at a diminishing rate, yielding an arc of price responsiveness. However, it has been difficult to say whether the “arc” will persist over time. The main reason is that most of the scientifically designed pilots have lasted only for just one season, usually a summer. Only one scientifically designed pilot has lasted for four seasons. This pilot was carried out by Baltimore Gas & Electric Company in the state of Maryland. We analyze the results of this pilot across each of the four years, first individually and then collectively. By estimating a constant elasticity of substitution (CES) model, we find that customers do indeed respond to higher prices by lowering peak usage and that this response is higher when dynamic prices are coupled with enabling technologies. More significantly, we find that these responses persist across all four summers. In our presentation, we will present the study design and the salient findings. 1. Ahmad Faruqi and Jenny Palmer, “The Discovery of Price Responsiveness: A Survey of Experiments Involving Dynamic Pricing of Electricity,” *EDI Quarterly*, 4:1, April 2012. <http://www.energydelta.org/mainmenu/edi-intelligence-2/our-services/quarterly-2/edi-quarterly-vol-4-issue-1>

Session #: 2E

Speaker Matthew Lipson, Department of Energy and Climate Change

BEST FIT Topic: 4. Modeling Behavior

Sector: Building Energy

Presentation Title **Why Do Comparable Households Use Different Amounts of Energy?**

Abstract Text The UK is committed to reducing greenhouse gas emissions 80% by 2050. The Government's objective is to reduce emissions from domestic buildings from 25% of total emissions in 2009 to almost zero in 2050. At present, 85% of UK domestic energy consumption is gas with huge variation between households: the highest 10% consume over 4 times as much gas as the lowest 10%. The property (size, age and type), household income and tenure (rented, owner-occupied, council/social housing) can explain 40% of this variation. This qualitative research explored how and why households use energy in the ways that they do (to cook, clean, relax, work etc.) to explain the remaining 60%. The sample included 70 owner-occupied households across a range of incomes and life-stages. All lived in semi-detached, 3-bedroom properties with gas central heating. Households were matched so that half had relatively high and half relatively low gas consumption, but were otherwise comparable. Semi-structured interviews explored participants' domestic lives incorporating house-tours and hands-on exercises. Over the next 8 weeks all households completed a lightweight, on-line diary and, in some, temperatures were monitored unobtrusively. This data was analysed and discussed with households in closing interviews. The Hawthorne effect was minimised by exploring how materials, meanings and skills shape domestic practices in general, rather than focusing explicitly on energy use in particular until the final interview. This presentation will discuss what drove different levels of energy consumption and how this is being used by policymakers to design more effective energy legislation.

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Session #: 6E

Speaker Mark Lubell, UC Davis

BEST FIT Topic:

Sector:

Presentation Title **Collective Action and Environmental Behavior**

Abstract Text Abstract Unavailable

Session #: 7B

Speaker Kevin Luten, UrbanTrans ANZ

BEST FIT Topic: 1. Community-Based Programs

Sector: Transportation

Presentation Title **Conversations and Coaching: Lessons from Two Projects in Western Australia**

Abstract Text Building behaviour change interventions around one-on-one conversations and on-going coaching is becoming standard practice in environmental and health programs in Australia. This dialogue-based approach offers a series of significant benefits: • Skilled conversationalists allow program participants to frame the motivations for participation to match their own priorities. • Coaching approaches help participants overcome choice paralysis by guiding them toward the best initial actions steps for their circumstances, along with thinking ahead to overcome likely barriers to action. Done well, participants own these choices, not the conversationalists. • Commitments to action are strengthened through perceived social contracts between participants and conversationalists. This presentation will be firmly grounded in two recent projects UrbanTrans has implemented in Western Australia: • A current randomised control trial utilising five distinct research conditions (comparing coaching approaches to normative feedback), plus placebo and control conditions, targeting transport, energy, and water use at the household level. This project involves 2,500 households in Perth. The project is running over the course of 2012, and preliminary results will be available for the conference in November. • A program to increase physical activity levels in Geraldton by working with over 4,000 households using on-going coaching techniques. The project was completed in 2011, and final results will be tabulated in time for the conference in November. These projects will ground this paper and presentation in real-world applications and lessons learned.

Session #: 2E

Speaker Loren Lutzenhiser, Portland State University

BEST FIT Topic: 10. Trans-Disciplinary Research

Sector: Building Energy

Presentation Title **What Kind of Occupants Do ZNE Buildings Require?**

Abstract Text The federal government and several states have adopted goals and guidelines for achieving substantial numbers of Zero Net Energy (ZNE) buildings within the next decade. In this planning, the focus has been strongly on building design and electricity supply curves, leaving questions of occupancy and occupant behavior to defaults. It is assumed that occupants can be exhorted to behave as necessary—or if not, that the industry will at least have done its best. But without paying attention to what is known, or could be known, about occupant behavior, this strategy seriously risks producing a fleet of buildings that falls unnecessarily short of policy intents for ZNE design. So instead of focusing on technologies required for ZNE buildings, we turn the question around, asking: “What occupants are required for ZNE buildings?” Our analysis combines building energy simulation with available data on occupancy and occupant behavior, using California residential buildings as an example. What types of households are good candidates for performance as ZNE? Which are not? How might current efforts better use available data? What are the risks of not doing so in both commercial and residential cases? Our findings illustrate why it is vital to go beyond consideration of plug loads, lighting, and behavioral tweaks to a more wholesale recognition of the role of occupants, and the potential role of occupants, in creating better-integrated systems of supply and demand—taking advantage of the potential of ZNE policy mandates to better integrate technology with occupants to meet climate change goals.

Session #: 6D

Speaker Jenny Lybeck, Port of San Diego

BEST FIT Topic: 2. Marketing and Outreach

Sector: Building Energy

Presentation Title **The Green Business Challenge, a Business Outreach and Engagement Model**

Abstract Text The Port of San Diego's Green Business Challenge is a voluntary program that creatively engages businesses around San Diego Bay to reduce energy consumption and greenhouse gas emissions, increase their sustainability, and improve their bottom line. This is accomplished through a comprehensive effort that includes an online scorecard to help participants track their sustainability initiatives, and free trainings and resources to further encourage long-lasting engagement. Strategies to engage businesses include a media and marketing campaign, peer-to-peer best practices sharing, capacity building through training and certification programs, and old fashioned competition. Year One of the Challenge, beginning in January 2011 and ending in January 2012, proved to be a highly successful business engagement tool. Participating businesses ranged from marinas and hotels to large industrial facilities. The presentation will highlight the successful Green Business Challenge as a model for local business engagement and behavior changes. Topics will include: • Program implementation • Lessons learned • Incentives and benefits to businesses • Year One results The Green Business Challenge proves to be a highly adaptable and comprehensive program with a variety of applications. Momentum for this program is growing in the San Diego region, with support from the local utility San Diego Gas & Electric, and it has expanded to the Cities of San Diego and Chula Vista. The Port of San Diego's program has evolved into the Green Business Network for Year Two, and can be found at www.greenportnetwork.org. Speaker Bio: Cody Hooven, Green Port Program Manager with the Port of San Diego, will deliver the presentation. Ms. Hooven leads the development and implementation of environmental sustainability programs for the Port and its 600+ diverse waterfront tenants. Ms. Hooven earned her Masters in Marine Biodiversity and Conservation from UC San Diego Scripps Institution of Oceanography and her bachelors in biology and marine studies from the University of Hawaii.

Session #: 2A

Speaker Paul Markowitz, Vermont Energy Investment Corp.

BEST FIT Topic: 1. Community-Based Programs

Sector: Work Place

Presentation Title **Employee Energy Efficiency Challenge**

Abstract Text In 2010, Efficiency Vermont partnered with selected Vermont employers to help their employees improve energy efficiency in their homes, called the “Employee Energy Efficiency Challenge” (E3 Challenge). Under this pilot program, participating employees earned points by taking specific actions to save energy, such as purchasing CFLs or buying an efficient refrigerator. For every set number of points earned, employees had their name entered into a drawing. The more points an employee earned – the more times their name were entered into the drawing to win weekly prizes and a grand prize. Employers had primary responsibility for implementing the program in their business, while Efficiency Vermont provided financial support and educational materials. Overall, employees saved an estimated 90,000 kilo-watt hours with a dollar savings of \$13,000. An estimated 376 employees signed up to participate in the program or approximately 1/3 of all employees. Of the employees that signed up, approximately 30% took at least one action to improve energy efficiency. 91% of survey respondents said they were more knowledgeable about energy saving opportunities in their home as a result of participating in the program. 89% said they took actions to reduce their electrical bills, 70% took actions to reduce their heating bills, and 63% noticed an overall reduction in their energy bills. 58% of respondents said that their participation in the E3 Challenge either “very significantly” or “significantly” influenced their decisions around improving efficiency in their homes. Efficiency Vermont is currently expanding the program to more employers.

Session #: 7A

Speaker Yoky Matsuoka, Nest Labs, Inc.

BEST FIT Topic: 4. Modeling Behavior

Sector: Building Energy

Presentation Title **Nest Learning Thermostat's Auto-Schedule Feature Reduces Residential Energy Usage**

Abstract Text The Nest Learning Thermostat launched in October 2011 to solve a problem that has eluded homeowners since HVAC systems were first introduced: how to easily and efficiently manage the device responsible for controlling about half of the home's energy – on average, more than \$1,000 a year per U.S. household. The EPA says a properly programmed thermostat can cut 20% off a monthly energy bill, and while about 40% of households have a programmable thermostat, only 11% of owners take advantage of the programmable mode. Programmable thermostats are simply too complicated to program, and even if a user programs it once, she is unlikely to go through the tedious process again if her schedule changes. In fact, in 2009, the EPA eliminated Energy Star rebates for programmable thermostats. Unlike other thermostats, Nest learns lifestyle patterns, temperature preferences, and the home's thermal profile to keep you comfortable when you're home and save energy when you're away. Just turn up the temperature when cold, down when hot, and Nest creates a customized schedule. The better you teach it, the better the schedule, and it adapts over time to changes in the user's lifestyle. In April 2012, 10,000+ devices in the field were sampled from every U.S. state to evaluate Nest's performance, revealing that 98.6% of devices are executing a schedule with setback. Furthermore, in the coldest months, devices with a good schedule save on average 20% of energy usage. Presentation includes additional data from summer evaluation.

Session #: 1B

Speaker Susan Mazur-Stommen, ACEEE

BEST FIT Topic:

Sector:

Presentation Title Relovilles and Retrofits: Big homes and Energy Conscious Homeowners in Alpharetta, Georgia

Abstract Text The Deep South Ethnographic Project at the American Council for an Energy Efficient Economy has been a year-long, multi-sited, qualitative research project looking into everyday energy practices across the sectors of buildings, agriculture, and transportation. The Behavioral Program staff at ACEEE have used a case-study approach to tackle specific suites of questions in locales distributed across states with nascent or emergent energy efficiency program adoption, like Louisiana, Mississippi, Alabama, and Georgia. One of our over-riding questions was, are end-users of energy in the Southeastern states interested in energy efficiency? Alpharetta, GA was our site for looking at upper income families (in homes over 3500 sq. ft.) and their responsiveness to energy efficiency campaigns by their local utility. 'Relovilles' like Alpharetta have become cross-roads for upwardly mobile corporate employees from across the country, forging a new melting pot for attitudes and values. What does this mean for acceptance of new energy efficiency programs among the customers of Southern utilities, including the installation of smart-meters, real-time feedback, and the social norm-based reportage of Opower-style behavioral programs? What we found was a high-level of energy efficient practices: air-conditioning was set to 78 in all of the homes we visited in the middle of a Georgia summer; all homes had programmable thermostats; and most home-owners had received a home energy audit. In other words, people were generally aware of and engaged with their energy consumption at home. This presentation will discuss consumer attitudes towards energy bills, conservation, peak-load management, and dynamic pricing.

Session #: 4B

Speaker Patrick McNamara, C3

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Building Energy

Presentation Title **Rapid Behavioral Experimentation: A Better Approach to Testing**

Abstract Text As behavioral insights become more accepted, the key challenge to scale behavior-based approaches to energy savings lies in rapid experimentation. While many foundational “behavioral” precepts have been established, including goal-setting, feedback and peer comparisons, the results can vary widely based on the context of implementation, audience and other factors. The conventional approach to testing involves setting up a large, statistically-significant experiment with a number of embedded hypotheses, testing this experiment over the course of several months to a year and then analyzing the results and recommending changes to implementation, often in the context of a “process evaluation”. While this conventional approach yields valuable insights, it limits the amount of experimentation possible. Alternatively, utilizing “agile” software development and “lean” research strategies, it is possible to rapidly experiment with new ideas to get households to save more energy. Agile software development is a best practice set of software development methods that promote adaptive planning, evolutionary development and delivery, and is much more flexible to change than previous development methods. “Lean” research strategies rely on techniques from innovation thought leaders such as Eric Ries, and involve testing the most sensitive assumptions and metrics. The presentation will focus on real-life examples of “agile” software development and “lean” research strategies. Examples will include small software changes that had large user engagement and energy-savings impacts, e-mail campaigns that test various feedback treatments and goal-setting tests. These kinds of rapid experiments allow for constant improvements to energy-savings products and programs.

Session #: 7F

Speaker Cynthia McPherson Frantz, Oberlin College

BEST FIT Topic: 8. Social Norms

Sector: Consumption

Presentation Title **Harnessing the Power of Core Social Motives to Make Transformation Happen**

Abstract Text A fraternity pledge swallows goldfish during Rush Week; a relative donates a kidney for a loved one; a suicide bomber dies for her cause: Individuals will do outrageous, painful, and even deadly things for people, groups and causes they care about. How can we harness this motivation to act in the service of climate neutrality? This talk will present new research that begins to answer this question. In addition to physical needs, humans have core psychological needs that they are powerfully motivated to fulfill. Climate activists and program designers must know how to take these core needs into account, as well as how to leverage their power in the service of sustainability. This talk will present the 5 core social motives (Fiske, 2004), and identify programmatic strategies that tap into them. In particular, I will explore the need to belong, and introduce research on connectedness to nature suggesting that the natural world can be an important source of belonging. Our research demonstrates that “connectedness to nature” predicts environmentally responsible behavior such as recycling and electricity. Programs that focus on enhancing connectedness to nature may therefore be an important mechanism for driving fundamental shifts that link attitude with behavior change. Ideally this talk is included in the session, Making full spectrum sustainability a reality: Theory, practice and assessment in a small city.

Session #: 4D

Speaker Steven Meyers, EnerPath

BEST FIT Topic: 2. Marketing and Outreach

Sector: Building Energy

Presentation Title **Ya Want Fries With That CFL? Applying Cross-Selling To Efficiency**

Abstract Text Although leading consumer-focused corporations such as Starbucks, McDonalds, Wal-Mart, and Amazon continually apply cross-marketing and cross-selling techniques to their respective customer base, such practices are rarely used (and on occasion even scorned) within the energy-efficiency industry. This paper begins by discussing the theory of cross-marketing in other industries and analyzing the current barriers and potential benefits in the efficiency industry. We then discuss and quantify successful cross-selling of efficiency services and products in over 15,000 small-business and residential participants from efficiency-programs from California, Texas, and New York. These examples apply these techniques across technologies (e.g. lighting programs to pool pumps), customer segments (e.g. using small-business programs to generate leads for residential and large-commercial programs), services (e.g. enrolling demand-response customers from efficiency participants), and incentive types (e.g. finding customers to finance deep retrofits after participating in direct installation programs). The paper concludes with practical recommendations for implementing cross-selling and cross-marketing into current utility efficiency portfolios and defining key metrics to evaluate their impact. As utility efficiency goals become increasing aggressive, integrating cross-marketing and cross-selling techniques into the energy-efficiency industry will be essential to drive adoption both broader and deeper into hard-to-reach mass-market customer segments.

Session #: 7A

Speaker Aya Mikami, Osaka Gas, Japan

BEST FIT Topic: 4. Modeling Behavior

Sector: Building Energy

Presentation Title **Energy Saving Campaign and Its Effect After Fukushima Disaster in Japan**

Abstract Text In Japan, the need for demand response was not considered very high prior to the March 2011 earthquake. That is because there was surplus supply capacity to more than cover peak demand up until that time. Since then, however, the nation has suffered severe electric power supply shortages and electricity rates have been rising, increasing the opportunity to introduce demand response. Osaka Gas has been selling the “Ene-Look Plus” Home Energy Management Systems (HEMS). This system displays not only electricity consumption, but also gas and water consumption, along with hot water consumption by use (hot water supply, shower, bath, floor heating), by time. We held an electricity conservation competition among about 200 households with Ene-Look Plus from summer 2011 through winter 2012. Each month from July through September 2011 and January through March 2012 (periods when electric companies sought energy conservation), the household with the greatest electricity consumption reduction from the same month of the previous year was awarded a ¥3,000 gift certificate. During the campaign period, the year-on-year reductions in electricity consumption were 10% greater in summer and 20% greater in winter at households that monitored their Ene-Look Plus displays than at those that did not. After the campaign ended, however, the difference between the two groups narrowed. What should be noted is that households that monitored their displays during the campaign reduced their gas consumption by 15% more than households that did not. This indicates that electricity conservation campaigns also motivate consumers to conserve gas.

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Session #: 4F
Speaker EDF, Shorenstein Realty Services

BEST FIT Topic:

Sector:

**Presentation
Title**

Abstract Text If improving energy efficiency was as simple as flipping a switch, companies could easily cash in on huge savings in dollars and emissions. Unfortunately, challenges like limited resources, information gaps and organizational barriers prevent many from taking advantage of smart energy investments. Environmental Defense Fund (EDF) works within approximately 50 Fortune 1000 companies each year through the EDF Climate Corps program. This program specially-trained MBA and MPA students in companies, cities and universities across the nation to build the business case for energy efficiency. EDF will host a panel featuring an EDF representative, 2-3 company representatives and an EDF Climate Corps fellow who worked with one of the companies to identify opportunities and create practical, actionable energy plans. The panelists will lead a conversation about their experience with the program, and discuss common barriers to energy efficiency and how they use employee engagement and other leading practices to overcome them.

Session #: 2E

Speaker Mithra Moezzi, Portland State University

BEST FIT Topic: 4. Modeling Behavior

Sector: Building Energy

Presentation Title **Closing the Loop: Improving Home Energy Audits by Incorporating Behavior**

Abstract Text Most home energy audit programs view the home as a technological system and the goal of an audit as encouraging higher energy efficiency in this system. Trouble is, home energy use depends largely on what occupants do, and homeowners who seek an audit may usually be seeking to reduce energy use rather than to increase energy efficiency per se. How much better advice can audits provide if they take occupant behavior into account? We approach this question from our recently completed study of 300 households in the US Northwest, where we collected data on physical house characteristics, energy consumption, and – unusually -- household energy use behaviors. For 101 of these homes, we compared utility-reported energy consumption to home energy audit modeling tool estimates of total energy use. Incorporating occupancy and behavior in addition to the home’s physical characteristics lead to considerably more accurate estimates of total energy use than did using physical characteristics alone. Our results show that incorporating behavior into home energy audits can lead to better advice to homeowners, both in terms of the quality of technology recommendations and savings estimates, and in terms of effective behavioral recommendations. Not only would such customization improve over the “average advice” currently on offer, it opens a new window to reconfigure home energy audits to better reflect what people actually do with energy as well as to what they say they want to know. We provide evidence from our modeling work as well as from homeowner surveys.

Session #: 3C

Speaker Alex Malokin, University of California, Davis

BEST FIT Topic: 4. Modeling Behavior

Sector: Transportation

Presentation Title **Travel Multitasking: Relationships to Mode Choice and Value of Time**

Abstract Text Daily travel is conventionally treated as a disutility to be minimized. However, secondary activities conducted while traveling, referred to here as “(travel) multitasking”, could affect the utility of travel alternatives and thus mode choice and the value of travel time savings. In particular, the ability to multitask in certain ways may lead some individuals to choose transit over the automobile, despite the apparent superiority of auto on traditional dimensions such as travel time. Until recently, little effort had been made to empirically examine this premise. We address it through the collection of a rich new dataset, from a sample of more than 1500 Northern California commuters using a variety of transportation modes. The questions addressed by this study include the following: (1) How do the various kinds of activities that are commonly conducted while traveling differ by mode, by personality type and attitudes, and by sociodemographic traits? (2) In what specific ways does multi-tasking alter the utility of travel, and what types of people are associated with different ways? (3) How does the ability to multitask affect mode choice and the value of travel time? By November, we will be able to present a variety of descriptive statistics, relating the types of travel multitasking conducted to the mode chosen, and to socioeconomic and attitudinal characteristics of the commuter. The results will offer insight into the extent to which transit ridership could be increased through catering to forms of travel multitasking for which transit is superior.

Session #: 1B
Speaker Christine Mondor, evolve environment::architecture

BEST FIT Topic: 3. Community Planning

Sector: Building Energy

Presentation Title **Ecodistricts: Powered by Community Capacity**

Abstract Text Our built environment and our behavior have a reciprocal relationship—we shape our environment and it shapes us. This is especially true for urban settings, where there are nested environments that enable or inhibit how we act, who we engage with, and the values that we espouse. In our previous studies of small companies and nonprofits, we have found that the built environment offers a “gravitational assist” towards transforming the entire organization to more sustainable practices (reference our chapter in Andrew Hoffman’s soon-to-be-released book) and that those practices create more sustainable places. We wanted to know if an urban scaled concept such as an ecodistrict, could leverage both place-based projects and socio-cultural factors to transform a community to more sustainable practices. This study is based on field work in existing communities who are also economically disadvantaged communities of color. Our study has found that technology is not the limiting factor for ecodistrict success --the concept of community capacity is the single most important factor in determining a community’s ability to use more effective technologies and systems. This presentation will focus on key strategic community engagement opportunities that are essential to making the ecodistrict successful, including:

- Living city urban planning – the importance of planning with both quantitative and qualitative performance indicators related to sustainability
- Measuring to manage – the role of metrics and monitoring for ongoing literacy and cycles of improvement
- Tribe building – the need to cultivate authentic leadership to strengthen decision making mechanisms
- Kicking the tires – leveraging the power of place-based demonstration as an influential method for organizational learning
- Creating the commons – creating a legal structure to create equity and create financial resiliency with resources held in common.

The panel will give examples of successful programs that are essential to an ecodistrict and will distill principles of how place-based projects and organizational development can invite people to low carbon lifestyles.

Session #: 5A

Speaker Dulane Moran, Research Into Action

BEST FIT Topic: 7. Gamification

Sector: Consumption

Presentation Title **Experimentation with Feedback: How Do We Know What to Do?**

Abstract Text The effect of behavior on residential energy consumption is well documented. Studies have shown that energy use can vary greatly, even in identical homes occupied by people with similar demographics. Feedback devices have long promised to help residential customers understand and control their energy use. In-home display devices linked to energy consumption data available through Smart Grid enabled communication are poised to allow for direct feedback to a wider range of customers. A recent set of process evaluations conducted to understand the experience of residential participants provided with different mixes of feedback devices, plug load controllers and, in some cases, communicating thermostats, revealed evidence of an unexpected level of experimentation and engagement. While the pilots had been designed to inform residents of peak energy events and enable curtailment requests, participants reported using their in-home displays and plug load controllers to experiment: plugging different devices in and watching the display or website details to understand the energy profile of specific devices. The results of our process evaluation research suggest a desire for more granular and detailed understanding of what drives total household energy use. Experimentation is a sign of engagement and learning, as opposed to passive receipt of information. Experimentation could lead to informed behavior change—similar to changes in driving behavior based on real-time feedback about gas mileage (the Prius effect). The authors will discuss opportunities to enable and encourage more experimentation using plug load devices, in-home displays and website graphs in combination with detailed energy consumption data.

Session #: 6D

Speaker Amy Morsch, Center for Climate and Energy Solutions

BEST FIT Topic: 1. Community-Based Programs

Sector: Work Place

Presentation Title **Energy Efficiency: Engaging Employees and Communities to Make an Impact**

Abstract Text The presentation will draw lessons from the Make an Impact partnership between the Center for Climate and Energy Solutions (C2ES) and leading U.S. companies. The goal of the program: to engage the companies' employees in proactive steps to reduce their carbon footprint at home, at work and in their communities. A signature component of C2ES's work with corporate partner Alcoa is the Make an Impact: Change Our 2morrow (MAI CO2) schools' challenge. Over the past two years, this educational energy conservation competition has reached 23 schools in nine Alcoa communities across the country. In all, the program has secured commitments from 17,000 students, parents and teachers to take steps to reduce their carbon dioxide emissions by almost 35 million pounds through energy-saving actions. Make an Impact has succeeded as an outreach and communications campaign by framing the climate issue in terms that relate directly to people's lives — and their wallets. The program's messaging emphasizes energy efficiency and cost savings rather than greenhouse gas reduction, while at the same time explaining the connections between energy use and climate change. Make an Impact's success also is due to the validation provided by the Center's corporate partners, who support and promote the program among their employees in a variety of ways. In her presentation, Ms. Mandes will review the program's messaging and strategies with the goal of sharing lessons for other outreach and communications efforts related to climate change and energy.

Session #: 3A

Speaker Philip Mosenthal, Optimal Energy, Inc.

BEST FIT Topic: 5. Enabling Policies

Sector: Building Energy

Presentation Title **A New Regulatory Framework to Support Pursuit of Behavioral Programs**

Abstract Text Behavioral programs have appeared in recent years as a potentially large and cost-effective demand-side resource that can be pursued by utilities. However, existing DSM regulatory frameworks were not designed to support behavior initiatives, and are neither desirable nor ideally suited to promote behavioral initiatives while protecting ratepayer interests. There are a number of reasons for this. One is that efficiency goals in many jurisdictions are defined in terms of annual savings targets. Because behavioral programs can provide large annual savings, but do not generally persist and are therefore of much less societal value than more traditional DSM, they have resulted in distortions of intended DSM policy, perverse incentives and inappropriate utility financial awards. We propose a new regulatory framework for behavioral programs, drawing on traditional cost-of-service regulations. Quite simply, one should view education to customers on best practices and approaches to using energy as a core business of utilities obligation to serve the public interest, similar to the way they inform customers about not digging near buried wires, low income assistance grants, or other “PSA-type” messages. This would be consistent with efforts toward a smart grid, where DSM frameworks have generally not been considered appropriate. This framework will ensure utilities their product is used wisely and provide enhanced customer service and public relations benefits. Finally, ratepayers would not be burdened with providing additional incentives to utilities for this basic information, and can continue to invest in hardware related efficiency efforts that provide the largest lifetime impacts and net benefits.

2012 BECC Abstracts

Session #: 5F

Speaker Crystal Murphy, Chapman University

BEST FIT Topic:

Sector:

Presentation Title **On Decision-Making: Towing the Line Between Entertainment and Engagement in Documentary Film Production**

Abstract Text Abstract Unavailable

Session #: 2D

Speaker Rebecca Neel, Arizona State University

BEST FIT Topic: 2. Marketing and Outreach

Sector: Water

Presentation Title **Speaking with One Voice About Uncertain Futures: How We Frame Scientific Disagreement Affects Public Trust in Climate Change Science**

Abstract Text When the public thinks that scientists disagree about climate change effects (such as the extent to which sea levels will rise), do they come to distrust climate science? We tested this possibility by presenting the same climate science information (sea levels will rise by between 4-16 inches over the next 50 years), but varying whether the information was communicated with one scientific voice (98% of climate scientists believe sea levels will rise by between 4-16 inches over the next 50 years) or several different voices representing the same range of possible futures (19% of climate scientists believe sea levels will rise by 4 inches over the next 50 years; 20% of climate scientists believe sea levels will rise by 8 inches over the next 50 years; etc.). As predicted, hearing varied scientific opinions reduced trust in climate scientists. Interestingly, this effect was largest for conservative participants, attenuated among moderate participants, and minimal for liberal participants. We discuss possible mechanisms driving this effect, such as differences between liberals and conservatives in discomfort with uncertainty, and the extent to which the scientific topic challenges or confirms one's values. Because disagreement, criticism, and scientific argument are central to scientific progress, the multiple voice problem may prove important for communicating many kinds of science, with implications for effectively presenting such uncertainty to policy makers, the public, and other stakeholders.

Session #: 3D

Speaker Rebecca Nelson, Milepost Consulting

BEST FIT Topic: 7. Gamification

Sector: Work Place

Presentation Title **Graphic Design and Energy Efficiency? Make it Beautiful to Change Behavior!**

Abstract Text A well-researched behavior change framework and report can be a powerful tool, but if it is not presented in a manner that is engaging and exciting for people to interact with, then even the best idea can fall flat. People are pulled in countless directions and at any given moment can choose between multiple tasks and opportunities. Let's face it; if it is good looking, "it" gets our attention. Our presentation will illustrate how visually appealing and tailored roadmaps galvanize stakeholders into decreasing environmental impact and increasing energy efficiency. Three roadmaps that fit the "it must be beautiful" policy and lead to results will be showcased. We'll highlight how a NASCAR themed roadmap developed for the University of Tennessee Knoxville has led to its implementation and development of a campus "strike force" to reduce campus wide EUI. Also showcased will be eScore, the visually grabbing audit report that tells the story of someone's house and motivates them to take one energy efficiency action after another. Finally, we'll share how a 14-foot installation of a strategic plan is changing a culture and creating community. When these roadmaps are developed the whole team is not only able to track progress, but can't resist it. This focus on the goal grows through their engagement in the development process, having fun and enjoying the experience in a way that has otherwise eluded typical energy efficiency projects, and then having a beautiful visual reminder hanging on their wall of the work to be done.

Session #: 6E

Speaker Samantha L. Neufeld, Arizona State University - Global Institute of Sustaina

BEST FIT Topic: 8. Social Norms

Sector: Consumption

Presentation Title **Gracious Guilt and Piggish Pride: Effects of Emotions on Cooperation**

Abstract Text Although much behavioral research has examined the factors that influence cooperation in situations where people share resources, surprisingly little work has addressed the role of emotions in pro-social behavior. Experimental researchers use cooperation games like the “take-some” game and the “give-some” game to examine behaviors in these contexts. The self-conscious emotions – guilt, shame, embarrassment, and pride – involve heightened awareness of our relationships with others, and therefore are hypothesized to have important effects on behavior in these games. Furthermore, because the desirable/cooperative action differs across dilemmas (e.g., sometimes the desirable behavior involves taking less from a shared resource, but other times it involves giving more to a shared resource) these emotions may not result in the same level of cooperative behavior across situations. In two studies, we examined the effects of guilt and pride on cooperation in two different social dilemma games. In the “take-some” game, people who felt guilty consumed less of a shared resource, whereas people who felt proud consumed more. However, this pattern of cooperative behavior was not found in the “give-some” game, in which the desired behavior was proactive contribution to a shared resource. We discuss what these findings suggest about the role of emotions in decisions about sharing resources in the real world.

Session #: 7D

Speaker Caroline Noblet, University of Maine

BEST FIT Topic: 4. Modeling Behavior

Sector: Renewables

Presentation Title **Primed for Action? The Potential Role of Priming in Renewable Energy Acceptance.**

Abstract Text As citizens and leaders make decisions regarding renewable energy production opportunities, including potential investment in wind infrastructure, it becomes important to understand the contexts which may trigger support or opposition for these projects. Work by Ferguson and Bargh (2004) indicates that behaviors may be unknowingly influenced by recent perceptions, thus leaving a question of whether an individual's current focus may influence their behavior towards supporting wind energy. At present in the state of Maine, the benefits associated with wind energy production are primarily discussed and perceived in the framework of economic or environmental benefits (Teisl, Noblet & McCoy, 2010). We hypothesize that activating environmental (economic) beliefs through priming will increase the extent to which individuals agree with wind energy as an environmental protection (economic development) option. We also hypothesize that individual's existing environmental worldviews, measured here by the New Ecological Paradigm (NEP) may moderate this activation due to attentional bias or self-concept activation. Across two analyses, we find evidence of assimilation of environmental (economic) messages but also note evidence of reverse priming or contrast; an individual's existing environmental worldview acts as a moderator on these effects. Our results indicated that those choosing to discuss the benefits of wind energy must take care to frame messages as inclusive of economic and environmental benefits. In addition, the varying pre-existing attitudes held by the audience towards the environment must also be carefully considered.

Session #: 3B

Speaker Bill Norton, Opinion Dynamics

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Waste

Presentation Title **Saving Waste: Identifying Wasted Energy by End Use**

Abstract Text Behavioral program efforts to date have not accurately or effectively measured the potential energy savings that could possibly be attributed to such efforts. This places behavioral programs behind more traditional programs. This presentation will detail an innovative residential and commercial penetration study approach that measures the magnitude of energy waste associated with settings, technology management, and other behaviors. In this presentation, the authors will argue that measuring technology and behavioral waste is central to the future success of energy efficiency efforts because it informs strategic interventions in the market. This presentation will showcase the study's approach to quantifying waste due to behaviors. Specifically, it will highlight how customers interface with a range of sector-specific technologies (lighting, HVAC controls, consumer electronics) to generate waste, and how measuring such waste can unlock new levels of behavioral potential. Beginning with total energy use for each technology, the presentation will demonstrate how the research identified baseload and then built up incremental energy use, or waste, due to inefficient technology, equipment settings, and end-user behavior – essentially breaking down the pieces of the energy waste “pie.” Audience members will learn how the study leveraged secondary data, on-site metering at the appliance and circuit level, as well as meter reads to measure waste. These insights will be valuable for program implementers nationwide, will identify new opportunities for data collection and measurement, and will quantify potential opportunities for greater behavioral savings by end use.

Session #: 3D

Speaker Lauren Olson, Michigan State University

BEST FIT Topic: 7. Gamification

Sector: Work Place

Presentation Title **The Green League Game: A Tool for Employee Learning & Engagement**

Abstract Text This presentation will discuss the criteria and outcomes of a web-based game designed to motivate and engage non-credit faculty and staff who are volunteer “environmental stewards”. Environmental stewards are trained to help colleagues reduce waste, practice energy conservation, and contribute to the overall sustainability of their unit. Analysis showed that environmental stewards had basic sustainability knowledge, but had gaps in applying more complex concepts such as systems thinking and the impact of their actions on the organization. MSU Campus Sustainability partnered with the MSU GEL lab to develop an interactive game to reinforce basic sustainability training and further develop systems thinking skills. Environmental stewards are organized in teams in similar geographic locations. The game enables participants to enter real activities and decisions as part of a challenge. Each challenge completed by the environmental steward goes toward the teams’ overall score. There are interfaces for reporting and validating behaviors and for displaying tracking information to maximize motivation, fun, and learning. Participants can elect to receive participation reminders and weekly competition updates. Participants are also encouraged personal stories related to energy conservation and waste reduction. Daily and weekly bonus point knowledge questions are incorporated into the game. At the end of the contest, participants are asked to complete a post-game survey. At BECC 2012 we will be able to share our lessons learned in creating such a game to better train and engage employees. This game is applicable to any organization looking to engage employees in sustainability efforts within the organization.

Session #: 6A

Speaker David Parisi, Parisi Associates Transportation Consulting

BEST FIT Topic: 6. Program Design

Sector: Transportation

Presentation Title **Marin County's Safe Routes to Schools (SR2S)**

Abstract Text Established in 2000, Marin County's Safe Routes to Schools (SR2S) is a program of the Transportation Authority of Marin (TAM) designed to reduce congestion around schools, while also promoting traffic safety, healthy habits, and environmental awareness. It has evolved to become a national model through its innovative classroom education, special events, infrastructure improvements, and other strategies that encourage walking, biking, carpooling, and taking transit to and from schools. In November 2011, TAM released a 10-year evaluation report of Marin's SR2S program. The results of the report show that SR2S continues to make a significant impact across the county, reducing car trips to and from schools and making a safer environment for all. Since the program began, there has been an eight percent mode shift countywide from single-student car trips to walking, bicycling, riding public transit, and carpooling to/from schools. According to a parent survey, over 25 percent of families changed their travel mode because of SR2S. In addition, over 100 SR2S infrastructure projects, totaling more than \$17 million, have been constructed or are currently under design. With a well-established program like Marin's, however, the focus going forward will be one of maintenance rather than expansion. Keeping in mind some of the lessons learned, the report concludes with a number of recommendations that are intended to improve the effectiveness of the program, setting it up for even greater success in future years.

Session #: 7A

Speaker Therese Peffer, CIEE

BEST FIT Topic: 4. Modeling Behavior

Sector: Building Energy

Presentation Title **Thermostat Wars and Other Tales from the Field**

Abstract Text Much research has described the lack of energy savings with programmable thermostats, but what do we really know about how consumers are using their thermostats, what are the problems, and what do people need to solve them? In addition, most methods to try and determine thermostat behavior are limited to surveys with preselected answers or interviews with small samples. This presentation describes the results of a recent online survey on thermostat use in homes, which included over 1000 people from all over the US. The convenience survey contained many multiple-choice questions regarding type of thermostat, demographics, home characteristics, and behavior regarding use of hold/overrides and setbacks. More notably, the survey included many open-ended questions that dealt with what people used and didn't use, and what they wanted a thermostat to do. These responses provided a very interesting portrait of the issues consumers have with programmable thermostats. The analysis of this rich collection produced several themes, such as thermostat wars between husband and wife or parent and children, usability issues, idiosyncrasies with the house (especially older homes or additions) or equipment, and thermal comfort. The results of these tales provide insight into additional thermostat features (such as the addition of timers), better set points for improved thermal comfort, and potential policies for programmable thermostats to better facilitate energy saving behaviors.

Session #: 2A

Speaker Heidi Perry, ThinkEco, Inc

BEST FIT Topic: 9. Management Decisions

Sector: Work Place

Presentation Title **A Cost-Effective Energy Efficiency Solution for Smaller Businesses**

Abstract Text Most small businesses lease their office space and often do not have the opportunity to implement energy efficiency upgrades, which typically address building-wide systems. However, there is one major source of electricity consumption over which these small business tenants have complete control – plug loads. Plug loads account for more than 20% of commercial buildings' electricity usage, and are the fastest growing electricity end-use in the commercial sector. The term plug load refers to the electricity demand from devices that plug into wall sockets, such as computers, printers, servers, water coolers and refrigerators – all of which are brought into the office space by the tenant business. This study demonstrates the electricity savings achievable utilizing a plug-load energy management and user engagement platform. ThinkEco's modlet(R) is an intelligent outlet that provides appliance-level energy use data that can be programmed for automatic energy savings, and also includes an interface to provide energy-saving tips and peer comparisons. With funding from the New York State Energy Research and Development Authority (NYSERDA), ThinkEco deployed modlets at ten small businesses to track the amount of plug load energy used and to implement energy saving strategies. Interventions include automated energy reduction plans, personalized energy savings tips, and inter-company energy consumption comparisons and competition. Energy consumption trends were monitored both via the granular data collected by the modlets and the electric meter data. Additionally, participants' attitudes and understanding of energy consumption was tracked throughout the study via survey instruments.

Session #: 6B

Speaker Jane S. Peters, Research Into Action

BEST FIT Topic: 4. Modeling Behavior

Sector: Consumption

Presentation Title **Digging Deeper into Program and Non-Program Appliance Purchaser Differences**

Abstract Text After 30 years of energy efficiency programs, we should know why customers buy energy efficiency products, especially things like appliances. However, we don't! Typically, we look at energy usage and demographic differences and ask questions to estimate how many of the program participants were influenced by the program. With no model for how people make investments in energy efficient appliances. Program managed assumed that increasing awareness and knowledge and providing incentives to increase capability would be enough, but high awareness of ENERGY STAR people still don't always buy an ENERGY STAR appliance, so there is more to it than that. In California, evaluators and program managers wanted a better model. The awareness, knowledge, attitudes, and behavior (akAB) model is grounded in both social science and energy efficiency research. The model provides a framework for assessing the process by which consumers come to make energy efficient purchases – their stages of change. This paper will discuss application of the model to an appliance rebate program and show how the model effectively captured differences between purchasers of appliances in and outside the program. The model can be used in any jurisdiction. While further refinements will be beneficial, it is already a tool to improve residential sector energy efficiency research. Further, this paper while a standalone paper, if presented in conjunction with Model of Success: Refining the akAB Model for Greater Impact and New Insights About How to Reach the Multi-family Market will fully articulate the model and its application for residential programs.

Session #: 7F

Speaker John E. Petersen, Oberlin College

BEST FIT Topic: 2. Marketing and Outreach

Sector: Consumption

Presentation Title **Connecting Individual Decisions to Community: Bioregional Dashboard**

Abstract Text Through the vast majority of our evolutionary history, humans experienced direct, intimate and continuous feedback on environmental conditions that informed individual and community decision making. Recognizing the current absence and potential power of feedback, technology that displays electricity use as a mechanism to reduce magnitude and alter timing of consumption is increasingly employing. This talk will examine the impact of introducing feedback that contextualizes household resource use within whole-community patterns. The “bioregional dashboard” (BRD) is an animated display of real time aggregated electricity and water consumption flows and environmental conditions at the scale of a small city. Controlled research indicates that the BRD technology builds a sense of community and enhances individual’s connectedness with nature (CNS). Parallel studies have shown CNS to exhibit a significant negative correlation with electricity consumption. This talk describes the deployment of the BRD as a centerpiece of a community-wide effort to promote environmental stewardship and a sense of community identity. Displays in public venues integrate the BRD with a variety of pro-environmental messaging developed by community members. In addition, we are working with local schools to integrate the BRD as a central curricular element to teach basic math and science alongside environmental education and awareness. This talk describes results of research assessing the impact of these efforts including the potential for social diffusion within and beyond a small-city context. Ideally this talk is included in the session, Making full spectrum sustainability a reality: Theory, practice and assessment in a small city.

2012 BECC Abstracts

Session #: 4F

Speaker EDF, Boeing Company

BEST FIT Topic:

Sector:

**Presentation
Title**

Abstract Text

Session #: 7A

Speaker James Pierce, Carnegie Mellon University

BEST FIT Topic: 10. Trans-Disciplinary Research

Sector: Building Energy

Presentation Title **Designing Local Energy Technologies for Everyday Life**

Abstract Text We present a collection of published and ongoing research studies investigating new ways of interacting with and experiencing energy in everyday life. Our work proposes and explores questions such as: How might we design for new social norms related to the use of distributed and renewable energy resources (e.g., windy-day laundering practices)? How might energy-harvesting technologies allow for both less energy-intensive applications and more experientially engaging and meaningful interactions? How does the design of consumer electronics in the context of emerging energy systems (e.g., demand-response appliances, domestic wind and solar generation)? Collectively we aim to illustrate new possibilities for both technological and cultural innovation related to resource consumption. Our methodology draws on trans-disciplinary traditions of design research in order to draw out insights and challenges for the design of future sustainable energy technologies. We incorporate ethnographic and qualitative methods, perspectives from anthropology and the sociology of consumption, and design approaches from interactive systems design and human-computer interaction. We describe several empirical studies involving the design, deployment and observation of new interactive systems, including (1) an eco-feedback display that presents home dwellers with information about the availability of wind and solar power, (2) a series of human-powered electrical devices, ranging from crank-powered remote outlet switches to aesthetic explorations of “hand-powered digital media”, and (3) “Energy Mementos”—objects that investigate new relationships to electrical energy such as emotional attachment to energy. This talk will tie together our explorations at three scales of interaction (the home/community, the product/device, and electricity itself) to argue the importance of expanding the range of concerns and opportunities for creating a sustainable energy future.

Session #: 2D
Speaker Cara Pike, The Resource Innovation Group

BEST FIT Topic: 2. Marketing and Outreach

Sector: Government

Presentation Title **Lessons from the Climate Access Case Challenge**

Abstract Text Local climate leaders who are working to motivate the public to support strong climate change policies and programs face a number of barriers, particularly in a polarized political environment during difficult economic times. The Climate Access network, launched in October 2011 by The Resource Innovation Group's Social Capital Project, is responding directly to these challenges by providing climate communicators with access to the necessary tools, information, and people to build effective public engagement campaigns. Through its Case Challenge series, Climate Access is partnering with ICLEI – Local Governments for Sustainability to address communications strategies for managing opposition to the United Nation's Agenda 21 action plan. The Case Challenge model builds on the success of Climate Access' monthly webinar series that brings together leading voices in the field of climate communications and behavior change. To address ICLEI's specific challenge, Climate Access has assembled a panel of experts to provide recommendations and is developing a case study that identifies best practices for engaging segments of the public with disparate worldviews around climate and sustainability issues. Cara Pike, founder and director of Climate Access, will share insights from ICLEI's Case Challenge and present the resulting communications recommendations for framing and responding to Agenda 21 opposition. She will also offer insights on the Case Challenge method as a model for providing direct expert strategic feedback to climate practitioners facing communications and behavior change dilemmas.

Session #: 4A

Speaker Lara Polansky, US Forest Service

BEST FIT Topic: 1. Community-Based Programs

Sector: Building Energy

Presentation Title **Sitka's Power Supply "Traffic Light" US Forest Service Partnership**

Abstract Text Could you reduce your community's short-term electricity consumption by 5 to 10%, just by changing the color on a sign? The U.S. Forest Service's (USFS) mission ("caring for the land and serving people") extends beyond Forest boundaries and includes community partners. One such collaboration between the City of Sitka, Alaska's Electric Department and the Sitka Global Warming Group (SGWG) is led by USFS employees. In 2008, the Sitka Electric Department met with the SGWG to: a) encourage use of excess hydroelectricity and b) promote conservation of electricity when hydroelectric generation capacity drops below demand. The traffic light symbol promotes behavior change through familiar color cues. Inspired by the successful Smokey Bear fire risk signs, the traffic light colors are easily recognized by City residents. The traffic light colors reflect the current hydroelectric supply status and desired behavior change (Green = reservoir levels are high; diesel supplementation is unlikely; "Proceed using electric heat." Red = reservoir levels are low; diesel generator supplementation is certain; "Stop using electric heat"). The concept is reinforced through community-based education. The energy traffic light targets the residential sector, which accounts for 43% of Sitka's electricity consumption. Implementation has resulted in a 5 – 10% reduction in overall system load when the light is changed to red. This equates to annual savings of up to 60 million kWh and \$5.6 million in electricity charges. After observing this success, the City of Ketchikan implemented a similar program. Findings from this community-driven initiative are directly applicable to communities powered by sources characterized by variable supply sources (e.g., hydroelectricity or wind).

2012 BECC Abstracts

Session #: Spotlight
Speaker Erica Priggen, Free Range Studios

BEST FIT Topic: Spotlight

Sector: Spotlight

Presentation Title **Storytelling for Change**

Abstract Text Stories are all around us, and everyone is clamoring to tell the ones that are going to catch attention and move people to action. Erica Priggen, Executive Producer at Free Range Studios, will take us on a journey through the empowerment marketing strategies that have helped create the company's award-winning video campaigns. We will get a sneak peak at some of the core tenets of powerful story structure, and experience some of the fun and fact-filled video stories created by Free Range that have helped audiences make heroic impacts in their world.

Session #: 3F

Speaker Varun Rai, University of Texas Austin

BEST FIT Topic: 4. Modeling Behavior

Sector: Renewables

Presentation Title **Information Search and Peer Effects in Adopters of Residential Solar PV**

Abstract Text The decision to adopt a residential solar photovoltaic (PV) system is preceded by a period of careful consideration. We characterize that information search process using data from a survey of residential owners of PV systems conducted in 2011 in Texas. We find that this research period lasts an average of nine months, during which potential adopters are primarily concerned with financial considerations and performance of the system. In this study we find evidence that uncertainty and non monetary costs, including highly dispersed information and a lack of easily available trustworthy sources are responsible for the length of this research period. Uncertainty is less of a problem for leasers than for buyers. Buyers seek to overcome this barrier though contact with other PV owners—an approach that yields high-quality information, but with diminishing returns. Potential adopters prefer contact with owners within their own neighborhoods; resulting in high utility and faster decision times, even when compared to leasers. Contact of this nature generates peer effects, strengthening the theory that technology diffuses through social networks. However, these effects alone are not powerful enough to finalize decisions regarding PV installation. Uncertainty and non-monetary costs in residential PV adoption could be overcome through a federal network of information hubs—partnerships between the Department of Energy, utilities, and state universities.

Session #: 4B

Speaker Katherine V. Randazzo, Opinion Dynamics Corporation

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Consumption

Presentation Title **Refining the akA-B Model for Greater Behavior Change**

Abstract Text Changing and measuring behavior is tricky business. Human action is complicated. Without careful planning and theoretical focus, targeting and measuring customers' path to action can fall short. This paper will detail and demonstrate how the California Utilities collaborated to generate a new Awareness-Knowledge-Attitude-Behavior (akAB) model to support program planning and measurement. The authors will detail the model, its tests, and next steps in refining a sophisticated, yet pragmatic, behavior change model. Recognizing that existing models failed to provide a framework for greater savings, the California Utilities drew on theories in social psychology to better model customers' actions and then field tested the theory across multiple program evaluations. In this presentation, the authors will discuss the results of this field test across several evaluations: Home Energy Efficiency Rebate, Multi-family, and Whole House programs. By putting the models to the test, the presentation will examine the effectiveness of the model in capturing customers' progress along the behavior change continuum. These data will be used to illustrate the application of the theory in practice and to demonstrate how the model can be used to assess the progress of programs in moving customers to behavior change. By detailing the revised theory and where it succeeded and failed in field tests, the authors bring insight, lessons learned, and new ideas to the discussion of behavior change. Based on these results, the presentation will outline the new contributions to our behavior-change models and the industry's use of such models to characterize and evaluate paths to action.

Session #: 6A

Speaker Steve Raney, Cities21 (smart mobility)

BEST FIT Topic: 1. Community-Based Programs

Sector: Transportation

Presentation Title **Green Culture: Low Driving 200-Apartment Communities**

Abstract Text The Low Miles Community (LMC) concept seeks to create and sustain low-driving, green communities. 100% of residents in large new residential complexes will pledge to reduce vehicle trips by using alternative modes of transportation, such as carpooling, vanpooling, bicycling, walking, telecommuting, or taking transit. LMCs will use online groupware technology, social marketing, and neighborhood gatherings to facilitate the evolution of a dual physical/cyber culture within these communities. This culture will provide positive social reinforcement and place a high value on a green lifestyle not centered on the private automobile. Each community-of-practice will develop innovative auto-reducing solutions and will share these solutions with other LMCs. LMC behavior change begins with meaningful pledges that are visible/known to the local peer group, changing individual self-perception. Peer pressure further reinforces behavior change and ensures that behavioral norms change permanently. The use of effective persuasion techniques contrasts with soon-forgotten on-line behavior change pledges such as <http://green.yahoo.com/pledge/create>. Building upon the innovative TravelSmart door-to-door neighborhood driving behavior change program, LMC takes a further step forward by achieving local critical mass. Would you pay more to live in this green, committed residential complex versus the behavior-as-normal complex next door? <http://www.cities21.org/LMC/>

2012 BECC Abstracts

Session #: Spotlight

Speaker Antonio Rangel, California Institute of Technology

BEST FIT Topic:

Sector:

Presentation Title How Does Your Brain Make Simple and Complex Choices?

Abstract Text

Session #: 1E

Speaker Grant Ricketts, Tripos Software, Inc.

BEST FIT Topic: 9. Management Decisions

Sector: Work Place

Presentation Title **Finding the ‘Tipping Point’ in Changing Organizational Behavior**

Abstract Text Large organizations have many different sustainability initiatives to address. However, given their size and complexity, efforts can be fragmented, ad hoc, and have limited impact or overall results or affecting corporate culture change. Traditional focus on carbon audits and generating Corporate Sustainability Reports (CSR), while important, do not necessarily engage people in ways that generate synergy and scale. Employee engagement is increasingly viewed as a critical strategy to mobilize people in support of sustainability initiatives, but relatively little is understood about what it takes to hone staff talent and passion to really change behavior inside companies. This session will highlight how two different organizations, VWR International (laboratory supply and distribution company) and the U.S. Postal Service employed behavioral change programs to increase employee participation and accomplish specific sustainability goals. Their experiences include a mix of online training tools, interactive surveys and suggestion forums, gamification, rewards and incentives to engage people in sustainability initiatives across the organization. By attending this session the audience will gain several tips and insights on how to affect behavior and cultural change around sustainability in large organizations. Key discussion points include:

- Why employee participation thresholds approaching 15-20% represent key ‘tipping points’ that help reshape company culture as a core attitude or way to see the business (this threshold is consistent with other consumer and technology adoption curves).
- What program mix did each company implement to accomplish these thresholds and why?
- How employee engagement programs help overcome internal obstacles and ‘pockets of resistance’ that can mar progress.

Session #: 2C

Speaker Erin Rose, Oak Ridge National Laboratory

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Consumption

Presentation Title **Weatherization Experiences Project--A Social Network Analysis**

Abstract Text Oak Ridge National Laboratory is leading an evaluation of the Weatherization Assistance Program, as tasked by the Department of Energy. A component of the evaluation, a Social Network Analysis (“Weatherization Experiences Project”) will address the potential for two groups, Program recipients and weatherization staff, to influence energy savings beyond their homes and day jobs. This analysis is exploring linkages between individual households, weatherization staff, and agencies as nodes within a multi-level and multi-relational social system. The project goal is to determine the impact that communication regarding weatherization activities had on the behavior of other individuals. Program recipients and weatherization staff are tasked with administering questionnaires to members of their own network, as well as a second round of snowball interviews, to document their interest in weatherization and actions taken to increase home energy efficiency. Five main questions the project is seeking to answer through the efforts of the researchers are: 1- who did you tell? 2-what did you say? 3-what did they hear? 4-what did they do? 5- and why? Quantitative and qualitative data will be evaluated for a rich ethnographic understanding of the community as a whole and will be presented during the conference session. This reading of the community will help understand how information within the community is shared (possibly feeding a viral spread of interest in weatherization), and what the core values are in place that might support or hinder adoption of new energy practices.

Session #: 4C

Speaker Mitchell Rosenberg, DNV KEMA Energy & Sustainability

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Building Energy

Presentation Title **Feedback Programs: Evaluation Lessons for the Next Wave**

Abstract Text Many energy efficiency program sponsors in the US and Europe have deployed comparative energy usage feedback reports programs, such as Opower and Efficiency 2.0, in an effort to increase energy savings from their program portfolios. Evaluations of these programs have shown that participants do realize energy savings, usually in the range of 1 – 3 percent of their baseline consumption. These results are encouraging and important. However, program sponsors need to know more about how the results of feedback report programs operate if this program strategy is to be incorporated effectively into program portfolios. This paper gathers and organizes findings from all available large-scale, independent evaluations, including the first analyses of third year results, address issues that will affect the longer term application of these program approaches in publicly-funded energy efficiency efforts. These issues include:

- To what extent do reductions in energy use observed in the first year of participation persist in later years?
- What effect do changes in details of program deployment, such as the frequency and format of reports, have on savings achieved?
- Which customer attributes are associated with high levels of savings through participation in feedback programs? Can these differences be reflected in strategies to increase program savings and cost-effectiveness?
- Through what specific actions do program participants achieve energy savings?
- To what extent does information and feedback received through the program stimulate recipients to participate in other energy efficiency programs? Are these savings incremental to what the other programs would otherwise have achieved?

2012 BECC Abstracts

Session #: Spotlight

Speaker Connie Roser-Renouf, Center for Climate Change Communication

BEST FIT Topic:

Sector:

Presentation Title **Conservative Perspectives on Energy and Climate**

Abstract Text Abstract Unavailable

2012 BECC Abstracts

Session #: 5A

Speaker James Russell, PEI

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Work Place

Presentation Title **Effective Behavior Change through the use of Real Time Data & Cross-Store Competition**

Abstract Text Core theme and message and intended audience: Snohomish County PUD and PEI collaborated with Starbucks, Lucid Design Group, and Puget Sound Energy to design and implement a Behavior Based Energy Efficiency pilot to test whether energy feedback and competition could produce persistent and measureable energy savings in the fast-paced retail sector. The pilot paired Lucid Design Group's Energy Information platform with a custom tailored 30-day competition across 10 Starbucks locations. The information platform pairs an energy dashboard with social media to affect behavior change through information, employee engagement, and focused energy savings strategies. Key outputs of the pilot are: 1) A method for measuring behavioral energy savings in small commercial buildings as well initial cost assessment for using this approach. 2) Estimates of energy savings, non-energy benefits, short-term savings persistence, and change in energy awareness of Starbucks team members. The findings of this pilot are of interest to utilities who want to expand their use of behavior-based approaches to improve uptake of energy efficiency offerings in small commercial buildings.

Session #: 4E
Speaker Polly Ryan, UW Milwaukee

BEST FIT Topic:

Sector:

Presentation Title **Focusing on the Process of Health Behavior Change: The Individual and Family Self Management Theory**

Abstract Text Within our lifetime the burden from health conditions has shifted from acute infectious disease process to the management of multiple chronic conditions extending across one's lifetime. The relative contributions of one's lifestyle to health have been increasingly recognized. Yet there is a vast disparity between the high prevalence chronic health conditions and the low number of people who effectively manage their health. Failure to engage in recommended health behaviors to prevent and manage health conditions is a pervasive public health problem negatively impacting the health of the individual, the ability of health care system to achieve condition specific outcomes, service use, cost of health care, and the ability to researchers to determine the effectiveness of new and innovative treatments. Facilitating health behavior change is foundational to improving the health of the nation. To this end, health care researchers and scholars have made major contributions to understanding health behavior change. The purpose of this presentation is to provide an overview of these historical efforts related to behavior change and to describe a new theory of behavior change as an exemplar of current thinking about behavior change and the potential for innovative intervention development and testing. The Individual and Family Self-management theory suggest that increasing one's capacity to self-manage improves health outcomes. This theory purports that self-management takes place in the context of risk and protective factors specific to the condition, physical and social environment, and the individual and family. Self-management is a process influenced by knowledge and health beliefs, self-regulation skills and abilities, and social facilitation. The theory will be applied first to a health condition and then potential for its use to facilitate behavior change in general will be explored.

Session #: 1C

Speaker Olga Sachs, Fraunhofer CSE

BEST FIT Topic: 3. Community Planning

Sector: Building Energy

Presentation Title **Field Evaluation of Programmable Thermostats: Does Usability Really Matter?**

Abstract Text Programmable thermostats have become notorious for how difficult they are to use. A large proportion of the population cannot use them effectively, partly because the interface design of this product is not intuitive for non-technical users (Peffer et al., 2011). Laboratory usability tests for five different programmable thermostats (Meier et al., 2011) revealed that usability varies greatly across various existing models. However, it is largely unknown what impact thermostat usability has on heating and cooling energy consumption in households - no field tests have directly evaluated energy savings achieved in actual households due to increasing usability of programmable thermostats. To fill this gap, we have deployed high and low-usability thermostats, as evaluated by LBNL, in a 94-unit multi-family building in the Boston area. We randomly assigned residents of the building to two experimental groups: the high- and low-usability thermostat groups. To infer occupant behavior regarding thermostat use, we installed sensors to monitor indoor temperature and HVAC use over a five-month period. We used this data to infer user interaction with the thermostats and to find out whether building occupants in the high-usability thermostat condition are more likely to set back their thermostats at night to save energy. Besides developing an algorithm to detect naturally occurring temperature fluctuations from changes of temperature setpoints we used autoregression analysis techniques to detect whether thermostat settings were changed permanently or were overridden manually on a day-to-day basis.

Session #: 1D

Speaker James K. Scarborough, Stanford University

BEST FIT Topic: 7. Gamification

Sector: Consumption

Presentation Title **Can Games Change Energy Behavior and Reduce Consumption?**

Abstract Text This ongoing program of research seeks to improve home energy behavior by connecting it to gameplay within an online multiplayer game, Power House. We examine how mechanisms common in popular games may be leveraged to engage users in energy data and to promote real-world energy behaviors. By inputting real world home energy data into a compelling social game, such information may be transformed into feedback that is relevant, timely, and fun. Further, by tying energy-friendly real-world behaviors to in-game rewards, users may be further incentivized to complete them. To this end, we have constructed a commercial-grade online game experience, in which players may view their home energy data, play energy-related games, obtain virtual achievement badges, compete in conservation challenges with other players, and learn about energy efficiency and conservation. In addition, while Power House serves as a compelling media intervention for influencing energy behavior (in providing information, modeling behaviors, and assisting users in setting energy goals), it also functions as an innovative research tool for collecting both live energy data and self-reports about actual and intended energy-related practices. This presentation will review our initial study and results. We examined how playing the online game in multiple sessions over an extended period (1-2 weeks) influenced actual home energy consumption, as well as self-reported home energy knowledge and behavior. Within subjects analyses were used, comparing player energy consumption to their own historical data. Building off of these findings, implications for theory and the energy data interfaces will be discussed.

Session #: 3C

Speaker Laura B. Schewel, UC Berkeley

BEST FIT Topic: 10. Trans-Disciplinary Research

Sector: Transportation

Presentation Title **No One Wants to Carry Grocery Bags on the Bus**

Abstract Text My presentation, “No One Wants to Carry Grocery Bags on the Bus” explores two topics: 1. A specific behavioral trend, the increase in shopping trips per household since 1970, which has caused large use of energy and, 2. How this example can help us elucidate techniques to change an energy wasting behavior without relying on obviously energy-related levers (such as fuel price) Today’s Americans are going on many more trips, and buy about half as much per trip than their 1969 counterparts. This behavior is inefficient, both in terms of time management and in terms of excess fuel use (petroleum use for shopping-driving us up ~160% since 1969, and shopping now represents 20% of miles travelled, up from 9% in 1969). This work builds on previous work, which identified these trends, by putting their implications for policy in a structured behavioral context. After reviewing the trends, I will outline several of the sociological factors that contributed to the increase in shopping miles (women in the work place, the ex-urbanization of retail, hecticness of family scheduling, increase in the utility of shopping to include social functions, etc). The majority of the presentation will apply key insights from behavior change work in other sectors of energy to this particular shopping-driving problem, noting where transportation behavior may have unique challenges compared to other types of energy behavior. More generally, this presentation explores the question: how do you change an energy-wasting behavior, without mentioning energy?

2012 BECC Abstracts

Session #: 6F

Speaker Annalisa Schilla, California Air Resources Board

BEST FIT Topic:

Sector:

Presentation Title Behavior Change Research in the Context of California's GHG Reduction Goals

Abstract Text Abstract Unavailable

Session #: 3C

Speaker Geertje Schuitema, Aarhus University

BEST FIT Topic: 4. Modeling Behavior

Sector: Transportation

Presentation Title **Segmenting the Private Consumer Market for Electric Vehicles. How Will this Help Accelerate Their Adoption?**

Abstract Text The recent focus on electric vehicles as a potential low carbon pathway for transport has led to speculation about the demographic characteristics, attitudes and travel patterns of typical 'early adopters'. This paper uses results from a UK-wide survey to understand (i) whether there is more than one early adopter segment (ii) the characteristics of potential 'mainstream' adopters and (iii) how we can use this information to accelerate the adoption of low carbon vehicles. A two-part questionnaire informed by prior qualitative work as well as innovation and behavioural theory was administered to elicit responses to battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs). The sample consisted of UK drivers who had purchased new or nearly-new cars within the last five years (N=4,250 (wave 1), 2,729 (wave 2)). Using factor and cluster analysis applied to a broad set of attitudinal indicators, eight distinct segments were discovered. Each of these segments represents a unique combination of self-reported likelihood to adopt a BEV or PHEV and differ in terms of underlying belief structures, anxieties, current travel patterns and the importance attached to symbolic, affective and instrumental factors in relation to car ownership and use. This paper outlines the characteristics of groups who are more or less likely to adopt EVs in the short and medium term. It then uses these findings to challenge whether this kind of analysis can help us understand how to influence behavior and predict potential changes to segmentation membership as the market penetration of EVs intensifies.

Session #: 4A

Speaker Chris Schultz-Buechner, WECC

BEST FIT Topic: 1. Community-Based Programs

Sector: Building Energy

Presentation Title **Get in the Game: Score Against Energy Waste**

Abstract Text During the 2012 Major League Soccer season, Nicor Gas Energy Efficiency Program and the Chicago Fire Soccer Club partnered to engage the Chicago Fire fan community in saving energy. Because there is a heavy fan population in Nicor Gas' territory—the stadium is located in the middle of Nicor Gas' territory—the sports team is a great way to generate excitement in the Take the Pledge Challenge. The Take the Pledge Challenge is an interactive program which encourages Fire fans, who are customers of Nicor Gas, to pledge to save energy. By making the pledge and taking action, they have an opportunity to win Chicago Fire merchandise and tickets. Through Chicago Fire promotion, fans are asked to go online and make a pledge to take simple actions to save natural gas, report on those actions, and ultimately have the opportunity to win a prize. Social media and social marketing were key tactics in getting Fire fans to be involved in the pledge campaign and take advantage of Nicor Gas' Energy Efficiency Programs. This poster presentation will provide information on results of the pledge campaign and show how the marketing and outreach methods were used to generate excitement in the fans to take part in the pledge.

Session #: 4B
Speaker Daniel Schwartz, Carnegie Mellon University

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Building Energy

Presentation Title **The Hawthorne Strategy: A Field Experiment**

Abstract Text We use the Hawthorne Effect -effect of participating in a study- as a strategy to examine energy use behavior without any other form of intervention. In the summer of 2011, we conducted a field experiment with electricity customers (N = 3,175) notifying them about their participation in a study about household electricity usage. We conducted a subsequent survey to examine the mechanisms of using the Hawthorne Strategy, such as increased awareness of electricity and the influence of the new metering installation. Through the mere participation in the field study, a proportion of participants (24% - 39%) self-reported changes in energy awareness and behavior. They also reported changes in energy behavior during the study (e.g. turning off their air conditioner). We also collected monthly electricity usage before, during, and after the treatment period for both the treatment and control groups. This allows for the comparison of perceived and actual changes in electricity usage. This experiment gives a deeper understanding about people's energy behavior, especially considering that awareness in electricity is typically low. Electricity is a small part of most Americans' budget and outside their consciousness unless it is made salient by events such as rocketing prices. Therefore, increased awareness about energy, stimulated by feelings of being observed or aware of participation in a study, may result in a positive behavioral change. Furthermore, previous studies have reported limitations on their results due to the Hawthorne Effect, and a systematic examination will elucidate whether energy-saving programs may have a baseline measure.

2012 BECC Abstracts

Session #: 1D

Speaker Eric Senunas, Zema Good

BEST FIT Topic: 7. Gamification

Sector: Renewables

Presentation Title **Gaming as an Energy Efficiency Behavior Tool**

Abstract Text Abstract Unavailable

Session #: 5C

Speaker Betty Seto, DNV KEMA

BEST FIT Topic: 3. Community Planning

Sector: Government

Presentation Title **Voluntary Actions: Behavioral Measures in Local Climate and Energy Action Plans**

Abstract Text Due to a confluence of political climate and favorable funding sources, local governments are on the forefront of planning efforts to reduce greenhouse gas (GHG) emissions associated with building energy use, transportation, waste and water consumption. This presentation will provide an overview of the types of behavioral based programs and measures that local governments are including in local climate action plans. Example climate action plan measures include specific programs for education and outreach, such as identifying neighborhood leaders and community champions, leveraging K-12 school programs for families, using GHG reduction pledges, and the Low Carbon Diet program that joins neighbors together to reduce household GHG emissions. The presentation will examine resources available to quantify and estimate GHG reductions associated with different behavioral programs, and identify best practices for incorporating behavioral measures into local government climate action plans.

Session #: 3C

Speaker Alison Sexton, University of Minnesota

BEST FIT Topic: 8. Social Norms

Sector: Transportation

Presentation Title **Conspicuous Conservation, Green Signaling, and the Prius: Theory and Empirical Evidence**

Abstract Text A considerable literature on conspicuous consumption has relied on status-seeking motives to explain anomalies in consumer behavior, such as upward sloping demand curves and persistent demand for luxury brands (e.g., Leibenstein 1950, Frank 1985, Bernheim 1994, Konrad and Glazer 1996, and Ireland 1998). This paper develops a theory of conspicuous conservation whereby changing social norms, particularly growing concern about environmental damage, permit individuals to attain status by displays of austerity rather than ostentation. The theory of green signaling is developed and a separating equilibrium is obtained that allows for revelation of “green” and “brown” types, much as the canonical Spence model of job market signaling allows revelation of high and low-ability types (Spence 1973). This paper tests for the presence of a conspicuous conservation effect in vehicle purchase decisions and estimates a willingness to pay for the green signal generated by the Toyota Prius, which until 2010 was the only hybrid vehicle on the road that provided standard amenities and a unique and recognizable design. Using observed variation in model market shares, this paper identifies a significant conspicuous conservation effect and estimates a mean willingness to pay for the green signal in the range of \$400-1,300 in Washington and \$1,400-4,200 in Colorado. Results suggest considerable potential to increase private provision of public goods (like pollution abatement) by exploiting green signaling motives. Environmental and human health outcomes can be improved by policies that make more conspicuous those private behaviors that impose positive or negative externalities on society (like household energy consumption).

Session #: 7F

Speaker Md Rumi Shammin, Oberlin College

BEST FIT Topic: 10. Trans-Disciplinary Research

Sector: Consumption

Presentation Title **Socially Contextualized Framework for Physical Sustainability Metrics**

Abstract Text In order to meaningfully assess progress towards achieving climate neutrality, communities must collect baseline data on resource use, design measurement tools for monitoring changes in resource consumption in response to policy interventions, and create meaningful indicators to inform the public and support decision making. This talk introduces a holistic framework for considering biophysical transformation in the context of concomitant transformations in social and economic systems. Achieving “full-spectrum” sustainability in a small town necessitates an integrated approach that is socially contextualized, politically relevant, and widely replicable. The process involves coordinating with local utilities and agencies, using geographic information systems and modeling techniques, developing data management and analytical tools, and conducting resident surveys. The framework presented here is intended to provide individuals with convenient access to and meaningful understanding of their resource use. At the community scale, this allows for more informed decision-making based on explicit connections between critical resources and stated long-term goals and targets. As part of an integrated approach, the physical metrics are coordinated and cross-validated with parallel initiatives on socio-economic metrics. The information and indicators are then communicated through multiple modes of feedback using technological interfaces (e.g. bioregional dashboards, online access to real-time data resource use, etc.), and traditional media (television, newspapers, flyers, redesigned utility statements, etc.). The end product is a dynamic, integrated and adaptive framework of physical systems metrics that would empower individuals and communities to become informed and active agents of change towards full-spectrum sustainability and climate neutrality. [This abstract is intended for a panel titled: Making full spectrum sustainability a reality: Theory, practice and assessment in a small city.]

Session #: 2C

Speaker Lisa Skumatz, SERA

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Building Energy

Presentation Title **What Are “Best Practices” for Measuring Impacts and Retention from Behavioral Programs?**

Abstract Text The market is recognizing that the number interventions that are strictly measure based is relatively few. While it is true that some interventions may have little-to-no interaction with behavior, most programs have some behavioral component, through use, O&M, or other influences. Program managers are also increasingly considering and implementing purely behavioral (e.g. social marketing) interventions – or various shades of behavioral-plus-measure interventions. The savings potential from behavioral programs is high, but the evaluation practices are weak (thus, incentives are weak), undermining adoption of the programs –and integration into energy efficiency portfolios. The authors share a review of the current best practices in behavior change measurement from the literature, and detailed hands-on case studies measuring behavior impacts. The authors discuss the state of current practices in experimental design and evaluation techniques for behavioral programs – pulling lessons from public health, social marketing, sustainability, energy and other fields – and present recommended protocols for behavioral programs developed from a number of recent projects. We provide a number of hands-on evaluation examples from the energy literature– including recent work by the authors – and show application of the techniques in the real world. We address behavior retention, persistence, impacts compared to other approaches, and what is currently under-valued in behavior evaluation.

Session #: 4D

Speaker David Sleeth-Keppler, Strategic Business Insights

BEST FIT Topic: 2. Marketing and Outreach

Sector: Consumption

Presentation Title **The Gender Gap on Climate Change**

Abstract Text Research on gender, risk perceptions and climate change suggests that women can be critical societal catalysts for action on climate change. For example, women are more likely than men to voluntarily introduce energy-efficient behaviors to the home. Climate-related outreach to women is particularly timely in light of their increasing ability to influence political discourse. Aware of women's significant economic and educational gains in recent years, many politicians are increasingly targeting women as a key 'interest group'. This talk will look at the link between gender and climate. It will show differences in the strength of climate-related concerns among different types of women (e.g., younger mothers raising children and seeking 'the good life' vs. women attracted to leadership positions). And using findings from national data samples of US adults, it will show that cultural gender, a dimension related to but not redundant with biological sex, is at the root of gender differences on environmental/climate concerns. The implications for climate change outreach are twofold: 1) There is no single campaign that is likely going to resonate with all women equally. Understanding the underlying psychology of different types of women is necessary for climate action messages to resonate. 2) Climate change as a cultural concern is primarily a feminine concern, which raises the question of how to reach both men and women who show a relative masculine cultural orientation in their attitudes and behaviors.

Session #: 2C

Speaker Brian Arthur Smith, Pacific Gas and Electric Company

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Building Energy

Presentation Title **Identifying Energy Savings Drivers of Home Energy Reports**

Abstract Text Efficiency programs that provide usage information and neighbor comparisons and use experimental design are offered by dozens of utilities. Evaluations of "home energy report" programs use billing data to determine energy savings, and use utility rebate records to assess differences in the uptake of downstream measures between treatment and control households. Utility rebate records provide a straightforward way to account for possible double-counting of energy savings with downstream measures, but designing a research methodology that reliably assesses the differential uptake of upstream measures and meaningfully characterizes how energy savings are achieved is more challenging. Self-report methodologies are useful, but since they rely solely on recall from a single household member, their validity is limited. In-person household inventories are difficult and expensive, but they offer the best opportunity for identifying the specific behaviors and purchases that drive energy savings in the treatment group. This session presents the design and results of a large study that employed self-report and home inventory methodologies to identify the specific behavioral and purchase drivers of energy savings. The results have implications for the thorny issues of program attribution, energy savings measure classification, and savings persistence values for the purpose of savings claims.

2012 BECC Abstracts

Session #: 7E

Speaker Daniel Smith, Graduate Theological Union

BEST FIT Topic:

Sector:

Presentation Title **Rediscovering Christianity's Ecological Roots**

Abstract Text The environmental crisis has caused many religious traditions to radically reconsider their theological foundations and in some cases has yielded interesting results. Many within the Christian world have found surprising support from the Bible and the history of Christianity for what might be called an eco-friendly faith. This presentation will present a few of those ideas and what implications they might have for the church's environmental action and its partnership with science, public policy and advocacy groups to bear witness to the goodness of God's creation and to protect it as stewards.

2012 BECC Abstracts

Session #: 4F
Speaker EDF,

BEST FIT Topic:

Sector:

**Presentation
Title**

Abstract Text

Session #: 4E

Speaker Janet Solie, Health Coach Advantage

BEST FIT Topic:

Sector:

Presentation Title **Using Change Talk in Integrative Health Coaching**

Abstract Text In 2006 Duke University introduced a new health care professional called the integrative health coach who was trained to reduce cardiovascular risk factors in high-risk patients. What started as a ten-month pilot program by 2008 became a formal training program for a new breed of health coaches, a first step in transforming the US healthcare system. Duke's motivation to create a new healthcare professional was driven by compelling statistics that showed 75% of all chronic disease is preventable and that 95% of all US healthcare spending is used to treat disease after it has occurred. Faced with a doctor oriented, acute care biased and reimbursement focused healthcare system, Duke needed to change its configuration and focus. What emerged was a patient centered, whole person approach where optimal health planning through use of a health coach became the tool for a critical step toward adopting health lifestyle behaviors. Integrative health coaching is a telephoned-based service designed to move clients through a process of successful lifestyle changes by linking health planning to their values and vision. The first step is assessing client's readiness for change. The client then identifies lifestyle related behaviors and goals that have personal significance. These findings along with specific interviewing techniques help clients leverage their internal motivation for change.

Session #: 2D

Speaker Meighen Speiser, ecoAmerica

BEST FIT Topic: 8. Social Norms

Sector: Consumption

Presentation Title **Are Americans Ready to Adapt to the Climate's Change?**

Abstract Text Until recently, a challenge for those who were trying to motivate people to mitigate climate change was that there were no immediate, tangible or personal climate impacts that could ignite action. Today, unfortunately, that is becoming less and less of a problem. Extreme weather is destroying homes, crops, and harming people. More Americans today recognize that climate change is happening. But, are they ready to adapt? And, what does adaptation mean to them? ecoAmerica's latest research on adaptation communication, "Changing Seasons: American Climate Impacts & Preparedness," provides new insights and opportunities to transcend party lines and cyclical debates on the reality of climate change. The findings from this nationally representative survey, and informed by in-depth focus groups, provide pathways for engaging Americans to prepare for the affects of climate change, while also building momentum for support on climate solutions. Our panel will present, discuss, and advise on these game-changing research findings. ecoAmerica constantly strives to understand Americans' nuanced beliefs on climate to better inform how we and others in the movement can effectively connect with the general public. In addition to the latest adaptation research, ecoAmerica has conducted extensive values and communications research on climate and shares those results with climate solutions advocates. The research is used to guide development of large scale public engagement programs like The American College & University Presidents Climate Commitment, Nature Rocks and the SEED Center. Meighen Speiser has led development, marketing, and management for many of ecoAmerica's past and present programs and research projects.

Session #: 7A

Speaker Cassandra Squiers, University of California, Irvine

BEST FIT Topic: 4. Modeling Behavior

Sector: Consumption

Presentation Title **Defining Devices: A Revised Typology of Energy Feedback Technology**

Abstract Text Feedback is promoted as a promising strategy for energy conservation and hundreds of devices have emerged on the market in recent years. Reviews of feedback research have found average savings of 10%, with effects ranging from increases in consumption to reductions of over 20%. These studies suggest that effectiveness varies based on the type of feedback, and propose categories to better understand and distinguish between these types. However, current categorizations lack the technological sophistication to account for the diversity in available products. A review of existing typologies identified the following issues: (1) the 200+ currently available feedback devices in the marketplace are grouped into four (or less) categories; (2) categories focus primarily on the type of information and ignore physical design and operating differences; and (3) none provide a systematic description of the specific attributes that vary by category. This paper presents a revised typology of technological feedback devices, derived theoretically from a qualitative device review, as well as empirically, via hierarchical cluster analysis of 218 feedback products coded on 120 device attributes. It is hoped that this report will assist both researchers and practitioners in the fields of energy efficiency and conservation and that it may serve as the basis for publicly available product information on feedback devices, much like that which is available for other consumer electronics categories (e.g. televisions, cameras, etc.).

2012 BECC Abstracts

Session #: 6F

Speaker Catherine Squire, PG&E

BEST FIT Topic:

Sector:

Presentation Title	Topic
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Abstract Text	Abstract Unavailable
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2012 BECC Abstracts

Session #: 6A

Speaker Elizabeth Stampe, Walk San Francisco

BEST FIT Topic:

Sector:

Presentation Title Simple, Green and Viral: A Walk to Work Day Pilot

Abstract Text Abstract Unavailable

2012 BECC Abstracts

Session #: 7E

Speaker Susan Stephenson, California Interfaith Power and Light

BEST FIT Topic:

Sector:

Presentation Title **Interfaith Power & Light: Motivating Action Through Faith, Fellowship, and Friendly Competition**

Abstract Text Abstract Unavailable

Session #: 7B

Speaker Tai Stillwater, PHEV Center

BEST FIT Topic: 4. Modeling Behavior

Sector: Transportation

Presentation Title **Large Sample Ecodriving Experiment Preliminary Results**

Abstract Text We present the preliminary results of a large sample (N=150), medium term (1 month per driver) natural ecodriving experiment conducted along the I-80 corridor between San Francisco, CA and Reno, NV in 2012. Driving their own vehicle, each driver completed one month of driving without feedback before driving with real-time graphical feedback for another month. Participants were separated into three experimental groups using a random selection process, and each group received a distinct feedback display in order to test the motivating and informative value of three prototypical vehicle displays in standard vehicles. The three displays included: a trip average and realtime fuel economy bar chart with numerical information; a similar display that used symbolic rather than numeric information; and a display with a symbolic trip-level readout and a real-time acceleration meter in place of the real-time fuel economy display. Driver surveys and interviews supplement the recorded driving data to explain both how and why drivers changed (or did not change) their behavior after exposure to in-vehicle feedback.

Session #: 7C

Speaker Elizabeth Stuart, Lawrence Berkeley National Lab

BEST FIT Topic: 2. Marketing and Outreach

Sector: Building Energy

Presentation Title **But I'm Not a Salesman: Contractor Sales Training Success Stories**

Abstract Text Many comprehensive residential energy efficiency programs rely on contractors as the customer-facing 'front line' to sell energy improvements. However, a number of energy efficiency program managers have observed that the increase in contractors with technical training and certification has not necessarily produced the anticipated increase in the number of energy upgrades. Adding sales skills to contractors' existing technical expertise is key to converting more home energy audits into comprehensive home energy upgrades. Leading programs recognize the need to support contractors with sales and business training to help them succeed and to support the growth of the home performance industry for the long term. A growing number of contractor sales training efforts are being implemented – by energy efficiency program administrators, as well as by leading practitioners in the home performance industry. A number of programs are seeing encouraging results from the training. This session will present insights, lessons learned and recommendations from several successful programs and trainers. Attendees will gain tips on how contractors and programs can overcome all-too-common barriers to converting audits into retrofits, including insights about how to get contractors interested in relating to homeowner needs as well as information for programs on what they should consider when setting up a training program.

Session #: 4A

Speaker John Tabori, Mayor of The Town of University Park, MD

BEST FIT Topic: 1. Community-Based Programs

Sector: Building Energy

Presentation Title **Size Matters: Why Small Towns are Key to Community Based Energy Efficiency**

Abstract Text Most government and utility efficiency programs are designed and deployed at regional or metro levels. However, the average jurisdiction in the US is only 6,200 people. This presentation will therefore explore why an affordable and replicable energy efficiency program specifically designed for small towns may be a missing key to advancing energy efficiency. The presentation will focus on the success of the Small Town Energy Program for University Park (STEP-UP). The twin goals of STEP-UP are to improve energy efficiency by 20% in 20% of homes in University Park, and “to create a model community energy transformation program that serves as a roadmap for other small towns across the U.S.” STEP-UP achieved the following measurable results by the end of the first year of the program: • 23% of UP households signed up for the program; • 16% of UP households completed a Home Performance with ENERGY STAR audit; • 11% of UP households completed home comprehensive energy efficiency upgrades resulting in average savings of 15% per home. The presentation will explore the logic model and the three pillars around which STEP-UP is built: use of only low-cost community-based social marketing to lower information barriers; the presence of an “Energy Coach” to lower transaction barriers, and; lowering financial barriers by leveraging existing incentives and providing attractive financing. We will also discuss how STEP-UP is both replicable and scalable, as all of the lessons learned from developing and deploying STEP-UP are being assembled into an on-line toolkit.

Session #: 2F

Speaker Gil Tal, ITS University of California Davis

BEST FIT Topic: 4. Modeling Behavior

Sector: Transportation

Presentation Title **Who Buys Electric Cars? Lessons from the 2011 Californian EV Market**

Abstract Text In 2011 electric vehicles and plug in vehicles become, for the first time, commercially available options for new car buyers in California. We conducted two surveys of more than 1000 EV owners and a survey of more than 500 new car buyers in California to explore the characteristics of the new EV buyers vs. new regular car buyers. We study the purchase decision and the new vehicles usage characteristics of the new vehicles based on the household fleets, the number of Hybrids replaced by the new EVs and the type of vehicles the household own before and after purchasing the EV or the new vehicle. We explore spatial clustering of EV buyers and new car buyers and explore modeling tools to forecasts the potential market growth based on Household characteristics and community characteristics. Early result shows for example, that LEAF owners clustered more than new car buyers or Hybrid owners. The results of this study will be used to estimate current and future demand and use of electric vehicles in California. First, it will be used to explore the potential near term market of EVs and PHEVs. Second this study will be used to estimate the demand home and public charging and to forecast future demand. Third, this study will be used to evaluate potential barriers for EV adoptions based on the purchasing and usage preference of the current users.

Session #: 6C

Speaker John Thogersen, Aarhus University

BEST FIT Topic: 4. Modeling Behavior

Sector: Consumption

Presentation Title **Consumer Acceptance of Playing an Active Role in the Smart Grid: A Three-Country Study**

Abstract Text The preservation of an effective supply and demand matching (SDM) system for electricity requires that electricity consumers act as suppliers of balancing capacity: they will need to delegate control of electricity consuming equipment to an external agent. Consumers have reservations about that. Making it mandatory is an option, but it is likely to provoke substantial public and political resistance. In this paper, we report results of a scenario-based experimental on-line study in Denmark, Norway and Switzerland on consumers' willingness to accept playing a more active balancing role in the electricity system, using a representative sample of $n \approx 1000$ in each country. We hypothesized that electricity consumers' willingness to accept their new role depends on the framing of the recruitment question. As expected, we found that a default (opt-out) model produced a significantly and substantially higher acceptance rate than a voluntary (opt-in) model. Further, when presented with both the opt-in and the opt-out question format, and being forced to choose whether or not to participate, acceptance was equal to the opt-out situation. From this we infer (a) that the difference in the acceptance rate between opt-in and opt-out is to a high extent a product of an inclination to avoid the effort of making a decision, (b) that consumers are more motivated to spend this effort in the opt-out situation, and (c) that the opt-out framing of the decision to participate produces results that reflect consumers' true preferences to a higher extent than the opt-in framing.

Session #: 2A

Speaker Kathryn Thomsen, The Cadmus Group

BEST FIT Topic: 9. Management Decisions

Sector: Work Place

Presentation Title **How Workplace Behavior Can Save Energy and Other Stories**

Abstract Text BC Hydro programs are aggressively pursuing electricity-self-sufficiency and energy conservation. The utility targets behavioural change in the workplace through its pioneering Workplace Conservation Awareness (WCA) initiative. WCA currently works with 40 major customers involving hundreds of buildings. Organizations range from health care to transportation but all have a goal to “create a culture...that promotes and supports energy efficiency.” The program assumes individual behaviour changes will coalesce into an organization-wide cultural ethic that produces measurable and persistent energy savings. The savings goal is at least 5% of total building consumption. By the time of the BECC conference, BC Hydro will have completed an impact and process evaluation of WCA. The goal of this work is to produce reliable estimates of savings; link savings results to process evaluation to explain the level of savings; and examine how saving energy affected participants and other sustainability efforts within the organizations. Another paper - Real Behavioral Savings: BC Hydro’s Workplace Conservation Program – can be linked to this one. It will present the methods and outcomes of an impact evaluation whose interim findings show 5% to 9.6% savings. This paper will explore the backstories of participant organizations, why savings vary and the other effects WCA has upon its organizations and workers. The interim findings gave us a good glimpse of how level and type of effort varied, and how these factors, along with different types of feedback and reinforcement, affected participant behaviors. We will connect findings to behavioral change concepts such as norms, anchoring, expectations, and habits.

Session #: 4C

Speaker Annika Todd, Lawrence Berkeley National Lab

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Building Energy

Presentation Title **EM&V for Residential Behavior Based Efficiency Programs**

Abstract Text Behavior-based energy efficiency programs have been identified as a major potential source of energy savings, and are increasingly being piloted nationwide. Behavior-based energy efficiency programs are those that utilize strategies intended to affect consumer energy use-related behaviors. These programs typically include outreach, education, competition, rewards, benchmarking and/or feedback elements and may rely on changes to consumers' energy use behaviors (e.g., turning off lights) or purchasing behaviors (e.g., purchases of energy efficient products), often in combination with other programs (e.g., rebate or direct install programs). However, because these programs often lack a technology-based unit for which savings can be modeled or deemed (such as a CFL), documentation of energy savings requires approaches which are common in the experimental sciences, but not in the energy efficiency industry. In this paper, we describe a set of methodology issues and recommend options for calculating savings from residential behavior-based programs, and we characterize the conditions under which each option is appropriate to produce rigorous estimates of energy savings. Specific best practice analysis models are presented, such as difference-in-differences and fixed-effects models, along with analysis issues such as clustering. We discuss three issues that have been of specific concern in behavior-based program evaluation: life cycle savings estimation (persistence), double counting of savings between programs, and data collection and validation issues. We also recommend criteria for developing a predictive model with an eye to the possibility of moving to a "deemed" approach for behavior-based programs at some point in the future.

Session #: 1A

Speaker Meredith Tondro, Gas Technology Institute

BEST FIT Topic: 6. Program Design and Evaluation

Sector: Building Energy

Presentation Title **Residential Feedback: What are the Opportunities for Natural Gas?**

Abstract Text Residential energy use feedback (REUF) has garnered growing interest as a way to save energy and money, while increasing consumer understanding of home energy use. REUF has yielded whole home energy savings of 5 to 15 percent, with variation across studies. As a relatively young market, REUF has focused on electricity, with few options for natural gas. The ubiquity of electricity, combined with the potential for utilities to achieve demand response savings has made it the fuel of focus. Given that nearly 43 percent of U.S. energy consumed in the residential sector in 2010 was natural gas, the potential for greater feedback savings is substantial. In this market analysis, the authors aimed to understand options for natural gas REUF by: • reviewing existing REUF research to identify lessons for natural gas; • discussing benefits and challenges of different types of feedback; • examining commercially available feedback options; and • identifying three REUF options showing strong potential for gas savings and should be the focus of future research and pilot projects. Unlike residential electricity, natural gas use patterns are highly seasonal and are not affected by the same capacity constraints, resulting in only marginal interest in demand response programs from utilities. With these unique characteristics, it's important to balance savings potential offered by a REUF option with overall cost. Based on limited pilot efforts and prior research, using the method outlined above, the authors identify three cost-effective REUF options for natural gas: enhanced billing, advanced thermostats, and advanced metering infrastructure alerts.

Session #: 3A

Speaker Flavia Tsang, RAND Europe

BEST FIT Topic: 5. Enabling Policies

Sector: Building Energy

Presentation Title **Which Types of Interventions Work the Best in Changing Energy Using Behaviors?**

Abstract Text Through a critical review of previous trials or initiatives designed to change energy-using behaviour, the present study aims to answer research question of “Which types of interventions work the best in changing energy using behaviours?”. At the request of the UK Department of Energy and Climate Change, this review focuses on energy use in the home, excluding travel to and from the home. This includes energy use for heating space, heating water, lighting, and electrical appliances. The focus is on interventions whose primary aim is to affect habitual behaviours (but not those influence isolated decisions at the point of action). The work is organised into three stages. In the first stage, we have developed and implemented a transparent and comprehensive search strategy to identify relevant academic and grey literature on trials and evaluation that focus on changing energy using behaviour at home. In the second stage, we are conducting a synthesis of findings, analysing how they inform specific policy questions: ☐

Session #: 7A

Speaker Bryan Urban, Fraunhofer Center for Sustainable Energy Systems

BEST FIT Topic: 4. Modeling Behavior

Sector: Building Energy

Presentation Title **Realistic Thermostat Energy Modeling Based on a Field Study**

Abstract Text Programmable thermostats are notorious for being difficult to use. People frequently operate them as on/off switches or rely only on fixed-temperature hold patterns, rendering the programmable features useless. Some users attempt to reprogram their thermostat's default schedules, with varying degrees of success. Temporary manual overrides add further complexity. Variable human behavior makes it challenging to estimate the true energy impact associated with programmable thermostat deployment in homes. Building energy modelers tend to oversimplify thermostatic control, assuming fixed thermostat setpoints. Since users may adjust temperature setpoints with irregularity, this practice fails at considering behavioral components of energy use. To address this variability we applied a Monte Carlo method based on behavioral data obtained in a recent thermostat field study. In the field study we installed two kinds of programmable thermostats – one was rated high-usability and the other low-usability – in nearly 100 apartment units. During two winter months we recorded air temperature and heating equipment cycling events to infer thermostatic setpoints, program schedules, and manual overrides. We also manually read the thermostat's program at the experiment's conclusion. From this data we determined (1) how many thermostats were manually re-programmed, and of those, how many were re-programmed correctly; (2) the frequency with which manual overrides occurred; and (3) the temperature distribution of setpoints and manual overrides. We represented these results as stochastic variables and applied these to the building model to estimate the expected difference and variation in heating energy consumption attributable to thermostat usability.

Session #: 6B

Speaker Edward Vine, LBNL

BEST FIT Topic: 4. Modeling Behavior

Sector: Building Energy

Presentation Title **The California Behavioral Gap Analysis**

Abstract Text As noted in California's Energy Efficiency Strategic Plan (Strategic Plan): "the development, enhancement, deployment, and operation of more and better energy efficiency related technology is fundamental to achieving California's energy efficiency vision and goals." One of the key strategies in support of this objective is to "enhance market intelligence and behavioral research activates related to energy efficient technologies" (Strategy 1-3, Research and Technology Chapter). In the past year, a research effort was undertaken to identify research activities in the following areas (in each of the residential and commercial sectors):

- Market segmentation and analysis
- Development of market alliances (for engaging customers - e.g., multifamily, low income, etc.)
- Modeling of technology adoption and behavior change, using "socially-realistic models"
- Analysis of social structure factors affecting development of a clean energy market
- Analysis of market actor needs, behavioral drivers and decision-making processes (includes residential consumers, sales, contracting, installation, innovators, manufacturers, policy makers, regulators, researchers, etc.)
- Analysis of user interface and the impact of the quality of interface capability on energy use
- Analysis of energy efficiency measure and services delivery mechanisms - assessment of contractor behavior
- Analysis of energy efficiency measure and services delivery mechanisms - assessment of green leases and other market mechanisms
- Analysis of energy efficiency measure and services delivery mechanisms - assessment of financing solutions
- Pilots and demonstrations for enhancing market intelligence
- Analysis of customer needs in analysis of emerging technologies

This presentation will describe key findings on these research activities. The bottom line: there is a lot of great research going on!

Session #: 5D

Speaker Marsha Walton, NYSERDA

BEST FIT Topic: 1. Community-Based Programs

Sector: Building Energy

Presentation Title **A Field Experiment of a Team-Based Approach for Achieving Measurable Energy Savings**

Abstract Text A presentation of the results of the Central New York Energy Challenge Team pilot that was launched in spring 2012 by the Central New York Regional Planning and Development Board in collaboration with Action Research and NYSERDA's Behavior Research Program. The goal of the pilot was to design and test an innovative team-based approach for achieving household energy savings. The pilot tested a community Energy Challenge Team model developed by Action Research. The program consisted of groups of five to eight households that were organized and facilitated by local team leaders. Team leaders led their groups through a 5-unit, 12-week energy-focused curriculum to achieve a 10% reduction in electricity use. The curriculum included a series of hands-on exercises that were designed to make a household's energy use tangible and build participants' self-efficacy by accomplishing bi-weekly assignments. Group commitments and peer-to-peer sharing were used to motivate team members to complete the curriculum and to sign up for a home energy assessment at the end of the 12-week period. The program was piloted with 12 groups of five to eight households in Syracuse, NY. Groups were randomly assigned to experimental or delayed treatment control groups and program outcomes were evaluated using participants' household utility bills and survey data.

Session #: 2A

Speaker Andrew Weber, Lawrence Berkeley National Laboratory

BEST FIT Topic: 9. Management Decisions

Sector: Government

Presentation Title **How E-Procurement Systems Influence Purchasing Behavior**

Abstract Text Public-sector energy-efficient procurement programs are relatively common. Unfortunately, public sector procurement programs generally suffer from low performance relative to the desired policy goals. Despite clearly-worded policies and mature program resources, low purchasing rates continue to plague energy-efficient procurement programs. Most studies place realized purchasing success at 50% or less. The US Department of Energy's Federal Energy Management Program (FEMP) is seeking to address these low purchasing levels in the US federal government through a more detailed understanding of purchasing pathways. A pathway is defined as the steps taken to achieve a given purchasing method. Multiple methods of purchasing are available to federal buyers. Early in this research, we have found that regardless of purchasing method, the purchasing path intersects an electronic business management system. Government procurement programs have traditionally treated these systems as 'unbiased' components of the procurement process – capable of influencing purchasing efficiency but not purchasing decisions. This talk will introduce the idea of business management systems as crucial influence points for federal purchaser behavior. It will detail a transformation in FEMP's strategy towards influencing purchasing decisions from providing supplemental purchasing resources to directly influencing the purchasing path. It will also highlight two case studies (the Strategic Petroleum Reserve and Thomas Jefferson National Laboratory) where business management systems have been modified to account for a preference towards energy-efficient products and services. This idea of business management systems influencing the organizational behavior relative to energy and climate change is not limited to the public sector.

Session #: 6E

Speaker Max Wei, Lawrence Berkeley National Laboratory

BEST FIT Topic: 10. Trans-Disciplinary Research

Sector: Consumption

Presentation Title **Confucius, Keynes and Christ: Is There A Larger Role for Ethics in Driving Climate-Friendly Behavior Change?**

Abstract Text To be a low carbon society requires big changes in infrastructure, delivery and usage of services, and individual lifestyles. But to achieve societal changes on the time scales that are needed to address global warming, what are the key drivers? Are they bottom up or top down; non-violent versus violent; triggered by environmental disasters; or are there other key drivers? Commentators occasionally invoke a “moral obligation” to take action but often do not press this further. This paper examines the intersection of output and consumption with a historical perspective of ethics and economics. It describes societal figures of merit such as GDP which are based on output and consumption, and revisits the place of ethics in the work of Adam Smith and John Maynard Keynes. The potential for ethical arguments as a driver for behavior change is discussed in the context of one particular behavior, dietary change. A case study is presented comparing the institution of slavery in the 1840s and 1850s with our modern consumption based culture from the perspectives of ethical considerations, political activity, and risk assessment. The paper compares teachings and ethical traditions of Christianity, Western philosophy, and Confucian philosophy and their implications toward building a modern “conservation ethic.” Finally, we examine the place of ethics in education today and argue that the lack of secular ethical education is a key opportunity for encouraging climate-friendly behavior change and at the least, that ethics and ethical considerations should be more widely discussed as a potential driver for behavior change.

Session #: 4D
Speaker Cheryl Winch, Cadmus Group

BEST FIT Topic: 2. Marketing and Outreach

Sector: Consumption

Presentation Title **Refining the Nudge**

Abstract Text Survey research in the context of utility program evaluations provide insight on the types of behavior change customers are engaged in. It also tells us what they are not doing to save energy. A meta-analysis of surveys found about 70% of respondents claim to have taken at least one energy-saving action within the past three months. While most respondents have no problem telling the interviewer that they regularly turn off lights in unoccupied rooms, other behaviors are more elusive. Additionally, many respondents articulate specific barriers to energy behavior change that go beyond what most utility programs are designed to address. The actions respondents cite--and the actions they are not taking--offer insight into effective ways to nudge additional energy-saving actions. We can use the same data to craft messaging designed to reduce barriers to behavior change. For example, several survey respondents discussed challenges associated with engaging other members in their household. Compounding the challenge, utility energy-saving tips received low ratings for their ability to engage other household members in energy saving actions. These survey findings lead to messaging strategies that target households rather than individuals and also provide hooks for different household occupants. This paper explores the types of behaviors in which respondents claim to engage, barriers to energy conservation, effective survey design techniques to capture these insights, and implications for translating these insights into marketing strategies.

Session #: 2E

Speaker Vikki Wood, Sacramento Municipal Utility District

BEST FIT Topic: 4. Modeling Behavior

Sector: Building Energy

Presentation Title **The Behaviors Behind the Impacts**

Abstract Text SMUD's Residential Summer Solutions Study was designed to investigate the effects of real-time data on residential energy use and to examine the relationships among energy use behaviors, treatments and impacts. Impacts on overall energy use were estimated for three randomly-assigned information treatment groups: next-day home-level data, real-time home-level data, and real-time appliance-level data. Pre- and post-summer surveys were conducted to identify energy use behaviors before and after the summer test period. Multivariate regression analysis indicated that overall energy savings were greatest for participants with real-time home-level data. Against expectations, participants with real-time appliance-level data (which included home-level data) did not save energy relative to those with next-day data, and saved less than did those with real-time home-level data only. In contrast, those with appliance-level data saved more during the 4-7 pm peak period than did the other groups. To help explain these seemingly counterintuitive impact findings, relationships among self-reported behaviors, treatments and impacts were analyzed. Cross-tabulation, correlation and ANOVA were conducted to determine where significant differences exist among impacts of various behaviors by the treatment groups. Impact results are discussed in light of the behavioral findings. SMUD's residential Summer Solutions study was managed by Herter Energy Research Solutions and co-funded by SMUD and the Demand Response Research Center at LBNL

Session #: 6A
Speaker Zanna Worzella, BikeArlington

BEST FIT Topic: 1. Community-Based Programs

Sector: Transportation

Presentation Title **The Joy of Biking**

Abstract Text Many Americans view bicycling as a recreational activity or a sport. There is a modest population who view bicycling as a mode of transportation. No one is wrong in their perceptions – the bicycle is all of these things at the same time. My job with BikeArlington, however, is to change the perceptions and behaviors of the people who don't see bikes as a mode of transportation and convince them that bicycling is a mobility solution. I accomplish this using two approaches, both which include face-to-face communication with the community. I speak to various existing groups in Arlington, Virginia, reaching people who would normally not think about riding a bike. I also lead an educational bicycle program that is designed to be informal and social in order to remove any element of intimidation that sometimes prevents people from riding a bike. My main concern is to normalize and humanize biking to the public by relating the message to their situation and personalizing the solution to them. This presentation will describe my outreach efforts with detail on the success of the two approaches as they develop through bicycle counter data and surveys. Previous efforts using formal bicycle classes were ineffective and saw attendance drop sharply. This new and more robust approach was developed in order to reach the wider audience of people who are not captured through other methods and aims to resonate change within the community so that next time, they will get on a bike instead of in their cars.

Session #: 2A

Speaker Shengyin Xu, Minnesota Historical Society

BEST FIT Topic: 9. Management Decisions

Sector: Consumption

Presentation Title **Integrating Sustainability Metrics Into Operational and Strategic Decision-Making**

Abstract Text Sustainability is a topic that is growing in reach to many industries, including historic preservation and museum industries. Public institutions, like the Minnesota Historical Society, can utilize sustainability strategies to reduce existing financial, regulatory, and environmental pressures. All these benefits are in service of the institutional mission. In order to achieve sustainability, an evaluation of energy, water, and waste consumption can help prioritize efforts and put resources towards the most impactful strategies. One such evaluation method is the greenhouse gas (GHG) emissions inventory, which was used by the Minnesota Historical Society's Institutional Sustainability Project. GHG emissions, representing the impact of consumption activities, can be weighed against return-on-investment, implementation time, and the impact on staff and visitors. Further, additional consideration can be given to the consumption embodied in the historic structures and objects, promoting the stewardship of history from a cultural and environmental perspective. This presentation will focus on the experience and outcomes at the Minnesota Historical Society (MHS) in measuring and implementing sustainability metrics-based decision-making at their 26 historic sites and museums. The project has identified numerous strategies that will save the institution \$2 million in utility costs over 5 years. In addition, the speakers will present alternate sustainability evaluation methods, presenting best practices for integrating sustainability into strategic and operational decision-making across different institutions and organizations. The outcomes of the presentation will be to demonstrate the benefits and best practices of integrating sustainability metrics, as well as the accessibility of the process for various sizes and types of organizations.

Session #: 5A

Speaker Yongwen Xu, University of Hawaii at Manoa

BEST FIT Topic: 7. Gamification

Sector: Consumption

Presentation Title **Makahiki: A Serious Game Engine for Sustainability**

Abstract Text Over the past decade, energy and water challenges have become a focal point for sustainability efforts at university, government, and industry campuses. Designers of those competitions have had three choices for information technology: (a) build their own custom in-house solution; (b) out-source to a commercial provider; or (c) use a "minimal tech" solution such as a web page and manual posting of data and results. For the past two years, we have been developing a new choice: an extensible game engine for the development and evaluation of sustainability challenges. This framework, called Makahiki, has a unique feature set intended to foster more rapid innovation and development. These features include: (1) an open source license and development model which makes the technology available without charge and facilitates collaborative development and improvement; (2) support for an "ecosystem" of extensible, interrelated, customizable games and activities; (3) real-time analytics for research and evaluation; (4) pedagogically organized and extensible learning activities; (5) a responsive user interface supporting mobile, tablet, and laptop displays; and (6) support for deployment to the cloud as an inexpensive option for hosting the competition. Our first version of Makahiki was used in 2011 by the University of Hawaii, and the second generation of the framework will be used in 2012 by three organizations to implement individually tailored sustainability challenges. We will report on the effectiveness of the game engine and how the various game techniques influenced sustainability behaviors.

Session #: 3A

Speaker Sara K. Yeo, University of Wisconsin-Madison

BEST FIT Topic: 5. Enabling Policies

Sector: Building Energy

Presentation Title **Exploring the Interplay of Values and Use of Media on Public Opinion of Nuclear Energy**

Abstract Text Public support for alternative energies is key to implementing policy changes that will curb climate change. Nuclear energy has been presented as a viable option but is particularly prone to lack of public support due to the safety hazards often associated with it. In this study, we used a national survey given to a representative sample (N = 2274) in the United States in 2010 to examine how value predispositions and media use predict support for nuclear energy, as well as attitudes about government protection from the risks of nuclear energy. Our results show Republicans and those who have confidence in safety and regulatory approval systems are most likely to support nuclear energy. Democrats and those who have less confidence in safety approval systems tend to be more supportive of governmental risk protection. Surprisingly, attention to science in the media and knowledge about nuclear power were not significant predictors of public support. However, attention to politics in the media was a significant predictor of support for nuclear energy but not of support for governmental risk protection. While confidence was the strongest predictor of support for nuclear energy, attention to political media helped increase that support, particularly in citizens with low confidence. Additionally, we found that high attention to political media increased support for nuclear energy among Republicans and Independents, but decreased support among Democrats. Ultimately, citizens rely most on confidence in safety and regulatory approval systems when forming opinions on nuclear energy. Implications of these findings are discussed.

Session #: 4A

Speaker Alexander Zwissler, Chabot Space and Science Center

BEST FIT Topic: 1. Community-Based Programs

Sector: Transportation

Presentation Title **Behavior Change -- Informal Science Communication Collaborations**

Abstract Text A Model for a Continuum of Behavior Change-Informal Science Communication Collaborations See what happens when $2+2+2=8$...a collaborative model of cooperating partners seeking to create behavior change in youth in the San Francisco Bay Area is discussed and outcomes are reviewed. Chabot Space and Science Center's Bill Nye's Climate Lab, Cool the Earth and Alliance for Climate Education (ACE) collaborate in a number of cross functional ways in order to maximize and multiply the effectiveness of their reach. By targeting multiple age ranges of youth in various venues, this informal collaboration brings together three proven programs that seek to leverage their individual efforts by offering a continuum of programs. Further, the collaboration extends beyond the programmatic, and includes resource sharing, professional development in climate change curriculum for formal educators, grant development and co-branding/marketing.