# Estimating the Energy Savings Potential Available from California's Low Income Population

*Kathleen Gaffney and Fred Coito, KEMA Inc., Oakland, CA*

## Abstract

This paper presents the results of the energy savings potential analysis completed as part of the first-ever, comprehensive needs assessment conducted for California's low income population. The needs assessment was commissioned to direct future policy regarding the various low income energy programs offered in the state. The focus of this paper is on one of these programs: the Low Income Energy Efficiency (LIEE) Program, which installs weatherization and energy efficiency measures in qualified dwellings at no charge.

We begin with an introduction to the LIEE Program and present an overview of our data collection methodology. We then describe the energy use characteristics of California's low income population, and discuss the approach taken to determine the applicability of and need for various energy efficiency measures that have historically been offered through the LIEE Program. Next, we assess the total energy savings potential associated with these measures and determine the extent to which this potential is available based on an analysis of willingness to participate. The results from this assessment indicate that nearly 600 GWh and over 80 million therms of energy savings potential is available from California's low income population. These results have been used to direct future policy regarding the program design features, as well as provided input for future program goals and funding decisions.

## Introduction

Under the jurisdiction of the California Public Utilities Commission (the Commission), the investor-owned utilities (IOUs) in the state of California offer low income assistance programs to qualified low-income customers. The first of these programs is the California Alternate Rate for Energy (CARE) Program. CARE provides a rate discount to qualified low income customers who request to participate. The second program, and the focus of this paper, is the Low Income Energy Efficiency (LIEE) Program. The LIEE Program provides energy education and outreach services to qualifying households, as well as the free installation of weatherization and energy efficiency measures where feasible. Households with incomes up to 200% of federal poverty levels may qualify for both CARE and LIEE. The Commission approved nearly $750 million for the major IOUs to fund the CARE and LIEE programs in 2006.[1]

[1] California's major IOUs are Pacific Gas & Electric, Southern California Edison, Southern California Gas, and San Diego Gas & Electric. Small and multi-jurisdictional utilities (SMJUs) also provide the CARE and LIEE programs to eligible customers in their service territories. Funding information taken from the Draft Decision of ALJ Weissman, 12/15/2005, "Opinion Approving 2006-2007 Low-income Programs and Funding for the Larger Energy Utilities and Approving New Low-income Energy Efficiency Program Measures for 2006," http://www.cpuc.ca.gov/published/comment_decision/51207.htm.

## Data Collection Methodology

The results presented in this paper are derived from over 1,500 onsite surveys completed in 2004 with low-income households throughout the state of California. The onsite data collection effort was carried out using two-person teams, consisting of an experienced interviewer (or outreach specialist) and a trained energy auditor. Each was responsible for one of two primary stages or types of data collection. The first stage involved an in-depth interview with the head of the household and/or a member of the household who was responsible for the management of household finances such as energy bills. These interviews were conducted in a variety of languages, including English, Spanish, Chinese, Vietnamese, Korean and Tagalog and involved the collection of household characterization and needs assessment data. The second stage consisted of the energy audit and involved the collection of more detailed information about the home and the components of energy use, as well as the condition of the housing stock and the need/feasibility for energy efficiency measure installations.

**Sample Design.** The sample for the onsite data collection task was designed to meet several objectives:

- To ensure that all eligible households in the covered areas are represented,
- To allocate data collection resources efficiently to meet the project objectives, and
- To ensure that the sampling probabilities for different segments of the eligible population can be determined, so that the sample expansion can weight each segment appropriately.

An additional objective was to ensure minimum sample sizes for segments of particular interest, specifically population density categories (i.e., urban vs. rural), and utility service territories. In Table 1, we display our final sample disposition by density and service territory. In this study, "density" encompassed both population density and incidence of low-income households within an area. For instance, a "very dense" area was defined as either an area with (a) more than 3,000 homes per square mile and low income incidence of more than 20%, or (b) more than 1,500 homes per square mile and low income incidence of more than 30%[2]. A "very sparse" area was defined as an area with less than 200 homes per square mile and low income incidence of more than 10%, and the strata defined as "low incidence" refers to any area where low income incidence is less than 10%.

**Table 1.** Final Sample Disposition by Utility Service Territory and Density/Incidence Strata

| Strata | PG&E | SCE | SCE/SCG | SCG | SDG&E | Total |
|---|---|---|---|---|---|---|
| Very Dense | 130 | 145 | 228 | 214 | 50 | 767 |
| Dense | 105 | 4 | 94 | 46 | 34 | 283 |
| Sprawl | 65 | 0 | 76 | 12 | 26 | 179 |
| Sparse | 30 | 4 | 27 | 7 | 13 | 80 |
| Very Sparse | 109 | 7 | 48 | 12 | 5 | 180 |
| Low Incidence | 23 | 0 | 16 | 3 | 3 | 45 |
| Total | 462 | 160 | 489 | 294 | 130 | 1,534 |

[2] "Low income incidence" refers to the percent of households within a given geographic area that are below 150% of poverty according to the 2000 Census.

**Survey Design.** A number of steps were taken to design the formal data collection instruments for the onsite data collection task, including:

- Defining the information requirements
- Determining the correct terms and language to use in a questionnaire
- Mapping out the sequence of questionnaire sections
- Drafting the survey instruments
- Conducting internal review and field pre-tests
- Revising, finalizing and monitoring survey instruments and procedures.

Of particular concern in this study were challenges related to securing respondent trust and translating survey questions in multiple languages. The final survey instruments were translated and administered in the following non-English languages: Spanish, Chinese, Vietnamese, Korean and Tagalog. We recognized early on that certain demographic and energy-related questions would not easily translate from one language to another. Similarly, response interpretation tends to vary by language and needed to be taken into account when designing pre-coded answer categories. It was critical to address these issues in the survey design task to ensure accuracy and consistency in data collection.

As stated above, the data collection instruments were developed to satisfy the information requirements identified for the needs assessment. Table 2 lists some of the data collection elements from the onsite survey that were used specifically to estimate the energy savings potential among California's low income population.

**Table 2.** Information Requirements for Energy Savings Potential Analysis

| | |
|---|---|
| General Dwelling | Dwelling type (single family, multi-family, mobile home) |
| | Number of units (for multi-family) |
| | Number of rooms |
| | Dwelling square footage |
| Heating System | Fuel type, system type, age, and condition |
| | Percent of heat supplied by each system type |
| | Shared systems |
| Cooling System | System type, age, condition |
| | Number of non-central systems and use of covers during winter |
| Water Heating | System type, age, location, condition |
| | Shared systems |
| | Water heat tank and pipe wrap feasibility |
| | Low-flow showerhead and faucet aerator feasibility |
| | Existing water heater temperature |
| | Number of weekly hot showers, baths, clothes washer loads |
| Building Shell | Foundation/floor type, condition, caulking feasibility |
| | Ceiling types, area, condition, existing R-values, proposed R-values, existing and proposed attic ventilation, caulking, weatherstripping and fan feasibility |
| | Duct types, linear feet, location, condition |
| | Door types, condition, weatherstripping feasibility |
| | Window pane type, condition, caulking/weatherstripping feasibility |
| Other Appliance/ Equipment | Number of refrigerators and freezers by type, size, defrost, age, location, grounding, overall condition |

| | |
|---|---|
| | Number of programmable thermostats, usage patterns, temperature settings (winter vs. summer) |
| | Type of range/oven, condition, usage patterns |
| | Lighting usage patterns, number of existing bulb/fixtures, fixture types, CFL feasibility |
| | Presence of other energy-using equipment or appliances, such as dishwashers, clothes washers, clothes dryers, swimming pools, spas or hot tubs, TVs, stereos, aquariums, computers, etc. |

## Characterization of California's Low Income Households

Across California, nearly 4 million households are eligible for the LIEE program, or 28% of the total population. This estimate is based on Census 2000 reports and was updated using commercial data for the year 2003 (Claritas). California's low-income population is split between two geographic extremes – nearly half live in densely populated areas (i.e., more than 1,500 households per square mile), while about one in five lives in very sparsely populated areas (i.e., less than 200 households per square mile).

Table 3 compares energy use, demographic and dwelling characteristics for California households overall with California's low income households. As shown, annual electricity consumption is somewhat lower for low-income households than for the residential population as a whole, which is expected given that low-income homes are smaller and more likely to be multi-family. As demonstrated through this study, this is considerable potential for energy savings within California's low income population as a result of poor housing conditions, inefficient equipment and outdated appliances.

**Table 3.** Energy Use, Demographic and Dwelling Characteristics

| **Average Annual Energy Consumption [1]** | **All California Households** | **Low Income Households** |
|---|---|---|
| Electricity | 5,914 kWh | 5,797 kWh |
| Natural gas | 431 therms | 370 therms |
| **Household and Dwelling Characteristics** | **Percent of All California Households** | **Percent of Low Income Households** |
| Urban areas [2] | 49% | 51% |
| Very sparse rural areas [2] | 20% | 23% |
| Four or more persons [2] | 31% | 45% |
| Employed [2] | 78% | 64% |
| Renters [1] | 37% | 65% |
| Multi-family [1] | 31% | 50% |
| Dwelling size less than 1,000 sqft [1] | 29% | 67% |
| Dwelling built before 1970 [1] | 53% | 51% |

[1] Source: RASS 2004, KEMA 2006
[2] Source: US Census 2000, KEMA 2004

## Determining Measure Applicability and Need

The first step in our analysis of energy savings potential among California's low income population was the determination of measure applicability and need. Measure applicability was based on the presence of an end use that the measure affects and the feasibility of installing the measure. For example, the applicability of ceiling insulation depends of both the presence of air conditioning and/or space conditioning and an accessible attic in the home. Table 4 lists all measures for which applicability was determined through the needs assessment. Measures described as having a "low" applicability were applicable in less than 25% of California's low income households, "medium" measures were applicable in 25-75% of households, and "high" measures were applicable in over 75% of households. For some measures, such as refrigerators and CFLs, measure applicability was essentially 100%. Keep in mind that one in five low income households in California live in a multi-family dwelling, many of which are large complexes with more than five units per building. This characteristic alone limits the applicability of most measures typically included in programs like LIEE.

Table 4 also displays the results for measure need. Where applicable, the need for a measure was determined during the detailed home energy audit[3]. For measures affecting end-use equipment, such as refrigerators or air conditioners, surveyors determined whether or not the unit was in need of repair or replacement. For weatherization measures, such as caulking, weather stripping, and minor home repairs, surveyors determined whether the current condition was adequate or was in need of repair/tightening. Low need measures could be installed in less than 25% of California low income households for which the measure is applicable, "medium" measures were needed by 25-75% of households, and "high" measures were needed by over 75% of households.

The results in Table 4 indicate that some measures with high applicability, such as refrigerators, were found to have a relatively low need (i.e., all low income households have refrigerators but very few are in need of repair or replacement). On the other hand, some measures with low applicability, like whole house fans, have a high percentage need (i.e., whole house fans were found to be applicable in very few low income households, but where feasible most households were in need of the measure).

The methodology for assessing need varied across measures. Below, we offer a few examples of the approach taken to assess measure need.

**Need for lighting measures (i.e., CFLs).** Based on the results of over 1,500 onsite energy audits, the average low income household in California has approximately 17 lighting fixtures or lamps – 13 of these contain incandescent light bulbs, two contain CFLs, another is a fluorescent fixture and the last is an incandescent porch light. Clearly, these data indicate there is significant remaining potential to increase the number of CFLs used by low income households. In fact, our onsite auditors found that, on average, 10 (additional) CFLs could be installed in the incandescent fixtures used by low income households. However, we assumed a maximum of four CFLs per household in determining energy savings potential for this measure. This is the current LIEE Program requirement and it is typically used as the maximum number of CFLs distributed through direct-install programs in California. The assumption is that after four, the marginal benefit from CFLs is significantly reduced because the bulbs are no longer put into the highest use fixtures. Our study found that between one and four CFL measures were needed in 83% of all low income households.

[3] This determination was based on the observed age, characteristics, and condition of the equipment or building shell as well as the judgment of experienced energy auditors. While no field measurements or more conclusive assessments were made, the process used to determine measure applicability and need was consistent with the Low Income Energy Efficiency Program measure screening guidelines.

**Table 4.** Measure Applicability and Need Among California's Low Income Households

| Measure Type | Measure | Measure Applicability | Measure Need |
|---|---|---|---|
| Space Conditioning | Central air conditioner repair/replacement | ⊙ | ○ |
| | Evaporative cooler repair/replacement | ○ | ○ |
| | Room air conditioner repair/replacement | ○ | ○ |
| | Whole house fan | ○ | ● |
| | Furnace repair/replacement | ⊙ | ○ |
| | Programmable thermostat | ⊙ | ⊙ |
| Water Heating | Water heater tank wrap | ⊙ | ● |
| | Water heater pipe wrap | ⊙ | ● |
| | Water heater replacement | ● | ○ |
| | Faucet aerators/low-flow showerheads | ● | ⊙ |
| Envelope | Duct sealing | ○ | ○ |
| | Weather stripping/caulking | ● | ⊙ |
| | Ceiling insulation | ⊙ | ⊙ |
| | Minor home repair | ● | ⊙ |
| Lighting | Screw-in CFLs | ● | ⊙ |
| | Exterior CFL porch lights | ⊙ | ● |
| Appliances | Refrigerators | ● | ○ |

*Key:*
○ = low applicability/need (<25% of households)
⊙ = medium applicability/need (25-75% of households)
● = high applicability/need (>75% of households)

**Need for refrigerators.** The energy surveyor collected information about the number, type, size, location, age, and overall condition of refrigerators being used by low income households. The need for refrigerator replacements was determined both according to the LIEE Program requirements (i.e., any refrigerator over 10 years old can be replaced), as well as taking into account the onsite auditor's assessment of the overall operating condition of the refrigerator. Table 5 presents the results from the onsite audits for refrigerator measures.

As shown, applying the LIEE Program requirements that any refrigerator over 10 years old should be replaced would result in need for this measure in 35% of all California's low income households. However, our onsite auditors found that only 5% of the refrigerators inspected were in need of replacement. Our assessment of the energy savings potential for refrigerator replacement measures assumed this more conservative approach.

**Table 5.** Need for Refrigerator Measures Among California's Low Income Households

| Refrigerator Operating Condition | Refrigerator Age | | | | |
|---|---|---|---|---|---|
| | < 6 Years | 6-10 Years | 11-15 Years | 16+ Years | All Refrigerators |
| Good | 30% | 16% | 5% | 2% | 53% |
| Fair | 5% | 14% | 12% | 5% | 36% |
| Needs repair, maintenance | 0% | 0% | 2% | 4% | 6% |
| Needs replacement | 0% | 0% | 2% | 3% | 5% |
| All Refrigerators | 35% | 30% | 21% | 14% | 100% |
| Sample Size: n=1,534 | | | | | |

**Need for ceiling insulation measures.** The onsite auditor also assessed the feasibility of adding (additional) ceiling insulation based on the ceiling configuration and/or the level of existing insulation. Overall, ceiling insulation measures were needed in 35% of all dwellings occupied by low income households (as shown in the shaded area in Table 6). Ceiling insulation measures were determined by the onsite auditor to be infeasible for the remaining 65% of all low income households. Most often, ceiling insulation was deemed infeasible because there was either no attic space (i.e., vaulted/sloped ceilings with no attic or flat ceiling with no attic) or the level of existing insulation was already sufficient (e.g., R-values of 15 or higher). Table 6 also shows the existing R-value and square footage for areas where adding ceiling insulation is feasible. As shown, approximately one in five low income households (20%) have a need for additional insulation for an average 1,100 square foot flat-roof attic space with R-13 of existing insulation. For an additional 12%, insulation could be added to an average 900 square foot vaulted/sloped roof attic space with R-10 existing insulation.

**Table 6.** Need for Ceiling Insulation Measures Among California's Low Income Households

| Type of Ceiling | Ceiling Insulation Can Be Added | | | Not Practical to Add Ceiling Insulation | | |
|---|---|---|---|---|---|---|
| | **Percent of All Low Income Households** | Average Existing Ceiling Insulation R-Value | Average Existing Ceiling Square Footage | **Percent of All Low Income Households** | Average Existing Ceiling Insulation R-Value | Average Existing Ceiling Square Footage |
| Vaulted/Sloped (No Attic) | 1% | 7 | 1,072 | 9% | 10 | 792 |
| Vaulted/Sloped (With Attic) | 12% | 10 | 927 | 10% | 15 | 1,184 |
| Flat (No Attic) | 2% | 10 | 926 | 36% | 7 | 728 |
| Flat (With Attic) | 20% | 13 | 1,107 | 9% | 21 | 986 |
| Other | 0% | 19 | 416 | 0% | 4 | 582 |
| All Low Income Households | **35%** | **12** | **1,031** | **65%** | **11** | **847** |
| Sample Size: n=1,295 | | | | | | |

## Determining Available Energy Savings Potential

Available energy savings potential was estimated as a function of measure applicability, the current need for a measure, and the savings from installing a measure.

$$Savings\ Potential = \sum_h \sum_i w_h A_{h,i} N_{h,i} S_i$$

Where:

$w_h$ = the expansion weight for home *h*
$A_{h,i}$ = the applicability of measure i in home *h*
$N_{h,i}$ = the need for measure *i* in home *h*
$S_i$ = the per-unit savings for measure *i*

Measure applicability and need were determined based on the results of over 1,500 onsite energy audits, as described above. The per-unit savings estimates were developed for each measure and building type, based on recent LIEE Program evaluation results.[4] We found that energy savings potential, defined as the total possible energy savings from the installation of all applicable and needed measures identified for low income households in California, is estimated to be 641 GWh and 94 Mth.

A realistic estimate of energy savings potential must incorporate not only applicability and need, but also the likeliness that measures will be installed. That is, even in a program like LIEE where needed measures are installed at no cost to the building occupant, some households will be unwilling to participate and, thus, the measures will not be installed. To account for this, we developed estimates of the "available potential" based on an analysis of willingness to participate. Available potential was calculated as a function of the total savings potential and the customers' willingness to participate in the LIEE Program:

$$Available\ Savings\ Potential = \sum_h \sum_i w_h \times Savings\ Potential_{h,i} \times Willingness\ to\ Participate_h$$

Where:

$W_h$ = the expansion weight for home *h*
Savings $Potential_{h,i}$ = the estimated savings potential for measure *i* in home *h*
Willingness to $Participate_h$ = the probability that home *h* would be willing to participate in the LIEE Program

During the indepth interview with the head of each low income household we surveyed, we asked a series of direct and indirect questions related to willingness to participate. First, we asked questions related to public assistance programs in general – e.g., were they aware of such programs? Have they ever participated in these types of programs? What do they see as potential barriers to participation? These questions were useful as part of the broader needs assessment, but also helped provide context and credibility to households' responses to the more direct questions related to willingness to participate in the LIEE Program.

Direct questions were asked of households who were aware of the LIEE Program prior to our survey, as well as those who were previously unaware. We found that the majority of California's low

4 KEMA conducted both the 2000 and 2001 impact evaluations of the LIEE Program on behalf of the four major California IOUs. Copies of these reports and the estimates of measure-level impacts are available at www.calmac.org.

income households (73%) were unaware of the LIEE Program, even after prompting with the following question:

> *"Your local electric and gas utilities offer a program that helps households use less energy. The program does this by sealing air leaks, insulating attics, and fixing or replacing some energy using equipment. Depending on the utility this can be replacing light bulbs, refrigerators, air conditioners, or fixing heating systems. Have you ever heard of this program?*

Low income households (both aware and unaware) were then asked to assume they were eligible for the program and to indicate their willingness to participate in LIEE. The results indicate, despite relatively low awareness of the program, there is a very high level of interest in participating. The majority of households (72%) indicated that they would be "very willing" to participate, with an additional 20% reporting they would be "somewhat willing." Three percent reported that they were "only a little willing," and another 5% reported being "not at all willing" to participate.

Each household's responses to both the direct and indirect willingness to participate questions were used to determine the available energy savings potential for that household. Overall, the results indicate that 90% of the total energy savings potential estimated for California's low income population – or 584 GWh and 84 Mth – is available from households who would be willing to participate in the LIEE Program.

For electricity, the measures with the largest available energy savings potential are CFLs, replacement refrigerators, and ceiling insulation. Measures with the largest available natural gas savings potential include ceiling insulation and water heater tank wraps. Figures 1 and 2 present the share of total available electricity and natural gas savings potential by end-use, while Tables 7 and 8 present detailed results by measure.

**Figure 1.** Percentage of Available Electricity Savings Potential, by End-Use

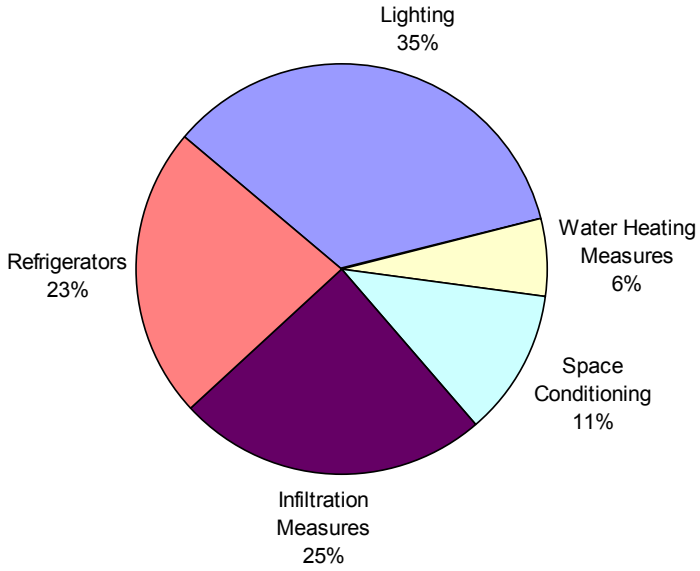

**Figure 2.** Percentage of Available Natural Gas Savings Potential, by End-Use

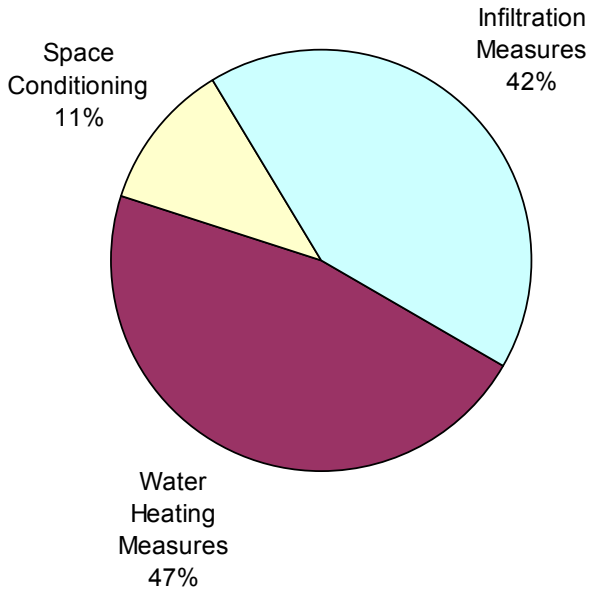


**Table 7.** Available Electricity Savings Potential By Measure

| Electric Measures | End Use | Unit Savings (kWh) [1] | Average Applicability | Average Need | Willingness to Participate | Available Savings Potential Per Home (kWh) |
|---|---|---|---|---|---|---|
| Central Air Conditioner Replacement (CAC) | Cooling | 246.3 | 0.306 | 0.002 | 99% | 0.15 |
| CAC Maintenance | Cooling | 39.0 | 0.306 | 0.070 | 97% | 0.81 |
| Caulking | Cooling | 3.5 | 0.548 | 0.258 | 95% | 0.47 |
| Ceiling Insulation | Cooling | 116.2 | 0.350 | 0.490 | 93% | 18.53 |
| Duct Sealing | Cooling | 24.2 | 0.105 | 0.163 | 96% | 0.40 |
| Evaporative Cooler Replacement | Cooling | 280.6 | 0.073 | 0.082 | 99% | 1.66 |
| Evaporative Cooler Maintenance | Cooling | 23.7 | 0.073 | 0.121 | 86% | 0.18 |
| Minor Home Repair | Cooling | 11.4 | 0.548 | 0.359 | 94% | 2.11 |
| Programmable Thermostat | Cooling | 5.6 | 0.266 | 0.398 | 96% | 0.57 |
| Room Air Conditioner (RAC) Maintenance | Cooling | 14.2 | 0.204 | 0.132 | 92% | 0.35 |
| RAC Replacement | Cooling | 117.3 | 0.204 | 0.129 | 85% | 2.62 |
| Weather Stripping | Cooling | 3.3 | 0.548 | 0.557 | 95% | 0.96 |
| Whole House Fan | Cooling | 75.0 | 0.144 | 0.843 | 94% | 8.56 |
| Caulking | Heating | 13.1 | 0.170 | 0.197 | 87% | 0.38 |
| Ceiling Insulation | Heating | 227.1 | 0.086 | 0.419 | 92% | 7.53 |
| Duct Sealing | Heating | 64.6 | 0.022 | 0.184 | 100% | 0.26 |
| Evaporative Cooler/AC Cover | Heating | 6.6 | 0.013 | 1.000 | 91% | 0.08 |
| Furnace Filter | Heating | 11.0 | 0.092 | 0.263 | 98% | 0.26 |
| Minor Home Repair | Heating | 28.1 | 0.170 | 0.342 | 90% | 1.47 |
| Programmable Thermostat | Heating | 6.9 | 0.022 | 0.143 | 91% | 0.02 |
| Weather Stripping | Heating | 16.5 | 0.170 | 0.500 | 91% | 1.28 |
| CFL | Lighting | 68.7 | 0.792 | 1.000 | 87% | 47.34 |
| Porch Light | Lighting | 51.5 | 0.309 | 1.000 | 88% | 14.00 |
| Refrigerator | Refrigeration | 720.1 | 0.999 | 0.045 | 97% | 31.40 |
| Faucet Aerators | Water Heating | 31.3 | 0.061 | 0.546 | 95% | 0.99 |
| Low Flow Showerhead | Water Heating | 81.6 | 0.061 | 0.326 | 96% | 1.56 |
| Water Heater Blanket | Water Heating | 107.7 | 0.048 | 0.835 | 92% | 3.97 |
| Water Heater Pipe Wrap | Water Heating | 46.1 | 0.049 | 0.777 | 89% | 1.56 |
| Water Heater Replacement | Water Heating | 190.0 | 0.061 | 0.023 | 100% | 0.27 |
| [1] Source: KEMA-XENERGY, 2002. | | | | | | |

**Table 8.** Available Natural Gas Savings Potential By Measure

| Natural Gas Measures | End Use | Unit Savings (therm) [1] | Average Applicability | Average Need | Willingness to Participate | Available Savings Potential Per Home (therm) |
|---|---|---|---|---|---|---|
| Caulking | Heating | 1.7 | 0.691 | 0.320 | 93% | 0.35 |
| Ceiling Insulation | Heating | 31.2 | 0.440 | 0.529 | 92% | 6.68 |
| Duct Sealing | Heating | 8.1 | 0.104 | 0.211 | 80% | 0.14 |
| Evaporative Cooler/ AC Cover | Heating | 0.9 | 0.060 | 0.835 | 92% | 0.04 |
| Furnace Filter | Heating | 1.7 | 0.394 | 0.292 | 92% | 0.18 |
| Furnace Repair | Heating | 32.2 | 0.394 | 0.127 | 86% | 1.39 |
| Furnace Replace | Heating | 49.6 | 0.394 | 0.037 | 92% | 0.67 |
| Minor Home Repair | Heating | 4.5 | 0.691 | 0.438 | 91% | 1.24 |
| Programmable Thermostat | Heating | 1.0 | 0.394 | 0.427 | 93% | 0.16 |
| Weather Stripping | Heating | 2.1 | 0.691 | 0.629 | 90% | 0.82 |
| Faucet Aerators | Water Heating | 3.1 | 0.761 | 0.712 | 88% | 1.48 |
| Low Flow Showerhead | Water Heating | 7.7 | 0.759 | 0.402 | 87% | 2.04 |
| Water Heater Blanket | Water Heating | 10.3 | 0.620 | 0.757 | 88% | 4.25 |
| Water Heater Pipe Wrap | Water Heating | 4.1 | 0.647 | 0.813 | 90% | 1.94 |
| Water Heater Replacement | Water Heating | 17.5 | 0.762 | 0.015 | 98% | 0.20 |
| [1] Source: KEMA-XENERGY, 2002. | | | | | | |

## Conclusions

As discussed above, the results from this assessment indicate that nearly 600 GWh and over 80 million therms of energy savings potential is available from California's low income population. The Commission has used these results to direct future policy regarding program design features, as well as provided input for future program goals and funding decisions. For example, measure applicability and measure need results have been used to direct program outreach and marketing efforts to targeted segments for which measures are the most applicable and/or needed. The needs assessment has provided the IOUs with demographic, socio-economic, housing type, and geographic data that can be used to develop effective strategies for directing program outreach and marketing efforts to those specific segments that have the highest measure applicability/need.

In addition, the needs assessment went beyond applicability, need and willingness to participate and identified segments that could be most easily accessed through existing program outreach and recruitment channels. The channels include a wide range of both utility and community-based strategies. This information has been combined with underlying population characteristics data to identify not only which segments to target (based on applicability, need and willingness) but also how to reach them with specific outreach and marketing channels that are likely to be the most successful.

The available potential results have also been used to set appropriate goals and make important budget allocation decisions for the LIEE Program. Historically, the IOUs have had spending goals for the program, but budgets were not tied to specific goals for energy savings and/or numbers of measures installed. The needs assessment has provided the Commission with the needed information to help establish these types of goals for the program. For example, the needs assessment results related to measure applicability/need and willingness to participate can be used by the Commission to establish annual measure penetration targets that take into account the IOUs overall budget and energy savings goals.

Finally, the available energy savings potential information can be used to establish budget allocations by utility. The IOUs can use this information to help them balance their efforts such that they can treat as many households as possible with some level of service (e.g., CFLs, showerheads, faucet

aerators, etc.), while at the same time have sufficient budget available to treat the targeted groups of households who need and would benefit from some of the more expensive, comprehensive measures (e.g., infiltration measures, replacement HVAC equipment, etc.).

## References

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