Evaluating Low Income Energy Efficiency Programs: Getting Results in California

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ABSTRACT

This paper provides an overview of California's statewide utility-implemented low income energy efficiency programs. In addition, it describes the nature and role evaluations play in assisting the four California investor-owned utilities to design and implement effective energy efficiency programs for their low income customers. During 2009-2011, California's investor-owned utilities are working together on five joint studies designed to assess and improve our low income programs. This paper will discuss some of these projects in greater detail and provide available preliminary results. In addition, we discuss the collaborative utility-regulatory agency project management process, the evaluation approaches used, and study results and lessons learned.

Overview of California's Low Income Programs

California has a long public commitment to promoting energy efficiency and energy conservation. California's four major investor-owned utilities (IOUs or Utilities)[1] have offered free assistance programs designed to support energy services to the low income community since the early 1980s. Historically, low income energy efficiency programs have been implemented in recognition of the limited financial resources and access that might hinder low income customer participation in conventional energy efficiency rebate programs.

In California, a vast number of residents have the potential to benefit from these programs, with roughly one third of the IOUs' combined 17 million residential customer households qualifying for low income services based on household size and federal income guidelines. Given the potential value to individual customers as well as to the state's goals of reducing energy consumption and greenhouse gas emissions, these programs remain a cornerstone in the portfolio of residential energy efficiency initiatives supported by the utilities and the California Public Utilities Commission (Commission). The utility services offered to this income-qualifying population include rate discount programs, one-time emergency rate assistance, energy efficiency programs, and cooling centers. This paper focuses on evaluation activities that support the IOUs' Low Income Energy Efficiency (LIEE) Program. Results from a recent evaluation of the Cool Center Program targeted to low income and vulnerable at-risk customers are also presented.

To varying degrees, these programs are designed to provide California's low income population with resources that assist them in saving money and energy while also providing non-energy benefits such as comfort, health, and safety. These free programs are funded through a public-purpose charge included on all customer bills and are regulated by the Commission. Within California, the IOUs work closely with the Commission to ensure the LIEE programs are as effective as possible. Evaluation, measurement and verification are integral to understanding and improving these large energy efficiency resource programs.

California's rate payer funded LIEE program is one of the largest programs of this type in the world. Over 5.6 million households (approximately one-third of California investor-owned utility residential customers) are estimated to be eligible to receive the low income program. Between 2009

[1] The four California IOUs are: Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), San Diego Gas and Electric Company (SDG&E), and Southern California Gas Company (SCG).

and 2011, the statewide IOU program is funded at $869.5 million, during which it will serve over 1 million homes and save over 240,000,000 kWh; 65,000 kW; and 15,000,000 therms. The importance and magnitude of the LIEE program within California's overall Energy Efficiency Strategic Plan is highlighted by the ambitious Low Income "Programmatic Initiative" set forth by the Commission, which states the program's goal: *"To provide all eligible customers the opportunity to participate in the LIEE programs and to offer those who wish to participate all cost-effective energy efficiency measures in their residences by 2020".*[2]

The LIEE program is available to qualified homeowners and renters residing in any type of housing, including single-family homes, apartments, condominiums, and mobile homes. A central purpose of the LIEE program is to provide energy efficiency products and services to customers who may not otherwise be able to afford them. The program's primary objective is to assist qualified customers in reducing their energy consumption. The program does this by providing eligible customers with various approved measures (i.e., types of energy efficiency equipment) at no cost through a direct-install, whole house approach. Income-eligible customers receive all measures and services available to them based on an assessment of their home. Some measures are only available in certain climate zones (for example, air conditioning measures are not cost effective in cooler coastal climate zones and are not provided to customers living in those areas). Table 1 below shows the measures available through the LIEE program.

Table 1: 2009-2011 LIEE Measures

Heating Systems	**Refrigerators**
Furnaces [1]	Refrigerators - Primary
Cooling Measures	**Pool Pumps**
A/C Replacement - Room	Pool Pumps [4]
A/C Replacement - Central	**New Measures & Pilots [5]**
A/C Tune-up/Services - Central	Forced Air Unit Standing Pilot Change Out
Heat Pump [4]	Furnace Clean and Tune
Evaporative Coolers	Forced Air Unit
Evaporative Cooler Maintenance	In-Home Display
Clock Thermostat [4]	Programmable Controllable Thermostat
Infiltration & Space Conditioning	Ceiling Fans
Envelope and Air Sealing Measures [2]	Thermostatic Shower Valve
Duct Sealing	High Efficiency Clothes Washer
Attic Insulation	Microwave
Water Heater Savings	LED Night Lights
Water Heater Conservation Measures [3]	Occupancy Sensor
Water Heater Replacement - Gas or Electric [1]	Torchiere Lamp Fixtures
Lighting Measures	**Customer Enrollment**
CFLs	Outreach & Assessment
Interior & Exterior Hard wired CFL Fixtures	In-Home Education

[1] Includes both Replacement and Repair.
[2] Envelope and Air Sealing Measures may include outlet cover plate gaskets, attic access weatherization, door weather-stripping, caulking and minor home repairs. Minor home repairs predominantly are door jamb repair / replacement, door repair, and window putty.
[3] Water Heater Conservation Measures may include water heater blanket, low flow showerhead, water heater pipe wrap, and faucet aerators.
[4] Measure available only at SCE.

[2] Adopted in Commission Decision 07-12-051, and reiterated in Decision 08-11-031, and the Commission's adopted *California Long-term Energy Efficiency Strategic Plan*, August 2008, p. 25. The *Plan* is available at http://www.californiaenergyefficiency.com/index.shtml.

[5] Not all new LIEE measures & pilots available at all IOUs.

In addition to providing weatherization measures and energy efficient appliances, each customer receives an in-home, individualized energy assessment and education, including information on how to read and understand their energy bills, and some easy things they can do to reduce energy use in their home. For example, at PG&E, customers agree to implement three of the energy savings tips they received during their LIEE energy education, such as turning the water heater down a few degrees, turning off lights when they leave a room, and not running the hot water continuously while washing dishes. As such, the program emphasizes long term and enduring energy savings which are intended to benefit both the individual customer via energy savings and improved quality of life while also contributing to meeting aggressive long-term emission reduction goals established by the State. In fact, past participants report in follow-up surveys months after their participation in the program that they continue to remember and implement the simple energy savings practices they learned through the LIEE program.

As is the case with other deregulated states, the four California IOUs work closely with the Commission to decide upon, fund, and execute evaluations to assess and improve program performance and effectiveness. During the current three-year program cycle, the Commission authorized five joint IOU studies for the LIEE programs: a process evaluation, an impact evaluation, a household segmentation study, a non-energy benefits study, and a refrigerator degradation study. The results of these studies will be used to make refinements to the programs and direct targeted marketing strategies, as well as update the cost effectiveness tests that will be used to assess program and measure effectiveness for the upcoming 2012-2014 program cycle. In addition to these studies, efforts are also underway to rename the LIEE program to create broader awareness of the energy efficiency program, and to pilot "Workforce Education and Training" approaches to help low income people enter the green job market as energy specialists or installers in LIEE or similar home weatherization/energy efficiency programs.

The Commission's Energy Division staff is responsible for managing and overseeing the Process and Impact Evaluations in order to ensure independence of these studies. Although LIEE programs do not have specific energy savings goals, LIEE energy savings contribute toward overall energy efficiency impact goals at each utility. In addition, LIEE energy savings are used to help calculate cost effectiveness at both the program and the individual measure level. The results of cost effectiveness testing for each individual measure will help determine which individual measures will be included in the 2012-2014 IOU LIEE program applications to be filed with the Commission in 2011.[3] If the previous 2009-2011 LIEE program application proceedings are any indication, design and adoption of the 2012-2014 LIEE program is likely to be a long and controversial public process, reinforcing Energy Division's determination to conduct evaluations that are demonstrably independent and transparent.

Because of their relationships with the customers and intimate knowledge of the programs, however, the IOUs are integral members of the LIEE evaluation advisory team. The IOU project staff is expected to make recommendations and provide input to Energy Division and the evaluation research contractor throughout the evaluation process. In addition, public input is solicited at workshop presentations of each evaluation at various study decision points, including finalizing the research plan and report recommendations.

The IOUs however, are directly responsible for managing and overseeing the other three LIEE research projects, which were specifically proposed to assist us in making implementation and design decisions to improve program effectiveness. For these non-evaluation studies, the Energy Division staff collaborates with the IOUs in an advisory role and participates in making recommendations and

[3] Low income cost effectiveness testing for California's LIEE program was discussed in: O'Drain, Mary and Angela Jones. 2003. *Evaluating Low Income Energy Efficiency In California: The Intersection of Cost Effectiveness, Energy Efficiency, Equity, and Politics.* Proceedings of the International Energy Program Evaluation Conference, Seattle, WA, August 21, 2003.

providing input. Needless to say, in California, an important collaborative relationship exists between the Commission and the IOUs for both types of projects – those that are managed by the Commission and those that are managed by the Utilities. The remainder of this paper describes several of the 2009-2011 program evaluations that are currently in progress.

The Low Income Energy Efficiency Program Process Evaluation

In California, Process Evaluations are a common and fairly standardized type of program evaluation designed to produce improved and more cost-effective programs. For the most part, they are expected to identify improvements or modifications that directly or indirectly acquire or help acquire, energy savings in the short-term (resource acquisition programs) or the longer-term (education, information, advertising, promotion and market effects or market transformation efforts).[4]

The 2009-2011 LIEE program included several new components, including a "whole neighborhood approach" and a statewide awareness campaign. The 2009 process evaluation is giving the IOUs and the Commission our first opportunity to understand how these new approaches are impacting key Commission and utility program objectives, including the Programmatic Initiative of serving all eligible customers by 2020, so that program elements can be fine-tuned to increase program participation and effectiveness.

In addition to assessing the effectiveness of various components of the LIEE program such as outreach, contractor delivery, and data tracking, this process study is also looking more specifically at customer behavior and attitudes towards energy saving opportunities. The study is assessing customer willingness to participate in energy saving programs, the particular needs of high usage customers, and low income customer response to IOU energy education and communication efforts. Finally, a key component of this process evaluation is to explore attitudinal and behavioral aspects of the LIEE population that create barriers to participation in the low income programs in order to help understand ways to mitigate and overcome these barriers.

The IOUs have been delivering LIEE programs for over 25 years, and by this time, the administrative and implementation models have been well tested. Many of the staff that currently administer or implement the programs have been involved with them for many years. The extensive program history, continuity of staff, and relatively static program design has all helped the IOU LIEE programs to run smoothly and efficiently.

Since 2000, the IOUs have coordinated efforts and standardized the LIEE offerings statewide, and each of the IOUs has developed databases to record and track program cost and installation information, as well as customer household characteristics, including income, number of household members, age and disability status, language, housing type and age, and climate zone. Information is collected on existing appliances, what measures are installed through the LIEE program, and their location in the home. It is the hope of the Energy Division and the IOUs that this wealth of program and participant information will allow the evaluation consultant to learn more program processes in relation to customer motivations and planning effective outreach.

As a review of program activities during the first year of the 2009-2011 Programmatic Initiative, the process evaluation plays a very important role in evaluating utility program processes and how they align with the Initiative. One of the most daunting tasks facing the IOUs is the ability to reach and motivate *all* willing and eligible customers by 2020. Previously, the IOU's primary goal was to serve as many homes as possible with our LIEE program budgets. With past budgets being so much smaller than the current budget and with so many low income people qualified to participate, IOUs did not usually have many problems expending our budgets and did not need to advertise the program. Currently, IOUs have dramatically increased budgets to enable us to serve 25% of our estimated eligible low income

[4] California Energy Efficiency Evaluation Protocols: Technical, Methodological and Reporting Requirements for Evaluation Professionals, April 2006. Available at http://www.calmac.org.

customers by December 2011, on our way to reaching our ultimate Programmatic Initiative of 100% participation by 2020. This requires us to thoroughly understand and overcome many program barriers (for example: lack of awareness of the program, innate suspicion of customers who do not believe any program would offer them "something for nothing," the multiple foreign languages and dialects spoken by California residents, and fear of discovery by illegal aliens--who in fact *do* qualify for LIEE as long as they are IOU customers).

The 2009 LIEE process evaluation is focusing on the delivery and effectiveness of customer outreach and energy education. The Commission and the IOUs believe examination of these processes will provide the most useful data to help program staff better understand current LIEE program barriers so that they can design more effective strategies for reaching large numbers of income-qualified customers and persuading them to change their energy behaviors to meet California's long term energy goals.

Furthermore, an assessment of the effectiveness of the program strategy is providing an opportunity to refine and improve program implementation in order to meet the goals of the Energy Efficiency Strategic Plan and other initiatives. In addition, understanding customer attitudes toward program messages and energy saving opportunities is informing marketing and outreach plans which will help achieve our ambitious penetration goals.

The customer outreach and energy education findings are leading to enhancements that, when integrated into the program, may result in improved customer acceptance and lead to successful low cost and no cost measures with positive energy efficiency potential, increased customer awareness and favorable customer energy outcomes – all which facilitate increased market penetration. Of particular interest to the Commission and program managers is what the process evaluation can reveal about how the goals of the Programmatic Initiative are being met and how the LIEE strategies are supporting those goals in practice.

Specific objectives of the 2009 LIEE process evaluation include:

- Documenting program goals, implementation strategies and procedures across utilities;
- Providing real-time feedback to program managers with specific focus on improving program recruitment and delivery, and identifying implementation and program design problems for review and modification to ensure program dollars are fully utilized and reach intended participants to achieve the greatest benefit;
- Assessing the effectiveness of the program;
- Evaluating areas of customer and trade ally satisfaction/dissatisfaction;
- Identifying barriers and obstacles to meeting program goals;
- Characterizing attitudes and energy-saving behaviors of targeted customers;
- Providing recommendations for improving programs;
- Determining the effectiveness and efficiency of the new LIEE program design and operations, including the whole neighborhood approach;
- Assessing customer willingness to participate in energy saving programs; and
- Assessing how our low income customers respond to LIEE education and outreach.

Current Status of the LIEE Process Evaluation Study

This study is following a unique collaborative approach between the Commission's Energy Division staff and the IOUs. Previous evaluations were bid out and managed by the IOUs. This process evaluation is being bid out by the IOUs, and will be managed and paid under contract to the IOUs, but all study decisions will be made by Energy Division staff, including final selection of consultants to implement the study. The study is currently behind schedule, but will occur by the end of 2010 in time to provide results for the Utilities to use in designing our 2012-2014 LIEE program and budget applications.

As with the previous LIEE program process evaluation results, the IOUs expect to correct and fine-tune the program as the study consultants discover potential issues and recommend fixes for them, so that by the time the final study results are reported at the end of the year, any issues found by the study will be long-resolved. For instance, the previous LIEE program made specific recommendations that helped the IOUs make changes to decrease invoice processing time, develop shared program brochures in joint service areas, and refocus contractor training efforts.

The Low Income Energy Efficiency Program Impact Evaluation

Like the Process Evaluation, the LIEE Impact Evaluation follows strict guidelines that are outlined in the California Energy Efficiency Evaluation Protocols (the California Protocols).[5] An Impact Evaluation of the LIEE program typically takes place every two to three years. The last impact evaluation was of the 2005 LIEE program. The 2008 program would have been the next LIEE program evaluated, however it was decided that it would be more valuable to wait and evaluate the 2009 program as that was the first year of a significantly expanded program. The upside of waiting to evaluate the 2009 program is more relevant results, but the downside is the severely curtailed study period that is required to have results to use for planning the next three year program cycle.

The Impact Evaluation will estimate first year electric and gas savings by measure, utility, housing type and other relevant dimensions for the IOUs'2009 LIEE Program. The IOUs will utilize these updated savings estimates in preparing their 2012-2014 LIEE programs and budget applications, which are currently due in May 2011. Since 2009 is the first year of the three year cycle's increased focus on energy savings via targeted segmentation, threshold criteria and related energy savings strategies, the impact study was designed with these strategic initiatives in mind.[6]

Study Approach

ECONorthwest, leading a team including Wirtshafter Associates, West Hill Energy & Computing, Inc., Michaels Engineering, Phil Willems/PWP, John Stevenson and Quantum Market Research, was selected to perform the impact evaluation. The study is being performed in accordance with the California Protocols. The Protocols allow for various methodologies including regression analyses and engineering models.

Previous impact evaluations of the LIEE Program, including the most recently completed Program Year 2005 LIEE Impact Evaluation Study,[7] have used regression analysis to estimate savings. Regression analysis has been considered in the past as the best choice for the LIEE program, and it is a key element for the 2009 study. Examining low income customers' energy consumption before and after measure installation is a relatively inexpensive and direct method of assessing program performance and we use data from their monthly utility bills. While cost advantages are strong compared to some other methods, the study team recognizes that there may be problems estimating measure-level savings for measures with relatively few installations.

In addition, twelve months of post-installation data are typically required for a billing analysis such as this. However, that was not possible to fit into the study schedule in this case, as an accelerated impact analysis timeline is critical in order to meet deadlines specified by Commission Decision 08-11-031 for using 2009 impact results in the IOUs' 2012-2014 LIEE Program Applications. Final results must be provided by March 2011, with solid draft results due by December 2010 so that the IOU can use impacts from this study to plan their 2012-2014 LIEE programs.

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[5] California Energy Efficiency Evaluation Protocols: Technical, Methodological and Reporting Requirements for Evaluation Professionals, April 2006. Available at http://www.calmac.org.

[6] This study may support the Process Evaluation's deeper examination of these 2009-2011 changes.

[7] Impact Evaluation of the 2005 California Low Income Energy Efficiency Program, Final Report, December 19, 2007, revised August 19, 2008. Prepared by West Hill Energy & Computing, Inc. (with Ridge and Associates, The Energy Center of Wisconsin, Wirtshafter Associates, & KVD Consulting).

This meant that this LIEE study started with a challenge: how to design and complete a rigorous, Protocol-compliant impact evaluation within a year of program completion. The IOUs and Energy Division encouraged ECONorthwest to be creative in its approach, and the study team discussed several different options before deciding on the one described below.

The study builds on the recent 2005 evaluation, which featured measure grouping to facilitate data requirements and data analysis, and which examined the relationship between usage and savings. Because the Commission has a focus on customer segmentation as a program strategy, the IOUs were particularly interested in approaches that demonstrated an analytical ability to tie segmentation schemas into the 2009 evaluation. Segments that were addressed include consumption level, energy insecurity, geography, language, and other delineations available from recent studies such as the Low Income Needs Assessment[8] or the 2005 Impact Evaluation. It is expected that the study will not only identify relevant segments but may also provide savings estimates by these segments for at least planning purposes.

The 2009 evaluation is particularly challenging because it necessitates ECONorthwest to navigate the shortened timeframe with creative methodological suggestions while also guiding the study toward recent Commission policy directives regarding customer segmentation as a strategy for achieving lasting energy and demand savings for the LIEE program.

Analysis Steps

A research plan for evaluating the 2009 LIEE program was developed to accommodate the accelerated timeline and produce usable results in time to support planning efforts for the 2012-2014 LIEE program. It follows these general steps:

- Use a billing regression model and data from 2008 LIEE participants to estimate impacts for measures that are included in both the 2008 and 2009 LIEE programs.
- For those measures that are new for the 2009 LIEE program, use engineering analysis and/or modeling to develop savings estimates instead of using a billing regression.
- For groups of measures (such as envelope and air sealing measures, or water heater conservation measures) where savings cannot be attributed to individual measures, attempt a second regression to allocate the share of the group savings to each of the individual measures.
- Develop versions of the billing model that include a comparison group of nonparticipants in the sample. The comparison group allows for the estimation of net impacts (if different from gross) and also incorporates broader market trends (e.g., fuel prices, recession, and effect of other efficiency programs).
- Conduct a phone survey of LIEE participants and eligible nonparticipants and use their survey results to supplement the billing regression model.
- Conduct onsite visits with LIEE participants to obtain additional information on persistence and how the installed measures are being used.
- Use the results from the previous steps to calculate measure-level impacts for the 2009 program.

Current Status of the Impact Evaluation Study

To date, the contractor has been working on developing some initial models while concurrently exploring mitigating factors that may contribute to inaccurate impact assessments of select measures (e.g., furnaces, evaporative coolers, and some weatherization measures) based exclusively on billing data. Once these phases of the research have been completed, the evaluation team will begin the onsite

[8] Final Report on Phase 2 Low Income Needs Assessment. California Public Utilities Commission Report. Prepared by KEMA, September 7, 2007.

data collection and final engineering analyses of selected measures. We anticipate having the final results of this project by November 2010. These results will inform our LIEE 2012-2014 program applications.

The Low Income Energy Efficiency Program Market Segmentation Study

In addition to the aforementioned evaluation projects, PG&E and SCE have been directed to conduct a Segmentation Study during the 2009-2011 LIEE program cycle that will provide each of the two utilities with a customized targeting plan to increase their effectiveness at identifying eligible and willing customers for the LIEE program.[9] Given the aggressive long-term goals noted above, this effort will result in utility-specific targeting plans that can be implemented on an on-going basis to help the IOUs to meet these goals.

The results of the segmentation study will assist the IOUs in targeting outreach efforts based on such variables as geography, relevant demographics (e.g., language preference), social networks, energy burden, energy insecurity, and level of energy use.[10]

The research will also develop targeting plans that include specific methods to facilitate the identification of households that are especially likely to benefit from the program. For example, given the specific measures that are offered via the program, SCE and PG&E may prioritize "maximum-value" customers based on one or more particular household or demographic variables (i.e., age of house, number of occupants, etc.). These findings will be utilized to provide specific targeting plans that will improve utility outreach results, particularly in so far as they increase customer receptivity and program penetration rates using the "Whole Neighborhood Approach" for outreaching and enrolling potential LIEE customers.[11]

The two utilities' targeting plans will each be unique due to differences in customer demographics, geography, and utility databases and infrastructure. The consultant is considering each utility's current marketing and customer database resources and capabilities (including internal databases and current vendor data) to design a viable and sustainable targeting approach for each utility. The outcome will be an overall targeting approach with clear delineation of where and why the suggested PG&E and SCE plans diverge to accommodate difference in either utility infrastructure or customer composition.

In addition to the targeting and outreach goals, this research is exploring ways to customize outreach media and messages to the defined segments within the eligible customer base. Once we understand who the key segments are, we will be in a better position to develop more relevant collateral materials and approaches to communicating with these segments in unique ways to insure optimal customer interest in the program. This secondary *research* objective serves the primary *targeting* objective by increasing the potential customers' propensity to participate in the program once they have been identified.

Study Approach

This segmentation project is being conducted by the research firm, Hiner and Partners. Based on the project goals, the research approach considers causal factors accounting for variation in energy burden within the customer population (such as income, household size, climate, dwelling

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[9] The other two IOUs—Southern California Gas Company and San Diego Gas and Electric Company—are not participating in this study since they were already conducting separate segmentation research.

[10] *Energy burden* represents the portion of a household's total income that is spent on energy bills; households that spend a large portion of income on such bills have high energy burden. *Energy insecurity* refers to the extent to which customers are likely to be delinquent with bill payments. Customers with high energy insecurity have regular or frequent late payments, and actual or threatened utility shutoffs.

[11] *The Whole Neighborhood Approach* is an outreach strategy in which the IOUs target homes and install measures on a neighborhood-by-neighborhood basis.

characteristics, etc). This is being used to facilitate predictive modeling approaches that use currently available information sets such as utilities' customer lists, other social assistance agencies' lists, lists of current or previous CARE[12] participants, at the same or nearby address, lists providing tenant addresses for master metered accounts, etc.

The approach to this study involves multiple iterations which tie existing customer data (i.e., billing and other customer data) to additional primary data collected for this project. In order to do this, the plan includes each of the following components:

- An assessment of the robustness of each utility's customer database in order to determine if it is necessary to augment one or both with third-party data that is deemed essential for segmentation.
- An investigation via focus groups to better understand some of the key issues that should be included in a quantitative survey that will ultimately provide necessary data to supplement the segmentation analyses of the existing customer data.
- The quantification of relevant attitudes, perceptions, awareness, etc, of customers drawn randomly from both SCE and PG&E CARE customer records,[13] in telephone survey research that will augment utility and available third-party data.
- Development of a segmentation solution of LIEE customers that is predictive of customer "need" for the LIEE program – based primarily or perhaps entirely on utility database data and any appended third-party data, using survey data to help qualify and prioritize the segments for targeting, and to profile the segments for marketing, communications and program management purposes.
- An assessment of the profiles of each resulting segment, which will be further explored in follow-up focus groups and in-home interviews and audits with customers representing these segments. This phase of the qualitative research is designed to test marketing and outreach strategies that will result in specific guidance for distinct and optimal communication strategies and tactics.
- The creation of an algorithm for each utility that will classify all their LIEE households into one of the final segments, providing an enterprise-wide LIEE segmentation solution.

Current Status of the Segmentation Study

To date, the first phase of qualitative research has been conducted as has preliminary analyses of the utility data bases. In addition, multiple participant and non-participant focus groups have been held throughout PG&E and SCE service areas. The contractor is currently engaged in preparing for the next phase of data collection which involves a quantitative phone survey. We anticipate having the final results of this project before the end of the summer.

The focus group results provided interesting insights that will also be shared with the Process Evaluation team. Focus groups were held in English and Spanish in rural and urban areas of California. For the most part, recent LIEE participants had a very positive view of the energy efficiency program and its impact on their bills, energy use and overall comfort. Customers remembered some of what they learned from the energy education portion of the LIEE program, and one participant revealed that he gave CFLs to all of his neighbors as Christmas presents, since he didn't think they would buy them on

[12] The California Alternate Rate for Energy (CARE) Program is the IOUs' low income rate discount program, providing a 20% discount on qualifying customers' monthly gas and electric bills. CARE rates also freeze certain high usage rates at lower costs for low income customers.

[13] Since CARE and LIEE income qualifications are the same, and almost 90% of eligible IOU customers participate in the CARE low income rate subsidy, samples drawn form current CARE customers are often used as a source of potential qualified LIEE participants.

their own, and he felt energy conservation was something important enough that we should all be helping with.

The Cool Center Program 2009 Process Evaluation

In addition to the LIEE and CARE programs, SCE and PG&E both provide a Cool Center Program for their income-qualified customers. This program runs during the summer months from May through the middle of October. While this is a considerably smaller program (by scope and resources), it provides a valuable service to our low income customers by offering them a means by which they can both reduce their personal household energy usage as well as increase their personal comfort and mitigate potential health and safety threats due to excessive heat. For the first time, in the summer of 2009, a comprehensive evaluation was done of SCE's Cool Center Program. Some of the results of this evaluation are presented below.

History and Overview of the Cool Centers

The Cool Center program was established from a grass roots initiative in 2001 in the wake of California's energy crisis. Several community-based non-profit organizations lobbied the CPUC to fund the establishment of Cool Centers, which are air conditioned places that people can go to keep cool during the summer months. The CPUC then mandated that SCE implement the Cool Center program for the 2002 summer season. The Cool Center program is designed to provide "human value" and "comfort" benefits, but it does not have quantitative goals or objectives at the program level, nor is there formal quantitative reporting to the CPUC. There is an expectation that the program will increase attendance over time. The program also has growth plans calling for steadily increasing numbers of Centers in the service territory.

In the desert areas of SCE's service territory, the ability to find relief from the heat has a major impact on comfort, health, and safety, particularly for low-income, elderly, and disabled customers. The Cool Center program is intended to provide low-income customers an energy efficiency resource by offering them a place to visit in lieu of cooling their own homes in an attempt to alleviate their home electrical usage, reduce their energy bills, and provide comfort as well as mitigate heat-related health problems (or deaths) resulting from extreme heat. Moreover, for customers who do not have air conditioning, the Centers providing a safe, cool place where they can get relief from the heat during the hot summer months. In addition, the Cool Centers provide a place for this population to learn about energy conservation practices and other low-income programs such as the IOU CARE (California Alternate Rates for Energy) low income discount rate, LIEE and LIHEAP (the federally-funded, state-run Low Income Home Energy Assistance Program providing weatherization and emergency rate assistance). Originally, the Cool Centers were established in "hot, isolated" areas, but since that time the Cool Centers have been increasingly located in low-income areas in population centers. In 2009 the program operated 16 Cool Centers in SCE territory.

While a small evaluation was conducted in 2005, the program has not had a comprehensive process evaluation since its inception. As such, SCE requested to conduct an evaluation of the 2009 Program. The evaluation was conducted by Hiner and Partners, a market research firm located in Southern California. The primary goal of the evaluation was to examine the efficiency of the program design and operations (including administration of the program, program targeting, outreach, service delivery, site activities, attendance, operations, and costs), customer benefits and satisfaction, as well as the relative performance of each of the 16 individual centers and associated contractors. Some of the key findings from this study are presented below.

Study Design & Methodology

The nature and small size of the program enabled us to employ multiple, including some nontraditional, methods of data collection and analyses, including:

- Semi-structured interviews with SCE's current and previous Cool Center Program Managers.
- A review of the Cool Center program documentation.
- Scheduled on-site visits to each Cool Center, which included semi-structured interviews with Cool Center managers, employees and visitors.
- Unscheduled visits to each Cool Center. This "participant observation" methodology was employed to gather information without alerting staff or visitors of the evaluation. In this case, the researcher observed the Centers as an "undercover" visitor.
- One-page on-site surveys distributed to visitors at each Cool Center.
- A ten minute telephone survey with SCE's residential customers within a five-mile radius of each of the centers.

Key Findings & Recommendations

The research uncovered differences in both the efficiency and operations of the individual Cool Centers. For example, some Cool Centers served large numbers of people who fit the profile of potential beneficiaries (e.g., people with low incomes who seek the benefits of cooling from outside their homes), while other Cool Centers provided cooling benefits to relatively few people. Overall, seven key factors were identified by the research as relevant to the effectiveness of the Cool Centers. Examples and recommendations regarding "best practices" were made for each of these factors. The following section briefly describes these factors.

Staffing Level. More staff does not necessarily translate into better service. Some Cool Centers had more staff but with little apparent added benefit. The research indicates that one full-time, dedicated Cool Center staff person is sufficient for each location – along with part-time accounting support and periodic supervision.

Staff Training. Staff varied in their training and understanding of the program. It is recommended that Cool Center staff receive standardized training that enables them to be able to (a) explain to visitors about the Cool Center and its purpose of providing a place where people can keep cool, and (b) provide effective energy efficiency information and education for visitors.

Staff Supervision. The research reveals that while Cool Center staff do not need direct supervision on a daily basis, they do require periodic and effective oversight. The program manager's extensive administrative activities limited the extent to which he engaged in on-site observations, supervision and direction. Increased supervision and enhanced (standardized) staff training by the program manager, will improve the administrative functions and activities of the individual centers.

Outreach and Promotion. Cool Centers are encouraged to promote their location through public service announcements in local media (e.g., newspapers and radio), flyer distribution, and other low cost, word-of-mouth activities. All of the Cool Center contractors appear to be following this guidance, however, with different levels of activity and success. Based on the research, it is recommended that Cool Center contractors receive guidance from the SCE Program Manager regarding outreach and promotion, along with standardized templates for flyers.

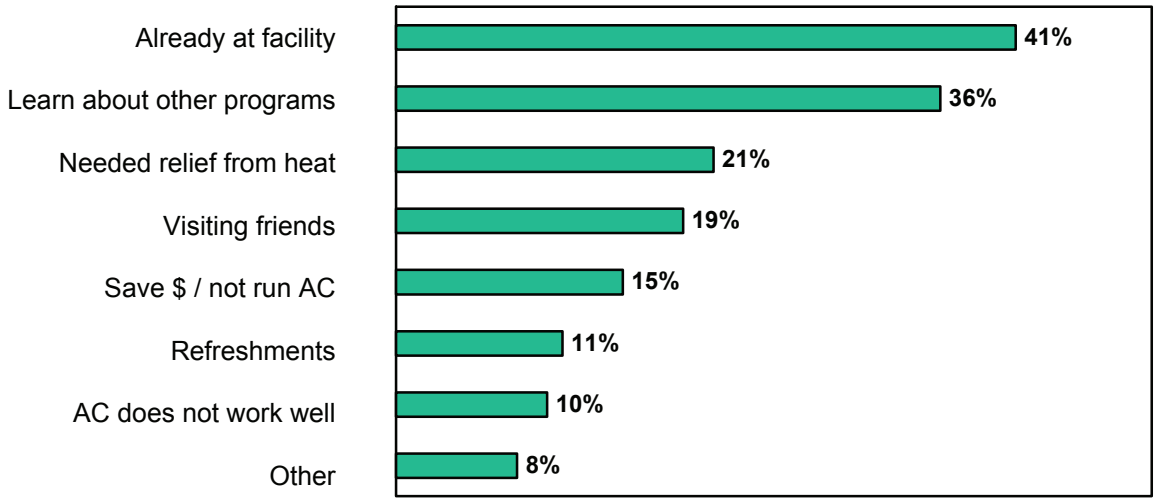
Location. The effectiveness of a location for a Cool Center appears to be more a function of the facility's physical characteristics and the year-round purpose of the building or property at which it is housed rather than its geographic location within SCE's service territory. Centers that are housed in facilities that serve specific populations (e.g., seniors, immigrants, etc) draw mostly those populations. It is important to market such centers in ways that also make them appealing to other demographic groups. It was also noted that the program should focus on identifying centers in more remote and hotter locations where people have far fewer cooling alternatives and much greater need.

Contractor Organizational Objectives. By design, a Cool Center is a part-time, incremental augment to the operations of an existing organization and facility. A conclusion of this evaluation is that the effectiveness of a Cool Center is dependent upon the host organization having objectives that are consistent with the mission of the Cool Center. The more effective Cool Centers are associated with host organizations that do not have to alter their operations to accommodate the Center.

Contracts and Compensation. Interviews with Cool Center contractors and the SCE Program Manager revealed that extensive paperwork and report processing leave limited time for program oversight and supervision. In addition, the current contract is structured in such a way that allows contractors to bill in ways that are not standardized between the Cool Centers. The research team suggested establishing a partial fixed-price contract with each Cool Center that would cover all overheads with receipt-based reimbursement for direct out-of-pocket costs. The intent would be to minimize the administrative burden while also standardizing the costs and requirements.

Not surprisingly, the "most successful," high attendance centers are those that are run effectively, have sufficient and interesting activities, provide a comfortable and conducive environment, and are situated in a location that tends to be hotter and/or somewhat remote.

From the customers' perspective, while many customers admit that they attend the Cool Center in conjunction with visiting the host facility (e.g., the Senior Center), a significant number of customers do visit the center to obtain information about other programs, and receive relief from the heat. The following bar chart graphs customer responses to the survey question: "Why did you visit the Center today?"

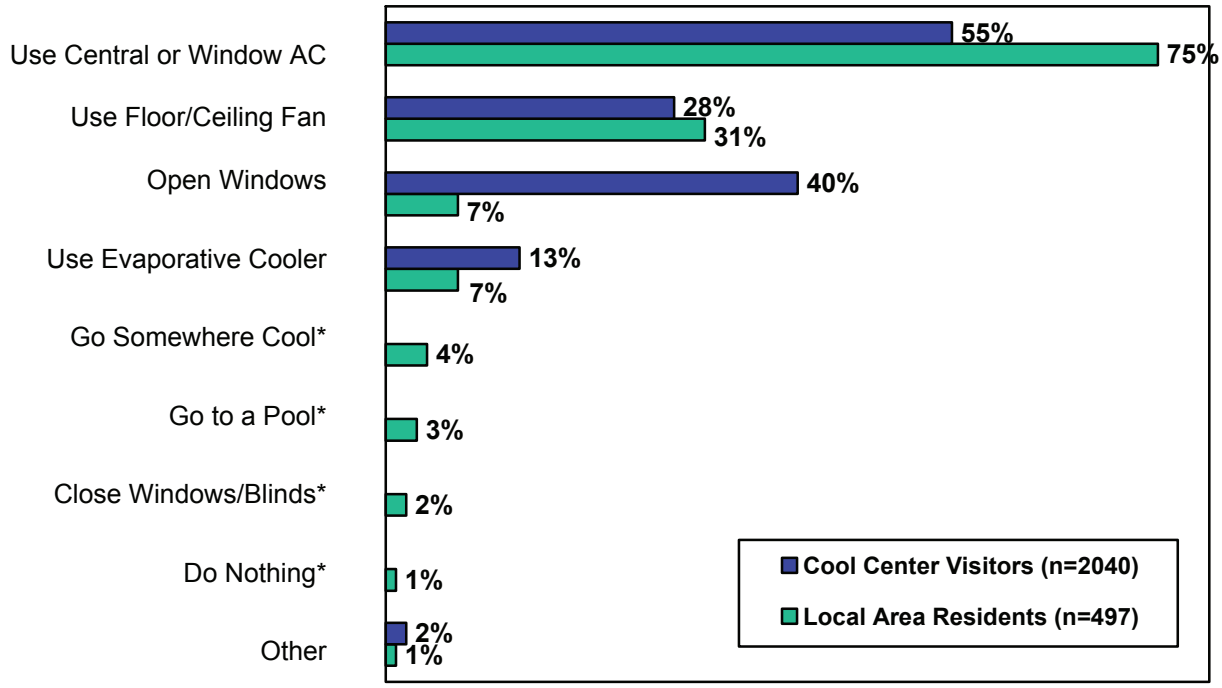


Q: Why did you visit the Center today?
N = 2013, multi response

The research also revealed that most of the low income customers who visit the centers are having difficulty cooling their homes to the extent that they would like (or are comfortable). Some do not have air conditioners or cannot run their air conditioners as much as they would like to maintain a comfortable temperature. This suggests that those who visit the Centers are in need of cooling assistance.

The phone survey with local residents found a high percentage of customers use their air conditioning and/or go to other locations to keep cool. It appears that the customers who visited the centers were more likely to open windows than use their AC units, which suggests that the Cool Centers are, in fact, serving a specific niche of customers who may not have the resources to maintain their home at a comfortable temperature during the hotter times of the summer. Both inquiries, however, reiterate the fact that there is a need to provide additional cooling assistance for residents in these warmer climate

zones. Customer responses to the survey question: "How do you typically cool your home or stay cool in hot weather?" are shown in the graph below:



Q: How do you typically cool your home or stay cool in hot weather?
*These response categories were added to the phone survey and not included in the on-site survey with visitors.

Moreover, while our research suggests that increasing awareness of the Cool Centers might increase attendance, it appears that there are certain segments of the low income population for whom the Cool Centers may be a more advantageous or beneficial program. For example, low income seniors are a viable target population for this program may be especially suited since this group is more likely to: (1) be home all day, (2) have health issues that may be more affected by extreme heat, (3) seek companionship and activities that are often found at senior centers, and (4) have less opportunity and means to find alternative places to go.

Cool Center Program Evaluation Summary & Overall Conclusions

The main purpose of the Cool Center Program is to provide respite from the heat for people who do not have or cannot afford to run air conditioning in hot summer climate areas. This is both a comfort and a safety issue. Susceptible segments of the population can physically suffer and, in extreme cases ,can die in high heat.[14] Secondarily, the Cool Centers offer customers a way to reduce their energy consumption and high summer bills, which can be a burden to low-income customers.

An evaluation of SCE's 2009 Cool Center Program uncovered the key features to consider in examining and improving the program. By systematically identifying best practices for these features and applying them to each Cool Center, the overall effectiveness of the Program is likely to improve. The research also suggested that for the Cool Center Program to be considered effective, it must meet an existing need for the target population. The results of the research indicated that there is a portion of low income customers who are faced both with inadequate cooling options and excessive heat (over 90 degrees) in their homes during the hottest times of the summer. While some customers are able to find alternative public places such as malls, movie theaters, or libraries to cool off during these times, there

[14] This evaluation did not investigate avoided health problems, yet this is an underlying justification for the program

are a number of customers for whom the alternatives are not as viable (too far, too expensive, not appropriate, etc.

In sum, the Cool Center Program provides a service for a significant number of low income customers who live in the hotter climate zones in California, and who have both inadequate home cooling as well as limited alternatives when it comes to keeping cool in the summer. While the individual Cool Centers vary in their effectiveness, the research identified specific steps that can be taken with regard to best practices which can enable individual Centers to perform more efficiently and thereby improve the overall effectiveness of the program.

Conclusions

Evaluations of California's LIEE programs are conducted regularly to help us document the successes of the programs in terms of energy savings, changing customer behavior, and meeting California's aggressive Low Income Programmatic Initiative. Under the direction of the Commission's Energy Division, independent evaluations will inform the next generation of low income programs in the upcoming public LIEE application process. In addition, to establishing energy savings impacts attributable to individual program measures, the evaluations are providing information to help IOUs design more cost effective energy efficiency programs, create more awareness of them and ultimately motivate more low income customers to participate in them.

Reference List

California Public Utilities Commission. 2008. *California Long-term Energy Efficiency Strategic Plan*. August. Available at http://www.californiaenergyefficiency.com/index.shtml.

KEMA. 2007. *Final Report on Phase 2 Low Income Needs Assessment.* September 7. Prepared for California Public Utilities Commission.

O'Drain, Mary and Angela Jones. 2003. *Evaluating Low Income Energy Efficiency In California: The Intersection of Cost Effectiveness, Energy Efficiency, Equity, and Politics.* Proceedings of the International Energy Program Evaluation Conference, Seattle, WA, August 21, 2003.

TekMrktWorks. 2006. *California Energy Efficiency Evaluation Protocols: Technical, Methodological and Reporting Requirements for Evaluation Professionals*. April. Available at http://www.calmac.org.

West Hill Energy & Computing, Inc., Ridge and Associates, The Energy Center of Wisconsin, Wirtshafter Associates, & KVD Consulting. 2008. *Impact Evaluation of the 2005 California Low Income Energy Efficiency Program, Final Report.* December 19, 2007, revised August 19, 2008. Prepared for Southern California Edison Company, Pacific Gas and Electric Company, San Diego Gas and Electric Company, and Southern California Gas Company. Submitted to California Public Utilities Commission.