PY2006-2008 Indirect Impact Evaluation of the Statewide Marketing and Outreach Programs

Volume I of II

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For the

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Energy Division

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PROGRAMS EVALUATED

The programs covered in this report are shown below.

Utility	Program ID	Program Name
SCE	SCE2554	Flex Your Power
SCE	SCE2556	Flex Your Power-Rural
SCE	SCE2555	Flex Your Power-Spanish TV (i.e., Univision Television Energy Efficiency Marketing)
SCG	SCG3508	Statewide Marketing and Outreach (reflects funding of above efforts)
SDG&E	SDGE3013	Statewide Marketing and Outreach (reflects funding of above efforts)
PG&E	PGE2013	Statewide Marketing and Outreach (reflects funding of above efforts)

ABSTRACT

This report presents results of the indirect impact evaluation of the 2006-2008 Statewide Marketing and Outreach (SWM&O) program. Opinion Dynamics was charged with assessing the SWM&O program success primarily through examining (1) program exposure and reach; (2) behavioral intention; and (3) energy savings from behavior change (as indicated in Decision 05-04-051, April 21, 2005). Our efforts also assessed other key metrics such as awareness and knowledge change.

Based on our findings, the reach of the program is fairly high (9.5 million of approximately 12 million households), with the greatest reach occurring among English speakers. The frequency of exposure, however, was less than the stated goals, and the primary method of outreach (mass media through 10- and 30-second spots) limits the intensity of the information communicated.

The most notable effects of the SWM&O program include changes in top of mind awareness of ways to save energy in the home (10% to 15% increases depending on the population). This is consistent with the intent of the SWM&O program, which was designed to raise awareness of energy saving actions (namely the installation of CFLs, energy efficient HVAC systems, and energy efficient appliances) in order to increase the propensity to take action among individuals exposed to program marketing and outreach messaging.

Ultimately, our research estimated energy savings based on CFL purchases resulting from exposure to messaging. Using self-reported data and structural equation modeling, we estimate that the program is having a small but statistically significant effect on both intent to take action and behavior change related to CFLs.[1] This effect is equivalent to roughly 175 GWh of annual savings from CFL purchases (equivalent to approximately 10% of the gross savings from the PY2006-2008 Upstream Lighting Program[2]). The avoided carbon dioxide (CO2) emissions from the estimated GWh savings are ~86,000 metric tons annually.[3] Note that this savings estimate does not attempt to pull out the effects of the Upstream Lighting Program since respondents are not knowledgeable about effects that occur upstream. As such, this finding is best interpreted as savings that were due, at least in part, to the influence of the SWM&O program. Notably, however, while the campaigns focused on several actions (installing energy efficient HVAC and appliances, etc.) our efforts to determine savings looked only at CFLs. Thus, we expect that total savings due to the SWM&O program would be greater.

[1] Effect size (p=0.08) on intent to take action and p=0.07 on the actual behavior of installing CFLs where an effect size greater than 0.50 is considered large. See Section 6.4 for additional details on effect size. The p-value here is the path model coefficient indicating the strength of the relationship between variables. P-values range from -1.0 to 1.0. The closer to either end of the range, the stronger the relationship.

[2] The KEMA study estimated 1802 GWh per year for CFL screw-in, residential-only. KEMA, Inc. under sub-contract to The Cadmus Group. Draft Evaluation Report: Upstream Lighting Program Volume 1: Main Report, December 10, 2009, Tables 25 and 26 on pages 55 and 56.

[3] This value is calculated using EPA annual non-baseload output emission rates for the WECC California subregion of 1,083.02 lb/MWh and 2,204.6 lbs CO2/metric ton. (http://www.epa.gov/cleanenergy/documents/egridzips/eGRID2007V1_1_year05_GHGOutputRates.pdf)

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1. EXECUTIVE SUMMARY

The purpose of this study is to understand the value and effects of the Program Year (PY) 2006-2008 Statewide Marketing and Outreach (SWM&O) efforts. The primary objectives were to quantify (1) program reach and exposure; (2) behavioral intention; and (3) energy savings from behavior change (as indicated in Decision 05-04-051, April 21, 2005). We anticipate that these findings will help to inform program and policy decisions regarding future marketing and outreach efforts.

The PY2006-2008 SWM&O efforts were comprised of three programs (Flex Your Power-General including an ethnic subcomponent, Flex Your Power-Rural, and Flex Your Power-Spanish), united as a single, comprehensive umbrella campaign to educate Californians about energy efficiency. The budget for the combined SWM&O program effort was $61.5 million across the three program years. The SWM&O effort utilized multiple channels to reach out to Californians. The primary outreach channel was mass media (television, radio and print); secondary channels included a website and local outreach through community-based organizations, booths, and presentations.

1.1 Key Findings

Following a continuum of behavioral change that begins at exposure and ends with actual change, we determined the impacts of this program effort by measuring (1) exposure to the program, (2) changes in awareness and knowledge, (3) changes in intent to take action and in behaviors as a result of the program, and (4) potential energy savings as a result of the behavior change. We also examined the extent to which the SWM&O efforts helped households become aware of, and participate in, utility program efforts such as rebate programs[4].

- **Exposure and Reach:** Exposure is the first step in generating program effects. Specifically, we examined exposure as a function of reach, frequency, and intensity of exposure. Based on our findings, the total reach of the SWM&O across all three programs is fairly high: we estimate as many as about 9.5 million of the approximately 12 million IOU households have been exposed to a message—more than 75%. The greatest reach is occurring among English-speakers. However, the verified frequency of exposure for the media formats where data was available indicated that it was much less than stated goals. For example, actual television and radio exposures were about 9 exposures per individual, much lower than the program-targeted 35 exposures. (Section 6.1.1)

  Overall, therefore, we found that the SWM&O program reach is statewide. However, while most consumers are exposed to the messaging, they are not exposed to it frequently enough and the information is not provided in enough depth to elicit large numbers of the intended actions. Our findings also demonstrate that there is a statistically significant relationship between frequency of exposure and message

[4] This term refers to IOU resource programs.

awareness and recall.[5] Thus, while many households have been touched by the SWM&O messages, the low frequency of exposure is likely to diminish the possible cumulative impact of the messaging. (Section 6.1.2)

The program's high levels of reach are a function of the program's design, which utilizes mass media formats to disseminate information across large geographic territories, reaching a large number of Californians. However, utilizing mass media to garner high reach figures has significant drawbacks. Since the mass media efforts require short interactions with those exposed (e.g. 10-, 30-, and 60-second ads) the intensity of the information communicated is greatly limited. While the SWM&O programs do utilize some more direct and personalized consumer contact (such as event-based outreach, a website, and an electronic newsletter), these are secondary efforts to the mass media campaign (both in dollars and in effort) and reach a very limited number of households. The findings show that while overall reach is broad, the ability of the program to change behavior is limited greatly by its reliance on mass media, and the low frequency and intensity of the main SWM&O communication formats. (Section 6.1.2)

- **Awareness and Knowledge:** As is expected for a marketing and outreach campaign, the greatest effects of the SWM&O program can be traced to increases in consumer awareness and knowledge. Our structural equation model analysis found that the SWM&O efforts had a small, but significant effect on awareness and knowledge (effect size of p=0.13[6] where greater than 0.50 is considered a large effect). Based on our modeling efforts, this appears to be where the program is having the greatest impact.[7] (Section 6.2.2)

  When examining the specific gains in awareness among all target audiences, the most notable changes found were increases in top of mind awareness of ways to save energy in the home, both for energy conservation and efficiency actions (the level of knowledge increased by 10% to 15% depending on the target audience).[8] Notably, awareness is the first step on the continuum to changing behaviors. Increasing awareness opens the door for moving people towards behavior changes in the future. (Section 6.2.1)

  We also found that in-language efforts were more effective in generating cognitive change than the general population outreach. Compared to the cognitive change among English-speakers, the Spanish and Asian-language speakers' cognitive change was substantially greater, likely due to lower levels of intervention in these communities in the past. These findings indicate that current levels of information through the mass media and outreach methods employed by the SWM&O program in program years 2006-

[5] People exposed to FYP four or more times had a 9% higher recall of the FYP name than those exposed less than four times.

[6] The p-value here is the path model coefficient indicating the strength of the relationship between variables. p-values go from -1.0 to 1.0. The closer to either end of the range, the stronger the relationship. Note that there is a discussion in Appendix F regarding the interpretation of "small".

[7] The CPUC-ED is currently working to develop a marketing strategy that is contemplating a more transformative message (i.e., one with high recall and response stimulation) in the future.

[8] This is based on an examination of pre- and post-exposure knowledge among the target populations.

2008 may be more effective for these audiences compared to English speakers. (Section 6.2.3)

Among the English-speaking population, our findings also demonstrate that the communication channel can greatly increase the program's impact. Specifically, interactions at event booths and presentations garner greater changes in awareness, at 0.79 and 0.76 respectively. These findings indicate that the face-to-face interactions with event participants have a greater impact than mass media efforts. (Section 6.2.4)

- **Intent to Take Action and Behavior Changes:** When we examined one specific behavior that is prevalent in the population, i.e., the purchase of CFLs, we were able to determine small but significant changes in both intent to take action and behavior changes. When using structural equation modeling to examine the effects of the SWM&O efforts among other major influences on the purchase and installation of CFLs, we found that the SWM&O program has small but statistically significant effects on both intent to purchase a CFL (effect size of 0.08 where an effect size greater than 0.50 is considered large) and the actual behavior of purchasing CFLs (effect size of 0.07). (Sections 6.3 and 6.4.1)

  While the effect is small, our research demonstrates that the program has the capacity to move exposed individuals to intention to act, and ultimately behavior change. This finding is supported by data from our tracking survey (i.e., a survey completed over three time periods and compared to the comparison group) which also shows a trend in this direction.[9]

- **Energy Savings:** To assess the energy impacts of the program, we explored annual energy savings gained from CFL purchases influenced by the M&O efforts. Once the purchased bulbs are installed, we estimated that the SWM&O programs are responsible for saving as much as 10% of the 2006-2008 gross savings from residential screw-in CFLs under the Upstream Lighting Program efforts (175±114 GWh).[10] However this value includes some of the influence of IOU upstream programs (e.g., marketing efforts, labeling, and cost reductions as a result of other programs), which cannot be factored out of the market. For this reason, it is more accurate to state that the SWM&O programs bolster or help to garner these energy savings (Section 7). In addition, we note that our efforts only sought to measure the energy saving impacts from CFLs, but the program included multiple actions such as installing energy efficient HVAC systems and appliances. As such, the savings for the program are expected to be greater than those measured in this evaluation effort.

- **Increasing Awareness of and Participation in Rebate Programs**: We also researched the ways the SWM&O programs may be channeling individuals to rebate programs to generate additional energy impacts. When measuring awareness, we saw increases in awareness of energy saving resources such as rebate programs and audits among most

[9] Note that this increase was not determined to be statistically significant at the 90% confidence level with the sample sizes used for this effort (600 English-speaking and 400 Spanish-speaking respondents). (Section 6.4.1) We expect that this was due to a limitation in the method (described in detail in this report).

[10] The KEMA study estimated 1,802 gross GWh per year for CFL screw-in, residential-only. KEMA, Inc. under sub-contract to The Cadmus Group. Draft Evaluation Report: Upstream Lighting Program Volume 1: Main Report, December 10, 2009, Tables 25 and 26 on pages 55 and 56.

populations (the exception was that there was no increase in energy audits in the Spanish population). However, since the program's messaging does not specifically call out these resources in their advertisements, the increases in participation are unlikely the result of the SWM&O. Our data indicates that very few households actually access the Flex Your Power website (2%) and very few are aware of the toll free number (5%); two primary places where the SWM&O programs offered information about rebate programs.[11] Thus, these increases in rebate program awareness are likely due to other market influences, such as California's IOUs marketing efforts. (Section 6.5)

The program's limited potential to move individuals to behavior change (and garner energy savings) is likely due to heavy use of mass media channels.[12] Due to the complex nature of energy efficiency (that is, the number of possible actions and the fact that households have generally taken some action but need more specific education to take additional actions), mass media spots, with their short message duration, have a limited ability to move people to behavior change therefore limiting the SWM&O program's potential to generate substantial effects in the population. (Section 6.6)

1.2 Recommendations

The following is a summary of recommendations for program design made as a result of the findings in this report (Section 8):

- Include clearly defined program goals and performance metrics in program planning documents prior to implementation.
- Review messaging in the market prior to developing goals, and determine whether program efforts should enhance existing messages (through other channels, etc.), complement existing messages (e.g., by providing more detailed or broader information), or fill a void in messaging.
    - Periodically assess the market (e.g., every three to six months) to monitor current message streams, and determine how program efforts should be adapted based on current market conditions.
- De-emphasize mass media (but do not eliminate it) as the primary element in the SWM&O program. Given the complex nature of energy efficiency and energy conservation (that is, the number of actions and the various stages for each type of action), this form of communication lacks the ability as a communications platform to meet Californians' need for specific and actionable information.
- Refocus SWM&O programs efforts on specific initiatives that are highly localized and targeted and have the capacity to provide detailed information about energy efficiency or conservation measures that will educate households and help move them to take action.

The following is a summary of recommendations for future evaluation efforts made as a result of the findings in this report:

[11] This data is drawn from a general population survey and includes all respondents.

[12] The CPUC-ED is currently developing a marketing strategy that may include a stronger emphasis on alternative methods of message delivery.

- Future EM&V efforts should be based on multiple success criteria that measure both the behavioral impacts of the ME&O efforts as well as the intermediate effects gained through program outreach, such as increases in awareness, knowledge, attitudes, intention, or decreases in barriers.
- The CPUC and the program implementer should both work to acknowledge common metrics and success criteria so that the implementer has a clear target against which to be judged by an evaluator. Some of these may provide insights on a micro level (such as industry standards, e.g., circulation, to help verify accomplishments), while others may be more informative at the macro level (such as efforts that speak to the overall effectiveness and success of meeting intended goals), but a common acknowledgement of these metrics is important.
- Where mass media methods are used, exposure, reach and frequency metrics should be stated, and commonly accepted prior to program implementation. The use of these metrics should be used as one component of program accomplishments as they are an indication of how program dollars were spent. However, they are only one component as the quality of the mass media and effectiveness of the messages should also be part of any assessment.
- Future EM&V efforts for marketing and outreach programs should consider utilizing quasi-experimental methodologies, which are uniquely suited to tease out the effects of the M&O from other market influences. There should be a close collaboration between the implementer and the evaluator to design the assessments and allow for purposeful data collection that best enables determination of causality.

2. PURPOSE OF THE STUDY

The overarching purpose of the California Public Utilities Commission's (CPUC) evaluation of these programs is to estimate indirect impacts attributable to the programs and to help improve future marketing and outreach efforts (M&O). The estimated cost of the indirect impact portion of our research was approximately $1.5 million across the three-year program cycle (~2.5% of the program budget).[13] Opinion Dynamics Corporation completed a process evaluation[14] in October 2008. Information from that report fed into the indirect impact assessment.[15] This current report covers the indirect impact of the SWM&O efforts within California as outlined below:

Decision 05-04-051 (April 21, 2005) indicates that for advertising and marketing programs:

> "The performance basis should be based on: a) any direct energy savings impacts attributable to the activity; b) the intention to act, if no direct impacts are possible to measure and c) the reach of the advertising/marketing activity, the frequency of the activity and the leveraging of ancillary resources that comes from the activity."

Our evaluation uses these metrics as well as those defined in the California Protocols[16] (Protocols) for indirect impact evaluation to assess the value of the program. Below we provide our researchable issues as outlined in the initial evaluation plan for the SWM&O evaluation effort.

1. What is the reach of each component of the Statewide Marketing and Outreach programs?

2. What education or information was provided by each component of the Statewide Marketing and Outreach programs?

3. How likely is each component to induce behavioral change among the targeted audience?

4. What percentage of those targeted and exposed to the program changed behaviors as a result of the each component?

5. What is the incremental change in awareness of energy saving opportunities as a result of each component?

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[13] Note that the overall budgeted amount for this research as 4% of the budget, but this research included the process evaluation, ethnographic research, baseline exploration, a segmentation study, and additional guidance and consulting services.

[14] http://calmac.org/publications/ODC_Statewide_Marketing_and_Outreach_Process_Evaluation_and_Appendices_Final_CALMACES.pdf

[15] We reference the process report where relevant, but do not provide our findings in this document.

[16] California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals. April 2006.

6. What percentage of participants were channeled into resource programs?

7. What indirect behaviors were taken by those people who received education or "treatment" through each component of the programs?

8. What direct energy saving behaviors were taken by those who received education or "treatment" through each component of the programs where energy savings can be estimated?

9. What are the net energy-saving behaviors[17] taken by those who receive education or "treatment" through each component of the programs where net behaviors can be estimated?

10. What are the net energy savings as a result of each component of the programs where net energy savings can be estimated?

11. What is the value of the program versus the cost of the program?

(Note that we consolidate some of these researchable issues, as relevant, throughout this report.)

[17] "Net" refers to behavior change attributable to program exposure.

3. INTRODUCTION TO THE STATEWIDE MARKETING AND OUTREACH PROGRAMS

California's 2006-2008 Statewide Marketing and Outreach program (SWM&O) efforts are comprised of three programs united as a single, comprehensive umbrella campaign to promote two primary goals: (1) educate Californians on the energy, financial, and environmental benefits of energy efficiency; and (2) promote and support the goals of California's Investor Owned Utilities' (IOUs) energy efficiency programs through channeling Californians into IOU rebate programs via a SWM&O program sponsored website and 800 number. The budget for these programs was $61.5 million across the three-year program cycle.

3.1 Description of Programs and Measures Covered in the Study

This program includes three sub-efforts, each implemented by a separate team: (1) Flex Your Power–General, implemented by Efficiency Partners; (2) Flex Your Power–Spanish TV, implemented by Staples Marketing; and (3) Flex Your Power–Rural, implemented by Runyon, Saltzman & Einhorn. Each program educates Californians through mass media advertisements and targets specific, seasonally appropriate energy efficient measures. In addition to their mass media efforts, the SWM&O programs implement a number of non-mass media efforts such as outreach at community events, electronic newsletters, and an interactive website. While the three SWM&O programs comprise a single, integrated effort, each program is charged with distinct objectives and target markets:

- Flex Your Power-General targets California's general English-speaking population through energy efficiency messaging via the following mass media channels: TV, radio, online, and print. The Flex Your Power program also utilizes non-mass media efforts to reach the general public, including but not limited to the following: the Flex Your Power website (www.fypower.org), which provides educational articles, channeling links to IOU rebate programs[18], and best practices guides; e-Newswire, a periodic email newsletter; PowerPlug Blog, an energy efficiency blog posted on the program website; the annual Flex Your Power Awards; and widespread collateral dissemination at events throughout the state. We estimate about 7 million households in California were exposed to this program.
    - Flex Your Power-Ethnic is a subset of Flex Your Power-General. It uses print media to target Californians who speak Chinese (Cantonese and Mandarin), Korean, or Vietnamese. We estimate about 550,000 households in California were exposed to this program.
- Flex Your Power-Rural targets California's rural population as defined through IOU designated rural zip codes. Flex Your Power-Rural utilizes energy efficiency messaging on

[18] Again, this refers to IOU resource programs.

radio and in print to reach its target audiences. The Flex Your Power-Rural program also reaches out to rural consumers by partnering with community-based organizations to promote energy efficiency at local events. We estimate about 760,000 households in California were exposed to this program.

- **Flex Your Power-Spanish** targets predominantly Spanish-speaking Californians through energy efficiency ads aired on 11 statewide Univision Network Stations. Flex Your Power-Spanish also utilizes the popular talk show format to education Hispanic consumers on energy efficiency issues. Furthermore, the Flex Your Power-Spanish TV program works with the local Univision stations to promote energy efficiency messaging at popular events statewide through booths and the dissemination of collateral. We estimate about 1.2 million households were exposed to this program.

The PY2006-2008 SWM&O efforts combined sought to move households to use CFLs, use energy efficient air conditioning, unplug/turn off lights when not in use, use ceiling fans in lieu of A/C, use appliances in the evening, as well as several other home energy saving tips. In addition, the program sought to educate households about two resources for obtaining additional information: the FYP website and the 800 number. Table 1 summarizes the actions promoted by the SWM&O program.

Table 1. SWM&O Actions Promoted by Target Audience (PY 2006-2008)*

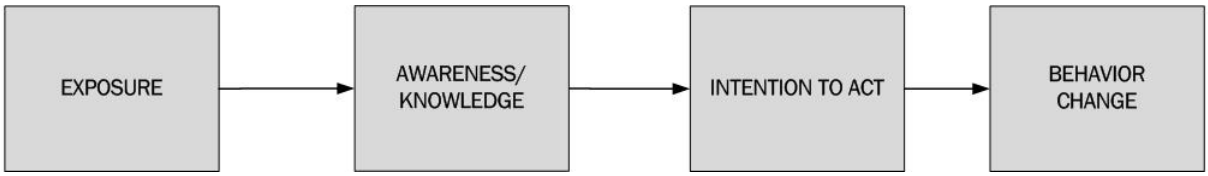
Program	Media	Practices (Product or Behavior)	Resources Promoted (Web or Phone)
English General	TV	• Use CFLs • Use EE appliances (2008 only) • Use EE AC	• Flex Your Power website
	Print	• Use CFLs • Use EE AC • Use appliances in the evening • Several other home energy saving tips	• Flex Your Power website
	Radio	• Use CFLs	• Flex Your Power website
	e-Newsletter	• Wide range of advanced measures	• Flex Your Power website
Asian	TV	• Use CFLs • Use EE AC • Use EE Appliances (2008 only)	• Flex Your Power website
	Radio	• Use CFLs • Use EE AC • Use EE Appliances (2008 only)	• Flex Your Power website
	Print	• Use CFLs • Use EE AC • Use EE Appliances (2008 only)	• Flex Your Power website
Rural	Print	• Use CFLs • Modify home heating/cooling • Several other home energy saving tips	• Flex Your Power website • Toll-free telephone number
	Radio	• Replace old ACs • Use ENERGY STAR	• Flex Your Power website • Toll-free telephone number
	Events	• Use CFLs • Use EE appliances (2008 only) • Unplug/turn off lights when not in use • Use ceiling fans in lieu of A/C	• Flex Your Power web • Toll-free telephone number
Spanish	TV	• Use CFLs • Replace old ACs • Use EE appliances (2008 only)	• Flex Your Power website • Toll-free telephone number

*Note that the number of measure installations for this program is unknown since this is an information and educational effort (i.e., there is no participant database or direct installations through this program).

The SWM&O program theory follows prominent behavior change theories to move individuals to action, asserting that exposure to their M&O efforts will lead individuals to behavior change by increasing their propensity to take action. Behavior change theory poses that individuals must be exposed to marketing and outreach efforts first and then through this exposure be made aware of the desired behavior change. From the point of awareness, an individual experiences a change in knowledge that then leads to behavioral intention and action. This progression from exposure to behavior change is not instantaneous (i.e. one is not immediately exposed and then takes action), but rather it is a cognitive progress that is not temporally fixed – any given individual may progress along the continuum over any given period of time, from a few days to a few years, depending on the targeted behavior and the individual's disposition at the point of exposure (such as previous exposure to the same

messaging, other messaging in the market, their exposure to the behavior through others, etc.). The measures promoted in this program are described in further detail in Appendix D.

Figure 1. Diagram of the Behavior Change Theory



The SWM&O program's ability to move people to behavior change must follow this continuum from exposure to action, which requires a series of effects along the behavior change continuum to ultimately impact behaviors. As such, we assess program effects along this continuum (discussed further below).

3.2 Structure of the Integrated Indirect Impact Report

This report is divided into two volumes. Throughout this report, we provide the SWM&O program's measurable effects obtained through a series of data collection tasks.

In this volume, we integrate these findings into a summary of the SWM&O program's effects and report those effects that are statistically significant. Where necessary, we indicate where our findings are inconclusive in a table at the end of each section. As outlined in the program description above, the SWM&O program targeted a number of different audiences. Throughout this report, we provide our findings by the following target audience: (1) English-speaking general population; (2) English-speaking rural population; (3) Spanish-speaking population; and (4) Asian language-speaking population (our overall findings for Chinese, Vietnamese, and Korean speakers).

The SWM&O program, unlike standard rebate programs, intervenes much further from the point of energy efficiency adoption and does not have a direct measurement link from program exposure (e.g. a rebate) to behavior change. That is, the behavioral and energy saving impacts do not always occur as fast, and as directly, as in resource acquisition programs. For this reason, this report assesses the impacts of the SWM&O program along the behavior change continuum (described in greater detail in Section 6) to assess effects.[19] The findings are structured along this continuum.

We also quantify net energy savings for key components of these programs—an effort that has not been required in past evaluations, which were process-based.[20]

Finally, we conclude with recommendations for future evaluation efforts and comment on the challenges of evaluating an M&O's indirect energy impacts.

[19] This methodology is consistent with the CPUC's measurement guidelines which focuses on "intention to act" when no direct link to behavior can be established.

[20] The components may be thought of as each sub-part or task that comprise the Statewide Marketing and Outreach programs' strategy for reaching their target market(s). These may be a mass media campaign, a website, community-based events, etc.

Volume II offers further detail on each of our research efforts, offering detailed findings memos published earlier in the impact evaluation process and the data collection instruments used. Volume II also includes a detailed technical memo explaining our structural equation method.

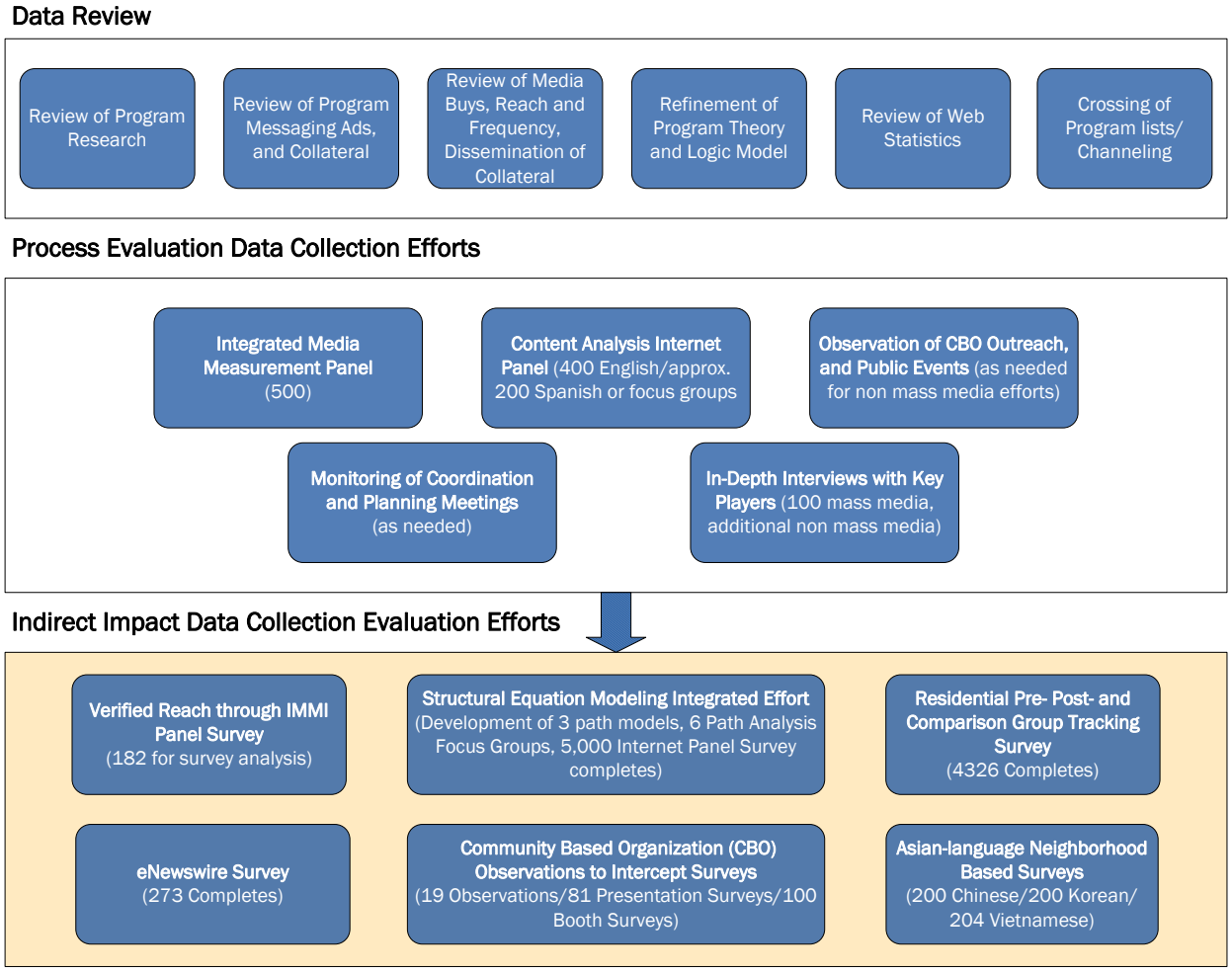
4. STUDY METHODOLOGY

Below we provide the methods used within the study. The reporting structure for this section follows the evaluation protocols; however, we have condensed sub-sections where possible. Note that we did not include sections that were not relevant for indirect impact evaluation efforts.

4.1 Overview of the Approach

To evaluate these programs, the Opinion Dynamics team conducted a series of evaluation tasks. Our primary efforts included a data review, process evaluation data collection efforts, and indirect impact evaluation data collection efforts, as shown in the Figure 2 below. This report draws on some of the earlier research, but focuses on the six indirect impact data collection efforts shown in the figure below.

Figure 2. Summary of Statewide Marketing and Outreach Evaluation Efforts



4.1.1 Indirect Impact Evaluation Data Collection Efforts

The Opinion Dynamics team performed six tasks aimed at evaluating the indirect impact of Statewide Marketing and Outreach Program efforts, and when and where possible, the energy savings associated with these efforts.

- **Structural Equation Modeling Integrated Effort:** The Opinion Dynamics team utilized structural equation modeling (SEM) techniques to assess the relative impact of Statewide Marketing and Outreach Program efforts in influencing participants' awareness, intention to act, and adoption of energy efficient measures, specifically CFLs. To do this, our team modeled both FYP and other influences on consumer attitudes, as well as barriers to energy-efficient purchases as possible intervening variables between messaging and purchase or intent to purchase energy efficient (EE) equipment. This effort required three discrete subtasks: (1) development of models, (2) focus groups, and (3) an Internet panel survey effort.
- **Residential Pre/Post and Comparison Group Tracking Survey:** Our team fielded residential tracking surveys to assess program impact over time. Our team also identified non-participant comparison groups in two other states for the residential tracking survey. Here, we conducted a similar number of surveys in tandem with the residential tracking survey. Using a similar (and exact for the most part) survey each time we fielded, we conducted hundreds of interviews for three quarters in both English and Spanish. These tracking surveys assessed the impact of program efforts over time in the English-speaking and Spanish-speaking target markets.
- **Verified Reach through IMMI Panel Survey:** Working with Integrated Media Measurement, Inc. (IMMI), we used an innovative and unique data collection effort. This company tracks what panelists hear 24/7 using a digital monitoring system based on open-architecture cell phones. Our panelists resided in the Los Angeles Designated Media Area (DMA). Information from this data collection was compared to known television and radio advertising of FYPG in the area to accurately assess exposure to the advertisements.
- **Asian-Language Neighborhood Based Surveys:** To assess the impact of Statewide Marketing and Outreach Program efforts on the Cantonese, Korean, and Vietnamese speaking population, the Opinion Dynamics team fielded six neighborhood-based survey efforts. Three efforts, one in each language, took place in Northern California and Southern California respectively to gather this information.
- **Community-Based Organization (CBO) Observations and Intercept Surveys:** Our team observed non-mass media events, both booth and presentation events. We performed random intercept surveys during booth events. At presentation events, participants filled out surveys directly after the event. These surveys gauged the effects of the events both in terms of knowledge gained and intent to change behavior or take action.
- **E-Newswire:** Our team conducted an email survey of readers of FYP's e-Newswire, an email-based newsletter sent twice per month to subscribers across California (and outside of California), promoting "energy efficiency among California businesses, residents and institutions."

4.2 Questions Addressed in the Evaluation

We originally identified 11 researchable issues in the plan. These issues were condensed into 8 questions that were addressed within our study. These questions are shown in Table 2.

Table 2. Research Questions

Updated (as combined in this report)	Old (from Research Plan)	Research Question
1	1	What is the reach of the Statewide Marketing and Outreach programs? (Note that this researchable issue was also relevant to our process evaluation, which was completed on October of 2008[21])
2	2	What education or information was provided by the Statewide Marketing and Outreach programs? Which behaviors (and resource programs) were promoted by the programs? (This research question was covered in detail within the process evaluation and is not reiterated in this report.)
3	3	How likely are the Statewide Marketing and Outreach programs to induce behavioral change among the targeted audience?
4	4	What percentage of those targeted and exposed to the program changed behaviors as a result of the program efforts?
5	5	What is the change in awareness of energy saving opportunities as a result of program efforts?
6	6	What percentage of participants were channeled into resource programs?
7	7	What indirect behaviors were taken by those people who received education or "treatment" through the programs?
7	8	What direct energy saving behaviors were taken by those who received education or "treatment" through the programs where energy savings can be estimated?
7	9	What are the net energy-saving behaviors taken by those who receive education or "treatment" through each component of the programs where net behaviors can be estimated?[22]
7	10	What are the net energy savings as a result of the programs where net energy savings can be estimated?
8	11	What is the value of the program versus the cost of the program?

In our data collection efforts, we further consolidated these research questions into three key research areas: (1) marketing impacts on purchases and behaviors, (2) community based organization impacts on behaviors and intent to take actions, and (3) outreach impact on purchases and behaviors.

[21] http://calmac.org/publications/ODC_Statewide_Marketing_and_Outreach_Process_Evaluation_and_Appendices_Final_CALMACES.pdf

[22] The components may be thought of as each sub-part or task that comprise the Statewide Marketing and Outreach programs' strategy for reaching their target market(s). These may be a mass media campaign, a website, an 800 number, a community-based event, etc.

4.3 Protocols and Rigor Levels

This section addresses the rigor levels, as well as how our study meets or exceeds the rigor levels required by the Protocols.

The Protocol requirements for indirect impact evaluations have three different rigor levels for the minimum allowable methods. (Table 3)

Table 3. Protocol Rigor Levels for Indirect Impact Evaluations

Rigor Level	Description
Basic	An evaluation to estimate the program's net change on the behavior of the participants is required; the impact of the program on participant behavior.
Standard	A two-stage analysis is required that will produce energy and demand savings. The first stage is to conduct an evaluation to estimate the program's net changes on the behavior of the participants/ targeted customers. The second is to link the behaviors identified to estimates of energy and demand savings based upon prior studies (as approved through the evaluation planning or evaluation review process).
Enhanced	A three-stage analysis is required that will produce energy and demand savings. The first stage is to conduct an evaluation to estimate the program's net impact on the behavior changes of the participants. The second stage is to link the behavioral changes to estimates of energy and demand savings based upon prior studies (as approved through the evaluation planning or evaluation review process). The third stage is to conduct field observation/testing to *verify* that the occurrence of the level of net behavioral changes.

Additionally, our plan included a *verify* and *enhanced verification* rigor level that was accepted at the time of the evaluation plan. (Note that these two levels do not meet the Basic level.)

Rigor Level	Description
Verify	This category includes verifying quarterly reports through review of program.
Enhanced Verification	For our efforts, enhanced verify includes anything that falls short of measuring net behaviors. This may include looking at changes in awareness, channeling efforts, indirect actions such as calling toll free numbers, and/or gross behaviors where attribution is not possible to ascertain.

We met our planned rigor levels as follows:

- Basic Rigor Level was met for the Verified Reach, CBO observations and intercept surveys, e-Newswire, and Asian-language neighborhood surveys. In these research efforts, we used self-report to estimate behavior changes or intent to take action. For the CBO observations and e-Newswire, we collaboratively created a cognitive change

index that "nets out" the influence of the program to obtain net impacts.[23] We used the non-exposed as a comparison group for Verified Reach and the Asian-language neighborhood surveys to determine net impacts.

- Standard Rigor Level was met for the SEM and Tracking survey where we calculated energy savings for self-reported purchases using DEER data and secondary sources if the action was not present in DEER.

4.4 Description of the Study Methodology

The key items to describe the methods used for this research include how the data were collected and subsequently analyzed. Table 4 shows the six different evaluation activities within this indirect impact evaluation and how data were collected for analysis of each. Table 5 contains the analysis for each evaluation activity. This section includes the overview of the methods employed in this study. Further details on sample design, sample size, and how the data were collected are provided in Sections 4.5 and 4.7.

[23] A detailed analysis of the cognitive change index (CCI) is in Appendix O.

Table 4. Overview of Data Collection

Research Area	Evaluation Activity	General Population Survey			Observation	Panel Survey	Participant Survey (Online)	Secondary Data
		Web survey	Random Digit Dial	Intercept Convenience Sample				
Marketing Impacts on Purchases / Behaviors	Structural Equation Modeling	✓						
	Tracking Survey		✓					
	Verified Reach					✓		
	Asian-Language Neighborhood Surveys			✓				
Community Based Organization Impacts on Behaviors / Intent to Take Actions	CBO Observations and Surveys			✓	✓			
Outreach Impact on Purchases / Behaviors	e-Newswire						✓	✓

Table 5. Overview of Analysis

Research Area	Evaluation Activity	Analysis
Marketing Impacts on Purchases / Behaviors	Structural Equation Modeling	Statistical regression model (Hierarchical Equation Model) with multiple tests of the fit of the model and subsequent revisions. Full discussion of the model is in Volume II.
	Tracking Survey	Pre / Post with comparison group (z-test for two proportions)
	Verified Reach	Descriptive statistics / Inferential statistics (chi-square tests, ANOVA, Fisher's exact test, z-tests for two proportions, and independent sample t-tests, where appropriate) p-values of less than 0.10 were considered statistically significant.
	Asian-Language Neighborhood Surveys	Descriptive statistics; qualitative analysis; Inferential statistics (t-tests) p-values of less than 0.10 were considered statistically significant.
Community Based Organization Impacts on Behaviors / Intent to Take Actions	CBO Observations and Surveys	Descriptive statistics; qualitative analysis
Outreach Impact on Purchases / Behaviors	e-Newswire	Descriptive statistics; qualitative analysis

4.5 Sampling Methodology

Each of the activities has a specific sampling methodology as shown in Table 6. Section 4.7 provides details about the samples for each evaluation activity.

Table 6. Overview of Sample Design

Research Area	Evaluation Activity	Sample Design
Marketing Impacts on Purchases / Behaviors	Structural Equation Modeling	River Sample Design (River sampling recruits using banner ads, pop-up ads and similar instant "capture" promotions. Individuals who volunteer to participate are screened for their reported demographic characteristics.)
	Tracking Survey	Random Digit Dial (RDD)
	Verified Reach	Census of Panel

Research Area	Evaluation Activity	Sample Design
	Asian-Language Neighborhood Surveys	Convenience Sample in Purposefully Chosen Areas
Community Based Organization Impacts on Behaviors / Intent to Take Actions	CBO Observations and Intercept Surveys	Convenience Sample for Intercepts and Observations
Outreach Impact on Purchases / Behaviors	e-Newswire	Census of e-Newswire Participants

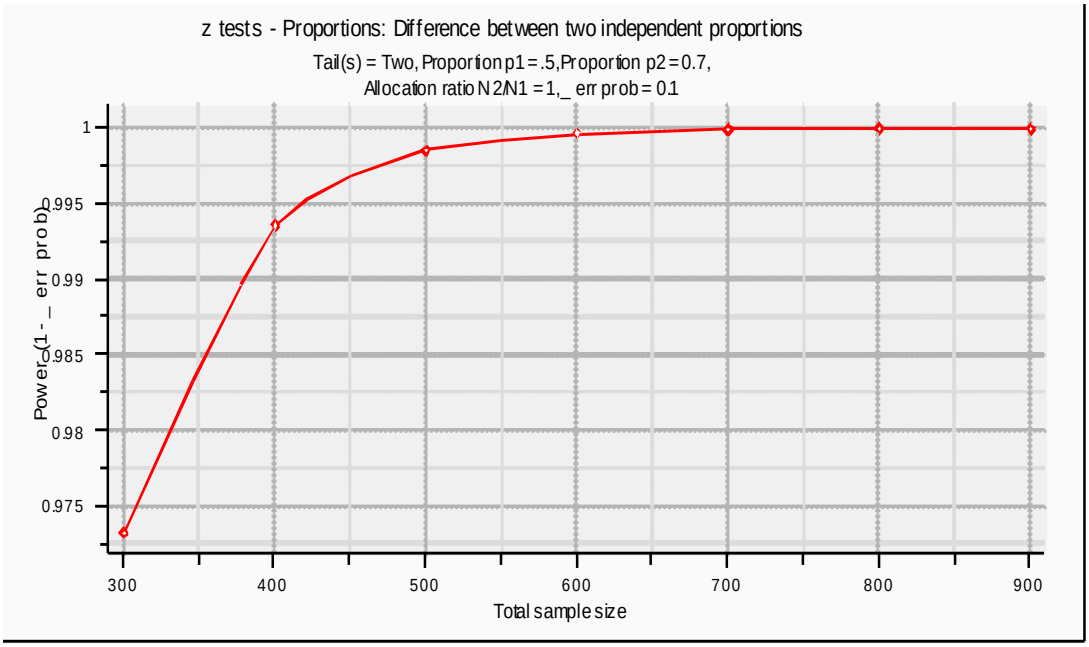
4.6 Expected Precision or Power Analysis Results

There are only two data collection activities in which it is appropriate to calculate an expected precision or perform a power analysis. These are the activities in which a probability sample was used (i.e., the SEM and tracking surveys). While both river sampling and RDD are flawed in that the entire population does not have an equal probability of being sampled, they are accepted in the industry as designs in which inferential statistics can be used and an expected precision value calculated based on results of the survey.

For the SEM, determination of a confidence interval for the estimates of bulbs installed was a complex procedure. This type of analysis does not lend itself to power analysis. However, a sample size of 1,000 is generally considered sufficient for most models.

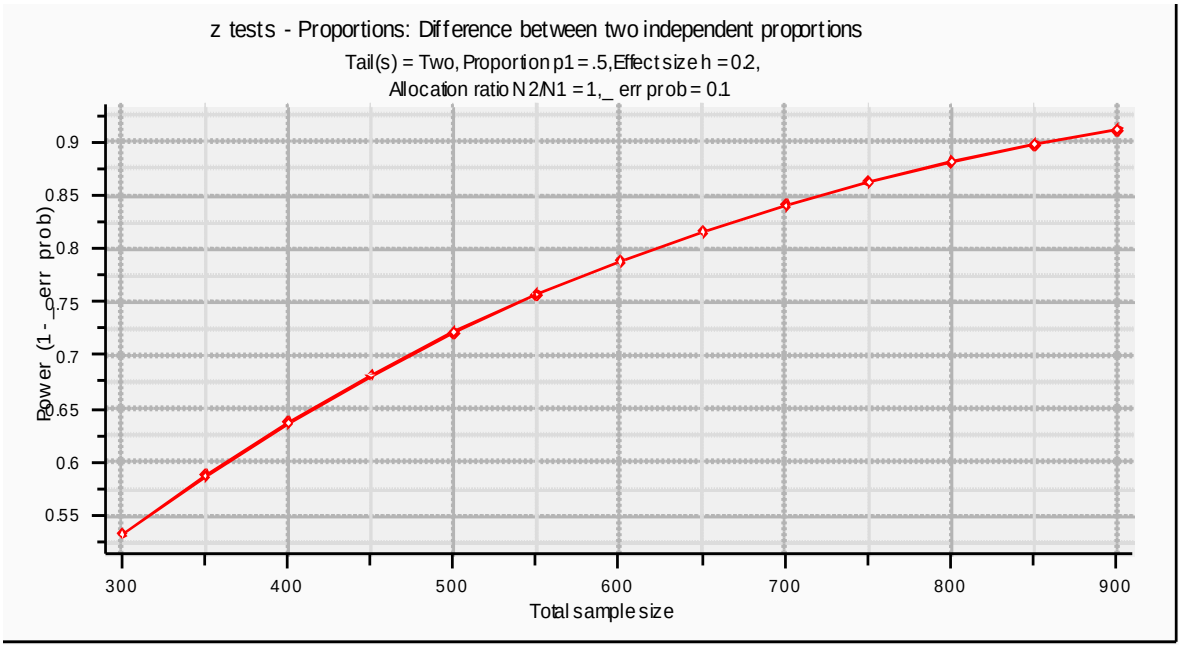
For the tracking survey, we calculated the power of seeing an effect if one was present assuming the worst case scenario of difference from a 50% value. Using sample sizes of 400 each and an assumed 20% difference between two time periods the power analysis showed that this sample size was sufficient to see a difference if there was one present virtually all of the time (Figure 3).

Figure 3. Power Analysis for Tracking Survey Proportions



The SEM results provided us with insight into the actual effect size of the FYP campaign on intention to act and behaviors taken (at least for CFLs). The low effect size seen from the SEM is somewhat analogous to a value of 0.20 (i.e., Cohen's h=0.20[24]). As such, we performed a power analysis using similar sample size and found that the power was lower, but still close to 90% (Figure 4).

Figure 4. Power Analysis for Tracking Survey Proportions Using Effect Size



[24] Cohen's h is a statistical value for determining the effect size in the difference of proportions. Specifically it is (arcsin P1 – arcsin P2). This is the effect size statistic provided in the Power Analysis software (GPower).

This means that, when we assess difference in percentages between our tracking surveys, we have sufficient sample to see relatively small effect sizes if they are present.

4.7 Sample Descriptions

Each of the samples for our data collection was carefully drawn. Our convenience samples were thoughtfully considered. The sampling issues handled within each data collection activity are presented below (including population characteristics, contact information availability and sample disposition rates).

4.7.1 Structural Equation Modeling Integrated Effort

The full fielding of the survey was performed in November 2008 with 1,100 completed interviews. We developed the sample design by taking several issues into account. To enhance the validity and reliability of our measurement of program awareness (which underpins the relationship between the program and actions taken), the SEM survey effort required visual advertisement prompts. Thus, a random digit dial (RDD) telephone survey was not a viable option. In our evaluation plan, the Opinion Dynamics team indicated that the SEM questionnaires would be fielded using online panels. To determine the most appropriate field method, we explored alternative field methods that we thought might generate a more randomized sampling approach to produce a more representative sample.

To determine the most appropriate field method and sample design for the SEM survey effort, we considered three key factors:

1. Cost per complete
2. Distribution of key demographics for each sampling approach
3. Need for visual advertisement prompts

We then explored two alternative methods to online panels:

1. The first alternative method we explored was a random digit dialing (RDD) approach to recruit participants for an online survey and/or mail survey. Once participants agreed to participate, they would receive a mail-in form or link to an online survey and a five dollar incentive for participating. The estimated fixed costs for fielding this effort were approximately 3 times the cost of the river sample method described below.
2. The second alternative method we explored was an online river sample[25] where we would set quotas to mirror the same two 2006 census demographics controlled for in the tracking survey: Age and Homeownership. A river sample is an online intercept survey, where participants are solicited from thousands of websites in the AOL-Time Warner media conglomerate to take a survey on frequently viewed websites. These include but are not limited to the following sites: CNN.com, Time.com,

[25] River sampling recruits using banner ads, pop-up ads and similar instant "capture" promotions. Individuals who volunteer to participate are screened for their reported demographic characteristics. Hence the metaphor of being captured from the flowing river of online persons.

PopularScience.com, Parenting.com, AOL, and Netscape. Participants are then screened for a number of potential survey efforts and routed to a given survey based on their eligibility. This differs from the Internet panel approach because it randomly solicits a wide range of potential participants, rather than drawing from a pool of pre-selected individuals.

To assess the potential differences between the RDD sample approach and online methods, the Opinion Dynamics team determined if there were marked differences in the demographic distributions between our online panel participants (SEM pre-tests) and RDD survey participants (Tracking survey).[26] We compared the demographic distributions between the tracking RDD sample and the SEM online panel on three items closely correlated with homeownership. Note that we did not test homeownership directly because this question was not included in the SEM pre-test.

Overall, the online sample had the most representative distribution on age and income compared to the 2006 census. Notably, the age weights for the online sample ranged from 0.75 to 1.18, while the age weights for the RDD group were much higher. Our team conducted a chi-square test to see whether there was a statistically significant association between the type of survey (online or RDD) and income and education. We found the following:

1. The RDD sample was shown to skew higher income[27]
2. The online sample was shown to skew more educated[28]

While there appeared to be a bias in each method, the Opinion Dynamics team felt that the potential impact of these biases on the survey results was comparable. In our tracking survey, we found that education and income were moderately associated (a Cramer's V of 0.21, where a value of zero indicates no relationship and a value a one or negative one indicates a perfect relationship), thus we hypothesize that the difference of the potential bias imposed based on income and education is negligible.

Therefore, looking at cost, key demographics, and recall validity, the river sample was the most appropriate method for the SEM survey. To ensure that the sample was representative of the state, the Opinion Dynamics team mirrored the tracking survey and imposed quotas on homeownership. Once fielding was complete, we calculated weights to compensate for differences in the age distribution of the sample compared to the population. Ultimately the weights were not used in the SEM analysis because a comparison of the correlation matrices with and without the weights showed no difference. Thus, the simplifying measure of leaving the sample "unweighted" was taken in this already complex analysis.

[26] We recognize that there are differences between the river and panel sampling approaches, but believe that the panel sample serves as an adequate proxy for biases inherent in online sampling approaches.

[27] There was a statistically significant association between the type of survey (online or RDD) and income, with the $\chi 2$ (7) = 17.6, p=0.01. The percentages indicate that the telephone sample tended to have higher income levels.

[28] There was a statistically significant association between the type of survey (online or RDD) and education, with the $\chi 2$ (5) = 37.3, p<0.001. The percentages indicate that the online sample tended to have higher education levels.

4.7.2 Residential Pre/Post and Comparison Group Tracking Survey

The Opinion Dynamics Evaluation Team fielded a Residential General Population Tracking Survey (Tracking Survey) to assess program impact over time in the General and Hispanic markets.

Our first fielding of the survey (Quarter 2, 2008, just before the FYP Summer '08 mass media campaign) became the baseline against which to measure change for questions relevant only to the California population. Opinion Dynamics utilized comparison group surveys to provide an indicator of the incremental effects of the program. The chosen comparison groups came from Oregon and Arizona for the General English speaking market and Arizona for the Spanish speaking market.

Completed Surveys

As a tracking study, we conducted telephone interviews in both English and Spanish statewide and in comparison states at three different time periods. The sampling for each survey was large enough to provide statistically valid results per survey at the 90% confidence level.

Time period 1 was fielded between May 31 and June 25, 2008, prior to the 2008 FYP summer campaign season. Time period 2 was fielded between October 1 and October 29, 2008, immediately after the 2008 FYP summer campaign implementation. Time period 3 was fielded between February 1 and February 28, 2009, a few months after the 2008 FYP summer campaign implementation. Table 7 shows the completed interviews by time period.

Table 7. Total Interviews by Group

Time Period	CA English	CA Spanish	AZ English	AZ Spanish	OR English	Total
1	400	400	260	200	246	1507
2	402	400	200	200	201	1405
3	400	406	201	209	201	1420
Total	1202	1206	661	609	648	4332

Comparison Groups

To fulfill the goal of our comparison analysis, we selected groups that were as comparable as possible to California's population. California is an extremely difficult state to compare to any other state due to spanning several different climates and having a large, diverse population. In light of several influencing factors, we chose people residing in Arizona and Oregon as our comparison groups. These states were closely comparable to California's population in terms of demographics. In addition, both states have established energy saving, or resource-type, programs offered to the population but do not have any statewide energy efficiency mass media efforts comparable to the Flex Your Power campaign. Appendix E provides details about the choice of comparison groups.

Sample and Survey

The primary sampling method in each group was a random probability sample design using a Random Digit Dial (RDD) approach. For California, the sample frame was stratified by IOU service territory to accurately represent the population distribution across the state. For the California English survey, we used a list of electric service territory zip codes[29] from the major IOUs to select the RDD sample. For the California Spanish survey, we ordered Hispanic surname sample from the same list of electric service territory zip codes.

Table 8. California English and Spanish Sampling Frame

IOU Territory	Percentage of Targeted Population [a]
Pacific Gas & Electric	45%
Southern Cal Edison	42%
San Diego Gas & Electric	13%
Total	100%

[a] The target population comprises about 92% of the total California population, as discussed in Section 6.1.

A statewide random probability sample design was implemented for the Oregon survey. The Arizona surveys (English and Spanish) were implemented via a random probability sample drawn only from Arizona Public Service Territory. A Hispanic surname sample was purchased for the Arizona Spanish survey.

As we collected data during each period, we discovered that the data was skewed by age and homeownership in some of the groups using this method. Throughout the interviewing process under the RDD method, we checked to see what post-stratification weights would be required for age and homeownership. In the cases where the weighting would require a weight value greater than 2.0[30], we switched to an alternate sampling source. In each period, we added a young renter sample to the existing RDD sample in the comparison groups to more accurately represent the age and homeownership distribution of California[31].

Weighting Scheme

The weighting scheme in our analysis ensures that the findings can be extrapolated to the California General[32] and Hispanic populations. In addition, our weighting scheme ensures

[29] The sample was further stratified by the exact proportion of electric meters in each utility territory zip code. The counts were based on individually metered, sub-metered and non sub-metered households obtained from the four major IOUs in August of 2006.

[30] A typical industry value used in surveying.

[31] In each period, the renter sample accounted for no more than 20% of the total sampling pool.

[32] For ease of reference throughout this document, the California General survey is the English speaker survey while the Hispanic survey is the Spanish speaker survey.

that the comparison groups are more closely aligned with California[33]. Our weighting scheme is based upon a thorough analysis of all key demographics including:

- A comparison of the each group's demographic distribution to the most recent CA census data;
- An analysis (proportional and mean significance testing at the 90% confidence level) to understand the differences in awareness, knowledge, attitudes and actions due to demographics;
- A correlation coefficient analysis (Cramer's V) between all of the demographics to understand the relationship between the demographics and make sure that we were choosing the right weighting variables.[34]

Based on the above analyses, we decided to implement a weighting scheme based on age and home ownership (the weak correlation between the variables showed that the data could be weighted on both) because they proved to be the most impactful on the data and the most relevant to the program design.

We weighted all of the comparison group data to mimic the age and homeownership make-up of California. By standardizing the comparison groups, we are making them the best comparison groups for California. The comparison groups were chosen to directly compare to California and not to compare to the states' themselves. California, Arizona and Oregon English data were weighted to the 2006 California Census Total Population distribution for age (18 years or older) and home ownership. California and Arizona Spanish data were weighted to the 2006 California Hispanic Census distribution for age (18 years or older) and homeownership[35]. Table 9 shows the Census statistics for age and homeownership to which the Tracking Survey results were weighted.

Table 9. Data Weighting Scheme

Variable	Category	2006 General Census	2006 Hispanic Census
Homeownership	Own	58%	48%
	Rent or Lease	42%	52%
Age	18-34 years	34%	45%
	35-44 years	21%	23%
	45-54 years	19%	15%
	55-64 years	13%	8%
	65 and up	15%	8%

[33] The comparison analysis is not a comparison of California to the actual states of Arizona or Oregon. Instead, we see the comparison states as similar groups to California (in terms of influencing factors such as demography, geography, utility energy efficiency programs and exposure to national energy efficiency messaging) that lack the influencing factor of a statewide energy efficiency mass media campaign. In light of this, we implemented a weighting scheme, based on age and home ownership, to further ensure that the comparison groups are as comparable as possible to California's population.

[34] No two variables showed a strong relationship (>.25 coefficient).

[35] Census data for Spanish speakers was unavailable for these two variables, and therefore we had to default to the Hispanic Census data.

4.7.3 Verified Reach through IMMI Panel Survey

For this study, the Opinion Dynamics team analyzed IMMI's TV and radio spot advertisement data for the June to September 2008 summer campaign season in the Los Angeles DMA. This analysis excluded the extended 2007 winter campaign (spanning into January-March 2008), which served as the FYPG 2008 winter campaign. Note that the IMMI technology only measures TV and radio spot advertisements and excludes the following media formats that FYPG counts towards their reach and frequency goals: (1) TV and radio traffic ads, sponsorships, and weather reports; (2) outdoor media; and (3) online banner advertisements. Thus, our findings for this study should be considered the program's outcomes *at a minimum*. We conducted two primary data collection efforts with IMMI: (1) monitoring and verification of panelists' exposure to FYPG TV and radio spot advertisements for the 2008 summer campaign season (June-September); and (2) a post-campaign survey with panelists (November-December 2008). Table 10 provides the number of data points for each of these efforts.

Table 10. Final Number of Panelists Ages 18-54 by Analytical Effort

	Total in Compliance	Exposure Analysis	Survey Analysis
Number of Panelists	360	319	182

4.7.4 Asian-Language Neighborhood Based Surveys

The FYPE program disseminates TV, radio, and print advertisements during the Summer Lighting and Cooling campaigns. The program also has in-language pages on the FYP website.

To provide insight into FYPE's potential program effects for this effort, our team conducted intercept surveys of Californians who speak Chinese (Cantonese or Mandarin), Korean, and Vietnamese in both the San Francisco and Los Angeles Designated Media Areas (DMAs) during the weekends of September 26-28 and October 4-5 in 2008. Note this was completed just after the 2008 summer campaign season. The next section provides details of the intercept survey method. For each DMA, our team sought to complete 100 intercept interviews for each of the following populations: Chinese-speaking (including both Cantonese and Mandarin speakers), Korean-speaking, and Vietnamese-speaking individuals. The table below shows our target number of completes by language and DMA as well as our final number for each.

Table 11. Target and Actual Completes of Neighborhood Based Effort by Language

		Chinese	Korean	Vietnamese	Total
Los Angeles DMA	Target	100	100	100	300
	Actual	*100*	*100*	*104*	*304*
San Francisco DMA	Target	100	100	100	300
	Actual	*100*	*100*	*100*	*300*
Total		**200**	**200**	**204**	**604**

Selecting Intercept Locations

To determine the neighborhoods for intercept interviews, the Opinion Dynamics team used three primary neighborhood selection criteria: (1) concentration of FYPE media dissemination; (2) population density of in-language targets; and (3) location of commerce centers to ensure high-volume traffic of the target sample.

The first selection criteria for choosing the neighborhoods for our intercept interviews was choosing a location that had a high concentration of FYPE media messaging. To do this, we obtained a list of zip codes where FYPE messages were disseminated in Chinese, Korean and Vietnamese communities.[36] Secondly, we chose neighborhoods with the greatest population density of FYPE's target audience. The Opinion Dynamics team used the US Census to determine the areas in both San Francisco and Los Angeles most densely populated with FYPE's target language groups. The third criterion was to determine cross streets within the San Francisco and Los Angeles DMAs that serve as ideal locations for intercept interviews. To determine these cross streets, we had five main criteria:

- Accessibility to pedestrian traffic
- Ease of stopping pedestrians and space to interview (benches, open areas, etc.)
- Close proximity to retail shops, restaurants, cafes, office buildings, parks and recreational areas (we made sure to allow enough distance from the places of business as to not interfere with patrons or the course of business)
- Highly visible areas
- Ensure safety for interviewers

With these parameters in mind, we selected the final sites for intercept surveys.[37]

Methods for Intercepting

The Opinion Dynamics team conducted the intercept research by approaching individuals that spoke the target language. Interviewers spoke the target language when intercepting potential respondents. Those who could not or did not speak the language were not selected

[36] The zip code list was gathered from print and broadcast media. The print outlets provided their paper's distribution sites and the broadcast media provided their top coverage areas. The zip code list does not necessarily indicate that all three media (print, radio, and TV) were used in all geographic areas.

[37] In some cases, the densely populated regions were also highly residential neighborhoods, and we elected to survey at sites of high traffic and commerce as these are ideal conditions for finding people to fill out the surveys.

to participate. To make a special effort to minimize age or gender bias, the Opinion Dynamics field researchers took special care to target a wide variety of ages and an equal representation by gender.

The interviewers approached a potential respondent and asked if he or she would like to fill out a short survey for a $5 retailer gift card. Once respondents agreed to take the survey, interviewers were instructed to administer the questionnaire. This method was favored over a self-administered approach so that we could reduce survey errors and eliminate skipped or missed questions. To ensure that the interviewers could properly administer the survey, they were fully trained on the survey instrument. Respondents were given the $5 gift card once the survey was complete.

4.7.5 Community-Based Organization Observations and Intercept Surveys

For the analysis of FYPR and the Community Based Organizations (CBOs), primary data collection encompassed observational research[38] at a sample of 19 events from June – October 2008. The events included both booth type events, where CBOs set up a Flex Your Power booth to disseminate information, and presentation type events, where CBOs gave presentations to communicate the Flex Your Power message to discrete audiences. The evaluation team worked closely with RS&E to coordinate the logistics for attending events. We attempted to attend at least one event per CBO, however this attempt was subject to unforeseen complications such as last-minute event cancellations, lack of sufficient lead time between our receipt of event information and the event date, several CBO's lack of proactive communication of event schedules, and resource availability. In light of these challenges, we were able to observe at least one event per CBO with the exception of three; the Children's Museum, the Santa Maria Valley YMCA and the Volunteer Center of the Redwoods. Table 12 shows the breakdown of the 19 completed event observations by CBO and event type.

Table 12. CBO Event Observations Completed

CBO	Presentation	Booth	Other*	Total
Amador-Tuolumne Community Action Agency		2		2
Children's Museum				
Climate Protection Campaign		1		1
KernCorps Americorps Program	1			1
Kings Community Action Organization		2		2
Mission Resource Conservation District	1	2		3
Plumas Community Devel. Commission	1			1
Power Up NC		1		1

[38] Opinion Dynamics prepared a ten-page guide for observers to document and describe the event, booth, staff, information provided, attendee-types, and the attendees' level of interest in the program information. The observation involved taking detailed notes, careful listening and watching human behavior – such as actions, reactions, facial expressions and body movements – to answer the questions included in the guide. Each event observation lasted two hours.

CBO	Presentation	Booth	Other*	Total
Santa Maria Valley YMCA				
United Way of Merced		1		1
Volunteer Center of Mendocino		1		1
Volunteer Center of Riverside County		1	1	2
Volunteer Center of the Redwoods				
Warner Community Resource Center	1	1		2
Watsonville YMCA, Central Coast		1		1
Western Shasta Resource Conservation District		1		1
Total	**4**	**14**	**1**	**19**

*One event did not fit in the traditional booth or presentation category. This was an energy efficiency-themed children's art contest.

After observing several events, Opinion Dynamics chose to complement the observation approach with brief, in-person intercept surveys capturing participants' reactions to the booth-disseminated information immediately following their encounters at the booths.[39] Note that the booth survey data only reflects the opinions of event attendees that engaged in conversation with the CBO representative at the booths. Excluded were people that attended the events but did not interact with the CBO booth. For the presentation events, Opinion Dynamics administered surveys to all of the participants immediately following the presentation. Table 13 shows the number of participant surveys completed at nine events we observed. Note that the sample sizes for the presentation and intercept survey data may vary by question from the total completes below as we often use valid percents, i.e. omit missing data from the base total.

[39] The intercepts were 25 questions long and took approximately 10 minutes to complete. They were self-administered and they covered participants' reasons for visiting the booth, their knowledge of energy efficiency, the usefulness of the information provided, the likelihood that they will take specific actions as a result of visiting the booth, their awareness of specific information campaigns, and included psychographic and demographic questions. In return for completing an intercept survey, each participant was offered $5.

Table 13. Participant Surveys Completed at CBO Events

CBO	Event Name	Presentation Completed Interviews	Booth Intercept Completed Interviews
Plumas County Community Development Commission	Presentation to Greenville Senior Nutrition Site	16	
Mission Resource Conservation District	Presentation to Save Our Forest Group	11	
Warner Community Resource Center	Presentation to the Stoneridge 55+ Community	23	
KernCorps Americorps Program	Presentation to the Lamont Community Collaborative	31	
Kings Community Action Organization	Corcoran Cotton Festival		22
Mission Resource Conservation District	Stage Coach Sunday		21
Western Shasta Resource Conservation District	Return of the Salmon Festival		20
Amador-Tuolumne Community Action Agency	Tuolumne County Health Faire		18
Volunteer Center of Mendocino	Ukiah Pumpkin Festival		19
	Total	**81**	**100**

Note that due to limits on participant contact information, it was not possible to obtain a sample of attendees at each event or a sample of the total events in 2008. Instead, our findings are drawn from a convenience sample of events and participants. The observational and intercept survey findings presented in this report are not meant to be representative of the California rural population. These findings provide a window into the CBO efforts and the participants in those efforts.

4.7.6 e-Newswire

Opinion Dynamics utilized primary and secondary data collection methods to analyze the e-Newswire component. For primary data collection, Opinion Dynamics conducted an online survey of e-Newswire subscribers. For secondary data collection, we conducted a content analysis of the e-Newswire.

In November 2008, Opinion Dynamics fielded an online survey to all 12,290 e-Newswire subscribers. Efficiency Partners distributed an email invitation, on behalf of Opinion Dynamics, to complete the survey and provided a unique URL to the survey for each subscriber. Subscribers were allowed to complete the survey over a two-week period from November 11-21, 2008. As shown by Table 14. e-Newswire Subscriber Survey Disposition Report, 465 email invitations "bounced back"; therefore we revised the total reach of the e-Newswire to 11,825 subscribers. There were 2,746 subscribers (or 23% of subscribers with valid email addresses) who opened the survey. Amongst subscribers that opened the survey, 20% (or 540) attempted to answer the survey. Out of the total valid subscriber base, 5% answered the survey.

Table 14. e-Newswire Subscriber Survey Disposition Report

Outcome	Number	% of Total
Survey invitations sent and received (less 465 invalid email addresses)	11,825	100%
Subscribers opened survey invitation	2,746	23%
Subscribers attempted to complete the survey	540	4.5%
Subscribers completing survey after screening	273	2.3%

After each of the people indicated a willingness to complete the survey, we screened them to ensure that respondents were current (received the e-Newswire via email for at least 2 months), were not associated with the implementation or evaluation of the FYP programs, and actively read the e-Newswire. As shown in Table 15, 540 subscribers attempted to answer the survey while 273 subscribers qualified and completed the full survey. Most of the subscribers who were disqualified for the full survey were part of implementing or evaluating the FYP Campaign. It is important to note that the survey data we collected is likely representative of active e-Newswire readers and not necessarily the entire subscriber base.

Table 15. e-Newswire Screening Process Outcome

	Screening Reason	Number	Percentage based on total subscribers that attempted to answer the survey (n=540)
Screening Outcome	Helping to implement or evaluate the FYP campaign	159	29%
	Do not read it frequently	30	6%
	Do not currently subscribe to the e-Newswire	20	4%
	Subscribed for less than 2 months	20	4%
	Younger than 18 years old	3	<1%
Survey Outcome	Qualified but terminated	35	6%
	Qualified and completed	273	51%

Viewers can either read the e-Newswire on the FYP website itself or they can sign up as a subscriber and receive the information via email. Note that our survey was fielded to the subscribers that receive the e-Newswire via email and did not attempt to survey individuals that read the e-Newswire directly from the FYP website.

In addition to the subscriber survey, we conducted a content analysis of 20% of randomly sampled e-Newswires issued in 2006 and 2007. To maintain objectivity in this qualitative assessment, two researchers documented the content of the e-Newswires in a data collection spreadsheet and sorted the news articles into energy-related categories without knowledge of the other's input. The content analysis involved examining each e-Newswire for content such as what information is typically included and who would likely benefit from

the information. Table 16 shows the sampling universe from which we randomly selected issues for analysis.

Table 16. e-Newswire Content Analysis Sample Universe

	Total Issues	Sampled for Analysis
2006 e-Newswires	25	5
2007 e-Newswires	25	5
Total	50	10

4.8 Description of the Baseline

Our source of baseline data comes from the first general population survey of California that took place in the second quarter of 2008. Because of the timing of the survey, we acknowledge that the baseline was already affected by many years of the Flex Your Power program. However, this was the first opportunity to gather this data using primary data collection.

5. RELIABILITY ASSESSMENT OF STUDY FINDINGS

Determination of program impacts for this diverse set of marketing and outreach activities is difficult to state with specific statistical certainty. Our evaluation captured discrete items with varying degree of rigor and discusses each of those items here.

For the collection of quantitative data through surveys by a Computer Aided Telephone Interview (CATI) both validity and reliability were addressed through multiple strategies. First, the experience of the evaluation team was used to create questions that, at face value, appear to measure the idea or construct that they are intended to measure. The questions were reviewed to assure that double-barrel questions (i.e., questions that ask about two subjects, but with only one response) and "loaded" questions (i.e., questions that are slanted one way or the other) were not asked. Scales were constructed so that multiple items (which increase reliability) can be used to assess an underlying construct. The overall logical flow of the questions was checked so as not to confuse respondents, which would decrease reliability. All survey instruments were reviewed by key members of the evaluation team as well as the CPUC and MECT. In addition, to determine if the wording of the questions is clear and unambiguous, we pre-tested each survey instrument and allowed the CPUC/MECT and team members to monitor the telephone interviews as they were being conducted or review the pre-test survey data. We used the pre-tests to assess whether the length of the survey was reasonable and reduced survey length as needed.

Reliability was also assured through careful training of all CATI interviewers. Opinion Dynamics interviewers went through a rigorous training period before they began interviewing. Interviewers received a general overview of the research goals and the intent of each survey question. After the initial training, interviewers were then asked to make a number of timed "mock calls" where they were trained to deal with different situations that might arise when conducting an interview. We then carried out continuous, random monitoring of all telephone interviews and validation of at least 10% of every interviewer's work.

We addressed ***construct validity*** through careful review of the data collection instruments as described above. Additionally, after completion of an interview, where multiple questions were used to measure a single underlying construct, we performed statistical tests such as Cronbach's alpha, to measure how well a set of items (or variables) measured a single unidimensional latent construct, such as attitudes and awareness.[40] This type of construct analysis occurred with the SEM effort and when we captured program influence through several questions. Additionally, the SEM effort included factor analysis of the constructs to

[40] Cronbach's alpha can be written as a function of the number of test items and the average inter-correlation among the items. Below, for expository purposes, we show the formula for the standardized Cronbach's alpha:

$$\partial = \frac{N \times \bar{r}}{1 + (N-1) \times \bar{r}}$$

Here N is equal to the number of items and r-bar is the average inter-item correlation among the items.

reduce the burden of responding to the survey by removing constructs that were essentially duplicative.

We performed several tests on the data prior to analysis within the SEM to assure ***statistical validity***. Multiple approaches to address the skewness issue found in the SEM data were tried, including using transformations such as square roots, logs, and negative reciprocal roots for positively skewed variables, and squares and cubes for those negative skewed. For many of the questionnaire items, these methods did not produce variables that could be characterized as normally distributed. For those, collapsing values into trichotomies and dichotomies was tried. Even these remedies were not ideal as they did not result in truly normal continuous variables.

The transformed variables were then used in the development of scaled constructs. However, this version of the variables did not scale well. Finally, we reverted to the original versions of the variables, but used robust methods to ameliorate the distributional problems. For all remaining analyses, estimates were based on these robust estimation methods.

Outside of the SEM analysis we included a different type of statistical analysis (a Poisson analysis) to answer one question when it was clear that the distribution of data did not lend itself to a typical linear regression.

Internal validity was addressed in two ways. The first is through using structural equation modeling (SEM) that was used to test and estimate key causal relationships illustrated in the logic model using a combination of statistical data and causal assumptions. The demonstrated correlations of key constructs in the model support the confidence in the constructs' internal validity. One of the key benefits of SEM is that it employs additional methods for increasing reliability by modeling constructs as latent variables (variables which are not measured directly, but are estimated in the model from measured variables which are chosen to reflect the latent variables). This allows the modeler to explicitly capture the unreliability of measurement in the model, which in theory allows the structural relations between latent variables to be accurately estimated. The second way that internal validity was addressed was through the use of a comparison group or using a self-report method.

Because of the broad nature of the programs and the somewhat few specific assessment points within our analysis, we address internal validity (the ability to show a causal relationship) for the entire program through explanation building combined with the use of logic models. To gain greater confidence in the accuracy of key indicators, multiple sources of evidence and chains of evidence are used as available.

For quantitative efforts, ***external validity*** (the ability to generalize any differences to the population of interest), was enhanced through the use of an appropriate research design. We were careful to assure that the sampled customers were a representative sample of households exposed to the umbrella programs. During data collection, the Opinion Dynamics team managed the sample to minimize self-selection bias (i.e., we allowed for multiple attempts at different times of the day and exhausted one part of the sample prior to moving on to the next).

Using the first six specific areas of potential bias and uncertainty as outlined in the Protocols and further described in the California Framework[41], Table 17 summarizes the entire data collection efforts of this study and how bias was minimized.

[41] TecMarket Works. 2004. The California Evaluation Framework. June.

Table 17. How Study Addressed Potential Bias and Uncertainty

Potential Sources of Bias	Structural Equation Modeling	Tracking Survey	Verified Reach	Asian-Language Neighborhood Surveys	CBO Observations and Intercepts	e-Newswire
	Online	RDD	Panel	Intercept Convenience Sample	Intercept Convenience Sample	Online Survey
Non-response and other forms of selection bias	See Section 4.7.1 for a complete discussion	See Section 4.7.2 for a complete discussion	NA as all panelists participated	Convenience samples have no expectation of addressing this bias	Convenience samples have no expectation of addressing this bias	The population was included and email follow up reminders were provided for all.
Measurement error and response bias	Focus group for conceptual understanding, careful construct design, multiple pre-tests. When multiple choices were provided, they were randomized as to order.	Careful design and review of survey, pre-testing. When multiple choices were provided, they were randomized as to order.	Careful design and review of questions	Careful design and review of questions, pre-testing	Careful design and review of questions, pre-testing	Careful design and review of questions, pre-testing. When multiple choices were provided, they were randomized as to order.
Erroneous specification of the statistical model	There were known issues with the skew of the data, so we used robust methods to ameliorate the distributional problems.	NA	NA	NA	NA	NA

Potential Sources of Bias	Structural Equation Modeling	Tracking Survey	Verified Reach	Asian-Language Neighborhood Surveys	CBO Observations and Intercepts	e-Newswire
	Online	RDD	Panel	Intercept Convenience Sample	Intercept Convenience Sample	Online Survey
Choosing an inappropriate (energy) baseline	For the energy estimates derived from this analysis, DEER values were used	NA	NA	NA	NA	NA
Self-selection of program participants	Self-selection bias often arises within energy evaluations when free ridership compares behavior of program participants to a sample of non-participants. The SWM&O programs do not have "participants" as a rebate program defines participants. As such this issue is not relevant for our study. Bias that could arise from how respondents answer the surveys (e.g., socially acceptable bias) is covered under measurement error.					
Misinterpretation of association as causal effects	This model was specifically used to test causal hypotheses	This potential source of bias comes into play when a regression is used in the analysis. This is not applicable for these efforts.				

6. DETAILED FINDINGS

The SWM&O programs differ from standard rebate programs because M&O efforts may expose consumers to information before they are in the market or consider an energy efficient purchase. Marketing and outreach programs in particular, as well as education-driven efforts generally, aim to first affect the awareness, knowledge, and attitudes around energy efficiency *prior* to action in order to effect behavior change. This model differs dramatically from rebate program approaches, as it requires a series of cognitive and social changes to move individuals to action well before they are presented with a purchase decision. In contrast, rebate programs intervene specifically at the point of purchase and focus almost exclusively on the price of the product, aiming to influence after consumers enter the market.

Measuring the behavioral effects of the SWM&O program presents unique challenges that are not encountered when evaluating most incentive-based programs. When we consider the relatively low frequency and intensity of program messaging and the low purchase incidence of two out of the three measures that the SWM&O program targets (energy efficient appliances and HVAC), *and* that the SWM&O program intervenes in the market relatively far from the behavioral decision, teasing out the net effects of the SWM&O program requires very large sample sizes and highly sophisticated measurement approaches that standard rebate programs usually do not.

Throughout this chapter, we provide a summary of the SWM&O program's effects. In this section, we detail our findings of the SWM&O's effects along the behavior change continuum: (1) exposure; (2) increases in awareness and knowledge; (3) intent to take action; and (4) behavior change. We also present findings related to channeling into utility rebate programs in this section. Section 7 presents energy savings estimates as a result of the behavior change.[42]

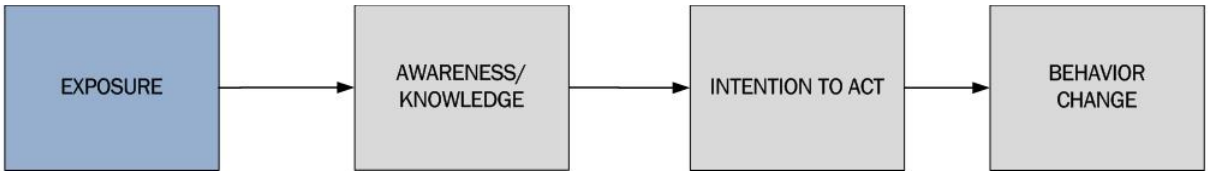
6.1 Exposure

The effects of the SWM&O program are dictated, in part, by the exposure to the program efforts and the information provided in each outreach format. That is, individuals cannot be affected by the marketing and outreach efforts unless they have been exposed (either directly or indirectly through friends, family, colleagues, etc.) and provided with substantive information. As such, to understand the effects of the SWM&O program, we first examine exposure to the program and discuss the impact of the SWM&O program's exposure efforts on its target audiences.

As a marketing and outreach campaign, the primary goal of the SWM&O program's intervention is exposure: the program aims to generate behavior change by increasing consumer exposure to information on saving energy.

[42] Detailed findings by research effort and the data collection instruments used are provided in Volume II.

Figure 5. Behavior Change Theory: Exposure



The exposure to the program is measured through three primary metrics: (1) program reach; (2) frequency of exposure; and (3) intensity of exposure as described below.

- **Program Exposure:** The "exposure" of an M&O program is the number of individuals or households who indicate that they were exposed to the M&O efforts. Exposure is cumulative and only counted once for a given individual or household over a set period of time.
- **Frequency of Exposure:** The frequency of exposure is the average number of times an individual is exposed to the campaign's marketing and outreach. With increased frequency of exposure, any given message has an increased likelihood to affect change among those exposed.
- **Intensity of Exposure:** Intensity is the depth and extent of substantive, actionable information provided to the public in a given marketing and outreach format.

While the exposure of a program indicates how many individual households were likely touched for each target audience, the frequency and intensity of exposure provides a better indication of program's likelihood to affect behavior change. Overall, we found that the SWM&O program has generated broad exposure through its mass media efforts, but the frequency and intensity of the SWM&O messaging is limited. Below, we explore first the program's overall reach, frequency, and intensity of exposure.

6.1.1 Overall Program Exposure

Currently, the SWM&O program disseminates information within California's four Investor Owned Utility (IOU) territories (Pacific Gas & Electric, Southern California Edison, San Diego Gas & Electric, and Southern California Gas). These IOU territories do not cover the entire state of California, but do cover approximately 92% of the state's households, thus comprising the great majority of Californians. Included in these territories are the state's most densely populated and diverse metropolitan areas: Los Angeles, San Francisco and the Greater Bay Area, and San Diego. The SWM&O program is targeting one of the most linguistically diverse areas of the country, with approximately 80% of its population speaking English, 26% speaking Spanish, 9% speaking Asian and Pacific Islander languages, and the remainder speaking other languages.[43]

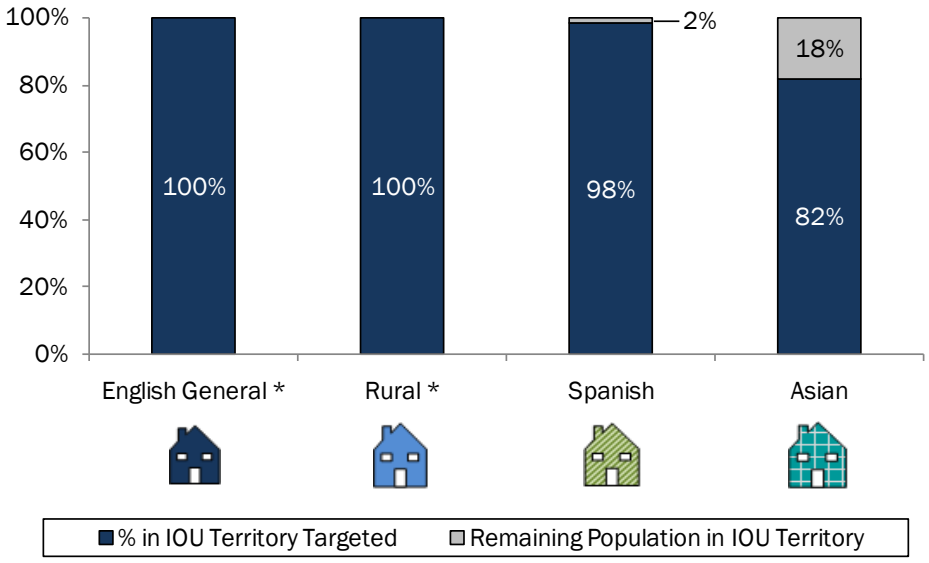
While the Census does not provide exact numbers of households who speak the target languages, we can approximate from the percent of the population who speaks these

[43] Note that this adds to more than 100% because some households speak more than one language.

languages that the SWM&O program has been charged with reaching as many as 92% of all California households.[44]

To use media dollars more wisely, the SWM&O program selected specific Designated Media Areas (DMAs) for their English and in-language (i.e., non-English) marketing and outreach efforts. These DMAs were chosen based on the population density of the target audience within a given DMA (See SWM&O Process Evaluation Chapter 8). For this reason, the program's maximum exposure potential was not equal to the entire population for which it is assigned, meaning that the program's marketing and outreach efforts would never be exposed to the entire population it was intended to impact. The figure below provides a summary of the program's scope relative to the number of households in the IOU territory that they were charged with targeting.

Figure 6. SWM&O Program's Exposure Potential by Target



*The English general and rural populations were covered entirely by the SWM&O program's DMA targets for these language groups.

Table 18 provides a summary of the program's total household coverage based on the DMA's it targeted with M&O for the entire state of California and the IOU territories.

[44] This figure is an estimate derived by applying the percent of the population who speak the target language to the number of households in each of the program's target audiences.

Table 18. California and IOU Territory Composition by Target Audience

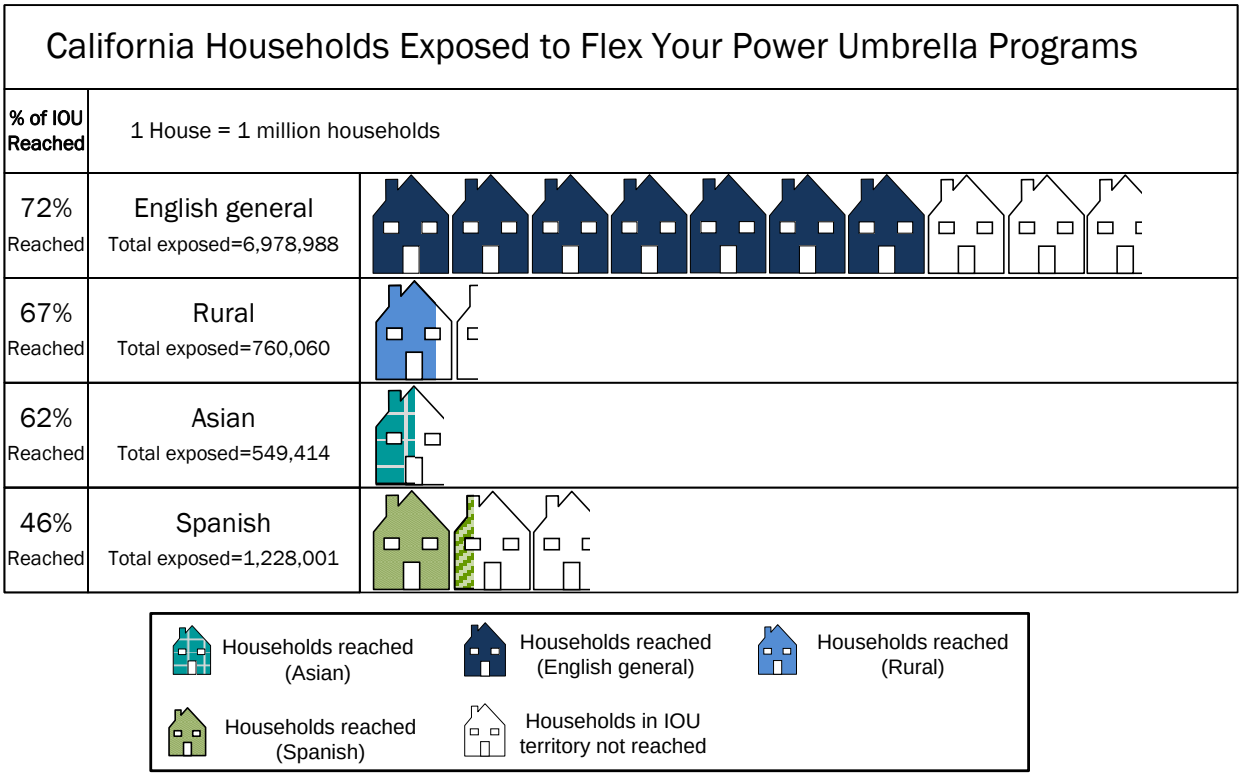
Target Audience	The State of California (households)	Total Households in all four IOUs [A]	Percent of CA Population for all IOUs Combined	% of Households Targeted in Combined IOU Territory [B]	Total Number of Households Targeted
Total Households	13,159, 358	12,116,299[C]	92%		
English Speaking house-holds, all ethnicities (including those who speak other languages)[D]	10,527,486	9,693,039	92%	100%	9,693,039
Rural Households (English Only)	NA [E]	1,134,418	NA	100%	1,134,418
Spanish Speaking House-holds, Hispanic House-holds (including those who speak other languages)[F]	3,484,323	2,655,746	77%	98%	2,612,768
Asian and Pacific Island Language Speaking House-holds, Asian Households (including those who speak other languages)[G]	1,054,616	883,584	84%	82%	722,914

[A] Total Population is 36,264,467 Statewide, or 33,737,596 (7%) in the IOU territories.
[B] The program was designed to target language groups within specific DMAs in the IOU territories.
[C] Households in IOU Territory Determined using 2000 Census data for IOU Zip Codes
[D] Total households who speak English at least "well" (includes bi-lingual individuals), according to the 2007 US Census. Individuals in this group may also speak Spanish or Asian languages well enough to be targeted by the Spanish and Asian language programs.
[E] IOU and Census Urban/Rural criteria do not align. Here, we use IOU definitions for Rural Zip Codes
[F] Total Hispanics households who speak Spanish, 2007 US Census
[G] Total Asian households who speak any Asian and Pacific Island languages, 2007 US Census

To understand the percentage of households actually exposed by the program, we used the self-reported recall of the Flex Your Power brand name (72% for English General, 67% for Rural, 47% for Spanish, and 76% for Asian languages). While our findings from our verified reach analysis[45] indicate that the percent exposed is likely higher than those who recall (where 88% of English speakers confirmed exposure to the SWM&O messaging), we use this self recall method to understand, at minimum, the program's relative impact on each of its target audiences. However, when we consider that the Spanish and Asian language population coverage in the IOU territory was not 100%, the actual exposure in the IOU territory for these two populations is 46% and 62% respectively.

We cannot determine the exact number of households exposed due to the overlap in populations.[46] However, we estimate this program effectively exposed around 9.5 million households. While this is not as high as the stated goal of reaching 100% of Californians, it is a sizable percentage of the State of California and represents a large number of households. As such, these efforts are considered successful in terms of their overall exposure. The figure below details the program's exposure as a function of its DMA targets and audience recall of Flex Your Power.

Figure 7. Percent of IOU Households Exposed by SWM&O Efforts



[45] This was conducted through the Integrated Media Measurement (IMMI). See Section 4.1.

[46] Note that the target audience groups are not mutually exclusive as some households in each target language are bi-lingual and may speak both Spanish and English, or English and Chinese, for example.

Exposure, however, is just an indication of touch, not depth of exposure. The SWM&O program disseminates its messaging through a series of M&O channels: television, radio, print, online ads, local events, and web-related outreach, such as the e-Newsletter and a blog roll. At minimum, most of the IOU territories were covered by two and up to four different M&O channels during the campaign season. While it was beyond the scope of our evaluation to determine how many households were exposed to multiple formats or outlets, we did examine exposure, frequency, and intensity by channel. These findings are provided below.

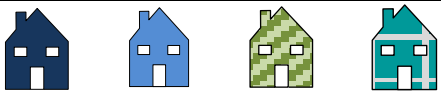
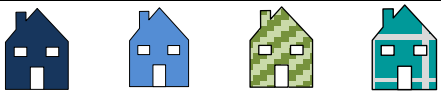
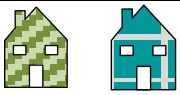
6.1.2 Summary of Exposure, Frequency and Intensity by Channel

Across channels, the exposure of the television and radio efforts was the largest—with none of the remaining channels exposing more than 3.5% of the population. Frequency, however, was higher for those exposed to print ads and the e-Newswire. Furthermore, the events, website, print ads, and e-Newswire offered a greater depth of substance (as reflected in the "relative intensity" column).

The frequency and intensity of messages tend to increase the impact on those exposed. Our research found that increased levels of frequency can have an impact on one's recall of messages. Specifically, the IMMI findings showed that increased levels of frequency had a statistically significant relationship with one's recall of the Flex Your Power messages. Further our analysis indicated that consumers exposed to messaging through event-based channels had a greater cognitive change than those exposed to mass media.

Specific findings by format are discussed below.

Table 19. Comparative Levels of Exposure, Frequency, and Intensity by Media Outlet

Target Audiences Touched	Format	Maximum HH Exposed per Year	Maximum Frequency per Year	Relative Intensity
	Television & Radio	9,516,463	8.9 exposures	Low
	Events	430,000	1 event	Medium to High
	Website	400,000	3 visits per person	Medium to High
	Print	37,364	10 exposures	Medium

Target Audiences Touched	Format	Maximum HH Exposed per Year	Maximum Frequency per Year	Relative Intensity
 English general	e-Newswire	10,524	25 newsletters	Medium to High

Television and Radio

Exposure and Frequency: As noted earlier, we estimate that the SWM&O programs exposed somewhere around 9.5 million households. Our research indicates that, during the 2008 summer campaign, the SWM&O program's combined television and radio frequency was 8.9 average exposures per person. This falls short of its stated annual goal of 35 average exposures per person,[47] even if we assume that the winter 2008 messaging garnered the same frequency. While these two channels represent the greatest reach of all channels, the frequency per person is relatively low given its stated goals and objectives as a mass media outreach tactic. Thus, the overall impact of TV and radio advertisements is likely to be small.

Intensity: Television and radio advertisements are placed in the form of 10-, 30-, and 60-second spot advertisements, with the advertisement time divided between creative appeal and measure-specific information. As outlined in our process evaluation (See SWM&O Process Evaluation Executive Summary), the capacity of these two channels to provide detailed information is very limited, and therefore their intensity is rated the lowest of all channels.

Print

Exposure and Frequency: The SWM&O program disseminates print advertisements in rural areas in English and Spanish and in urban areas in Spanish, Mandarin, Cantonese, and Vietnamese. These print advertisements are disseminated, at most, 10 times in a given year with a total circulation figure of 37,364 households per year. Of the mass media channels, print advertisements have the greatest frequency of exposure of all outlets based on the SWM&O program circulation figures.

Intensity: The SWM&O print advertisements provide more information than the television and radio advertisements. They communicate no-cost energy saving alternatives (such as turning off lights or using set points for HVAC), coupled with energy efficiency measures and have a slightly greater intensity level compared to TV and radio.

Events

Exposure and Frequency: The data collected from SWM&O events revealed that the events exposed approximately 1.3 million people throughout 2006 to 2008. While these figures do not represent unique individuals, it is unlikely that the individuals were exposed more than once in a given calendar year.

[47] This exposure level may also have included print, but notably, neither the implementers nor the evaluation staff had a method of combining available data on exposure across the various sources to determine if this could be met.

Intensity: The rural-targeted events are conducted in two formats: booths and seminars. Booths provide an opportunity for event participants to engage in short interactions to obtain collateral and information from event attendants. Seminars are information-driven presentations that aim to provide more specific, detailed information on an energy efficiency topic. While both event formats have greater intensity than standard marketing tactics (TV and radio) due to face-to-face dissemination of information, seminars are likely to be more effective than booths, as indicated in our cognitive change assessment in the following awareness section. The intensity of exposure for event participants is dependent on the outreach format they were exposed to, booths or presentations.

Website

Exposure and Frequency: The website received almost 1.2 million unique visits between 2006 and 2008, with an average frequency of three visits per person. While we could not identify whether the visitors to the website were from California or not, if even half of this group were in-state that would represent about 3% of California households.[48] This figure is relatively small compared to the SWM&O programs overall objectives (which is predominantly accomplished through TV and radio), however our process evaluation findings indicate that this format was under-promoted in advertisements and may explain the limited exposure to this channel. (See SWM&O Process Executive Summary).

Intensity: Of all communication channels, the Internet is the most user-focused, allowing the user to search for information that is customized to his or her needs. An easily navigable and information-rich website has the potential to have the greatest intensity of all channels due to users' ability to spend extended periods of time browsing specific information suited to their needs. The average exposure for the most visited web pages (the residential pages) was about 2 ½ minutes, based on the 2008 data. (See Section 11 of the SWM&O process evaluation for more details on the website.)

e-Newswire

Exposure and Frequency: The e-Newswire was distributed to 11,825 residential and non-residential customers as of November 2008, with approximately 25 newsletters provided to its subscribers each year. Of the active readers that responded to our survey, approximately one in eight (13%) work and live outside of California with the remaining 10,524 recipients residing in California alone. Eighty-nine percent of the readers in California share the e-Newswire with colleagues, friends, family and customers. In addition, the e-Newswire editions are available on the FYP website and can be viewed by anyone. Among all channels, the e-Newswire has a very limited and targeted population, but does garner the greatest frequency figures of all marketing and outreach channels.

Intensity: As a channel, the e-Newswire provides detailed information on energy saving measures and current events related to energy efficiency and renewable energy. The e-Newswire attracts individuals involved in the energy industry or individuals with a high interest in adopting energy efficiency in their homes and/or businesses. However, the

[48] We acknowledge that this figure is likely smaller than 3% once access to the Internet is factored into the estimates. However, since there is very little reliable data on Internet access among Californians, we retained this maximum estimate of households.

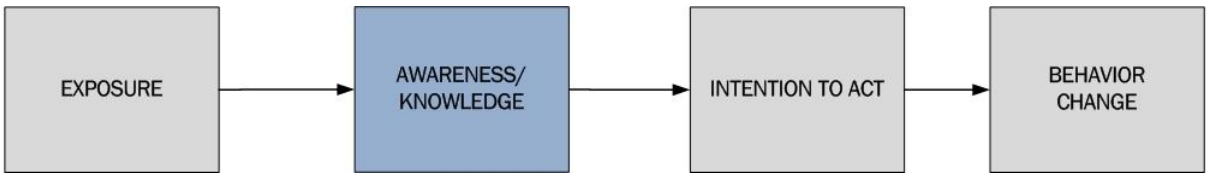
likelihood of this medium to move individuals to take action whose propensity is otherwise low is unclear. While the intensity of this format is great given the depth of information provided to its subscribers, it is unclear if the impact of this information would be substantial among those who are less engaged in energy issues.[49]

In sum, the exposure of the SWM&O program was great. However, its capacity to generate knowledge among those exposed was limited by the low frequency of exposure and intensity of the marketing and outreach tactics it employed given that the great majority of efforts focused on mass media channels. In the next section, we explore the program's impact on the next phase along the behavior change continuum: Awareness and Knowledge.

6.2 Awareness & Knowledge

After exposing the target audience to the messages, M&O attempts to raise awareness and knowledge through the content it provides. As described in the behavior change theory, increases in these two cognitive measures will generate intention to act once individuals internalize such knowledge and awareness. Awareness and knowledge are influenced by attitude towards a behavior, subjective norms (e.g. what is considered "normal" within an individual's social sphere), and self-efficacy (the sense that an individual can make a difference and/or perceived behavioral control). Figure 8 below highlights this point in the behavior change continuum.

Figure 8. Behavior Change Theory: Awareness/Knowledge



We measured changes in awareness and knowledge using three methods: (1) increases in awareness and knowledge of energy efficiency and conservation among the target populations before and after being exposed to the campaign; (2) a Structural Equation Model (SEM) which was able to examine direct effects on knowledge and awareness and intention to act; and (3) a cognitive change influence index from traditional marketing evaluation. These findings are described below.

6.2.1 Pre- and Post-Exposure

In addition to assessing the program messages' ability to generate knowledge and awareness, we examined the program's impact on specific awareness and knowledge gains of energy efficiency actions. We found that the SWM&O program efforts were impacting awareness and knowledge on two specific metrics of success: knowledge of energy conservation actions and knowledge of energy saving actions. The table below shows the increases pre- and post- exposure.

[49] We note that the goals of this effort, while not explicit, are most likely to create energy efficiency evangelists, not just increase awareness of the unaware.

Table 20. Changes in Awareness and Knowledge by Language Spoken[50]

	English	Spanish	Asian
Top of Mind Knowledge of Ways to Save Energy in the Home			
Knowledge of Energy Conservation Actions	+15%	+11%	+14%
Knowledge of Energy Efficiency Actions	+11%	+13%	+10%

Notably, we found similar increases in top of mind awareness of energy efficiency and conservation actions for all target audiences, demonstrating that the SWM&O program is having an impact on these specific metrics. Additionally, these findings indicate that the SWM&O efforts are likely to increase the ability of individuals exposed to take action by providing them with increased levels of knowledge, in other words increasing the propensity to take action. In addition to these confirmed effects immediately after program exposure, we found that these effects do not diminish after the campaign season. Notably, our post-campaign tracking study of the English-speaking population found a prolonged effect of the SWM&O program on awareness of both conservation and efficiency actions.[51] In addition, there was also a prolonged effect found for the Spanish-speaking population for conservation actions. These findings indicate that awareness may be sustained, even after campaign messaging is no longer in circulation.

6.2.2 Structural Equation Modeling Findings

We also examined effects on awareness and knowledge using a Structural Equation Modeling analysis (SEM).[52] We found that the program's greatest impacts were at the point of raising awareness, as demonstrated in the following table (for more information on SEM, please see Section 1 in Volume II).

The SWM&O program's mass media messaging used concern for Global Warming as the motivational theme to move individuals to adopt energy efficiency measures by highlighting the consequences of *not* taking action. This motivational message is meant to increase intention to act, specifically by influencing two of the three primary inputs into awareness and knowledge: subjective norms (namely that energy efficiency matters) and perceived behavioral control. As shown in the table below, we did find that the SWM&O efforts had a

[50] Note that the research method for the Asian-language population differs from the English and Spanish approaches which used comparison groups. For the Asian-language audience, differences due to the campaign's impact we determined by comparing those who were exposed to the campaign against those who were not exposed. Thus, the findings for the Asian population are not directly comparable to the English and Spanish-language populations (see methods section for more details on these two research approaches).

[51] This was conducted approximately three and six months following the summer 2008 campaign.

[52] Note we did not measure purchase intention for those behaviors with low incidence in the population (EE appliances and HVAC systems), namely due to limitations in budget and scope. Thus, the absence of findings on the program's ability to effect behavioral intention for these measures is not necessarily due to a lack of program effects

significant effect on awareness and attitudes. We note that our findings are stated in overall effect sizes, ranging from -1 to 1, with -1 and 1 being an absolute, perfect relationship, which rarely occurs when examining behavior change. These effect sizes provide quantified values for the program's impacts.

Table 21. Direct and Indirect Effects of SWM&O on Other Variables in the Model (Path-Coefficients)

English general

Rank	Construct	Type of Construct	Direct Effect of SWM&O	Indirect Effect of SWM&O
1	**Awareness of Consequences**	**Awareness**	**0.13**	**NA**
2	Concern for Global Warming	Attitude	NA	0.12
3	Personal Responsibility to take Action	Attitude	NA	0.11
4	Concern for Energy Efficiency	Attitude	NA	0.08

The findings in Table 21 show that the SWM&O are influencing subjective norms (awareness of consequences (p=0.13) and concern for global warming (p=0.12)) and perceived behavioral control (one's sense of personal responsibility to take action (p=0.11)). While these effect sizes are considered relatively small, it is the area where the research found the greatest impact.[53]

6.2.3 Cognitive Change Influence Index

Finally, to assess the program's overall influence on actions taken, or its ability to affect actions, we conducted a cognitive change assessment on respondents in all target audiences. The aim of this assessment was to determine the SWM&O program's ability to raise awareness and increase knowledge. As discussed earlier, the program theory indicates that the SWM&O program must first generate an increase in knowledge (a cognitive change) before actions are taken. Therefore, if the information was not new or did not move forward existing plans, the program information was not part of the reason why actions were taken. This assessment provides an overall snapshot of the program's capacity as an M&O campaign to move individuals along the behavior change continuum and provides us with a sense of its potential to generate behavior changes.

The cognitive change assessment is comprised of a series of measurements to generate an index of influence, the cognitive change influence index (CCI). This index is comprised of a series of concepts outlined below: [54]

- **Newness of the information:** SWM&O must increase knowledge before individuals can take action, that is, if the information was not new or did not move forward

[53] Note that there is a discussion in Appendix F regarding the interpretation of "small".

[54] The cognitive change influence index core battery of questions is outlined in the Appendix C.

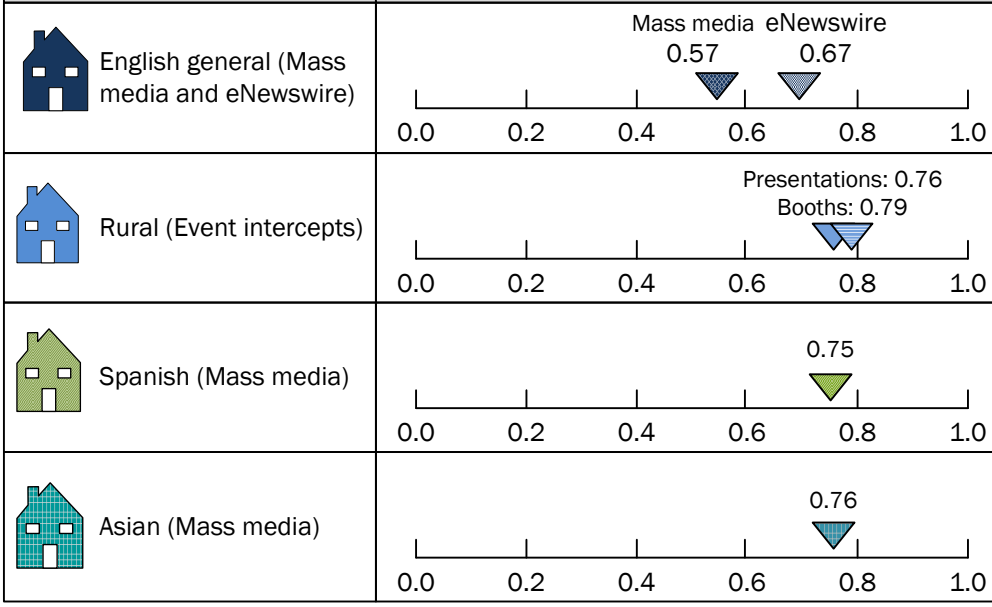
existing plans, the program messaging was not part of the reason why actions were taken.

- **Determination of cognitive change:** exposure to SWM&O must create a cognitive change before actions taken are considered attributable to the program. Although similar to concept 1 as both are attempting to measure cognitive change, it is different from concept 1 because it is a level of effectiveness in change.
- **Direct influence assessment:** SMW&O may directly influence the behaviors of those exposed, as determined through self report.[55]

These three concepts and their questions were used to generate the CCI's below for each target audience. These findings should be interpreted on a scale of 0-1, with 1 being the greatest level of influence.

Table 22. Cognitive Change Influence Index Findings by Target Audience

Target Audience	Cognitive Change Influence Index
English general (Mass media and eNewswire)	Mass media 0.57, eNewswire 0.67
Rural (Event intercepts)	Presentations: 0.76, Booths: 0.79
Spanish (Mass media)	0.75
Asian (Mass media)	0.76



By comparing the CCI's of each target audience, we gain perspective on the program's overall potential in the market, and can better identify where messaging needs to be updated and better tailored to its targets. As Table 22 shows, the SWM&O program's

[55] These core set of questions were slightly varied based on the specific program for which they were asked and some questions were dropped as they were not appropriate. For example, it does not make sense to ask someone about changes they may take directly after being exposed to the information, as is the case for event intercepts. Additionally, if there is difficulty remembering an advertisement, the ability to discuss influence of that advertisement on behavior is poor. As such, for all but one of our data collection efforts, the third concept was not included

greatest level of influence was among the English-speaking rural population exposed to event booths (0.79), indicating that the community-based events had the greatest affect on awareness and knowledge. Next, the Asian-language speaking population also experienced a high cognitive change, likely due in part to the group's relatively limited exposure to messaging on energy efficiency, hence increasing the cognitive impact of the SWM&O messages. In contrast, the English-speaking general population had the lowest change among all audiences, with a CCI of 0.57. This is most likely due to the saturated media environment, where we find that this particular population is exposed to similar messages in the market and thus the SWM&O messaging is not likely providing as much new and compelling information to this particular audience. This low impact is important to call out, as the great majority of the SWM&O program's efforts and allocation of dollars goes to targeting this population with mass media messaging. In addition, the messages' likelihood to move individuals beyond awareness and knowledge is substantially lower than the program's impacts among other audiences.

6.2.4 Additional Insights by Channel

When we examine the effects of non-mass media efforts, namely the work of rural-focused Community Based Organizations (CBOs), we find increases in knowledge across all those exposed with the greatest gains in knowledge among those who had very little prior knowledge of energy efficiency. The CBOs focused on four energy saving recommendations (CFLs, purchase energy efficient appliances, unplug devices/turn off lights, and use a ceiling fan in lieu of air conditioning). The use of CBOs as an outreach channel positively impacted the levels of knowledge of those exposed. The self reported changes by outreach type are shown in Figure 9 and Figure 10 below.

Figure 9. Impact of CBO Presentation Events on Energy Efficiency Knowledge

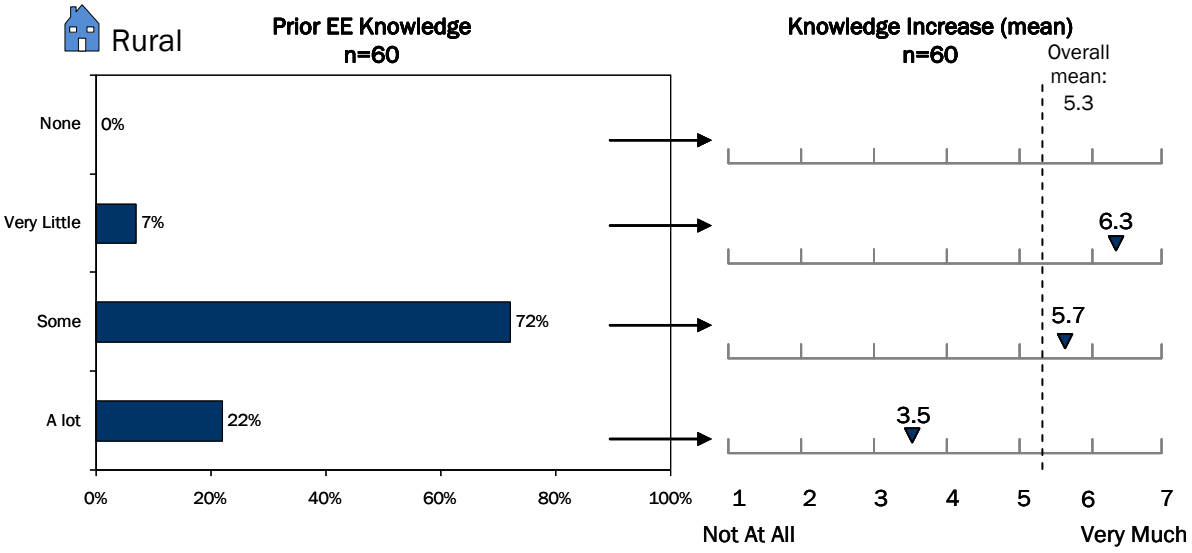
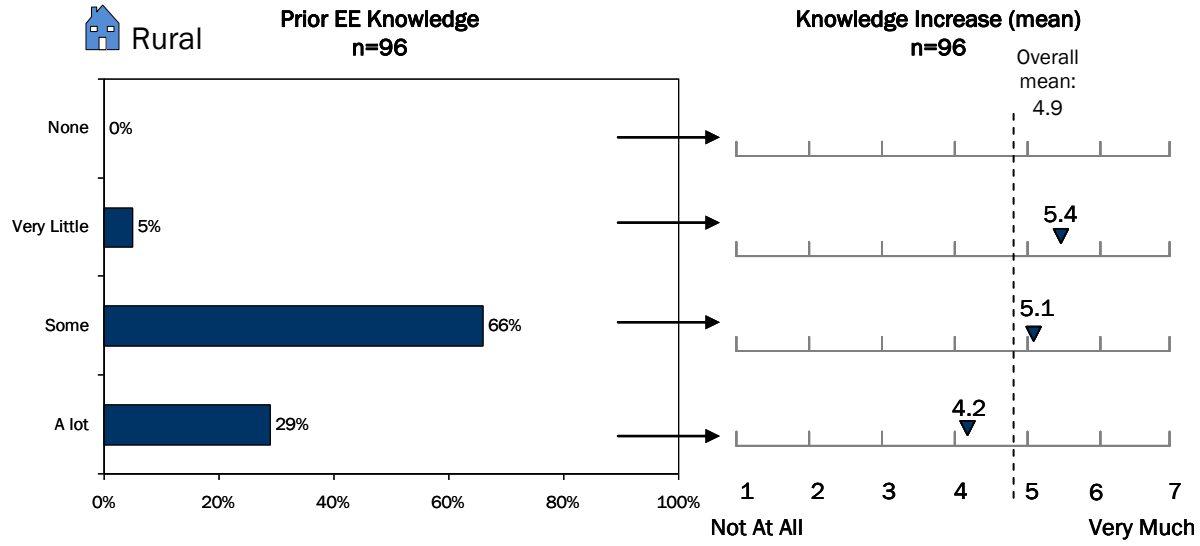


Figure 10. Impact of CBO Booths Events on Energy Efficiency Knowledge



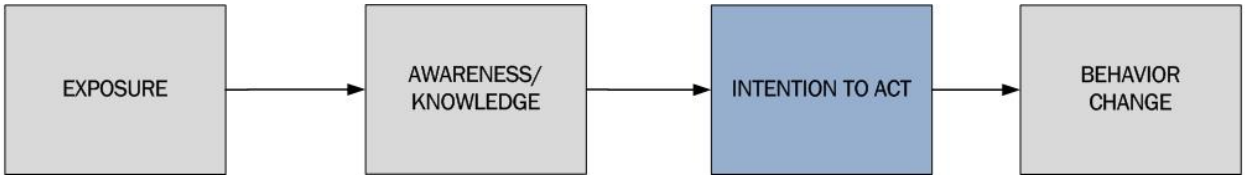
Additional Insight		
	English general: e-Newswire Readers	Finally, we note that the e-Newswire targeted a highly knowledgeable group of individuals who may have gained increases in specialized knowledge of energy efficiency and events through the dissemination of the newsletter. However, due to the varied and specific content of these newsletters, we were unable to measure specific increases in knowledge and awareness among its readers.

Based on our findings, the SWM&O programs have generated the greatest impacts in awareness and knowledge, with the most notable increases in top of mind awareness of ways to save energy in the home, both for energy conservation and efficiency actions (detailed in Table 27 in Section 6.6), and that these effects may be sustained in the population over time. In addition to these specific changes in awareness, we found that the SWM&O program has the potential to generate increases in knowledge and awareness by exposing individuals to new and useful information, as demonstrated in the Cognitive Change Influence Index section above.

6.3 Intent to Act

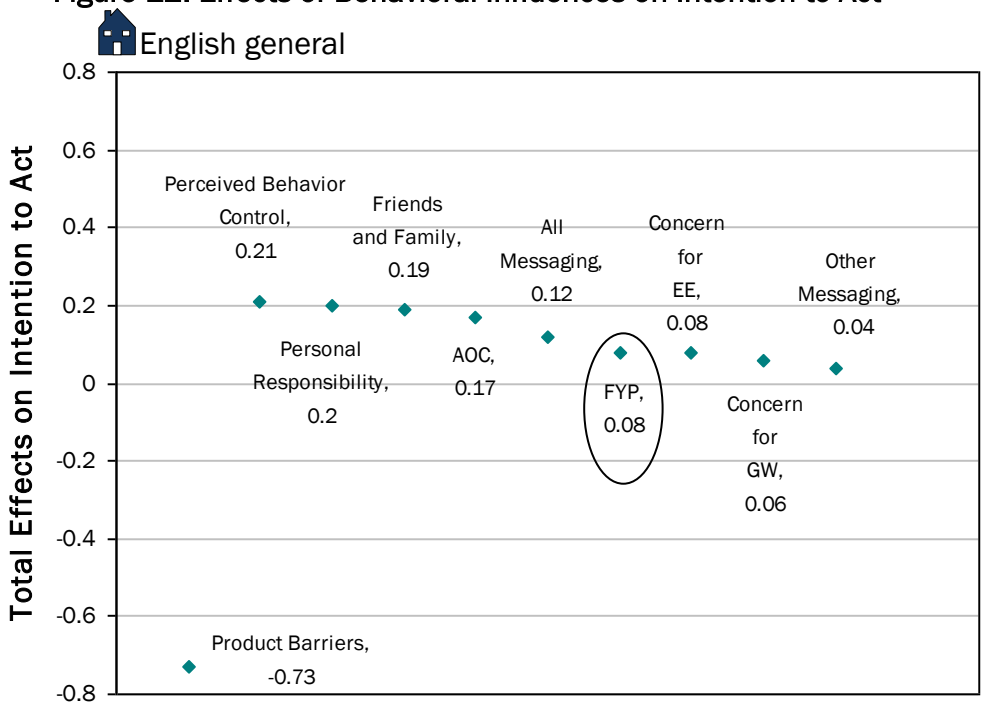
Our research also found effects on intention to act. Following the behavior change continuum, the program theory posits that once a person is exposed to messaging and is aware or knowledgeable about an item, a person forms an opinion regarding their intention to take specific actions based on that knowledge, thus generating intention to act.

Figure 11. Behavior Change Theory: Intention to Act



The primary indicator of the SWM&O program's effects on intention to act was demonstrated in our SEM findings, which provided a quantified value of the program's impacts on behavioral intention (CFL behavior) relative to other influencers. As shown in the figure below, the FYP messaging had a total effect on intention to act of p=0.08, considered a small effect; however, the effect is statistically significant. While these findings are small, they demonstrate that the program has the capacity to move exposed individuals' intention and ultimately change behavior.

Figure 12. Effects of Behavioral Influences on Intention to Act



As Figure 12 demonstrates, other influences mediate behavioral intention more directly than marketing and outreach efforts, such as product barriers (0.73), and one's sense of behavioral control (0.21) personal responsibility to act (0.2) and thus have a larger effect on behavioral intention. In addition, there was indication in our tracking survey that intention to purchase CFLs and energy efficient appliances was greater after the SWM&O campaign season, but when compared to other states, these results could not be definitely attributed to the SWM&O program.

The program's small effect is a result of M&O's diminished ability of any marketing-driven outreach effort to affect behavioral intention, namely due to the distal point at which marketing and outreach intervenes along the behavior change continuum: exposure.

In addition to our findings on mass media marketing's ability to impact intention to purchase CFLs, we found that the rural-targeted CBO efforts are effectively generating intention to adopt energy saving behaviors among the majority of those exposed (Table 23). These findings indicate that the CBO-events, through the increases in knowledge demonstrated in Figure 9 and Figure 10, are moving individuals to the next step in the behavior change continuum: Intention to act.

Table 23. Rural Households Intent to Take Actions

Rural

Based on the information that you received, what is your likelihood to take the following actions at your home? (7-point scale, 1=not at all, 7=Very Likely)	Presentations % Likely (6-7 rating)	Booths % Likely (6-7 rating)
Install energy efficient lights	82%	73%
Change my behavior with regard to how I use energy	76%	69%
Install energy saving appliances	74%	61%
Share the information I have learned with others	70%	60%
Search for additional information on ways to save energy	55%	56%

Table 23 demonstrates that the SWM&O program's rural CBO presentation and booth events have had an impact on consumers' intent to take a number of actions, including sharing information with others, seeking out more information, installing energy efficient lighting and appliances, and changing their behaviors generally speaking. These findings show that these two outreach formats have a high likelihood to induce behavior change; this is due in part to the events comparatively higher levels of messaging intensity (exposure) which likely influenced their CCI scores (awareness) and subsequently had a greater impact on the behavioral intention.

Inconclusive Findings	
Spanish	There were no measurable changes in intent to take action among the Asian Language and Spanish Speaking populations as a result of the program. Note, however, that we did not conduct an SEM evaluation of these populations.
Asian	

A Note on the Relationship between Behavioral Intention and Action

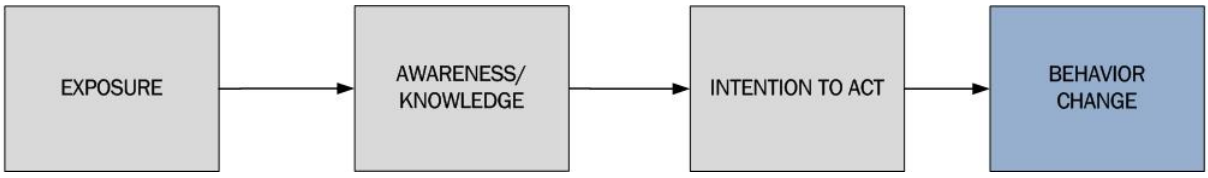
While it is widely understood that there is an imperfect relationship between one's stated intention and an actual change in behavior, the Opinion Dynamics team was able to assess the relationship between one's behavioral intention and actual behavioral adoption through our SEM findings. By examining the factors that influence behavior change and quantifying their impact on behavior, our team was able to generate a metric that indicates the strength of the relationship between intention and action. Our SEM research supports that the relationship between intention to act and actual behavior is equal to an effect size measurement of 0.37 (while not a perfect relationship of 1, this is considered a moderate effect size).

For the SWM&O program, behavior change is the most distal impact of the SWM&O programs from its point of intervention (exposure). Stated another way, behavior changes are considered the furthest away from any direct influence of the messaging within the program. Because individuals move through the behavior change continuum and can remain fixed at any given stage. This metric allows us to add additional context to our SWM&O findings on behavior change by further illustrating the imperfect relationship between intention and action. We also explore direct impacts on actions below.

6.4 Behavior Change

In this section, we discuss our findings on the SWM&O program's impacts on actual behavior change.

Figure 13. Behavior Change: Behavior Change



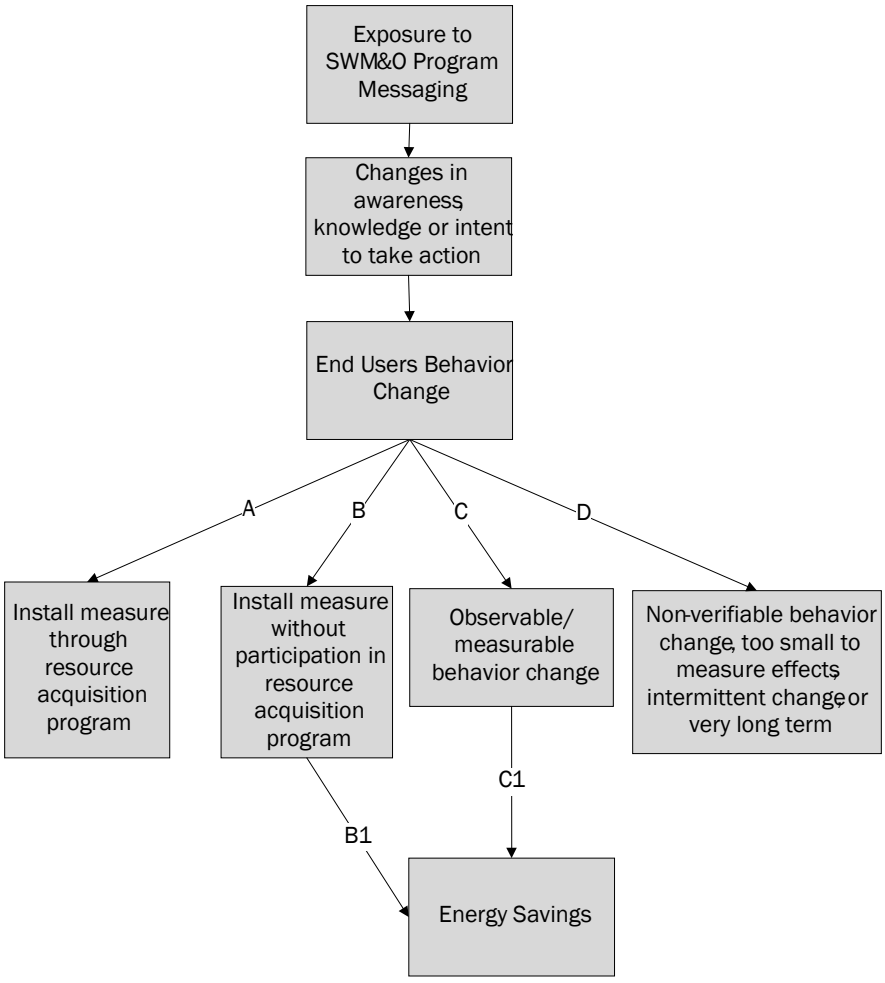
The PY2006-2008 SWM&O efforts combined sought to move households to: use CFLs, use EE A/C, turn off lights when not in use, use ceiling fans in lieu of A/C, use appliances in the evening, as well as several other home energy saving tips. In addition, the program sought to educate households about two resources for getting additional information: the FYP website and the 800 number.

Notably, these various actions have dramatically different potential for adoption based on a series of factors that affect the likelihood that any one individual will take action. The adoption potential of a given measure is a function of one's opportunity to take action (e.g. homeownership, status of current installation) and the specific barriers to entry of the product. Specifically, a number of factors contribute to a measure's adoption potential, including, but not limited to: (1) the total population able to adopt the measure; (2) the prevalence of the measure (e.g. the percent of the population who has already adopted the measure); (3) the measure's purchase incidence (e.g. how frequently over an individual's life will the measure need to be installed or replaced); and (4) the product-specific barriers that are likely to enhance or diminish a household's likelihood to adopt the measure (such as point of purchase and incremental cost, performance, reputation, etc.). For these reasons, the program's likelihood to produce behavior change is greater with some measures than with others.

For instance, an energy efficient HVAC system is a measure that only homeowners (not renters) are likely to adopt (58% of the population). Conversely, other measures and actions, such as CFLs, low-flow shower heads, weather stripping, and energy efficient consumer electronics are more likely to be adopted by both renters and owners, and thus have a larger target audience. As such, we examined the measure promoted by the program that is most prevalent in the population, namely the use of CFLs. We used CFLs as the basis for our SEM findings to ensure that we measured the behavior most likely to be affected by the SWM&O program.

Below we provide our impact findings on behavior change in two primary ways: (1) through direct adoption of a behavior due to SWM&O program efforts and *not* through the rebate programs; and (2) through indirect channeling paths such as participation in a rebate program. Figure 14 demonstrates these two paths to action: Direct Measure Installation and Behavioral Adoption (A & C) and Channeling into Rebate Programs (B).

Figure 14. Direct and Indirect Paths to Energy Efficiency Adoption

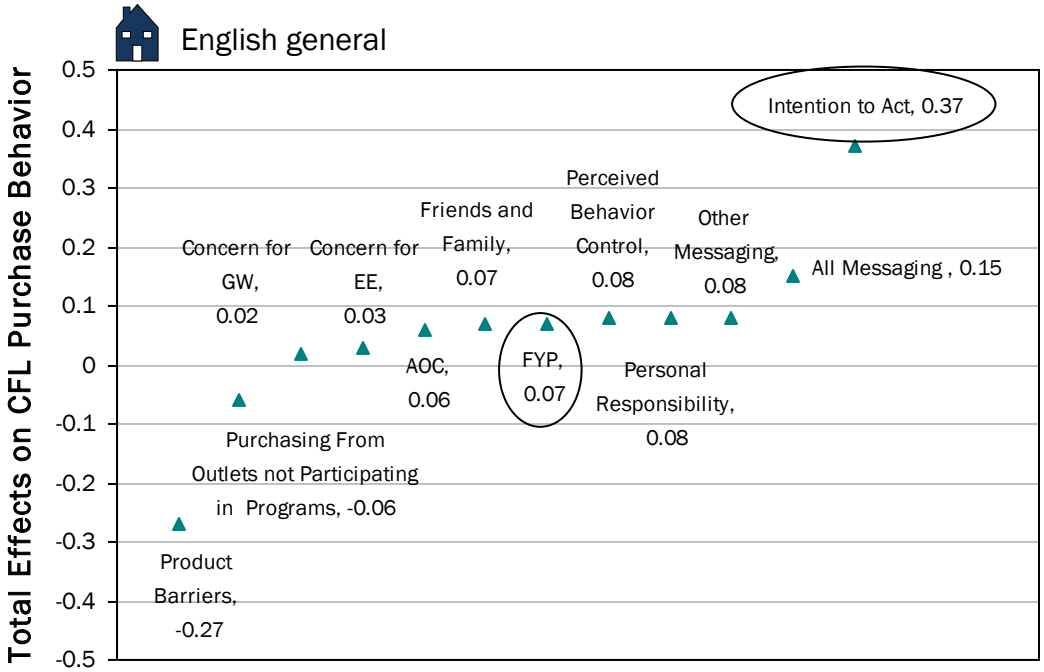


6.4.1 Direct Action Effects

It is important to discuss here that we could not detect SWM&O program effects for actions that had low adoption potential. Namely, we did not find behavior change effects for energy efficient appliances in the English and Spanish-speaking populations. This is likely due to a combination of factors, namely that the SWM&O program has low potential to affect these behaviors, and in addition, any possible effect is unlikely to be detected in general population survey efforts due to their low incidence in the population overall (irrespective of the program's influence).

When we examined the impacts of the SWM&O program on the general English-speaking population, we found a very small, but statistically significant effect of the program's marketing efforts on CFL behavior. The effect size of this specific behavior change is 0.07 (as shown in the figure below), and is considered a very small effect. This effect size is not entirely unexpected, as it is likely due, in part, to the gradual loss of individuals along the behavior change continuum from the SWM&O program's point of intervention (exposure) to behavior change (installation of a CFL).

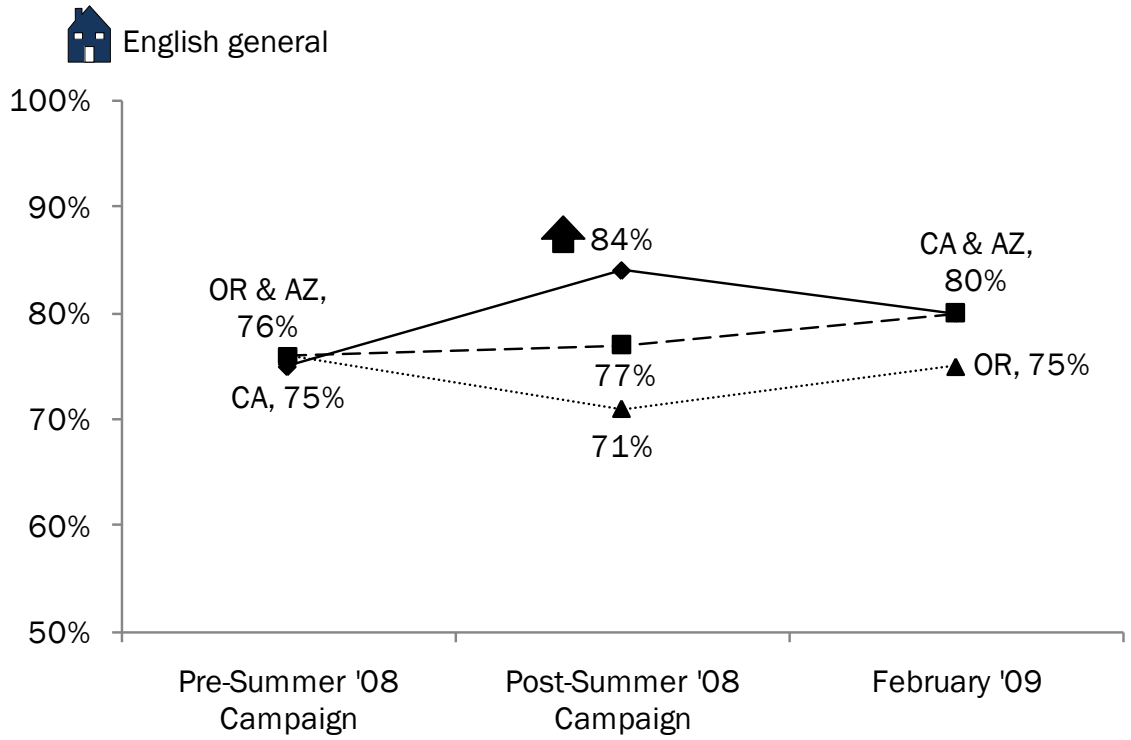
Figure 15. Total Effects of SWM&O Messaging on CFL Purchase Behavior



Interestingly, we found that the SWM&O program's effect on CFL behaviors is increased when it is combined with other M&O efforts – in particular the energy efficiency efforts of the IOUs. When we combine these two influences, we see a larger effect size of 0.15, indicating that M&O efforts may have a cumulative effect on behavior change if the messaging is well aligned.

Supporting the evidence of the SWM&O program's impact on behavior change found in our SEM efforts, our tracking survey also showed data that indicated that the SWM&O programs may be having only a small effect on CFL purchases. We found a 9% increase in CFL purchases after the 2008 SWM&O program's campaign among the general, English-speaking population.

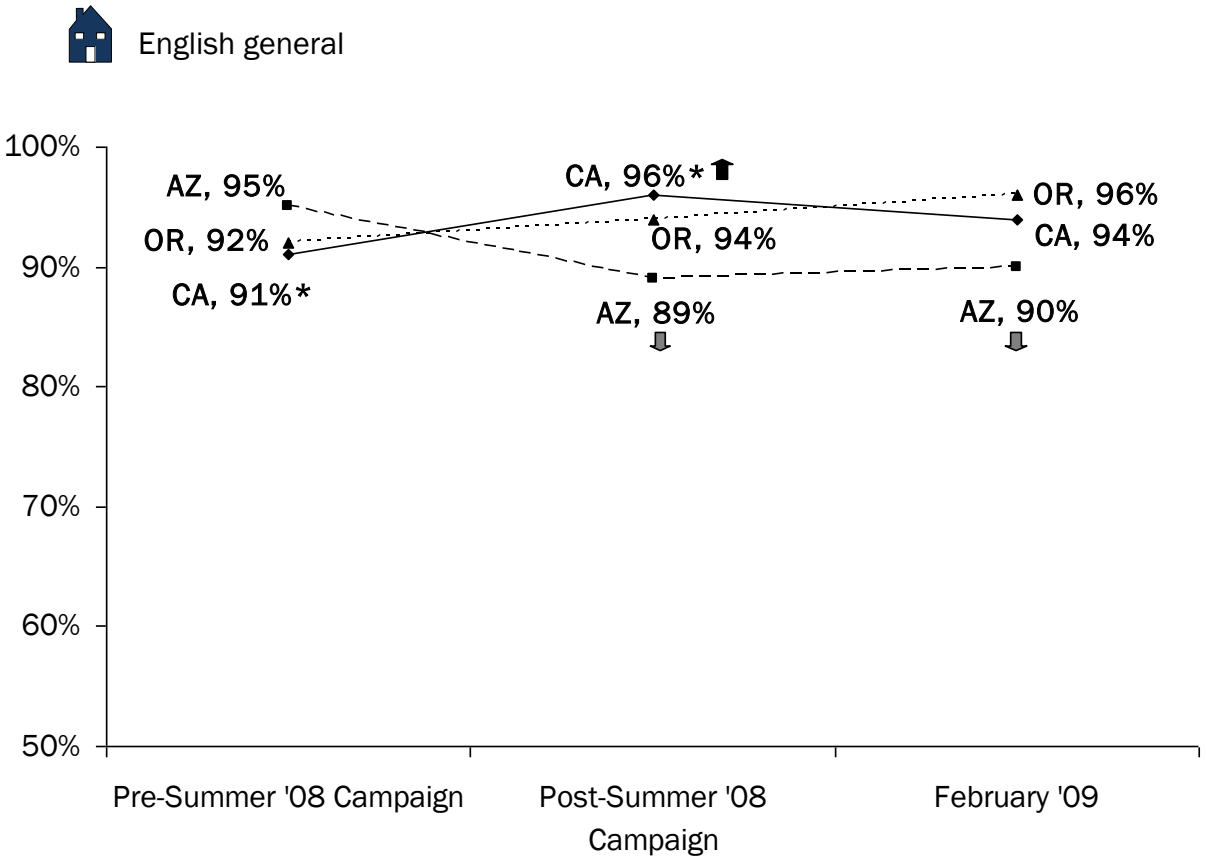
Figure 16. English-Language General Percent of Bulb Purchasers that Selected CFLs



Here, we compared the data between CA and the comparison groups and across time periods to analyze differences in the population at the 90% confidence interval. Block arrows indicate a statistically significant increase or decrease in the data when compared to the data collected prior to the Summer '08 Campaign. We use one asterisk, *, to indicate a difference between CA and one comparison group and two asterisks, **, to indicate a difference between CA and both comparison groups.

In addition to CFL purchase effects, we found additional conservation behavior changes among English speaking Californians. Specifically, more individuals of this target audience claimed to turn off the lights before they leave a room after the 2008 Summer Campaign (91% increased to 96%). This indicates that in the absence of the statewide Campaign, the number of people taking this action might have remained consistent or have decreased. The figure below details these findings.

Figure 17. English-Language General Percent Turn off Lights Before Leaving a Room



Here, we compared the data between CA and the comparison groups and across time periods to analyze differences in the population at the 90% confidence interval. We use one asterisk, *, to indicate a difference between CA and one comparison group and two asterisks, **, to indicate a difference between CA and both comparison groups. Block arrows indicate a statistically significant increase or decrease in the data when compared to the data collected prior to the Summer '08 Campaign.

Further, when we examine the SWM&O program's effects on behavior change among the Asian-language target audience, we find a positive relationship between exposure to SWM&O messaging and the self-reported purchase of a CFL or energy efficient appliances.

Table 24. Asian Self-Reported Energy Efficiency Actions Taken

Asian	Exposed	Not Exposed
Percent Purchased an EE Appliance	**19%^{n}**	8%
Percent Purchased A CFL	**31%^{n}**	23%

Bolded numbers indicate a statistically significant difference among the comparison group indicated in the superscript. Superscript "n" equals those not exposed.

As we see in Table 24, we found a statistically significant difference among those exposed to the SWM&O program messaging and those unexposed in the purchase of an energy efficient appliance and the purchase of a CFL. These findings indicate that the SWM&O program is having an effect on the purchase behavior of this population.

Inconclusive Findings	
 Rural	There were no rural behavioral changes indicated due to the type of program and available data collection. This does not indicate a lack of actual changes, only that it was not possible to capture any changes within our evaluation.
 Spanish	There were no measurable behavior changes among Spanish-speaking Californians based on our tracking survey results.

Additional Insight		
	English Speaking Population: e-Newswire Readers	More than half (61%) of CA e-Newswire readers claim they made energy efficiency changes in their home as a result of the e-Newsletter and only 35% made changes in their business/profession. Lighting upgrades were by far the most common changes influenced by the e-Newswire.[56]

6.5 Channeling Effects

While channeling to the IOUs is not a primary goal of the SWM&O program, our team was asked to understand how the SWM&O program works with the existing resource acquisition programs to encourage energy savings through program participation.

The SWM&O program attempts to move Californians to rebate programs through its website (www.fypower.org) and toll-free telephone number. It does not explicitly mention rebate programs in any outreach format, including mass media and events. Those exposed must first go to the website or call the 800 number to be channeled into these programs. The table below summarizes what populations receive information on the SWM&O program's primary channeling mechanisms, the website and the 800 number.

[56] We note that this population is likely biased towards action, as e-Newswire subscribers both opt into receiving information and are comprised of many individuals who work in energy-specific professions.

Table 25. Channeling Exposure by Target Audience

Target Audience	Website		800 Number	
	Mass Media	Events	Mass Media	Events
 English general	√			
 Rural	√	√	√	√
 Spanish	√	√	√	√
 Asian	√		NA	

It is important to note here that while awareness of these rebate programs increased (see Table 26), the program is unlikely to be the cause of this awareness. Namely, the SWM&O program does not directly discuss programs in their M&O messaging. Rather, those exposed are referred to the website or 800 number for "more information" on ways to save energy. This reference is ambiguous, and it is unclear from the messaging what information a caller or browser would obtain through these outlets (although once they get to the website, finding out about rebate programs is fairly easy). Further, the program does not actively target or promote the website or 800 number in their advertisements, and through our process evaluation, we found that many individuals exposed to the messaging did not immediately recall either channeling mechanism after viewing the messaging.[57] Despite these program design and implementation limitations, we do describe the potential channeling effects of the SWM&O program as seen through our research efforts in this section.

Given that the website is one of the primary channeling methods to rebate programs, we measured awareness of the website and utility rebate programs as an indicator of the upper limit of effects. Approximately 36% of the English-speaking population and 18% of the Spanish-speaking population were aware of the website prior to the Summer '08 Campaign. Based on our tracking study, there were no significant increases in these awareness levels after the SWM&O campaign ended. The only target audience that had a statistically significant increase in awareness of this channeling mechanism was the Asian-Language Speaking population, where those who were exposed to the SWM&O program messaging (23%) were more aware than those who were not exposed (10%).

[57] See SWM&O Process Evaluation Chapter 9.

Table 26. Awareness of the SWM&O Channeling Mechanisms

	English 	Spanish 	Asian 
Aware of Channeling Resources			
Awareness of Website	NE*	NE	+13%
Awareness of 800 Number	NE	NE	NA*
Awareness of Programs			
Awareness of Rebates and Incentives	+10%	+6%	+23%
Awareness of ENERGY Audits	+8%	NE	+12%

*NE=no measurable effect

It stands to reason that an even smaller percentage of those who are aware of the website actually go the website. As shown in our exposure section, approximately 3% of the California population goes to the website each year, a notably small proportion of those exposed to the program messaging (76%). Furthermore, an even smaller percentage of those that go to the website also search for resource acquisition programs. While the website serves as a clearinghouse for access to resource acquisition programs, our process evaluation revealed that out of the total visits to the website, only 4% entered their zip code to access rebates, services and tax incentives (See SWM&O Process Evaluation Chapter 11).

Given that only the Rural outreach efforts of the SWM&O program actively promoted the toll-free number in advertisements and community events, we measured awareness of the toll-free number among residents in rural areas. Less than 5% of the English-speaking and Spanish-speaking populations were aware of the toll-free telephone number and this number did not significantly increase after the FYPR Summer '08 Campaign. The lack of awareness of the toll-free telephone number and the website indicates that the program is not channeling a significant proportion of the population to these programs through the intended route.

Even though awareness of the website and toll-free number is low, awareness of rebate programs is high and increasing among all California customers (as shown in the Awareness/Knowledge section of this report). However, given the indirect way in which Californians are educated on rebate programs (e.g. through the toll free number or website), it is highly unlikely that the SWM&O program is solely responsible for these effects. Rather, they are likely due to utility-specific program efforts. If future SWM&O program efforts aim to leverage the IOU rebate programs in order to move people to action, M&O efforts will need to develop more creative and memorable ways to channel individuals to programs.

6.6 Summary of Findings

The SWM&O program was implemented as a mass media-driven marketing campaign aimed at increasing Californians propensity to take energy efficiency actions. To generate this effect, the SWM&O program devoted the bulk of its funding to disseminating mass media advertisements through TV, radio, and print advertisements that provide limited depth of information and actionable messaging (see our discussion on intensity in Section 6.1 and

channeling in Section 6.5). For this reason, the program functions more like an awareness raising campaign than one designed to foster behavior change.

When we examine the SWM&O program's impacts in the context of its defined success metrics, it is clear that the inherent *value* of the SWM&O program is its ability to generate awareness and knowledge of energy efficiency issues and to keep energy saving actions top of mind among Californians. While we were able to demonstrate that the SWM&O programs are having a small, but significant, effect on CFL purchases and garnered energy savings, this is not the primary value of the SWM&O programs. Rather, as our SEM analysis indicates, the program's value, as it is currently designed, may lie in the added awareness and behavioral effects it can garner in parallel to other efforts in the marketplace.

Social marketing experts are careful to distinguish between a marketing-focused, awareness-raising campaign and a social marketing program which aims to change behaviors. The former relies on mass media to raise awareness and the latter has more localized and targeted program components, such as grass roots initiatives, community partnerships, and events. Through the use of more intensive outreach components, social marketing campaigns increase their likelihood to change behaviors through outreach and education activities.

As a mass media campaign, the *likelihood* of the SWM&O program to generate behavioral effects is dramatically limited by the program design which devotes the bulk of its efforts to high level awareness raising through mass media efforts.

Further, the SWM&O program's mass media messages have three very limited behavioral "asks": installation of CFLs, and energy efficient HVAC systems and appliances. Only homeowners have the ability to adopt two of the three behavioral targets (energy efficient HVAC and appliances), limiting the program's potential effects to 58% of California's population. In addition, these two expensive purchase behaviors are adopted relatively infrequently over the course of homeownership tenure, limiting the impact of the SWM&O messaging to only those in the market for these products. Of all three behavioral asks, the SWM&O program is most likely to affect CFL purchase behaviors among those exposed, as 100% of Californians can act on this message and the purchase incidence in one's lifetime is substantially greater.

Simply by virtue of the point at which it intervenes along the behavior change continuum (exposure), the SWM&O program's behavioral impact is necessarily limited as individuals must move through each stage of the continuum first before taking action. This is not unique to the SMW&O program, but rather it is an expected limitation of any social marketing effort whereby the time necessary to get from awareness to action is often significant. When we examine the program's non-energy effects, as summarized in the table below, we find that the program's impacts diminish as we measure impacts at more distal points from their primary site of intervention: exposure.

Table 27. Summary of SWM&O Program Impacts among Target Audiences

Target Audience	Exposure (% of Target)	Awareness and Knowledge	Intent to Take Action	Behavior Change
English speaking households	72%	Conservation ↑ Efficiency ↑	CFLs ↑	CFLs ↑ Increase based on SEM. No Measurable Effects within Tracking Study at 90% confidence level.
Rural households (English only)	67%	Knowledge overall ↑	Install CFLs ↑ A EE Appliances ↑ A Change Energy use Behavior ↑ A	No Effect
Spanish speaking households	47%	Conservation ↑ Efficiency ↑	No Effect	No Effect
Asian and Pacific Island language speaking households	76%	Conservation ↑ Efficiency ↑	No Effect	CFLs ↑ EE Appliances ↑

As

Table 27 indicates, the SWM&O program's greatest effects occur immediately after the point of exposure, which is the most likely impact of the program along the behavior continuum. After the campaign season, all target audiences demonstrated an increase in top of mind awareness of energy saving actions (both conservation and efficiency). These findings demonstrate that the SWM&O messaging is raising general awareness, yet the measured effect on behavior change is substantially smaller in comparison, and limited to a few specific actions that the program targeted (namely turning off lights and installing CFLs). If we follow behavior change theory, this is expected, as behavioral effects are the most distal outcomes of the SWM&O program and are the least likely to occur due to program intervention.

7. ENERGY SAVINGS ESTIMATES

The SWM&O program was not charged with achieving energy savings. However, we explored energy impacts of the SWM&O program to provide insight into the potential of M&O programs to garner energy savings. Specifically, the Opinion Dynamics team explored energy savings estimates of the SWM&O program to determine: (1) if such estimates could be generated from the evaluation of marketing and outreach programs, and if so, (2) to what extent the SWM&O program generated energy savings.

For this analysis, we looked specifically at just one of the three primary measures promoted by the SWM&O effort: purchase/installation of CFLs. Our justification for focusing on this one measure is described below.[58]

To calculate energy savings for the SWM&O program, we relied on two different data collection methods and three analytical approaches. Data for this estimate was collected through our: (1) Structural Equation Modeling (SEM) Survey and (2) Tracking Survey (described in detail in our methodology section). In our SEM analysis, we used the SWM&O program's effect size on CFL purchases to estimate the change in the number of bulbs purchased due to exposure to SWM&O advertising. For the tracking survey effort, we used information from our survey to establish two different calculations of potential CFL savings: (1) a pre/post analysis within California using a self-reported net-to-gross ratio (i.e., the cognitive change index) and (2) a pre/post analysis using two comparison states to determine net effects. These approaches resulted in three energy saving estimates (i.e., SEM, pre/post self-report, and pre/post comparison group). Additional description on our analysis is provided in this chapter.

As a result of our indirect impact analysis, we estimate that the SWM&O program influenced approximately 175 GWh annual savings from CFLs per year (assuming CFL purchased are installed) equivalent to approximately 10% of the gross annual savings from residential screw-in CFLs under the Upstream Lighting Program efforts.[59] This estimate is based on our SEM analysis. Below we describe our energy savings analysis that supports this finding, including a discussion of each method and the details behind our decision to use the SEM estimate as the best estimate of savings from the SWM&O program.

7.1 Estimating Savings from CFLs

While the SWM&O program has three primary behavioral targets (CFLs, energy efficient HVAC, and energy efficient appliances), we hypothesized that the greatest measurable program impact would be detected in CFL behavior. Previous work suggests that CFLs are the most widely adopted of all of the program measure targets (that is, more consumers

[58] Note that future studies may chose to examine additional measures if energy savings are a key metric for the program; however, cost considerations with finding individuals who took specific actions (such as purchased a new air conditioner over a three month period) would have to be considered.

[59] The KEMA study estimated 1802 GWh per year for CFL screw-in, residential-only CFLs. This value is from the following reference: KEMA, Inc. under sub-contract to The Cadmus Group. Draft Evaluation Report: Upstream Lighting Program Volume 1: Main Report, December 10, 2009, Tables 25 and 26, pages 55 and 56.

have purchased CFLs than an energy efficient HVAC unit or even an appliance) and any sort of statistical analysis needs sufficient numbers of people who have made one of these behavioral changes. Our approach, therefore, assumed that CFL purchase and installation behavior was the most straight-forward to measure effectively—and that if we could not tease out program induced CFL adoption actions within the population (that would then allow us to determine energy savings from CFLs), we would not be able to determine adoptions and savings from other measures targeted by the SWM&O effort.

Measuring the adoption of CFLs, however, also has unique complications. While there are methods that allow us to tease out the effects of the SWM&O efforts from other campaign and program efforts, because of the upstream nature of most CFL programs in California and the fact that many consumers do not even realize that they are participating in a utility rebate program, we cannot effectively tease out the SWM&O program effects from upstream program effects. As such, we acknowledge that many of the bulbs calculated to have been affected by the SWM&O program may have been counted in the CPUCs residential retrofit evaluation. For this reason, we note that it is not appropriate to simply add the energy impact indicated here to the portfolio of savings.[60]

7.2 Method of Analysis

As stated above, to calculate energy savings for the SWM&O program, we relied on two different data collection methods and three analytical approaches. This approach resulted in three energy savings estimates (pre/post analysis using a self-reported net-to-gross estimate, pre/post analysis using a comparison group to determine net effects, and SEM). These three methods are described below.

7.2.1 Tracking Survey Analysis

Based on our research plan, our team was charged with using multiple approaches to determine savings. For our tracking analysis, we explored multiple approaches to determine the most robust method for measuring energy savings. The methods that we used to analyze the tracking survey data are described below.

Exploratory Analysis using Regression Techniques and a Zero-inflated Poisson Regression Model

As part of our analysis of the tracking data, we tested an ordinary least squares (OLS) regression, which is one common way of obtaining ex post estimates. However, we found that the distribution of our outcome variable (the number of CFLs installed in the last three months) was highly skewed, making the use of OLS regression problematic.

Through this assessment, we found that the outcome variable had too many non-adopters (i.e. zero installed CFLs) to run the OLS, and instead we moved to a zero-inflated Poisson

[60] This potential for "double-counting" is one reason why we recommend that the CPUC consider some of the more intermediate measures on the buyer behavior continuum when determining success of SWM&O efforts. Having said this, we still believe it is instructive to determine potential energy savings as a way of ensuring that at least some consumers are moving through the continuum due to marketing efforts.

(ZIP) model which can handle large proportions of zeros in the dependent variable. The ZIP model proved to be the most robust verification approach as it: (1) improved prediction over a standard Poisson model when there were excess zeros; and (2) allowed us to divide the two pieces of the curve into binary and linear components and ultimately reduce the variance without violating assumptions.

Our results from the ZIP model indicate that the SWM&O campaign has an effect on whether or not someone installs a CFL, with our data indicating that the SWM&O program has led to a decrease in the odds of not installing a CFL within California. Thus, the model demonstrates that the SWM&O program has the potential to influence CFL installation among California residents. While the ZIP model cannot estimate energy savings or provide precise estimates of bulbs installed (bulb installation was not verified in this evaluation), it does provide credence to our pre/post methods, and we determined that these two estimates could be used to generate complementary energy savings estimates to compare with the more robust SEM findings.

Ultimately, however, while the Poisson model indicated an effect, we were not able to use estimate savings using this model (that has an output of an odds ratio) or the regression model (due to the extreme variance in the self-reported number of bulbs installed).

Pre/Post Self-Report and Comparison Group Approach

Because of the extreme variance in number of bulbs installed and the indication from the ZIP model of an effect on bulb installation, we built a model that compared the pre/post percentage of the population that reported installing a CFL within the past three months (rather than number of bulbs installed). Our findings on the pre/post percentage of the population show that the percentage of homes installing CFLs was significantly different between time 1 (pre-) and time 2 (post-) in California and between California and the comparison states. Using this input is atypical for this type of impact assessment, but provides an order of magnitude type of value for comparison with the SEM approach.

We generated gross estimate of savings by multiplying the difference in percentage of homes installing a CFL by the average number of bulbs installed after the campaign (post program intervention) (Table 28) and the 2005 DEER value of 33.8 kWh per bulb to obtain an estimated gross impact. The difference in the percentage of homes, and the average number of bulbs installed were gathered from our tracking survey efforts.[61]

Table 28. Percentage of Households Installing CFLs by Time Period

State	T1 n	T2 n	T1 % installing CFL	T2 % installing CFL
California	400	402	52%	72%
Arizona	260	200	59%	68%
Oregon	246	201	65%	55%

[61] Note that we compared our estimates of the number of bulbs installed to other studies being conducted at the same time and found our estimates to be among the most conservative.

Net Estimate Based on Self-Report

We created a net impact by multiplying the gross impact by the cognitive change index, which assesses the SWM&O program's likelihood to change behavior by increasing awareness and knowledge. For this population we calculated a cognitive change index of 0.57, indicating a moderate effect. (See Appendix C for details on the cognitive change index.)

Net Estimate Based on Comparison Group

In addition to using the pre/post assessment with a self-reported net-to-gross estimate, we relied on our comparison group findings after the Summer 2008 Campaign (post program impact) to generate a net savings estimate. When using the comparison group approach, the net is embedded in the differences between California and the other states (see Appendix E for more information on comparison states) in terms of percent of households installing CFLs after the campaign season. We used the average number of bulbs installed after the campaign and the 2005 DEER value to calculate net energy savings.

7.2.2 SEM Analysis

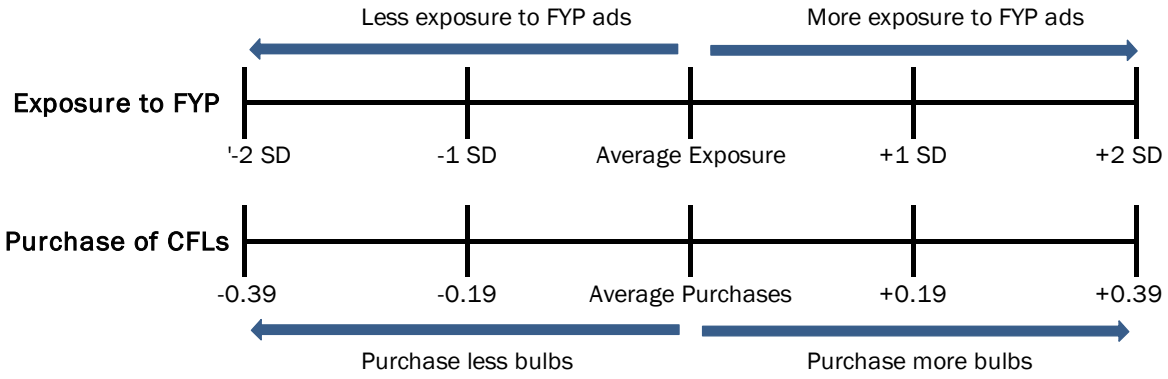
The SEM model results used for our overall findings relied on three indicators of CFL behavior – purchase, installation, and storage. For energy savings analysis, we drew on a version of the model designed to estimate program influence on actual purchases made over the 12 months prior to the survey. To do this, we re-estimated the model to reflect CFL purchase only behavior. Then, we used the model to estimate the number of CFLs purchased that might be attributed to program exposure.

To generate energy savings estimates due to program exposure, we developed a method that could determine the incremental effects on CFL purchases based on incremental increases in exposure to SWM&O messaging. To develop this method, we drew on techniques applied in regression modeling. In regression modeling, program effects are commonly interpreted by comparing the difference between a null intervention level (e.g. no exposure) and the predicted value generated from our model using the mean intervention level (e.g. average exposure). In other words, regression analysis determines the difference between (1) the predicted CFL purchase value produced by the mean intervention level; and (2) CFL purchases produced by an equation with the intervention variable at set at zero, i.e., the counterfactual.

While it is not feasible to directly analyze the SEM model produced in this same way (due to the complexity of the model), it is possible to approximate the regression procedure using the model's standardized values and analyzing the model in terms of standard deviations. Here we compare the CFL purchases generated in our model to: (1) those with two standard deviations less exposure to SWM&O (e.g. almost no exposure) and (2) the mean intervention level (i.e. average exposure). Hence, the difference between average and two standard deviations is the number of bulbs purchased due to the program.

Our SEM analysis indicates that 0.39 bulbs per household are attributable to the program. Our approach is illustrated in Figure 18 below.

Figure 18. Relationship between Exposure to FYP and CFL Bulb Purchase



SD=Standard Deviations

To generate energy savings estimates, we then generalized the sample results to the statewide impact of the SWM&O program. The program effect at the statewide level would be 0.39 times the number of households in the state (0.39 * 13,308,346), resulting in CFLs purchased attributable to the program of 5,176,313 bulbs.

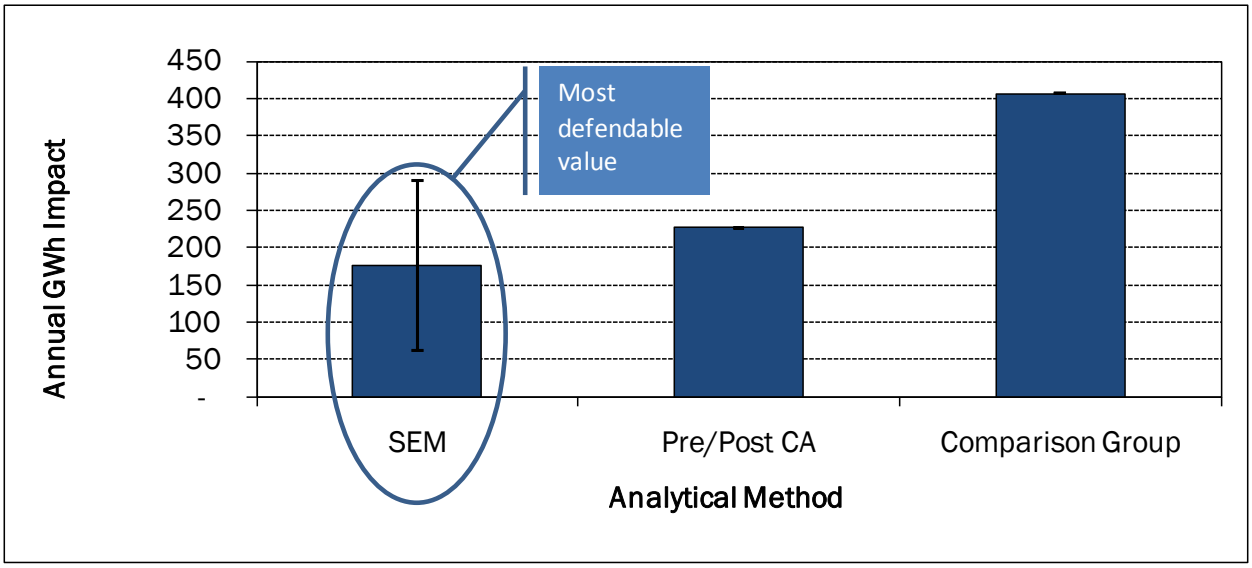
7.3 Summary of Findings and Explanation of Final Method and Estimates

We present our energy savings findings for all three methods in the figure below. Our most rigorous assessment of savings showed that after the purchased bulbs are installed and engender energy savings[62] -- 175 GWh of savings annually can be attributable to the SWM&O program.

The error bar for the SEM shown in Figure 19 is equal to 95% confidence intervals.

[62] We applied a 2005 DEER value of 33.8 kWh savings per bulb. This value is lower than a recent study by KEMA (Draft Evaluation Report: Upstream Lighting Program, prepared for California Public Utilities Commission – Energy Division, December 10, 2009) which used a value of 44.5 kWh per bulb, but included specialty bulbs as well. As such our per bulb estimate of impacts is somewhat conservative.

Figure 19. CFL Energy Savings Due to SWM&O Efforts



Determining energy savings as a result of the SWM&O efforts is challenging. Good methods for evaluating M&O program effects must have the capacity to: (1) isolate the effects of the M&O efforts to determine the *net* effects of M&O efforts; (2) measure the incremental effects of program exposure along the behavior change continuum; and (3) provide a comprehensive picture of how the program "moves" the market to provide actionable feedback to program implementers.

Often, the primary method used to assess marketing and outreach program effects is a simple pre/post analysis. However, this fails to generate a clear net, or measurement of change due to the program. To better evaluate SWM&O programs, our impact evaluation not only included a pre/post approach with a self-reported net-to-gross adjustment, but also drew on two additional methods to assess causality: (1) A pre/post analysis with out of state comparison groups; and (2) the SEM effort. Combined, these efforts allow for us to provide a better perspective on the effects of the SWM&O program's behavioral impacts and help to demonstrate the program's potential to move consumers to take low-cost actions.

We noted in an earlier section that our tracking study, which aimed to track and measure the behavioral impacts of the SWM&O program over time, was unable to detect a statistically significant change in CFL install behavior using our two comparison states. Analysis using a simple comparison group without the ability to account for other influences and mediating factors (that SEM is able to account for) simply does not have sufficient information to detect findings of this magnitude. In addition, with the highly skewed distribution in our data, the OLS model was not appropriate.

Therefore, of all efforts, the SEM findings are the most defensible, as the method allows for a more precise approximation of energy savings using the effect size of the program. This effect size factors out a number of other influences on CFL purchases, and of all estimates, is the least likely to overestimate program effects.

SEM, unlike most other statistical methods, has the ability to tease out and quantify the effects of M&O programs among a number of different market and other influences. In

addition, SEM allows us to determine program success at multiple points along the behavior change continuum, specifically quantifying program effects on factors that directly influence energy efficient purchase considerations, such as awareness and knowledge of a behavior, the benefits of a behavior, attitudes and social norms that influence a behavior, etc. SEM allows evaluators to determine the net effect of the program on each of these factors, providing a series of measurement data points for a given M&O program not limited to the behavioral outcome alone.

Further, because SEM provides a comprehensive model of program effects on multiple influences on behavior, it also has the capacity to provide the program staff with clear feedback on where M&O efforts are most effective (and thus help with program design). SEM lays clear program influence on multiple cognitive and social influences that affect behavioral decisions. In addition, SEM demonstrates which of these influences have the greatest impact on behavior change; thus it can provide program evaluators and implementers with clear direction on how to move forward and generate greater impacts on behavior by directly addressing or attempting to leverage these influences.[63]

[63] SEM can provide information needed for program administrators to modify their market and program theories to be more reflective of market conditions and operations. SEM also holds potential to test and improve market and program theories.

8. RECOMMENDATIONS

The CPUC is actively working to develop a statewide energy efficiency marketing, education, and outreach (SWME&O) strategy for 2010-2012. As part of this effort, the CPUC is developing branding and marketing strategies for the SWME&O program. These efforts are aimed at generating a "movement" in California to encourage smarter energy use, namely through the adoption of energy efficiency and conservation actions with the potential to expand these efforts to demand side management and renewable efforts.

In support of the 2010-2012 strategic plan, Opinion Dynamics conducted ethnographic research and a statewide segmentation study to capture a comprehensive picture of Californians' knowledge, attitudes, beliefs, and to a limited degree, actions on energy efficiency. Through this research, we found that while there is great interest in energy efficiency, the depth of knowledge and estimated importance of energy efficiency is low.

Specifically, our ethnographic research found that outreach needs to speak to the specific needs and potential of each segment in the population. It is not enough to say energy efficiency matters and, therefore, one should take energy efficiency/conservation actions. Rather, outreach needs to communicate why energy efficiency matters as much or more than other actions that have the same desirable effect and provide specific information that overcome market barriers.

While the 2006-2008 SWM&O effort focused on raising awareness, the 2010-2012 strategy will promote a more social marketing-based approach where interventions are expected to: (1) be highly targeted addressing the unique values, beliefs, and behavioral needs of California's segments; (2) include outreach tactics that align with the unique needs of its target audience; and (3) directly address the barriers to action through messaging. The development of the marketing plan for the 2010-2012 strategy is currently underway. Notably, developing clear goals and measurement criteria in advance of program implementation will be critical to the success of this future effort.

In this chapter, we provide a few recommendations based on our indirect impact research to help with future program and evaluation efforts. Specifically, in this section, we provide:

(1) Recommendations for program design, and

(2) Recommendations for future research and analysis.

8.1 Recommendations for Program Design

The SWM&O process evaluation provided multiple recommendations for program design that will not be reiterated here. In this report, recommendations are based on findings from the indirect impact assessment. However, we call attention to one of our previous process findings: The PY2006-2008 program goals did not provide clear objectives and performance expectations. Without clear program objectives, it is difficult to effectively assess impacts.

Future efforts should also consider that the SWM&O program acts as one outreach campaign among many that aim to raise awareness on energy efficiency. In our 2006-2008

process evaluation of the SWM&O programs, we discussed the role of the SWM&O programs in the current media marketplace:

> "The current California marketplace is flooded with "green" messaging from the recent PR campaigns of BP "beyond petroleum" and Chevron's "human energy" to more action driven, global warming awareness raising campaigns such as Al Gore's "We Can Solve it" campaign and the Environmental Defense's "Fight Global Warming" efforts. Retailers of home appliances and light bulbs also are actively promoting energy efficient products for sale at their stores, such as Wal-Mart's recent CFL campaign and Home Depot's "Eco Options" in-store merchandising. These promotions, among a series of "green" products in the marketplace, clearly indicate that "green" is the new color of choice for marketers. Several of these campaigns can be seen as having the same energy efficiency and global warming message – "increasing the propensity to take energy saving actions." Thus, the SWM&O programs' efforts are viewed as one of many messages in the marketplace."[64]

As such, it is important to monitor the messages in the current marketplace prior to implementation and determine whether the current efforts should enhance, complement, or fill a gap.

The findings of this indirect impact evaluation, when assessed alone, indicate that the SWM&O program's effects on behavior change are small. However, when we combine the program effects with other mass media messaging, we see an increase in the overall impact of mass media on behavior change (in this case CFLs). The program's influence alone on behavior change was measured in an effect size of 0.07, but when combined with other marketing and outreach efforts (effect size of 0.08), the effect of M&O doubled, to 0.15. Thus, the data indicates that there is a cumulative effect of mass media messaging when it is combined with other efforts.

While the program effects are measurable and demonstrate the combined influence of M&O efforts, the overall effect size is still low by statistical standards (e.g., Cohen's standards, where a value of 0.2 is considered low). This outcome indicates that the mass media messaging from the 2006-2008 efforts, even as part of an overall program to encourage energy efficiency, had a relatively small impact on actual behavior change. This is likely due in part to the shallow information and communication that is an inherent part of mass media formats.

As discussed earlier, the SWM&O program's primary cause for not generating behavior change was its heavy reliance on mass media channels over the other channels that it employed. Thus, it was not as integrated or balanced as it could have been. For this reason, we strongly recommend that future SWM&O efforts de-emphasize (but not eliminate) mass media driven initiatives. Prior research demonstrates that interest in energy efficiency is already awakened. Moving individuals beyond awareness requires specific education and

[64] See SWM&O Process Evaluation pg. 56.

outreach initiatives to generate behavior change. Mass media alone is not suited to this task and more targeted and in-depth outreach efforts are necessary to effectively educate the public and move them to take action. As we discussed in our process evaluation,[65] the SWM&O program also conducted outreach at events and through the use of community-based organizations allowed the program to take on a more localized and targeted structure. We recommend that such outreach initiatives, not necessarily limited to events, should be expanded to the entire state and across target audiences, not just the rural market.

Based on these findings, we recommend the following:

- Include clearly defined program goals and performance metrics in program planning documents prior to implementation.
- Review messaging in the market prior to developing goals, and determine whether program efforts should enhance existing messages (through other channels, etc.), complement existing messages (e.g., by providing more detailed or broader information), or fill a void in messaging.
    - Periodically assess the market (e.g., every three to six months) to monitor current message streams, and determine how program efforts should be adapted based on current market conditions.
- De-emphasize mass media (but do not eliminate it) as the primary outreach method of the SWM&O program and explore the possibility of using mass media in a more integrated and balanced fashion with other outreach methods. Given the complex nature of saving energy (that is, multiple actions where households could have varying degrees of awareness or knowledge for each action) this form of communication lacks the ability to meet Californians' need for specific and actionable information.
- Refocus SWM&O program efforts on specific initiatives that are highly localized and targeted and have the capacity to provide detailed information about the actions the program seeks to increase.[66]

8.2 Recommendations for Future EM&V

Measuring the behavioral effects of the SWM&O program presents unique challenges that are not encountered when evaluating rebate programs. When we consider the relatively low frequency and intensity of program messaging and the low purchase incidence of two out of the three measures that the SWM&O program targets (energy efficient appliances and HVAC), and that the SWM&O program intervenes in the market relatively far from the behavioral decision, teasing out the net effects of the SWM&O program requires very large sample sizes and highly sophisticated measurement approaches that standard rebate programs do not.

[65] See SWM&O Process Evaluation Section 8.6.

[66] The CPUC-ED is developing a marketing strategy that may consider a more coordinated effort with the IOU efforts so that the M&O and the IOU program efforts are more integrated in the future.

Below we address two key questions to help guide future EM&V efforts: (1) What are the most appropriate metrics of success for M&O campaigns? and (2) What are the best methods for the evaluating the effects of M&O efforts?

8.2.1 Recommended Metrics

The SWM&O program's mass media approach limits the program's ability to generate behavior change, and thus, the success metrics that we were charged with quantifying (namely behavior change and the resulting energy savings) were difficult to quantify. This challenge is not unique to the SWM&O efforts, and similar mass media campaigns will be faced with the same issue of measurement challenges.

For this reason, it is necessary to determine whether energy savings are the best and most telling tool for evaluating the success of marketing and outreach programs. Based on our experience with this program evaluation and others of its kind, we know it is possible to provide an energy savings estimate for marketing and outreach efforts. However, as our analysis points out, it is difficult to argue that these effects are unique to the SWM&O program; much of the energy saved could be double-counting rebate effects, particularly if these programs are upstream programs, as was the case in our analysis.

M&O success should not be determined based solely on energy savings behavior change, but should also assess the program's ability to affect each step in behavior change continuum, such as awareness, knowledge and attitudes. Marketing and outreach efforts can help reduce barriers to behavior change, and measuring these interim changes can help determine the ultimate success of marketing and outreach programs. As such, we recommend the following:

- Future EM&V efforts should be based on multiple success criteria that measure both the behavioral impacts of the ME&O efforts as well as the intermediate effects gained through program outreach, such as increases in awareness, knowledge, attitudes, intention, or decreases in barriers.
- There should be acknowledgement by the CPUC, the IOUs and the implementers about the specified program impact metrics and success criteria so that the implementer has a clear target against which the program will be evaluated.[67]

The use of standard metrics specifically for mass media is discussed more below.

Exposure, reach and frequency as metrics for mass media efforts

Two primary challenges occur when attempting to assess program exposure for the SWM&O efforts: (1) verifying program reach and frequency across media outreach channels; and (2) verifying program reach across target audiences, namely in-language efforts.

Verifying program exposure across media channels is particularly challenging for the following reasons:

[67] Multiple metrics may be used—some of which are more useful for implementation and others more useful for evaluation—but all should be commonly accepted so that the metrics are clear to all parties.

1. **Each media channel (e.g. TV, radio, print, etc) uses different metrics for reach and frequency**. For instance, TV reach is measured across large DMAs and in gross impressions, while radio reach area is not. Exposure to the program website may only be tracked in the form of visits and are not geographically bound. Therefore, confirming specifically which populations have been exposed to what media channel with certainty is costly and virtually impossible. In addition, determining the extent to which a population was exposed to in-depth, more substantive communication channels, such as a website, is particularly challenging because such outreach channels are user-driven, where individuals seek out content instead of being exposed to content by virtue of where they live (as is the case with TV, radio, and print advertisements, which are geographically targeted).

2. **Exposure metrics are rarely verifiable and expensive to analyze**. For this reason, most EM&V efforts necessarily rely on program-provided media buy estimates to determine the reach and frequency of M&O efforts. Despite these limitations, the Opinion Dynamics team was able to verify exposure to mass media messaging (radio and TV) using our Verified Reach Assessment. Through an innovative technology, we recorded the actual exposure of individuals to the audible SWM&O program messages and were able to determine that the program's effects fell short of its stated goals, particularly its frequency goal. In other words, the actual exposure to the program messaging was much lower than the stated exposure based on accepted reach information provided by the individual television and radio stations.

3. **There are multiple challenges in measuring across a program's target populations**. The SWM&O program targets both geographically (urban vs. rural populations) and demographically (Spanish and Asian-language speaking individuals). Both targets present challenges to EM&V efforts. Urban and rural targeting is conducted using IOU-defined urban and rural regions, which do not align with the US Census' criteria for urban and rural. As the US Census data is used to determine the population in an area, it is difficult to ascertain which types of people (demographically speaking) and how many people were exposed to the SWM&O rural efforts. While our team was able to purchase zip code level data for those exposed in IOU-defined rural areas, we could not determine with certainty how many individuals were/were not exposed within the state of California outside of IOU-defined urban and rural areas.

   In addition, the SWM&O programs target two primary ethnic populations: Spanish and Asian (speaking three languages: Chinese, Korean, and Vietnamese). However, confirming who has been exposed to program messages as a function of the population (individuals who speak the language) is complicated by in-language proficiency (how well do those exposed to the program message speak the language) and English language proficiency (how well do those exposed to the program message speak English). Census data does not provide population estimates for households, nor does it provide language proficiency estimates for the population over the age of 18 (only for those five years of age or older). For this reason, it is difficult to assess the number of adult households exposed to program messaging, and our team had to rely on individual-level data as a proxy for household exposure estimates. In addition, varying levels of language proficiency in a population, combined with poor census estimates, make it difficult to determine specifically

which populations in California require in-language efforts, and which ethnic populations may be effectively covered by English-language outreach efforts.

Based on our assessment, we recommend that for mass media efforts, the program implementers work with the CPUC and the IOUs to determine standard media metrics to verify during the contract period, and accept these metrics as one indicator of achievement. Specifically, we recommend the following:

- Mass media exposure, reach and frequency metrics should be stated, agreed upon, and accepted prior to program implementation. The use of these metrics should be used as one component of program accomplishments as they are an indication of how program dollars were spent. However, they are only one component, as the quality of the mass media and message effectiveness–should also be part of any impact assessment.

Methods for Estimating Change

In the future, we expect that non-CPUC funded marketing and outreach efforts for energy efficiency will become even more pervasive–messaging is already in the market from for-profit entities such as Home Depot to non-profit entities such as Alliance to Save Energy or federal messaging on weatherization.[68] These efforts, in addition to the current suite of energy efficiency programs being sponsored by the utilities and Federal stimulus dollars–dedicated to energy efficiency, will further complicate the challenges of evaluating the success of any one marketing effort alone among a melee of other efforts. Although the overall effect for the energy efficiency cause is likely to be quite positive, it will make proving both the cost and overall effectiveness of any one marketing effort more complex.

Because of these expected assessment issues, program implementers and the CPUC should investigate the use of different quasi-experimental evaluation methods that are tied directly to mass media implementation to determine causality. To attempt to reduce some of the "noise" from other media efforts, these efforts need to be targeted, purposeful, and timely. While there are several different types of quasi-experimental designs; use of those designs in this context requires knowledge of how media is purchased. For example, consider pre/post testing of a TV message within a single DMA using agreed-upon metrics such as changes in awareness of what the advertisement was stating, intention to purchase or actual purchases of the item being discussed. Use of a comparison group DMA adds rigor to this assessment by helping to rule out other efficiency messages that are present at the same time. Test the results by switching where the message is presented to the comparison group DMA and see if there is a similar change in the second area as seen in the first. If there is substantial mass marketing within use for future programs, this may be a viable approach to determine effects from that component of the program. However, the evaluation must occur at the same time as the mass marketing and would need to be balanced by other evaluation needs.

Our approach used SEM because it provided the most cost-effective and reliable approach for measuring net behavior change instilled by mass media outreach through this and other programs (such as local government partnerships, etc.). Further, the analysis shows that the effect size may be used to generate energy savings estimates. SEM is also capable of

[68] See SWM&O Process Evaluation Chapter 5.

providing evaluators and implementers with insight into multiple potential impacts of the program, both direct and indirect. By showing both direct and indirect effects, it provides a clearly defined picture of the program's impact and the multiple paths through which its impact is realized. As a result, SEM provides a complete assessment of the program's proximal impacts, while also generating enough statistical precision to measure distal effects, such as behavior change.

While we highly recommend SEM as a method, there are a series of methodological considerations in implementing this analysis. First, SEM is best suited to high incidence behaviors, such as CFL purchases or conservation actions. SEM requires a sufficient number of respondents who have either purchased[69] the energy efficiency measure the marketing efforts are promoting or have changed their behaviors as requested by the marketing effort. Thus, the method is decidedly more costly to execute with low-incidence purchase measures. It may, however, be a valuable tool within specific targeted geographic areas where incidence is expected to be higher due to program efforts.

Ultimately, future EM&V will be determined based on the goals of the program, but we recommend the following:

- Future EM&V efforts for marketing and outreach programs should consider utilizing quasi-experimental methodologies, which are uniquely suited to tease out the effects of the M&O from other market influences. There should be a close collaboration between the implementer and the evaluator to design the assessments and allow for purposeful data collection that best enables determination of causality.

[69] This evaluation focused the SEM analysis on CFL purchases but future evaluations could analyze CFL installations.

APPENDICES A-F

In the appendices to Volume I, we present the following information:

Appendix A. Note on Performance Metrics, Assumed Savings, and Weather Data (as requested by the Protocols)

Appendix B. Success and Timing of Data Requests (as requested by the Protocols)

Appendix C. Detailed Cognitive Change Influence Index Analysis

Appendix D. Description of Program Measures

Appendix E. Detailed Tracking Survey Comparison Group Analysis

Appendix F. Utility Comments Addressed in Final Report

APPENDIX A. NOTE ON PERFORMANCE METRICS, ASSUMED SAVINGS, AND WEATHER DATA

As required by the Protocols, this appendix addresses the performance metrics, differences in assumptions and findings, and weather data. There were no performance metrics supplied by the CPUC-ED for this indirect impact evaluation, so there are no metrics listed here. Similarly, there were no IOU savings assumptions with which to compare to our results, and weather data was not relevant to the research.

APPENDIX B. SUCCESS & TIMING OF DATA REQUESTS

As required by the Protocols, Appendix B provides information on the success and timing of data requests. This information was provided prior to writing of the final report through an early feedback memo.

Throughout the evaluation effort, the SWM&O program implementers provided most data requested by the Opinion Dynamics team. There were a few data deliverables requested that were either not tracked at the time of the request and/or not provided to the EM&V team upon request. These data deliverables include:

1. **Detailed Budget and Expenditures** by Outreach Effort for the Flex Your Power-General (FYPG) Campaign: Namely, the Opinion Dynamics team sought an itemized budget for the FYPG campaign on behalf of the CPUC to be included in our 2006-2008 Process Evaluation. Budget data was both difficult to obtain and did not meet the specific standards requested by the CPUC.

2. **Ethnic Media Reach and Frequency Data** was provided to the Opinion Dynamics team, but did not include reach and frequency indicators for all media outlets used for the Asian-language targets. The program implementers were compliant in providing the data they had collected from local media sources, however many local media outlets do not track or have estimates of their reach, frequency, and circulation and this information could not be provided by the program implementer.

3. **Flex Your Power Rural Events** were tracked by the program implementers using an intranet system. Overall, the system worked well to provide after-the-fact details on rural events. However, the community based organizations (CBOs) did not provide the program implementer with timely feedback on event scheduling, and for this reason, our EM&V team could not rely on the intranet site for event observations. However, we were able to work directly with the CBOs to circumvent this issue. In the future, more diligent monitoring of CBO activities is recommended.

4. **CBO Event Reach and Frequency Metrics** are provided in the form of estimated number of individuals who attended and collateral distribution. However, the latter estimate provides only the data that was shipped to a CBO, therefore we could not

estimate the number of individuals who actually received materials at each event. In the future, we recommend that the SWM&O program use signed pledge cards received or a sign in sheet and contact information as more accurate proxy of those "touched" by the program's efforts.

While the SWM&O programs provided the majority of data in a thorough and timely way, there are a few additional recommendations for the SWM&O program implementers and the data request process:

5. **Data files should have clear naming conventions.** While much of the data that was provided was complete, it was often unclear what each data file contained and who the data file was submitted from. When provided in aggregate, sorting through data files that do not have a clear naming convention, date, or indication of the source requires substantial effort on the part of the EM&V team to sort through the deliverables and determine what was provided and what maybe missing.

6. **Data should be organized following the data request structure.** Overall, the SWM&O program implementers provided data to our team that was well organized. However, if future data deliverables were organized following the structure of the data request, it would be evident exactly which files are being submitted to meet each specific request. This is closely linked with the above recommendation.

7. **Reach and frequency reports should use the same metrics, where possible, for all SWM&O activities.** Reach and frequency statistics are often reported in the form of impressions, gross impressions, and reach and frequency statistics. Within the same media channel (i.e., radio or TV) all data submitted to the program evaluators should use the same metric, e.g. gross impressions vs. total impressions. In addition, these numbers should be provided in the greatest detail possible. Thereby evaluation teams are not required to disaggregate or back populate reach and frequency data, but rather can readily aggregate the data for each marketing and outreach activity across program efforts and media channels.

Table 29. Information Requested from SWM&O Implementers

Data Needs	Data was Available	Data was Complete	Data Met Quality Standards
I. Reach and Frequency for Mass Media Efforts for TV, Print, Radio, Outdoor, and Online			
a. Exposure Counts (by all media outlets). If exposure counts are not available, provide circulation and distribution figures by area	√		√
b. Geographic Coverage Areas (by all media outlets)	√	√	√
c. Dates of Exposure (by geographic areas and media outlets)	√	√	√
III. Web-based Reach and Frequency Figures	√	√	√
a. Number of Website Visits	√	√	√
b. Number of Click-Throughs	√	√	√
c. Number of Opt-Ins	√	√	√
d. List of Websites Containing Links to Program Websites	√	√	√
II. Non-Mass Media Outreach Details			
a. Reach for the PowerPlug Blog (e.g. number of blogs published)	√	√	√
b. Reach for Residential Product Guides (e.g. number of website hits to these pages and/or any print or distribution figures for hard copies)	√	√	√
c. Reach for Non-Residential Product Guides (e.g. number of website hits to these pages and/or any print or distribution figures for hard copies)	√	√	√
d. Hard Copies of Any Case Studies Distributed Online	√	√	√
e. Reach for Each Case Study in the Form of Web Hits or Print/Distribution Numbers for Hard Copies	√	√	√
f. Number of eNewswire Subscribers	√	√	
g. Database for CBO Events with CBO Name, Event Name, Event Type, Number of Attendees, Event Location	√	√	
h. Collateral Distribution or Print Numbers (including pledge cards, tip cards, and other print media)	√	√	
III. Program Planning and Research			
a. Program Budgets and Expenditures	√		
b. Research Reports	√	√	√
c. Program Goals, Objectives, and Planning Documents	√	√	

APPENDIX C. DETAILED COGNITIVE CHANGE INFLUENCE INDEX ANALYSIS

The cognitive change index (CCI) was one of the methods used for calculating net behaviors for the information and education programs evaluated by Opinion Dynamics across the three evaluation contract groups.[70] This method was discussed at length and agreed to with the CPUC and the CPUC's Master Evaluation Contract Team (MECT) in regards to the training center efforts (in August 2008). We indicated that we would adjust the questions, but use a similar approach for efforts under the marketing and outreach contract and the third party information programs contract. Because this was a new index for calculating net change, we use data collected through one or more of our surveys to discuss this further.

Based on our analysis, the calculation of net behaviors using our approach (i.e. a self-reported influence index) is acceptable. We reached this conclusion through looking at responses to these questions and the variability obtained. First, we present the specific core battery of questions used through our surveys or intercepts to collect information from participants. Then an algorithm is used to calculate an index representing the influence of the program in bringing about the behavioral change. Last, an analysis is provided based on a test to whether the questions appeared to be a valid measurement.

Questions Used for This Analysis

The cognitive change index (CCI) contains three specific concepts; newness of the information learned from the program, determination of cognitive change based on the presentation of the information from the program, and a direct influence assessment.

Questions in the Cognitive Change Index

Concept 1 – Newness of the information

Program theory indicates that the program must have increased knowledge before actions taken, therefore, if the information was not new or did not move forward existing plans, the program information was not part of the reason why actions taken.

- C11. As you think about what you heard at the [effort], was any of this NEW information? (Yes=1, No=0)

If the respondent indicated a "No" to C11, they were asked C12.

- C12. Although you don't think the information was new, did [the effort] move you any closer to implementing efforts to save energy that you were already considering? (Yes=1, No=0)

[70] Opinion Dynamics was under contract for the assessment of the Statewide Marketing & Outreach programs, the Training Centers Programs, and the Information and Education Programs.

Because both these questions are given equal value, it is the maximum of these two values that is used in the calculation of the CCI.

Concept 2 – Determination of cognitive change

The interaction that took place due to the program must create a cognitive change before actions taken are considered attributable to the program. Although similar to concept 1 as both are attempting to measure cognitive change, it is different from concept 1 because it is a level of effectiveness in change, not a dichotomous value.

These questions are all asked on a 7 point scale where 1 is not at all and 7 means very much so.

- C21. How much did the [effort] cause you to think differently about how you use energy?
- C22. How much did the [effort] cause you to want to make changes in how you use energy?
- C23. How much did the [effort] increase your awareness of ways you can save energy in your {home/business}?
- C24. Was the [effort] a good way to explain the ways to save energy in your {home/business}?

While these four questions can be analyzed individually, it is the average of them together that is used for the CCI.

Concept 3 – Direct influence

This is a direct self-report of influence of participation on actions taken

- C31. On a scale of 1 to 7, with 1 meaning that you not at all influential and 7 means very influential, how much did the program influence you to make the changes you just mentioned?

This core set of questions were slightly varied based on the specific program for which they were asked and some questions were dropped as they were not appropriate. For example, it does not make sense to ask someone about changes they may take directly after being exposed to the information, as is the case for event intercepts. In those cases C31 was not asked.

Table 30 shows the questions by survey across all three contract groups.

Table 30. Questions by Survey

Questions	Evaluation Effort					
	Ethnic Surveys	E-newswire	Tracking CA Spanish Phase 2	Tracking CA English Phase 2	CBO Presentations	CBO Event
Concept 1						
C11	X		X	X	X	X
C12	X					X
Concept 2						
C21	X	X	X	X		X
C22	X	X	X	X	X	X
C23	X	X	X	X	X	X
C34	X	X	X	X		X
Concept 3						
C31 (commercial)						
C31 (residential)						
C31 (market actors)	X					

CCI Algorithm

The algorithm used to calculate the CCI is shown next.

CCI = W1*[max of C11 and C12] +

W2*[(average of (c21, C22, C23, C24)-0.17)/0.17] +

W3*[(C31-0.17)/0.17]

Where W1, W2, and W3 are weighting of each concept and the scales have been changed to deciles for the index calculation.

In most cases, W1 was 0.1, W2 was 0.7, and W3 was 0.2. Concept 2 was the primary area that must change in the program influenced actions and thus was given the highest weight. Concept 1 is a dichotomous value and needed a smaller weight to not cause large swings in the overall index while concept 3 is provided a smaller weight as people will have some awareness of influences, but there may be difficulties with memory recall.

When questions numbers changed, the weighting changed as well, but concept 2 always had the highest weighting.

Example of Cognitive Change Index (CCI Score)

As an example, information from one of the programs is next. This program had all three concepts included in the core battery. We looked at the data from this program several ways to assure ourselves that the CCI was robust (i.e., appeared to measure what we expected and had variation).

Comparison of Level of Influence Index to Direct Influence Question

We assumed that the calculated index should not be wildly different than a self-reported influence (concept 3).

Figure 20 shows the variation within the CCI, including all three concepts for those who made a change while Figure 21 shows only the direct influence question.

Figure 20. CCI with All 3 Concepts

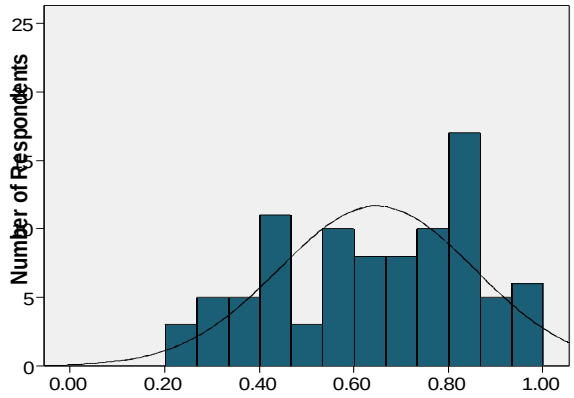
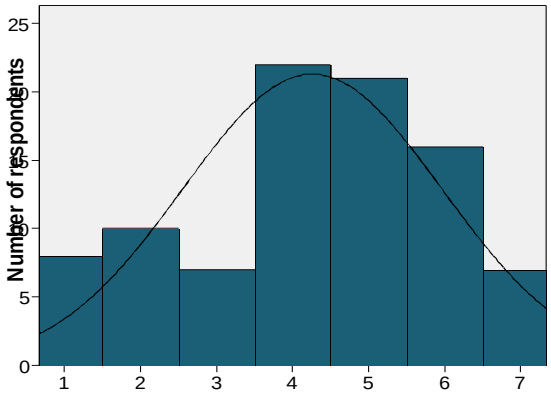


Figure 21. Direct Influence Question



The two graphs show a similar distribution (i.e., bell shaped and not too skewed) which supports the use of the index.

CCI Question Correlations

The index must be viewed as similar concepts by the respondent to be a successful index. To test this, we calculated a Cronbach's alpha[71] for the questions. This value indicates whether the questions "hang together" as a concept. Information from the first tracking survey had a Cronbach's alpha of 0.86. These values support the use of the CCI as a reliable index.

CCI Value Variation

We also looked at the variation within the CCI value by first computing it using the planned weighting and then by changing the number of questions within the index and lastly, the number and their weights.

Table 31. Variation by Number in CCI and Weighting

Test	CCI Value
Concepts 1 and 2, everyone with concepts 1 and 2	0.67
All 3 concepts and only computed for those with all 3 concepts	0.65
All 3 concepts and only computed for those with all 3 concepts, weighting 0.5 on concepts 1 and 2 and 0.5 on concept 3	0.61

As shown Table 31, there is a 0.04 degree of variation when changing the weighting, which is acceptable, but does show that the weighting affects the overall value. Introducing the third concept also creates a difference. This information shows the potential variation in the CCI for calculation choices. Although this shows some variation, it appears relatively small and we support the weighting scheme originally agreed upon.

Taking Action and CCI

In the training center assessments, many market actors and end users were asked the CCI questions. Table 32 shows that there is a relationship between the CCI and the percent of actions that people indicate they have taken.

Table 32. Relationship to Taking Action and CCI

Cognitive Change Index	% Taking Action*			
	All	Market Actors	End User–Nonres	End User–Res
Little (1.0–2.50)	29%	29%	40%	17%
Some (2.51–5.50)	69%	71%	73%	55%
Very Much (5.51–7.0)	85%	87%	87%	73%

[71] Cronbach's alpha is a statistical test that measures the internal reliability or consistency of a number of items within a scale or index. The value ranges from 0 to 1.0 with values towards the higher end (above 0.70) suggesting that the items are measuring the same thing.

*Taking action indicated through responses to three questions

This supports the validity of the questions as an influence concept.

Application of CCI to Energy Savings

In all surveys, the CCI questions were asked only once. As such, the CCI is applied to all energy savings behaviors and to any measures where energy savings are calculated. Table 33 shows possible results from the survey and how the CCI value was applied. For the SWM&O programs, the CCI was multiplied by the percent taking action to obtain net actions.

Table 33. Example use of CCI

Measure	n	Total Square foot ('000)	kWh Unit savings (per 1,000 square foot)			Therm Unit savings (per 1,000 square			MWh savings			Therm Savings		
			Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Lighting	53	106	282	565	847	0	0	0	1,587	3,174	4,761	-	-	-
HVAC	27	67.5	167	334	501	0	0	0	304	609	913	-	-	-
Boilers / Hot Water	3	7.5	0	0	0	2.1	4.1		-	-	-	46	92	-
Gross Total									*1,888*	*3,775*	*5,663*	*1,741*	*3,492*	*5,080*
Level of Influence	0.72													
Net Total									*1,359*	*2,718*	*4,077*	*1,254*	*2,514*	*3,658*

Background Research for CCI

Part of creation of the CCI involved research around how best to approach this new concept of net behaviors (versus net energy savings). Next is this original write up.

Energy saving utility programs are usually rebate, incentive, or direct install programs where participation is defined as using program support to install a particular measure or take a specific action. In California, when net analysis occurs using self-report design for these programs, a net-to-gross ratio is applied to gross energy impacts to *screen out* free-riders, that is, program participants "who would have implemented the program measure or practice in the absence of the program.[72]" In a typical energy saving (or resource) program, the default assumption is that the participant took the actions as a result of the program (i.e., gross savings) and a screening out process to get to net savings is an important step to ensure that the program impacts are known.

The concept of participation is defined differently for non-rebate programs such as information, education and training programs (including programs such as marketing and outreach efforts). Information, education, and training programs may or may not have lists of people exposed to information as participation can mean anything from attending a training session to the unsolicited receipt of a brochure. When we attempt to look at energy savings for these informational programs, we are "building up" the savings; due to the lack of knowledge that a specific measure or practice was taken. The default assumption for each person touched is that they learned something that would change future energy saving action. As such, the standard concept of net-to-gross (screening out savings) needs to be adjusted for information, education and training programs. When the aim of a program is to

[72] California Energy Efficiency Evaluation Protocols: Technical, Methodological and reporting Requirements for Evaluation Professionals. April 2006. TecMarket Works Team, p 226.

inform and educate, the impact question for which the self-report queries focus becomes *what would the person have learned if the information, education, or training programs had not been present.* However, this is not the whole picture for indirect impact analyses in California. This issue is discussed more later.

Unique Characteristics of Information, Education and Training

Information, education and training program efforts—unlike a financial incentive—do not align with the "per unit" assumptions of the set of standard net-to-gross (NTG) questions currently in use in California. For example, the standard NTG battery asks about timing and quantities; which allows the parsing out of energy when an individual buys two or three light bulbs. However, information, education and training generally contribute to an overall decision, which is very difficult to separate out in people's minds, especially using survey questions.

Standard NTG questions about whether the respondent would have "paid the additional amount on their own" obviously do not work since information, education and training do not provide any form of financial support. Moreover, batteries such as the current California non-residential NTG battery asks to rate program effects (that is, rebates or incentives) relative to other effects. However, the other effects considered are informational efforts: *"Using a [one] to [seven] rating scale, where [1] means not at all important and [7] means extremely important, please rate the importance of each of the following in your decision."* This battery then asks about availability of the rebate (which is not applicable for information programs), information provided by a feasibility study (which is also not applicable), information from a training course, information from other marketing materials, and recommendations from a supplier/vendor. This series of questions, therefore, cannot easily be adapted for the standard informational program.

Therefore, when we attempt to understand the net effects of informational programs, we need to consider the following:

- Information, education and training are not as tangible as a financial rebate.
    - While some efforts like trainings may occur on a particular day, other efforts such as a community event, advertising, receiving a brochure or visiting a website are harder to attribute to one particular day, and may be difficult for an individual to recall even if they were exposed, much less when. This makes causality difficult to assess well.[73]
- Information, education and training cannot always be separated from other efforts. That is, these efforts often lead to the next step in a web of related behaviors and influences that ultimately lead to the energy saving action.
    - Notably, even with rebates or financial incentives, there is at some point in time education about both the rebate and the measure or action that occurs prior to the customer taking any action. As such, "education" cannot always be teased

[73] Roger Tourangeau (in *The Science of Self-Report. Implications for Research and Practice*) calls this an encoding error – people never form a representation of an event or what is formed is so sketchy "as to render retrieval difficult or impossible" (p. 31).

apart from the more tangible rebate (e.g., How much did learning about the rebate affect your action versus how much did the actual rebate affect your action? These are difficult to separate.)[74]

- Information, education and training are generally thought of as contributing to actions; they lay the groundwork for the ability to take reasonable actions. However, they are not usually the sole reason (or even a critical reason) for taking action.
    - While it may be a more critical factor if the respondent was totally unaware of the action prior to the effort, asking what would have been done in the absence of seeing an advertisement, attending a training, or viewing a brochure is not as likely to provide valuable information as it becomes too hypothetical and abstract to obtain valid measurements. For example, if the question is asked, *If you did not know about this action, what do you think you would have done?* The obvious response is: *Not do that action.* However, it is possible that learning more about an action provided the "tipping point" that, combined with the ability to make a purchase or take an action not required financing, brought about energy saving actions.

Method for Determining Net Behaviors

Information, education and training programs are subject to an evaluation under the Indirect Impact Protocol, which requires "An evaluation to estimate the program's net changes on the behavior of the participants.[75]" In this statement, it assumes that the information provided through the program has made behavioral changes that could have occurred without the program. The first impact evaluation question we stated earlier becomes multiple questions to: 1) figure out if the information learned through the program was new (and therefore provide a temporal "spot" for causality); 2) where else the person may have learned that information; 3) did the person take an energy saving action; and 4) what was the influence of the program information on performing the action. The last evaluation question is the most difficult to answer well as academics have been searching for years for models to help understand why people take actions (of any sort). Because of the complexity of interactions between a person's internal cognition and emotion with the external reality of their social structures, financial ability, and physical space, there are a myriad of influences on any one action.[76]

We researched previously created scales around cognitive change so that we were sure that they already had been tested with a reasonable Cronbach's alpha. We reviewed three sources:

- Marketing Scales Handbook. A Compilation of Multi-Item Measures. Gordon C. Bruner II and Paul J. Hensel. 1992 American Marketing Association.

[74] This difficulty is similar to when Tourangeau writes "What we retrieve from memory often consists of our current beliefs about an incident, beliefs that reflect what we actually experienced (and remember), what we did not experience but infer, and what we learned later on." (p 35)

[75] California Energy Efficiency Evaluation Protocols: Technical, Methodological and reporting Requirements for Evaluation Professionals. April 2006. TecMarket Works Team, p 41.

[76] This can also be thought of as a person's personal and contextual domain that influence actual behaviors.

  - Handbook of Marketing Scales. Multi-Item Measures for Marketing and Consumer Behavior Research. William O. Bearden and Richard G. Netemeyer. 1999. Sage Publications Inc.
  - Marketing Scales Handbook. A Compilation of Multi-Item Measures for Consumer Behavior & Advertising. Volume IV. Gordon C Bruner II, Paul J. Hensel, Karen E. James. 2005. Thomson Higher Education.
- Ultimately, we chose a scale from the last source that had a Cronbach's alpha of 0.79 and dealt with cognitive change as the program theory indicated that the programs were attempting in influence change in cognition – what one knows. This background formed the basis of the CCI algorithm and questions.

APPENDIX D. DESCRIPTION OF PROGRAM MEASURES

The SWM&O programs include information about specific measures as well as less specific messaging. The next sections provide information about the specific and non-specific messaging from each of the umbrella programs.

Mass Media Advertising

The primary medium through which the education and information is disseminated to the market is a mass media mix of television, radio, online, outdoor and print advertisements. Beginning in 2007 and continuing through 2008, the mass media campaign effort changed to be environmentally-driven, departing from the economics-driven campaign strategy of 2004-2005 and 2006, specifically drawing on a global warming theme. All three SWM&O Programs devoted 80% of each mass media message to global warming and 20% of the messaging to the target measures that indicate to the viewer *how* he or she can take action to help reduce greenhouse gas emissions through small household changes such as installing CFLs or energy efficient HVAC equipment.

By making the link between global warming and household energy use, the SWM&O programs attempt to not only raise awareness, but also to generate enough concern on climate change to motivate consumers along the continuum of awareness to action. The Opinion Dynamics evaluation team, with the assistance of social marketing expert Richard Earle, examined the new message themes, tone, and imagery of the environmentally-driven global warming premise. The SWM&O campaign employed a commentary on global warming to draw on the moral responsibility of Californians to leave a positive environmental legacy to future generations. This campaign relied on messages like "To my children I leave _____" and "Global warming is a choice" as a method to motivate consumers to adopt energy efficient behaviors. The programs' devote the majority of their advertisements to discussing global warming and its relationship to household energy use.

The SWM&O programs have two primary message seasons with specific promotional measures:

1. Summer Advertisements focus on energy efficient lighting measures, such as the installations of dimmers and CFLs and various energy efficient cooling measures.
2. Winter Advertisements focus on energy efficient gas heating measures, such as efficient furnaces and water heaters

The target measures are deliberately aligned across the SMW&O programs promoting a few universal measures such as CFLs and energy efficiency HVAC systems. In addition, each program implementer may elect to promote a few supplemental measures which tend to change year-over-year or that are more appropriate to the target audience, e.g. rural audiences.

Many of the TV, radio, and print ads showcase simple actions that individuals can take in their home. For example, in 2007 one FYPS ad shows a woman changing a light bulb with her child, while another displays a man lowering the thermostat in his home. Similarly, some of the FYPR ads encourage the use of ceiling fans in place of ACs, and waiting until after 7 p.m. to use large appliances (which is an action most commonly associated with the Flex Alert days). These examples demonstrate a clear practice that an individual can adopt to save energy and, implicitly, help limit climate change. The table below shows an inventory of promoted practices items across the programs. CFLs are the most commonly proposed practice. The 2008 FYP TV advertisements only referenced the FYP website in the program logo and did specifically call out the website in the FYP radio advertisements. The toll-free number is not referenced in either the TV or radio spots. All of the 2008 FYPR messages functioned in a channeling capacity, with all messages referencing both the FYP website and toll-free telephone number.

Table 34. Inventory of Practices and Resources Shown in Mass Media 2008

Program	Media	Practices (Product or Behavior)	Resources (web or phone)
FYPG	TV	• Use CFLs • Use EE appliances • Use EE AC	• Flex Your Power web site
	Print	• Use CFLs • Use EE AC • Use appliances in the evening • Several other home energy saving tips	• Flex Your Power web site
	Radio	• Use CFLs	• Flex Your Power web site
FYPR	Print	• Use CFLs • Modify home heating/cooling • Several other home energy saving tips	• Flex Your Power web site • Toll-free telephone number
	Radio	• Replace old ACs • Use Energy Star	• Flex Your Power web site • Toll-free telephone number
	Events	• Use CFLs • Use EE appliances • Unplug/turn off lights when not in use • Use ceiling fans in lieu of A/C	• Flex Your Power web site • Toll-free telephone number
FYPS	TV	• Use CFLs • Replace old ACs • Use energy efficient appliances	• Flex Your Power web site • Toll-free telephone number

A brief description of the three programs, the information provided and the behaviors promoted, is described below.

Flex Your Power-General Program (FYPG)

The campaign devotes very little of its airtime discussing targeted measures, often using a teaser approach whereby the produced media is composed of an extensive narrative in advance of introducing the target measure. This advertising approach is highly stylized and draws the link between the narrative and the target measure message at the conclusion of the spot. If the individual viewer/listener is ready and willing to take action, our analysis of the advertisements indicate the heavy global warming focus may not provide enough energy efficiency information for viewers to take action. While the advertisements may ignite a desire to save the planet, by conserving energy or protecting the environment in some capacity, a direct call to a specific energy efficiency or conservation action, such as turning down the thermostat by three degrees in the winter months, is often lacking in the FYPG mass media advertisements. The primary measures promoted in the 2006-2008 mass media FYPG advertising are shown in the table below.

Table 35. English-Language Marketing and Outreach Primary Measures 2006-2008

Target Measures	Efficiency Partnership		
	Flex Your Power General		
	2006	2007	2008
Summer	• CFLs • Ceiling Fans • EE Air Conditioners	• CFLs • EE Air Conditioners	• CFLs • EE Air Conditioners • Appliances
Winter	• EE Furnaces	• EE Furnaces • EE Water Heaters	• EE Furnaces • EE Water Heaters

Flex Your Power-Rural Program (FYPR)

FYPR promote energy conservation behaviors as supplementary or secondary actions that consumers may take year round if and when the promoted energy efficient measures cannot be adopted due to situational or fiscal constraints on the consumer. The FYPR program implementers employ conservation practices as supplemental messages in their efficiency advertisements. These practices are mostly promoted in print advertisements and longer radio or TV advertisements and directly correspond to the target measure (e.g. promoting thermostat set-points with energy efficient furnace advertisements). [77] [78]

The FYPR 2006 campaign is characterized by clear, actionable information that speaks to both the environmental and economic benefits to the user of energy efficient activities. The FYPR program's message focus on information-driven advertisements remained in the 2007 campaign; however the 2007 FYPR campaign had more emphasis on the environmental impact of energy consumption – e.g. Global Warming – as a motivation to drive energy efficient activities. All of the 2008 FYPR messages functioned in a channeling capacity, with all messages referencing both the FYP website and toll-free telephone number

The FYPR mass media efforts are characterized by their emphasis on information, providing their audience with a series of high and low cost measures with each seasonal campaign. Based on the messages alone, the FYPR campaign aims to provide its audience with practical, option-driven content to better inform the purchase decisions of its rural consumers.

[77] While the CPUC-defined goal of the SWM&O programs is to promote energy efficiency measures so that, in the event that the need arises, consumers will elect to purchase the energy efficient measure, program implementers stated that these practices provide an additional path to action and provide other options if and when consumers are not in the position to adopt the promoted measures due to the financial constraints of the target audience. This practice is most prominent in the Flex Your Power-Rural campaigns, where the messaging is more educational in tone and provides more in-depth information.

[78] It is important to note, however, that Flex Your Power-General targets similar behaviors in its Flex Alert, demand response campaign (which is not under the purview of this evaluation effort and is not examined in this research). The Flex You Power-General program does not promote conservation behaviors in their advertisements.

Table 36. English, Rural Marketing and Outreach Primary Measures 2006-2008

Target Measures	Runyon, Saltzman, and Einhorn		
	Flex Your Power Rural		
	2006	2007	2008
Summer	• Install CFLs • Install and use Ceiling Fans	• Install dimmers • CFLs • EE/Energy Star AC Units	• CFLs • EE Air Conditioners • Appliances
Winter	• EE Furnaces • Insulate Home	• EE Furnaces • Insulate Home • EE Heat Pumps	• CFLs • EE Air Conditioners • Appliances

Flex Your Power-Spanish TV Program (FYPS)

Much like the FYPR program, FYPS promotes energy conservation behaviors as supplementary or secondary actions that consumers may take year round if and when the promoted energy efficient measures cannot be adopted due to situational or fiscal constraints on the consumer.

The FYPS program aims to educate and encourage Hispanics to adopt energy efficient measures by promoting the connection between energy efficiency and global warming, and subsequently identifying the individual's role in making an impact on this global issue. The program educates Spanish-speaking Californians on energy efficiency through a series of TV advertisements placed primarily on Univision Television (and later on Azteca American when that channel was added) and through a number of events throughout the state. These advertisements and events focus on lighting, cooling, and heating measures and were aired in tandem with the FYP general audience campaign schedule. The FYPS ads used either a talk show/town hall format or presented actions in and around the home to deliver messages on climate change and saving energy. The ads aim to educate an audience that is not very familiar with climate change and energy saving practices, and direct them to the toll-free FYP phone number and FYP website for details about specific actions they can take to save energy and help stop global warming.

The FYPS campaign is the only program whose sole task is to educate Spanish-speaking Californians. Although each of the he SWM&O programs each implement Spanish-language marketing and outreach, FYPS is the only SWM&O program devoted entirely to targeting Spanish-speaking Californians exclusively through Spanish TV and related events sponsored by Univision. Both the FYPG Spanish program and the FYPR Spanish program supplement FYPS's outreach efforts through radio and print advertisements within their geographic targets (urban and rural respectively).

Table 37. Spanish-Language Marketing and Outreach Primary Measures 2006-2008

	Flex Your Power Spanish
	2006-2008
Summer	• Evap Coolers • Adjust Therm • Whole House Fans • CFLs • EE Appliances
Winter	• Seal Leaky Ducts • Natural Gas Furnaces • Insulate Home • Programmable Therm
	Flex Your Power Rural – Spanish Language Advertising
Summer/Winter	• Use CFLs • Use EE appliances • Unplug/turn off lights when not in use • Use ceiling fans in lieu of A/C
	Flex Your Power General – Spanish Language Advertising
Summer	• CFLs • EE appliances • EE A/C

Within the FYPG campaign the Spanish efforts have been part of the broader ethnic outreach component, part of which aims to supplement the FYPS TV advertisements with radio and print ads. These ads are aired in the state's four major DMAs: Los Angeles, San Diego, San Francisco, and Sacramento/Fresno. The Spanish-language portion of the 2007 FYPG program is dominated by radio, followed by print.[79]

The FYPG program's Spanish-language efforts often focus on the many sacrifices Hispanic immigrants have made for their children–including uprooting themselves, moving to the US, and holding down two jobs–to make a connection between the parents' current energy-related actions and the impact that they may have on their children's environment.[80] The FYPG Ethnic advertisements are aired only during the summer campaign season. Throughout this season the advertisements focus on lighting and cooling measures.

The Flex Your Power-Rural campaign targets Rural Hispanics with a series of PR activities, outreach events, and media partnerships. The program disseminates Spanish-language print and radio advertisements that target Hispanics who live in IOU rural-designated zip codes. These efforts are negotiated entirely through media partnerships and aim to supplement the FYPR program by focusing on rural California's largest minority population. The FYPR print and radio ad campaign emphasizes that an easy change (e.g., using CFLs) can help provide solutions to global warming.

[79] Statewide Energy Efficiency Marketing and Outreach Programs Preliminary Summary Reach and Frequency Evaluation Memorandum. "Opinion Dynamics Preliminary Reach and Frequency Summary updated.doc".

[80] General Creative Brief, February 2007.

Additional Outreach Strategies

Beyond the mass media mix, the programs also make use of other outreach strategies including an interactive website, a toll-free telephone number and community outreach activities and events. Below is a brief description of the information provided through these other outreach strategies.

Interactive Website

The interactive website, www.fypower.org, includes many pieces of energy efficient and energy conservation information for the residential, commercial, industrial, institutional and agricultural market segments. In addition to general website content, the website also includes the e-Newswire, PowerPlug Blog, Best Practice Guides, Product Guides and Case Studies. The e-Newswire, a frequent online newsletter, is assessed as part of this evaluation. An in-depth look at the content and reach of the website can be found in the October 2008 Process Evaluation of the California Statewide Marketing and Outreach Programs PY2006/2008. As part of this impact evaluation, the Opinion Dynamics team conducted a brief content analysis of the PowerPlug Blog, Best Practice Guides, Product Guides and Case Studies available on the website, as of March 2009, to better understand the information offered, the energy practices promoted and intended beneficiaries. While most of this information is available on the website, much of this information is also disseminated in hard copy at various events such as the Flex Your Power Awards Ceremony. Below is a summary of this content analysis.

Product Guides

The FYP website offers product guides for residential and non-residential (commercial, industrial, institutional and agricultural) market segments. The product guides promote energy efficiency by offering tips to viewers on major appliances and equipment. For example, the product guides for the residential market offers information on a wide range of measures: such as refrigerators, insulation, heating and cooling appliances, lighting, and water-saving measures.

Within each measure or product category, each product has a dedicated webpage of detailed information. The FYP product guides are consumer-oriented and offer recommendations not only on brands and types of products that save energy, but also ways that consumers can save energy using the products they already have. The main value of the product guide is that it gathers information from several sources and presents it all at once to the consumer in a clear and reader-friendly fashion. This information includes federal and industry ratings for energy efficiency, as well as calculations of – potential energy or monetary savings. The individual pages include some or all of the following information:

- Which product designs are more energy efficient (front-loading vs. top-loading clothes washers, for example), though not endorsing specific brands or models
- Ways to reduce energy use for a product already owned
- An explanation of ENERGY STAR and the Energy Guide, if applicable to the product

- Explains other energy efficiency ratings and measurements that apply to each product (Energy Factor for dishwashers and R-value for insulation, for example)
- Tips on more cost-effective power (if not more energy efficient, in the case of dryers)
- Why the consumer should try to reduce energy use for the product
- How much energy the consumer can save with by changing energy use or buying a new energy-efficient product
- Specific features to look for when buying
- Developing energy efficiency technologies for the product
- A list of some brands that produce ENERGY STAR models for the product

A good example of a product guide is for a heat pump, which has the following sections:

- **Introduction.** Explains what a heat pump is and its potential for energy savings.
- **Technology Options.** Explains parts and types of heat pumps. Explains SEER (Seasonal Energy Efficiency Rating) and HSPF (Heating Season Performance Factor) ratings, which measure the heat pump's energy use, and what the numbers mean for the consumer's energy bill. It also lists what ratings meet the American Council for an Energy Efficient Economy (ACEEE) standards.
- **Energy Benefits.** Recommends the type of heat pump to use (geothermal) and breaks down approximate savings (energy savings and monetary) over a year and over the heat pump's lifetime if the consumer buys an energy efficient product.
- **Manufacturers.** Lists specific producers of ENERGY STAR heat pumps. It also links to the ENERGY STAR and ACEEE lists of recommended manufacturers and products.
- **Purchasing Tips.** Offers nine tips for picking a more energy efficient heat pump, as well as setting it up and using it in the most energy efficient way.
- **Emerging Technologies.** Describes planned developments in rating heat pump efficiency, as well as ways of making heat pumps more environmentally friendly.
- **Sidebar.** Links to pages that generally explain ENERGY STAR and Energy Guide labels, though they do not give specific information on heat pumps.

Best Practice Guides

The FYP website offers best practice guides for non-residential (commercial, industrial, institutional and agricultural) market segments. These guides offer consumers information for ways to save energy and reduce energy costs. The guides describe benefits of energy-saving practices and offer tips for energy conservation. The guides are often industry specific, such as guides specifically for hotel facilities or general office buildings.

The best practices guides are dense divided into several chapters spanning several web pages or downloadable in a PDF format. The guides offer some information for buying new products, but most of its content is geared toward energy conservation recommendations.

All of the guides include all of some of the following information:

- Explanations of the general benefits of saving energy

- Strategies for developing an energy savings plan appropriate to the business and getting the necessary funding and approval to carry the plan out
- Specific types of changes for products (such as building envelopes or HVAC) that are most likely to apply to the business
- Description of demand response programs that apply
- Ways that a business can generate its own power supply, such as solar power
- Other information resources on useful policies, actions, or products
- Links to case studies of California businesses that implemented some of the practices recommended in the guide
- Link to a glossary of terms used in the guide

The commercial building best practices guide, for example, breaks down into the following sections:

- **Introduction.** Explains why commercial buildings should try to save energy, in terms of environmental and energy impacts, as well as financial and productivity impacts.
- **Planning an Energy Program.** Gives detailed steps of roles that will be needed and steps that a business should take to decide what steps are best for them to take to save energy. It also explains policies and guidelines that may apply to the building plans, as well as independent organizations that verify and certify energy saving measures, such as LEED and Energy Star.
- **Funding and Approval.** Lists financing mechanisms and resources for energy projects, as well as possible incentive and rebate programs for improvements. It also gives strategies for selling the plan to stakeholders and other decision-makers.
- **Lighting**. Offers specific ideas on ways to improve lighting, in terms of use and in terms of replacements. It offers multiple areas of the building where lighting measures can be done: offices and workstations, hallways and corridors, restrooms and closets, signs, and outdoors. It also suggests installing daylighting, using large windows to light rooms by sunlight alone, for larger rooms and hallways.
- **Building Envelopes.** The building envelope is defined on the site as "all partitions that separate outdoor air and temperature from indoor spaces: windows, doors, walls, roofs, and foundation," so these measures offer ways to reduce energy use by changing the building itself. It offers the specific strategy of cool roofs, keeping light-colored to expel as much heat as possible from the building. It mentions other more general strategies such as using the shade and sealing ductwork.
- **Central HVAC System.** Lists strategies for reducing energy use in the HVAC system overall, as well as possible specific improvements to different subsystems (such as heating and cooling equipment) to improve energy efficiency.
- **Distributed Generation.** Details ways for a building to produce its own power (distributed generation), such as solar power. It also describes cogeneration, an electricity production process that also can provide heating and cooling through the HVAC system.

- **Demand Response.** Provides information on ways that a company can get alerts for peak demand periods, times when power demand reaches or is anticipated to reach especially high levels, and strategies a company can implement to reduce energy use during those times (demand response). It also mentions billing plans that reward businesses that cut use during peak demand period.
- **Commissioning.** Discusses incorporating energy efficiency practices into day-to-day operations and management of the building after new measures have been installed. Argues the benefits of maintenance and lists specific potential strategies.
- **Procurement Policy.** Lists smaller ways for offices to save energy, especially with office equipment. Suggests replacing older office equipment with Energy Star and lists tips such as shutting down computers at night.
- **Water Use.** Explains the relationship of water and energy consumption, and ways to increase awareness and reduce use of water in the office. It details specific areas and ways where water consumption can be reduced: bathrooms and landscaping.
- **Education.** Offers strategies and programs that building owners and company owners can use to inform tenants and employees about energy.
- **Energy Efficiency in Telecommuting.** Explains potential benefits of encouraging telecommuting, and gives guidelines for ensuring that telecommuting employees actually use less energy.
- **Resources and Appendices.** PDF documents of specific savings calculations and examples of a company's energy savings plan. Also links to Flex Your Power pages on finding grants and loans, products guides, and other resources, as well as case studies of California businesses and their energy savings plans.
- **Lessons learned.** Summarizes benefits of energy efficiency in business, environmentally and financially.

Case Studies

Within the FYP Best Practices Guides are case studies explaining how specific California businesses and organizations implemented energy-saving measures suggested in the guides. The case studies both allow readers to learn specific applications of energy-saving measures in the real world, and for companies featured in the case studies to gain public attention for their actions. The case studies are in several different places on the site, and their format changes based on where users find them. The studies for manufacturing customers, for example, are only in PDF format and are found on the main page of the Best Practices Guide. The case studies for the food production industry, however, are only in HTML format and are only found in the margin of the guide itself. The case studies for commercial buildings and local governments are in both formats and locations; however, the list of case studies changes from the HTML list to the PDF list.

The format of the case studies themselves remains generally consistent across the different formats and industries. The studies include basic information about the company, their planned energy improvements, their actual energy improvements, the resulting financial and energy savings, and lessons learned for the future. One example is the case study for Unisys' offices in Mission Viejo, which features the following sections:

- **Building the Case for Energy Efficiency.** Basic information about the company's financial expenditures and savings from their energy efficiency programs.
- **Summary.** Describes the company's actions to save energy, their main objectives and reasoning for these actions, and the overall results.
- **Plan.** Gives a brief history of Unisys' decision to implement major energy-efficiency measures and areas the company identified to focus on for their efforts.
- **Programs: Efficiency.** Lists specific installations at the building, such as cool roofs and hardware to monitor real-time energy use.
- **Programs: Employee Outreach.** Describes publications, events, and other programs used by the company to promote energy efficiency awareness and reward employees for reducing use.
- **Budget and Finances:** Lists sources of funding for the project, as well as where the most money was spent.
- **Results:** Breaks down approximate financial and energy savings for each major measure.
- **Marketing:** Describes the company's program to show employees the resulting savings after the measures were implemented.
- **Lessons Learned:** Major challenges and important factors that may be relevant in future projects or in maintaining current projects.
- **Contact Information:** Basic information about the company and information for the company's project contact.

The only studies that are organized differently are the HTML commercial case studies, which give much of the same information but in an overall description without the section headings of the other case study pages.

PowerPlug Blog

The PowerPlug Blog is one of the pieces of online collateral for Flex Your Power. It can be accessed through the Flex Your Power website and RSS newsfeeds, for example an individual can sign up to receive the PowerPlug blogs through customized settings on a www.yahoo.com home page. A select number of recent blogs can be accessed on the FYP website at any given time (35 blogs were available to view on the website as of April 2009). On average, there are about 2-3 blogs released per week, sometimes as many as 5 per day. As is typical with blogs, the content is quite short, often announcing a newsworthy event or piece of information relative to energy efficiency or environmental protection in general. The blog provides content about the event or information and often a link to other sources of information.

Some of the blogs are directly beneficial to Flex Your Power's target market of general residential and business consumers looking to upgrade their residence or facility with energy efficient measures. For example, one of the blogs goes through a homeowner's experience of performing an energy audit on an old house. However, many of the blogs also go outside of Flex Your Power's target market. This includes consumers looking to buy a new fuel efficient vehicle, US businesses interested in accessing stimulus money for energy efficiency, investors interested in green technology, and job seekers interested in penetrating the green market. For example, one blog lists the 10 cars with the lowest greenhouse gas emissions per mile in 2009 that are for sale in the US. Another blog provides practical tips about how job seekers can land a green job. Overall, the blog roll is

beneficial to a multitude of target markets interested in frequent information about the energy efficiency and conservation industries.

Toll-Free Number

The Flex Your Power Rural program (FYPR) maintains a toll-free number as part of its marketing and outreach activities. The goal of the toll-free number is to help educate Californians on energy efficiency products, and to help steer them into utility-run education and rebate programs. Any Californian can call the toll-free number to receive assistance, but the number is only referenced in FYPR print and radio advertisements, and is aimed at targeting English- and Spanish-speaking rural residents that may have limited access to the Internet and the Flex Your Power website.

When a call is placed to the toll-free number – 1-866-431-FLEX – the call is received by an automated operator who gives the caller a choice between continuing in English or in Spanish. Perhaps mistakenly, the option for Spanish, i.e. "For Spanish, press two," is stated in English. Many of California's Spanish speakers may comprehend enough English to understand this directive, but ratepayers that speak Spanish only may not understand what they are being asked to do and simply hang up. FYPR should translate this option into Spanish to maximize the effectiveness of the toll free number. -

Once the caller has made their language selection, the operator instructs the caller to pick their local utility to learn more about Energy Star qualified products and rebates. Options are given for: Pacific Gas and Electric (PG&E); San Diego Gas and Electric (SDGE); Southern California Gas (SCG); Southern California Edison (SCE); Los Angeles Department of Water and Power (LADWP); and Sacramento Municipal Utility District (SMUD). Once the caller picks their utility they are then connected with that utility's rebate program. From there it is up to the utility to provide education and information about energy efficiency, Energy Star products, rebates, and tax incentives to the caller. The Flex Your Power toll-free number is therefore not an educational tool, but rather an instrument to help steer California ratepayers to their utility for education and information on energy efficient products and rebates.

Considering that many residents in rural areas of California do not currently have access to the Internet – especially high-speed connections – it would seem that the FYPR toll-free number does provide an important resource for rural Californians that are interested in making their home or business more energy efficient. The FYPR program might also consider providing some basic information on energy efficient products and activities, such as the statistics on CFLs and Energy Star air conditioners provided in the Flex Your Power General campaign advertisements. This would help to reinforce Flex Your Power's branding and mission to the caller, and also might give the caller a starting point to discuss energy efficient products and rebates once they are connected to their utility's rebate program.

Community Outreach Activities and Events

In addition to mass media advertising, RS&E, as part of the FYPR program, also recruits and selects community-based organizations (CBOs) through a bidding process in rural areas throughout the state to place print ads in regional publications, to conduct grassroots

outreach events, to distribute collateral materials, and to give presentations to local leaders in rural areas of the state.

APPENDIX E. DETAILED TRACKING SURVEY COMPARISON GROUP ANALYSIS

Opinion Dynamics performed a longitudinal tracking survey of the awareness, knowledge, attitudes (AKA), and actions of the general population.[81] Part of this effort compared the California population to two comparison states in order to control for changes due to nationwide mass media efforts. In our analysis, we looked at changes over time within the CA population. We compared changes in California to changes among our comparison groups in an effort to untangle the possible impact of the Flex Your Power (FYP) mass media campaign on knowledge and actions from national media efforts that affected both California and our other states.

There was vast amount of attention on global warming between 2006 and 2008. The comparison group needed to have been exposed to similar mass media global warming messages from other entities such as magazines, local newspapers, and television (e.g., Al Gore's 'We' campaign). In our effort, we chose comparison groups that were likely equally exposed to these other nationwide mass media influences, but they would not have been exposed to Flex Your Power. Opinion Dynamics examined the mean and percent differences between the comparison groups to assess whether there was a statistically significant effect in CA that could be attributable to the FYP campaign.

California is an extremely difficult state to compare to any other state because it includes several different climates and has a large, diverse population. We acknowledge that there were a myriad of factors that could also explain any differences found between the groups. We believe that differences in knowledge and actions that could be influenced by the FYP campaigns were a function of the following factors:

- education level of people–educational level is used as a proxy for different exposure levels to various, multiple information sources,
- household income – the ability to take actions are often based on whether there is the financial capability,
- rebates for energy efficient (EE) equipment – this is believed to be somewhat tied to household income. When there are entities that are pushing for people to purchase EE equipment by using cash rebates, we believe there is a higher exposure to EE messages with resultant AKA and action potential,
- age – younger people tend to be exposed differently to global warming than older age groups,
- geography – whether an air conditioning advertisement influences a person to purchase a new air conditioner depends on whether there is a need for air

[81] This is not a panel effort, but will be using random digit dialing to obtain data from at least 400 Californians and 400 non-Californians per quarter.

conditioning. Areas of the country with fewer cooling degree days (CDD) have less of a need for air conditioning, and

- home ownership – some EE actions are taken more often when a person owns their homes rather than simply renting (e.g., ceiling insulation, furnaces, central air conditioners, possible refrigerators).

We examined these different factors in four different states, Arizona, Oregon, Massachusetts and New York with the following results (see table below).[82] Each of the states was ranked in accordance to their similarity to California.

Note that other CPUC efforts are selecting comparison groups to determine the influence of programs. As such, they are selecting states that are similar across these characteristics, but ones that do not have existing energy efficiency programs. Due to the nature of our research, it was important for us to select comparison states with established programs but no state mass media efforts.

Table 38. Factor Comparative Analysis between CA and Four Potential Comparison States

Factor	Arizona	Oregon	Massachusetts	New York
Statewide mass media campaign	No	No	No	Yes
Factor	**Arizona**	**Oregon**	**Massachusetts**	**New York**
Utility specific media campaigns	1	3	2	2
Education	2	1	3	3
Income	2	3	1	1
Age	1	3	2	2
Geography	1	2	3	3
Homeownership	3	2	1	1

*1=most similar to California, 3=least similar to California

Based on this data, we determined that using Oregon and Arizona as the comparison groups would be as close a match as possible to California. For our analysis, statewide mass media campaigns and geography were most important. We completed approximately 200 interviews in each comparison state at each time period. The specifics on California and the comparison groups, is provided below.

Detailed Information on Program Efforts, and Climates, By State

California

Statewide Mass Media Campaigns

Flex Your Power is California's statewide energy efficiency marketing and outreach campaign.

[82] We also considered BC Hydro, but we eliminated this option since they would not be exposed to the same national media ads as California.

PGC-funded Campaigns

Most California utilities have some sort of energy efficiency campaign.

Table 39. California Climate Zone Population Distribution

Climate Zone	Definition	Population	Share
1	<2000 CDD, >7000 HDD	243,339	0.7%
2	<2000 CDD, 5500-7000 HDD	21,263	0.1%
3	<2000 CDD, 4000-5500 HDD	2,787,311	7.6%
4	<2000 CDD, <4000 HDD	24,373,086	66.9%
5	2000 or more CDD, <4000 HDD	90,325,50	24.8%
Total		36,457,549	100.0%

Arizona

Statewide Mass Media Campaigns

There appear to be no current statewide energy efficiency mass media campaigns.

PGC-funded Campaigns

Since October 2005, APS (Arizona Public Service) implemented an ENERGY STAR Residential Lighting Program. Its goals were to raise awareness and educate the Arizona market about features and benefits of CFLs, to establish manufacturer and retail partnerships and to move 940,000 CFLs in 2006. The program exceeded these goals by moving 1.3 million CFLs in 2006.

The programs mass media campaign included print ads and radio spots. Other marketing materials included brochures and handouts, lighting and outreach displays, customer outreach events, bill stuffers, retail point-of-purchase materials, and media materials and press releases. These marketing efforts resulted in an estimated 2,561,000 impressions in 2006.

The APS service territory includes the Phoenix metro area and much of central and southwestern Arizona. (http://www.aps.com/images/pdf/AZ_Map.pdf)

SRP (Salt River Project) promotes the ENERGY STAR Change A Light program and has set a goal to have 100,000 customers make a pledge in 2008 to switch from incandescent bulbs to CFLs. This program is promoted by the utility through newspaper and print ads as well as bill inserts.

SRP also has a program called PowerWise, which promotes general energy saving behavior and related incentive programs. These include rebates for efficient HVAC systems, appliances, pools and other consumer goods. There is no indication of a mass media campaign for the PowerWise program on SRP's website, but some advertisement is likely, utilizing the same channels as the Change A Light program.

SRP's service territory covers much of Arizona not served by APS. (http://www.srpnet.com/about/pdfx/ElectricServiceAreaMap.pdf)

Due to the differences between SRP and APS territory, and the fact that the APS programs are more developed, we propose to use only APS territory within Arizona.

Table 40. Arizona Climate Zone Population Distribution

Climate Zone	Definition	Population	Share
1	<2000 CDD, >7000 HDD	--	0%
2	<2000 CDD, 5500-7000 HDD	271,099	4.4%
3	<2000 CDD, 4000-5500 HDD	1,455,191	23.6%
4	<2000 CDD, <4000 HDD	--	0.0%
5	2000 or more CDD, <4000 HDD	4,440,028	72.0%
Total		6,166,318	100.0%

New York

Statewide Mass Media Campaigns

NYSERDA implemented an energy efficiency campaign in New York called Energy Smart. The campaign created a clearing house for information about existing residential programs, energy saving tips, trainings and events. This program is available year round.

Energy Smart has mass media campaigns related to the ENERGY STAR Change A Light program and general promotion of ENERGY STAR products. The Change A Light program utilizes radio spots and the other ENERGY STAR program utilizes a variety of channels, including newspaper/print ads, radio and TV advertisements and billboards.

The Energy Smart campaign appears to include the entire New York State.

In June 2007, New York City began "GreeNYC," a multimedia campaign to promote energy efficiency in the city. The goal of the program is to reduce carbon emissions by 30% by 2030. This will be achieved through energy savings tips and partnerships with NYSERDA's AC and lighting rebate programs. The program also partners with companies such as Bank of America, GE, Con Edison and Whole Foods.

The GreenNYC campaign utilizes TV, radio, print, online and billboard advertisements. It also achieves branding with an apple logo that appears on bus shelters, hybrid taxis, reusable shopping bags and other environmentally friendly initiatives. These marketing efforts appear to be year round.

The program's initial press release says that more than $3.2 million in media assets have been committed towards the campaign, including over $1.5 million in donated ad space from New York's television stations, newspapers and radio stations. Three GreeNYC advertisements have run on WNBC-TV, WCBS-TV, WNYW-TV, WABC-TV, WWOR-TV, WNJU-TV, Time Warner Cable and the Discovery Channel. Print ads will run in The New York Times, New York Post, New York Daily News, Hora Hispana, New York Observer and 30 Community

Newsgroup publications. Radio ads have also run on WNYC-FM, WLTW-FM, WABC-AM and WQCD-FM.

PGC-funded Campaigns

Con Edison created an Energy Education campaign. The effort covers a wide range of energy-related topics, including insulation, ENERGY STAR products, green power, lighting, appliances and air conditioning. The utility uses both print and radio advertisements which are rotated by topic seasonally. Although Con Edison has only the 2007 advertisements archived on its website, it is believed that the program continues in 2008 in the same format.

Both Con Edison and National Grid participate in ENERGY STAR's Change A Light program.

Climate

Table 41. New York Climate Zone Population Distribution

Climate Zone	Definition	Population	Share
1	<2000 CDD, >7000 HDD	5,778,166	29.9%
2	<2000 CDD, 5500-7000 HDD	2,043,536	10.6%
3	<2000 CDD, 4000-5500 HDD	11,484,481	59.5%
4	<2000 CDD, <4000 HDD	--	--
5	2000 or more CDD, <4000 HDD	--	--
Total		19,306,183	100.0%

Oregon

Statewide Mass Media Campaigns

The Oregon Public Utility Commission created the Energy Trust of Oregon to invest in cost effective energy conservation, help to pay the above-market costs of renewable energy and to encourage market transformation by promoting energy efficiency to customers. The Energy Trust has a variety of incentive programs targeting residential and commercial customers, including ENERGY STAR homes, ENERGY STAR lighting and appliances, and solar electric and water heating.

Despite the Energy Trust's offering of programs, there is no evidence of a mass marketing campaign.

PGC-funded Campaigns

The Energy Trust offers its energy efficiency programs to utilities in the state, including NW Natural, Portland General Electric, Pacific Power, Cascade Natural Gas and Avista. These utilities provide tips and information on reducing energy costs and have websites that link back to the Energy Trust of Oregon's incentive programs, but none have a branded campaign to promote energy efficiency. There are some small programs, such as Pacific

Power's "Be Smart" initiative, which targets 1,600 sixth graders per year, but no large marketing efforts.

The service territories of the Oregon electric utilities can be seen here: http://www.energytrust.org/CMS/trade_ally_map.html

Climate

Table 42. Oregon Climate Zone Population Distribution

Climate Zone	Definition	Population	Share
1	<2000 CDD, >7000 HDD	204,954	5.5%
2	<2000 CDD, 5500-7000 HDD	856,488	23.1%
3	<2000 CDD, 4000-5500 HDD	2,639,316	71.3%
4	<2000 CDD, <4000 HDD	--	--
5	2000 or more CDD, <4000 HDD	--	--
Total		3,700,758	100.0%

Demographic Comparison of States

Income	2006 Share of Households				
	Arizona	California	New York	Oregon	Mass
Less than $10,000	7.1%	6.0%	8.9%	7.5%	7.4%
$10,000 to $14,999	5.4%	5.2%	5.9%	6.5%	5.4%
$15,000 to $24,999	11.8%	10.1%	10.3%	11.7%	8.9%
$25,000 to $34,999	11.8%	9.7%	10.2%	12.0%	8.4%
$35,000 to $49,999	16.2%	13.4%	13.3%	16.0%	2.0%
$50,000 to $74,999	19.3%	18.3%	17.9%	19.9%	18.5%
$75,000 to $99,999	11.4%	12.7%	12.0%	11.7%	13.5%
$100,000 to $149,999	10.6%	14.0%	12.1%	9.6%	15.3%
$150,000 to $199,999	3.4%	5.3%	4.5%	2.7%	5.5%
$200,000 or more	3.0%	5.3%	5.0%	2.6%	5.2%
Median income	$47,265	$56,645	$51,384	$46,230	$59,963
Mean income	$64,021	$77,386	$73,384	$60,331	$78,264

Age	2006 Share of Population				
	Arizona	California	New York	Oregon	Mass
Under 5 years	7.8%	7.3%	6.3%	6.2%	6.0%
5 to 9 years	7.2%	6.9%	6.2%	6.3%	6.0%
10 to 14 years	7.1%	7.4%	6.6%	6.5%	6.4%
15 to 19 years	7.0%	7.5%	7.2%	6.8%	7.0%
20 to 24 years	6.8%	7.4%	7.1%	6.7%	7.1%
25 to 29 years	7.6%	7.2%	6.5%	7.2%	6.3%
30 to 34 years	7.0%	7.1%	6.5%	6.6%	6.4%
35 to 39 years	7.0%	7.6%	7.3%	6.9%	7.3%
40 to 44 years	7.0%	7.6%	7.8%	6.9%	8.1%
45 to 49 years	6.7%	7.3%	7.7%	7.6%	8.0%
50 to 54 years	6.0%	6.4%	6.9%	7.5%	7.1%
55 to 59 years	5.6%	5.4%	6.2%	7.0%	6.2%
60 to 64 years	4.5%	4.0%	4.6%	4.8%	4.7%
65 to 69 years	3.6%	3.0%	3.6%	3.6%	3.4%
70 to 74 years	3.0%	2.5%	3.0%	2.9%	3.0%
75 to 79 years	2.8%	2.1%	2.6%	2.5%	2.6%
80 to 84 years	2.0%	1.7%	2.0%	2.0%	2.2%
85 years and over	1.5%	1.4%	1.9%	1.9%	2.1%
2006 Population	*6,165,689*	*36,249,872*	*19,281,988*	*3,691,084*	*6,437,193*

Age	2006 Share of Population between 25 and 64 Years				
	Arizona	California	New York	Oregon	Mass
25 to 29 years	14.8%	13.7%	12.2%	13.2%	11.6%
30 to 34 years	13.6%	13.5%	12.2%	12.1%	11.8%
35 to 39 years	13.6%	14.5%	13.6%	12.7%	13.5%
40 to 44 years	13.6%	14.5%	14.6%	12.7%	15.0%
45 to 49 years	13.0%	13.9%	14.4%	13.9%	14.8%
50 to 54 years	11.7%	12.2%	12.9%	13.8%	13.1%
55 to 59 years	10.9%	10.3%	11.6%	12.8%	11.5%
60 to 64 years	8.8%	7.6%	8.6%	8.8%	8.7%

Population 25-64 years	*3,169,164*	*19,067,433*	*10,315,864*	*2,011,641*	*3,482,521*

Race/Ethnicity	2000 Share of Population			
	Arizona	California	New York	Oregon
White	75.5%	59.5%	67.9%	86.6%
Black or African American	3.1%	6.7%	15.9%	1.6%
American Indian and Alaska Native	5.0%	1.0%	0.4%	1.3%
Asian	1.8%	10.9%	5.5%	3.0%
Other race	11.6%	16.8%	7.1%	4.2%
Two or more races	2.9%	4.7%	3.1%	3.1%
Hispanic/Latino	25.3%	32.4%	15.1%	8.0%

Race/Ethnicity	2000 Share of Population			
	Arizona	California	New York	Oregon
White	75.5%	59.5%	67.9%	86.6%
Black or African American	3.1%	6.7%	15.9%	1.6%
American Indian and Alaska Native	5.0%	1.0%	0.4%	1.3%
Asian	1.8%	10.9%	5.5%	3.0%
Other race	11.6%	16.8%	7.1%	4.2%
Two or more races	2.9%	4.7%	3.1%	3.1%
Hispanic/Latino	25.3%	32.4%	15.1%	8.0%

Home Ownership	2007 Share of Population				
	Arizona	California	New York	Oregon	Mass
Own home	70.4%	58.3%	55.9%	68.1%	64.3%
Do not own home	29.6%	41.7%	44.1%	41.8%	35.7%

US avg is 68.1%

Education Level	2006 Share of Population over 25				
	Arizona	California	New York	Oregon	Mass
Less than 9th grade	7.1%	10.6%	6.9%	4.7%	5.0%

9th to 12th grade, no diploma	9.2%	9.3%	9.0%	7.7%	7.1%
High school graduate (including equivalency)	26.7%	23.2%	29.8%	26.7%	28.2%
Some college, no degree	23.9%	20.3%	15.0%	25.5%	15.0%
Associate's degree	7.7%	7.6%	8.0%	7.9%	7.7%
Bachelor's degree	16.3%	18.6%	17.9%	17.6%	21.4%
Graduate or professional degree	9.2%	10.4%	13.3%	10.0%	15.6%
Population over 25	*3,953,375*	*23,133,174*	*12,845,882*	*2,501,372*	*4,345,561*

Population Density	2000 Share of Population				
	Arizona	California	New York	Oregon	Mass
Urban	88.2%	94.4%	87.5%	78.7%	91.4%
Rural	11.8%	5.6%	12.5%	21.3%	8.6%

APPENDIX F. UTILITY COMMENTS ADDRESSED IN FINAL REPORT

PG&E COMMENTS

The methodology for this study appears to be appropriate and overall, this was an effective evaluation. Our key concern with this evaluation is that throughout the report, the evaluators interpreted the effect sizes as "small." While these interpretations are not incorrect in a narrow statistical sense, they incorrectly apply the advice of Jacob Cohen, the statistician cited by the evaluators as the source for interpreting effect sizes. According to Jacob Cohen, these small/medium/large rules on effect sizes are merely rules-of-thumb for and should only be used when there are no studies from other interventions to be used as a basis for comparison. Compared to published studies of similar interventions (see citations within the body of the comments below), the effect sizes found for this program were medium-sized. Consequently, we believe the interpretation of results understates the effectiveness of this program at shaping consumer attitudes and behavior related to energy efficiency.

Cohen et al. state that the default option is not the best approach when more direct comparisons are available. Meta-analyses of mass media social marketing campaigns with goals of awareness, knowledge, behavioral intent, and behavior change characterize these effect sizes as "medium" impact rather than "small" impacts. These meta-analyses likely inflate actual campaign effect sizes given the bias against publishing results from ineffective campaigns. In light of these meta-analyses, as well as the evaluator's citation to Cohen et al.

please substantiate why you apply the “default option” and characterize the effect sizes as "small"?

Evaluation Team Response

Note that we added footnotes on pages 2 and 49 of the report to indicate that this issue is addressed in this appendix.

We agree that it is important to put this number in context. There are many studies in the marketing and communication literatures that assess the impact of media campaigns. A brief review of them, focusing especially on meta-analytic reviews reveals that this effect size is not at all unusual (Andrews & Franke, 1991; Assmus & Lehmann, 1984; Benoit, Leshner, & Sumana, 2007; Dillard, Weber, & Vail, 2007; Keller & Lehmann, 2008; Latimer, 2007; Lodish, Abraham, Kalmenson, Livelsberger, Lubetkin, Richardson, & Stevens, 1995; O’Keefe, & Jensen, 2007; Snyder, Hamilton, Mitchell, Kiwanuka-Tondo, Fleming-Milici, & Proctor, 2004; Tangari, Burton, Andrews, & Netemeyer, 2007). It is common to find effect sizes between 0.01 and 0.15. They can also be larger, and there are many factors that can affect the size of the impact, including the type of target behavior, whether there are physical or social consequences, whether emotions are involved, how frequency of purchase, message strength, framing of the message, and the use of fear, among other factors. The literature review to provide this context covered product advertising, campaigns on social issues, and health issues. None are exactly like the FYP program, but the range of what was covered is wide enough, and the small effect sizes common enough that it is clear that the small effect seen here is not out of line. Most importantly, we did focus entirely on effects on behavior rather than attitudes, as studies of media messages on attitudes yield larger effect sizes than those for behaviors.

We thought about indicating that the .07 of our study was in the middle of the range of effect sizes found, but we couldn’t really justify that characterization. We could say that there are quite a few studies with results in that range, so our results are not unusual. However, there are plenty of studies that have much larger effect sizes. The key is to select studies that address campaigns most like the FYP campaign. It is very difficult to find studies, at least meta-analyses of studies, that address mass-market campaigns promoting green behaviors. The Snyder study cited, addresses public health issues, and that is true of many mass-market studies. The commenter makes a good point that the Cohen effect sizes should be used when one has nothing better. We put thought into using the public health sphere indicated in the comment and determined that is was not a good point of comparison.

We don’t believe that the Snyder Study is the best point of comparison for the results because, although 0.07 is not an unusual result, that isn’t the same as stating it is medium in size. It is also common to get small effect sizes.

References for the write up above

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PG&E COMMENT CONTINUED…

Since the executive summary section is the most likely one to be read, the estimate of annual savings tied to increased use of CFLs (175GWh annually) should be cited in the energy savings section of the executive summary (p. 3)

Evaluation Team Response

We added this number and the confidence level values to the Executive Summary (p 3).

SAN DIEGO GAS AND ELECTRIC COMPANY AND THE SOUTHERN CALIFORNIA GAS COMPANY

COMMENTS ON THE STATEWIDE MARKETING AND OUTREACH PROGRAM IMPACT EVALUATION

The Joint Utilities have several concerns with Statewide Marketing and Outreach program impact evaluation. The most important of these are the following:

Comment #1

Structural Equation Modeling (SEM): In this study, the researchers posited a theoretical pathway that includes the following steps: *exposure → awareness/knowledge → intention to act → behavior change*. Structural equation modeling allows the researchers to estimate the magnitude of the behavior change as well as the linkages between the steps. In this way SEM potentially provides more information than a standard regression analysis. However, the SEM requires significantly more structure (assumed pathway and linkages) than the standard regression analysis. Given that, it is essential to conduct extensive sensitivity analysis to confirm that the assumed pathway is the *correct model*. This type of analysis would include testing alternative pathways or theoretical models (i.e., test for the validity of the baseline assumptions), alternative products (energy efficiency measures), or comparing the SEM results to alternative estimation methods. The current study does not include *any* tests for alternative pathways or alternative measures (only CFLs are evaluated). This is a critical flaw in the methodology and casts heavy doubt on the reliability of the outcome.

Evaluation Team Response

A careful SEM analysis starts with a theoretical model, and it tests that model to see if one's thinking is correct about the behavior being predicted. When there is a problem of the fit of the model with that theory, it is appropriate to make changes to the model (we did), but only one step at a time, and only when the modeler understands what changes in the original theory should be made that correspond with the model change. Only if there is more than one theory at the start would a modeler be justified in testing multiple models. In our case, we had one theory, which we tested, and which we modified based on the empirical results.

Our approach, therefore, did test multiple alternative pathways for CFLs. This information is described in the appendix on SEM, but was not included in the report for ease of reading.

We added a sentence to the methodology table (p 19) indicating that these tests were done, and referring the reader to Volume II for the full write up.

Note that including models addressing other purchase types (non-CFLs) would be inherently interesting; however, it wouldn't shed any light on the validity of this model. This is because we would theorize a different model for other product purchases. For example, purchasing energy-efficient HVAC would involve quite different variables and relations. The literature tells us that the cost of the behavior being predicted is a strong mediator of how much attitudes affect the behavior.

Comment #2

Sample Design for SEM. The evaluators use an online river sample for the SEM evaluations. River sampling recruits by means of banner ads, pop-up ads and similar instant "capture" promotions. Individuals who agree to participate are then screened and routed to the appropriate survey. River sampling does not provide a random sample from the population. Rather, river sampling involves selecting participants from a group that has already *chosen* to engage in online activity. This can potentially lead to serious problems with self selection and resulting self selection bias in the results. As noted by Charles DiSogra:

> "Fundamentally, river sampling is a web-based convenience sample of opt-in participants that uses a quota sampling approach to build a study sample. The selection method is not probability based, and participants cannot be described as representing any larger defined population. As an opt-in process, there is an inherent bias in river sampling, and that bias is both unknown and not measurable. Therefore, adding this to an opt-in panel sample does not address the projectability of results, nor does it ensure that there is fresh sample, as the respondent could be in a panel and in a river" (see: http://knowledgenetworks.com/accuracy/fall-winter2008/disogra-fall-winter08.pdf for more details on the pitfalls of river sampling).

Thus, the use of river sampling calls into question both the internal (unbiased) and external (generalizability) validity of the results. The evaluators themselves note that the online river sample was shown to skew toward more educated individuals. This also points towards the nonrandom sample selection issues associated with online river samples. Higher educated individuals are more likely to already be familiar with energy efficiency measures and thus less likely to be influenced by marketing and outreach programs. Thus, the fact that the evaluators find that the SEM analysis produces the lowest estimated savings is not surprising given the nonrandom nature of the sample selection.

Evaluation Team Response

The River Sample was deemed to be the best and most cost effective way of recruiting for this effort since this effort required conducting the research via Internet. We developed the sample to match the demographics of the state of California.

All forms of surveying have some level of bias—our approach required the use of Internet surveys, and we chose a river sample as the best method of obtaining sample at a reasonable cost and in a reasonable time. We contemplated conducting an RDD telephone sample to recruit participants, but this also led to biases in customers who do not own computers, as well as missing about 16% of the population that do not have a land line. (Note that we also considered a panel but this method was determined to have additional biases.) We believe that our approach was the most appropriate for this work, and acknowledge that it has some biases, as do all other means of developing sample. We note that internal validity is associated with causality, not bias.

Comment# 3

Baseline data. The evaluators note that the source of their baseline data (used to measure the impact of marketing and outreach programs) comes from the first general population survey of California that took place in the second quarter of 2008. The late timing of the baseline data is extremely problematic. As the evaluators note, "Because of the timing of the survey, we acknowledge that the baseline was already affected by many years of the Flex Your Power program." The late timing of the baseline suggests that any results obtained by the evaluators likely represent an extreme lower bound on the actual impact of the Flex Your Power program since many of the effects of the program may have occurred prior to the development of the baseline sample.

Evaluation Team Response

Our analysis looked specifically at annual savings in the last year of the program. As such, the pre-campaign baseline was an appropriate baseline. This also helps to gauge the current effects. The current marketplace has embedded in it the past years of the FYP campaign and our efforts did not seek to tease out the market effects from past program years. We agree with the comment that earlier years would likely have lead to larger effects…but believe that the effects that we saw in 2008 were indicative of the current marketplace. In addition, we note that the Energy Division evaluations need to provide summative program information that will result in improvements to the current program. The summative information provided by the tracking survey provides information to the IOUs, CPUC and program implementers about the necessary changes to the program to increase its outreach effectiveness.

Comment #4

In the SEM analysis of energy savings (see page 70) the evaluators use their SEM model "to compare the CFL purchases generated in our model to: (1) those with two standard deviations less exposure to SWM&O (e.g. almost no exposure) and (2) the mean intervention level (i.e. average exposure). The evaluators further note that this model is used to "approximate the regression procedure" that would typically be used to estimate savings associated with SWM&O. The methods used by the evaluators are not comparable to a regression based program evaluation procedure designed to measure the causal impact of SWM&O on CFL purchase behavior for a number of reasons. First, in a well designed experiment, individuals would be assigned to treatment and control groups randomly (i.e., receive exposure to SWM&O or not receive exposure). In the SEM analysis conducted by the evaluators, the group that is used as the control (i.e. those with two standard deviations less exposure) was NOT randomly assigned. Rather, they are a self selected group that for observable or unobservable reasons received less exposure. For that reason, it is unlikely that the SEM model will produce causal estimates of the impact of exposure to SWM&O on CFL purchases. While the direction of the bias (i.e. overestimate or underestimate effect) is unclear, it is nevertheless extremely likely that the estimates are not reflective of true program impacts. Second, the method used by the evaluators also does not approximate other quasi-experimental regression designs to estimate causal impacts. For example, in a pre-post analysis an evaluator is able to control for unobservable individual characteristics that might be correlated with both the exposure to SWM&O and the decision to purchase

CFLs. In the SEM analysis, the evaluators are unable to control for such unobservable variables, thus calling into question the internal validity of their findings.

Evaluation Team Response

The comment above assumes that the only way to infer causality is through an experimental design. While it is true that the experiment[83] is a strong method for establishing causality, researchers have long recognized that 1) it usually isn't feasible to apply this design in real-world research, 2) external validity suffers in a random control trial design, and 3) there are many other ways to establish causal relations. One of the bases for doing so is to use theory to guide the research. This puts the researcher in a much stronger position to believe that causal relations have been observed when the theoretical model is supported. There are other factors, too, that support interpreting the observed relations as causal, but the point here is that the experimental design is not the only way to do so. It is not easy to retrospectively assign people randomly to a mass media campaign.

Regarding the use of the SEM model in a way parallel to regression models to estimate program effects compared to a zero-exposure point, the comment indicates that the SEM approach is not comparable to a regression approach. The two are actually highly comparable in the use of the "counterfactual" as a point of comparison for the average program exposure. This is a very common econometric technique across analytic method that is used to estimate program effects.

Conclusion Comment

As a result of the problems and errors described above the Joint Utilities strongly recommend that unless these problems can be corrected, the study *not* be accepted as reliable or used for updating DEER or used to measure utility performance in the ERT and VRT process.

Evaluation Team Response

Note that as stated in the report, this study was an indirect impact evaluation of a marketing, education and outreach effort. This study was not intended for updating DEER or for being used to measure utility performance in the ERT or VRT processes.

[83] We assume that the term "experiment" refers to methods also called random assignment studies, random control trials as well as experiments and does not also encompass correlational or quasi-experimental designs in this term.