

California Energy Efficiency Coordinating Committee

Meeting Discussion Topic Proposal Form

Form Purpose

The purpose of this form is to assist Coordinating Committee (CC) members to layout their proposed discussion topics in a way that will enable productive discussion in CC meetings. Discussion topic proposals should adequately prepare other members for the discussion; articulate the specific “ask”; where possible set forth possible solutions; demonstrate consideration of the policy and other barriers to the proposed solution(s); and clarify where in the CC timeline the discussion needs to occur (e.g., is this really a Business Plan issue or an Implementation Plan issue?). *Please complete this form with these goals in mind and submit to the Facilitator and CC co-chairs!*

Problem Statement and Observations

Recent legislation in California (e.g., AB32, SB 350) has created an environment in which investor-owned utilities (IOUs) are both mandated and incentivized to engage consumers in demand-side management. While the IOUs have successfully utilized programs such as appliance codes, rebates, and direct install programs to reduce energy use in California, the energy savings that can be achieved through these programs is decreasing as the state becomes increasingly energy efficient. As a result, behavior-based programs are increasingly regarded as promising strategies to capture previously untapped energy savings.

California has been a leader in advancing the use of behavioral interventions to curb energy use, however, the state’s current definition of behavior programs is narrow. In 2009, the state of California restricted behavior-based programs to comparative energy usage disclosure programs and adopted a policy to measure and count savings using experimental design methodologies contained within the California Evaluation Protocols and only credit behavior programs on an ex post basis (D. 10-04-029). This decision was upheld in 2012, and defined behavior-based programs as those that use comparative energy usage disclosure, ex post measurement, and experimental design at a minimum for 2013-2014 (D. 12-11-015). Senate Bill (SB) 488 defined comparative energy usage as “a program pursuant to which an electrical corporation or gas corporation discloses information to residential subscribers relative to the amount of energy used by the metered residence compared to similar residences in the subscriber’s geographical area”, limiting the definition to Home Energy Reports. However, this definition was automatically repealed on January 1, 2016, opening the path for a new definition.

PG&E is leading a two-part stakeholder input process to inform the new definition:

1. Post the proposed definition on the CAEECC website and D.13-11-005 service list for public comment.
2. Host a public workshop at the end of September (date to be announced at CAEECC) at the Pacific Energy Center in San Francisco to finalize the new definition.

Proposed Solution(s)

Since the current regulatory definition was adopted, researchers and evaluators have worked to expand and refine it, resulting in several webinars, papers and a straw proposal suggesting an expanded definition. Many

stakeholders have pointed out that the definition of behavior programs should: include strategies including but not limited to comparative energy use, be tested using research designs including but not limited to randomized control trials, and measure savings using techniques including but not limited to ex post calculations (Illume Advising et al., 2015; Ignelzi et al., 2013; Mazur-Stommen & Farley, 2013; Todd et al., 2012). This dialogue and resulting publications identify several opportunities for improvement to allow for more creative, iterative programs and application of behavioral insights for greater energy savings. Three recommendations are discussed here, and broken down into three sections clarifying the range of target behaviors available for intervention, increasing the types of strategies available for testing, and expanding the list of evaluation approaches for estimating savings.

1. Clarify the range of target behaviors available for intervention

Informal definitions of “energy behavior” are often limited to habitual home decisions, such as turning off lights when leaving a room. However, the social science community defines energy behavior much more broadly, to include a wide range of behaviors. The International Energy Agency Demand Side Management (DSM) Program Task 24 states that, “it is important not to confuse influences on behavior, means of behavior change, or the purpose of behavior change, with what it is that is being changed...” (IEA, p.10).

A clearer presentation of what is meant by “energy behaviors” would expand the programmatic opportunities and further clarify the range of behaviors that a behavior-based intervention can target. Karlin et al. (2014) review past definitions of energy behavioral “dimensions” and find that the common distinction between “behavior” and “efficiency” is, in fact, a false dichotomy, such that the former is typically defined as including behaviors that are frequent and low-no cost and the latter including those that are infrequent and costly. However, these two variables present a 2x2 matrix which, when broken out, exposes at least three (if not more) possible behavioral categories (see figure).

	Low Frequency	High Frequency
Low Cost	Maintenance	Curtailment
High Cost	Efficiency	(n/a)

Further dimensions of energy conservation behaviors that have been proposed over the past three decades include:

- Dividing curtailment into temperature adjustments and minor curtailments (Black et al., 1985; Stern & Gardner, 1981)
- Dividing efficiency into high- and low-cost purchases and improvements (Nair, Gustavsson, & Mahapatra, 2010; Opinion Dynamics, 2011; Stern & Gardner, 1981)
- Distinguishing equipment from building envelope (Opinion Dynamics, 2011)
- The addition of a “maintenance” or “management” category (Kempton, Darley, & Stern, 1992; Kempton et al., 1984; McKenzie-Mohr, 1994; Stern, 1992; Van Raaij and Verhallen, 1983)
- Introducing the dimensions of WEMAD (Weatherization, Equipment, Maintenance, Adjustments, and Daily behavior; Dietz et al., 2009)

As such, we believe a more inclusive definition of Energy Conservation Behavior is: *Energy conservation behavior is comprised of those actions, including the acquisition, use and maintenance of energy-consuming infrastructure (e.g., HVAC, lighting, appliance, plug load), that impact the total amount or time when energy is used.* This

expanded definition of energy conservation behavior is both more accurate and more inclusive in the types of specific actions on the part of end users that a social science-based intervention strategy can address.

2. Increase the types of strategies available for testing

The current definition of behavior limits program strategy to comparative energy usage disclosure programs and expanding this definition has been discussed at great length in recent years. The California IOU Behavior Straw Proposal (2013) states that behavior-based energy interventions are those that “deploy one or more of the following behavior intervention strategies: a) Commitment, b) Feedback, c) Followthrough, d) Framing, e) In-person and trusted community messenger interactions, f) Rewards or gifts, g) Social norms, and h) other approved methods” (p. 1). The Straw Proposal expands the definition from one to seven strategies and adds a caveat that “other approved methods” can be considered. Subsequent work has categorized intervention strategies into schema or taxonomies to “eliminate the confusion caused by the fact that typological categories tend to overlap” (Mazur-Stommen & Farley, 2013, p. vi) as well as present interdisciplinary lists of behavioral theories that can be applied to strategies (Ignelzi et al., 2013).

There are many promising strategies and expanding the definition to include them is a vital and important step forward. However, social science-based is constantly evolving based on new research and limiting behavioral programs to a fixed list or taxonomy unnecessarily restricts the energy savings that could be generated by distinguishing and combining programmatic elements systematically.

Defining behavioral programs as a discrete set of strategies distracts from the key elements that successfully influences behavior. A behavioral intervention is comprised of various elements: namely the general approach or *strategy* taken, the *message* used in communications, and the *medium* used to reach end users (see examples on page 7). We believe a definition of behavioral programs that recognizes the distinction between these elements (strategy, message and medium) will be more effective in supporting behavioral programs that produce reliable savings and meet California’s energy goals than a definition that lists intervention strategies that may or may not actually be messages or mediums.

3. Use a range of reliable research methodologies to infer causality

The current definition of behavior requires that programs are evaluated using randomized control trials (RCT) and ex post measurement. While the RCT is certainly the “gold standard” for inferring causality of a treatment or intervention, there are limits to the types of programs that can be tested via RCT. This methodological restriction thus limits the types of behavioral programs that can be offered. Additional methods have been widely accepted in social science for decades for estimating the impact of behavioral interventions in fields varying from health to education. Specifically, quasi-experimental methods are considered a reliable alternative form of measurement when randomization is not feasible (California IOU Straw Proposal, 2013; Illume Advising, 2015; Todd et al., 2013).

With the availability of frequently sampled smart meter data, measured or “pay for performance” savings can also be calculated for interventions in real-time in addition to ex post and ex ante approaches. Actions that result in savings attributed to deemed measures can be deducted from the total savings calculated via statistical regression analysis, avoiding double counting. Todd et al. (2013) define evaluability “in the sense that energy savings impacts must be: quantified through accepted industry methods... and quantified in a manner that allows comparisons across programs (i.e., average percent saving).”

The proposed definition below presents a modified version of the CA IOU Behavior Straw Proposal (2013) that addresses the three points above - clarifying the range of target behaviors available for intervention, increasing the types of strategies available for testing, and expanding the list of evaluation approaches for estimating savings.

1. Behavioral Program Definition

Behavior-based energy programs use social science to develop interventions that influence energy related behaviors (elimination/reduction of kW, kWh or Therms). These approaches, in the absence of or complementing other rebated or measure-based programs, employ a range of reliable research methodologies to infer causality, estimate savings, and attribute savings across multiple programs as applicable.

These programs require the following steps:

1. Identify which **target behavior(s)** the program is seeking to change. Energy conservation behavior is comprised those actions, including the acquisition, use and maintenance of energy-related technologies, that impact the total amount of energy used.
2. Deploy one or more **program intervention(s)** to encourage customers to engage in the target behavior(s) based on applied social science. Program interventions are comprised of:
 - a. Strategies, including but not limited to:
 - i. Commitment
 - ii. Feedback
 - iii. Reminders [to encourage follow through]
 - iv. Rewards or gifts
 - v. Modeling
 - b. Messages, including but not limited to:
 - i. Social norms
 - ii. Loss aversion
 - iii. Perceived benefits
 - iv. Choice frame (i.e., default setting)
 - c. Mediums, including but not limited to:
 - i. In-person / trusted messenger
 - ii. Direct mail / Email
 - iii. Website / Social Media
3. Measure savings via a **research design** that uses accepted industry methods and allows comparisons across programs to infer causality of programs and/or program components.

Acknowledgement of legal, regulator, and high level operational constraints to the proposed solution(s)

An expanded behavior definition requires different testing and evaluation approaches than product-centric energy efficiency, as outlined above:

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Scheduling Justification

PG&E would like to engage stakeholders and solicit public comment in the behavior definition process in August. Feedback will inform the behavior workshop to be held at the end of September.