

# **Achieving and Claiming Savings from Behavior-Based Programs: Challenges Facing Program Administrators**

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# Disclaimer

This work does not represent the views of the CPUC, CIEE, LBNL, and USDOE

# Topics

- Definitions
- Challenges Facing Program Administrators (PAs)
- Overcoming Challenges
- Signs of Progress
  - CEE Behavior Committee work
  - Jurisdictions where PAs have claimed savings

# Behavior-based EE Programs

- Utilize strategies intended to affect consumer energy use behaviors to achieve energy and/or energy demand savings
- May apply behavior insights from the social sciences to energy efficiency programs
- Typically include outreach, education, competition, rewards, benchmarking and/or feedback elements
- May rely on changes to consumers' habitual behaviors (e.g., turning off lights) or 'one-time' behaviors (e.g., changing thermostat settings)
- May target purchasing behaviors (e.g., purchases of energy efficient products or services), often in combination with other programs (e.g., rebate programs or direct install programs)
- Normally evaluated using large scale data analysis approaches involving experimental or quasi-experimental methods, versus deemed savings or measurement and verification approaches

# Behavior-based EE Programs: Looking Ahead

- Increasing interest, but challenging for PAs:
  - If, how, when and for how long behavioral programs truly impact energy consumption behavior, and separating out effects that can be attributed to that program
- Persistence studies needed
- Attribution is challenging
- Double counting must be avoided
- Experimental research design is needed
- Evaluation protocols may be needed

# Persistence

- How long can one rely on the savings?
- Measure life studies dormant
  - Few degradation studies on net technical performance since mid-1990s
- Key challenge: persistence of behavior change and education/outreach programs

# Attribution

- What were the true effects produced by a program, separated out from what would have otherwise occurred absent the program?
- Net-to-Gross Definitions vary by state and can result in large and significant differences in reported energy savings and carbon reductions!!
- Attribution Methods vary by evaluation study, each having strengths and weaknesses

# Should We Care About Attribution? – No!

- Past context: precise quantification of energy savings and demonstration of cost-effectiveness (burden of proof scrutiny)
- Current context:
  - EE has proven itself as a cost-effective resource & is a least-cost utility system resource
  - Climate change is overriding policy objective: reduce GHG emissions!
  - Challenging to source out the net effects of a program due to mosaic of public and private programs

# Should We Care About Attribution – Yes!

- Attribution is important for improving the effectiveness of programs and for targeting non-free riders
- Attribution is important where financial incentives are tied to energy savings
- Who to decide: gross savings or net savings?
- National level: is a dual approach viable?

# Double Counting

- Double counting occurs:
  - Traditional energy efficiency program motivates and incentivizes purchase or installation of EE measure
  - Behavior program motivates overall energy reductions, including the installation of the same measure
  - Ex: CFL rebate program and a behavioral program might both claim savings for installation of CFLs
- If randomized control trial (RCT), double-counted savings are mostly attributed to the behavioral program
  - If not RCT, behavior program gets  $\frac{1}{2}$  of savings

# Experimental Design Definitions

- Quasi-experimental design
  - The focus of program evaluation today
  - Comparison group (similar to treatment group) (selection bias?)
  - **Non-random assignment** to treatment and comparison group
  
- Randomized control trials (RCTs)
  - The focus of program design, implementation and evaluation in the coming years
  - **Random assignment** to treatment and control group
  - Minimize differences between treatment and control groups
  - Different types (**mandatory**, opt-out, opt-in, etc)
  - Very challenging to do!

# Institutional Barriers in Conducting Experimental Designs

- ❑ PAs: No corporate experience with experimentation – need the opportunity
- ❑ Unfamiliar with experimental design advantages, requirements, and management
- ❑ Fear of customer backlash or equity concerns
- ❑ PAs are often risk averse - influenced by regulatory considerations
- ❑ Risk of loss of incentive payments or cost recovery

# Other Barriers in Conducting Experimental Designs

## □ Design

- Large samples (and sufficient resources) required
- Small samples:
  - ◆ Large sample-to-sample variation in outcome measures: hard to detect statistically meaningful effect
  - ◆ Treatment & control groups: not statistically “identical”

# Overcoming Institutional Barriers in Implementing Experiments

- PAs:
  - Must be provided more opportunities and be encouraged to employ experimentation, where possible, as a means for innovation
    - ◆ Demand innovation!
    - ◆ Set up “reinvention laboratories”
  - Must fund staffing and other resources
  - Must develop experience in experimentation and manage customer backlash with customer education

# Current Studies in Experimental Design for EE Programs

- Evaluation of normative comparisons to encourage consumers to reduce energy use
  - OPOWER type programs (RCT)
- Evaluation of dynamic pricing on timing and magnitude of energy consumption
  - USDOE Smart Grid Investment Grants, some of which are using RCTs

# Targets for RCTs

- Technologies with the most experience (e.g., CFLs)
- Where demand savings may be largest (e.g., AC)
- Where total energy savings may be largest (e.g., plug loads)
- Where program delivery can be manipulated:
  - Information
  - Inducements, costs, penalties and prices
  - Market interventions
- Where findings can easily be generalized to other products
- Alternative marketing techniques (messages, channels, strategies)
- Community level interventions (local govt, schools and community groups)

# Program Delivery Manipulation

- Information
  - Vary form, content, delivery system/messenger, frequency and duration
- Inducements
  - Vary subsidies, rebates, price breaks, ex-post rewards and praise/approval
- Costs
- Penalties and prices
  - Vary amount, timing, framing, recipients and delivery system
- Market interventions
  - Point-of-sale delivery systems (vary signage, advertising, packaging with other items/services)
  - Mid-stream programs
  - Upstream programs (vary education, inducements, service provisions and competition)

# Final Thoughts on Experimental Design

- Experimentation can be complicated, expensive and time consuming
- Experiments should not be undertaken without considering the benefits and costs
- The key to successful innovation: strategically applying experimentation with good theory to obtain answers to critical questions
- **Expectation:**
  - **Experimentation will lead to improved programs and new programs, leading to greater energy savings and carbon emissions reductions**

# Evaluation Protocols

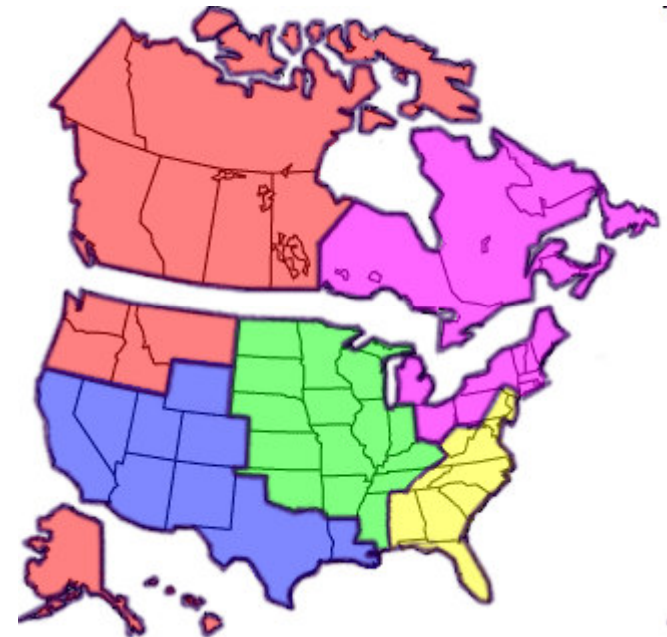
- Existing California protocols work for behavior programs
- **But more detailed guidance may be of value**
  - Electric Power Research Institute (EPRI)
  - Lawrence Berkeley National Laboratory – for SEE Action (State and Local Energy Efficiency Action Network), led by USDOE

# Role of CEE Behavior Committee

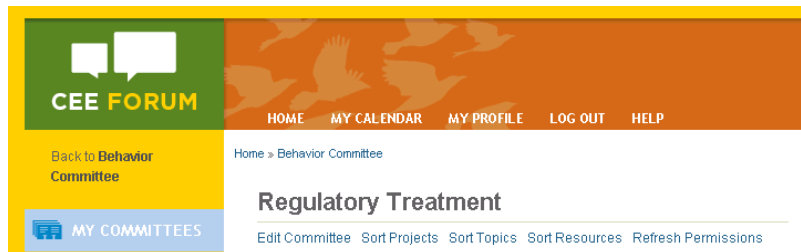
- **Purpose:** *Help CEE members apply behavior change insights to improve their EE programs across all sectors and achieve and claim savings from their behavior-based efforts.*
- **Behavior Insights & Tools** outlines insights about changing behavior culled from different social science disciplines and their application to EE
- **Behavior Program Summary**
  - Provides overview of members' behavior-based programs and related evaluations annually
  - 2010 and 2011 versions on Forum; 2012 to be released in Feb.
- **Comparative Feedback Overview** includes highlights from the evaluations of six members' home energy report programs
- **Behavior Breakout Session: "Investigating Behavioral Approaches to Leverage Two-Way Communication Technologies"**
  - To be held TODAY at 1:30pm

# Jurisdictions Where PAs Have Claimed Behavior-Based Savings

- CEE members please contact Kira Ashby at [kashby@cee1.org](mailto:kashby@cee1.org) for the content of this and the following slide



# CEE Forum Regulatory Overview



**CEE members please contact Kira Ashby at [kashby@cee1.org](mailto:kashby@cee1.org) for the content of this and the previous slide**

# Late Breaking California News

- ALJ's Ruling on Program Guidance for the 2013-2014 EE Portfolio (Rulemaking 09-11-014) (Dec. 7, 2011)
- Two new elements proposed for Statewide Program for Residential Energy Efficiency (SPREE)
  - **Residential Customer Education and Behavior Change Team**
    - ◆ Ensure that residential marketing campaigns are based on the latest EE behavioral science about what techniques best drive customer awareness, knowledge and action
    - ◆ Expand residential behavior change approaches
  - **Residential Market Transformation and Research Team**
    - ◆ Test innovative designs for their relative effectiveness in driving customer participation with an **Experimental Design Approach**

# Time for Questions



# Contact



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