ATTACHMENT A

ENERGY SAVINGS ASSISTANCE PROGRAM COST-EFFECTIVENESS WHITE PAPER

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Energy Savings Assistance Program Cost-effectiveness White Paper

Submitted by the Energy Savings Assistance (ESA) Program
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Note: The views expressed in this paper may not reflect the personal views of any of the individuals listed above. In addition, some of the views expressed in this paper may not be shared by all of the individuals or organizations listed above.

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I. Executive Summary

The Energy Savings Assistance (ESA) program[1] provides low income ratepayers with energy efficiency improvements to their homes. There is significant interest in demonstrating that the ESA program is both cost-effective in it provision of energy efficiency, and additionally, provides tangible value and benefits for low income ratepayers. However, parties have raised the concern that the current framework used to determine the cost-effectiveness of the ESA program does not adequately account for both energy savings and quality of life improvements, such as health, comfort, and safety benefits. In response to parties' concerns, D.12-08-044 directed Energy Division to convene the ESA program cost-effectiveness working group (Working Group) to examine the cost-effectiveness methods and tests used by the ESA program. The following white paper proposes some options for modifying the ESA program cost-effectiveness framework developed by the Working Group, summarized as follows:

1. Categorize each individual ESA measure as "equity" or "resource," although measures that are difficult to categorize may be identified as "uncertain." This will be used to determine which measures should be subject to the Equity Evaluation (see #3 below), and which measures should be included in certain proposed cost-effectiveness tests (see #2 below).

2. Base ESA program approval on the cost-effectiveness of the entire ESA program; use measure level cost-effectiveness results only as an informative tool. There are currently several proposals for new cost-effectiveness tests to use as a basis for ESA program approval. As yet undetermined is an appropriate cost-effectiveness approval threshold, which would be based on various combinations of existing and proposed tests.

3. Develop an "Equity Evaluation." The Equity Evaluation will provide a qualitative analysis of ESA program measures to determine the extent to which any particular measure provides identifiable and specific quality of life benefits to participants. The Working Group will use non-energy benefits (NEBs) research and reports from public health and safety agencies as the starting point to develop criteria which define the health, comfort and safety benefits which accrue to participants. Utilities will report, as part of the cost-effectiveness analysis of the ESA program, whether each measure is likely to provide each benefit.

   For the 2015-17 cycle, the Working Group will determine a list of health, comfort and safety criteria. Based on their knowledge of each measure, the investor-owned utilities (IOUs) will rate each measure, using a simple rating system (e.g., yes/no/maybe) During the 2015-17 cycle, the Working Group (or its successor) will work with stakeholders to develop a more sophisticated equity evaluation. This will likely involve a research study performed by an independent contractor who will conduct customer surveys to better determine the extent to which each measure has actually accomplished health, comfort and safety improvements.

[1] The ESA Program was formerly known as the Low Income Energy Efficiency (LIEE) program. D.08-11-031 and D.09-10-012 mandated that the other investor-owned utilities develop a new statewide name and brand identity for their low income programs, previously called LIEE. The IOUs worked with Energy Division to develop a new name, the *Energy Savings Assistance Program,* which was implemented in 2011.

4. Some modification of the NEBs calculation may be needed, to be determined as part of an ongoing stakeholder process. Possible modifications include adding sensitivity analysis, updating the NEBs study to try to obtain more accurate values, or calculating only those NEBs values that are both substantial and easy to calculate, and using an adder for the rest.

5. Reporting cost-effectiveness by household type. In addition to reporting the cost-effectiveness of the entire ESA program and performing an equity evaluation of individual measures, the IOUs will report cost-effectiveness information for groups of measures, based on types of households served.

The Working Group will incorporate comments received on this White Paper with its ongoing research, and present a more detailed proposal at (or before) a public workshop, which will be held by or before June 1, 2013. Final recommendations will be presented to the Assigned Administrative Law Judge by July 15, 2013, the deadline established in Decision 12-08-044.

II. Introduction

The Energy Savings Assistance (ESA) program provides low income ratepayers with energy efficiency improvements to their homes. Traditionally, California's low income energy efficiency programs have been as focused on providing equity and comfort as they have been on providing energy savings to low income customers. Thus, there is significant interest in demonstrating that the ESA program is both cost-effective in it provision of energy efficiency, and provides tangible value and benefits for all low income customers in each of the four utility service areas, particularly in these economically-challenged times.

However, parties have raised the concern that the current cost-effectiveness framework used to determine the cost-effectiveness of the ESA program does not adequately account for both energy savings and quality of life improvements, such as health, comfort, and safety benefits. Some parties suggested that the current framework does not provide accurate measurements of the cost-effectiveness of individual ESA measures. Other parties felt that additional cost-effectiveness tests, or additional reporting requirements, were needed to provide a more complete understanding of ESA program cost-effectiveness.

In response to parties' concerns, Decision (D.) 12-08-044 directed Energy Division to convene the ESA program cost-effectiveness working group (Working Group) to examine the cost-effectiveness methods and tests used by the ESA program. Specifically, D.12-08-044 directed the CE Working Group to review the following:

- What type of cost-effectiveness framework should the ESA program use? Should the cost-effectiveness analysis of the ESA program be determined by cost-effectiveness evaluation of the entire program? Should such cost-effectiveness analysis be done solely at the individual measure level to evaluate the cost-effectiveness of the individual measure to determine the approval of individual measure? Should such analysis be done using some type of hybrid approach, looking at both the cost-effectiveness of the program and its measures? Should such analysis be done using any other potential approach? And if so, what and how?

- Should the Commission continue to use the Modified Participant Test (PCm) and the Utility Cost Test (UCT) to measure the ESA program cost-effectiveness, or should the Commission instead (or additionally) use the Total Resource Cost (TRC) test? Do these tests require any modification to be better suited for use by the ESA program?

- Should all measures, both equity (including health, safety and comfort measures) and resource measures, be subject to cost-effectiveness analysis? How do we define which measures are considered resource measures and which are considered equity measures? Should they be treated differently? Should we have specific goals or metrics for equity measures? How should those goals or metrics be defined?

- What is the appropriate role of non-energy benefits, including equity factors such as health, safety and comfort issues, in the cost-effectiveness analysis for the ESA program? Which cost-effectiveness tests should include which non-energy benefits? How should

the various non-energy benefits be measured and treated? Are there additional non-energy benefits which should be included, or current non-energy benefits which should be excluded?

The following white paper proposes some options for modifying the ESA program cost-effectiveness framework developed by the Working Group. This white paper does not address the merits of the ESA program or the policy that it should be funded by all ratepayers. Rather, the purpose of this paper is to assess the adequacy of the current cost-effectiveness framework applied to the ESA program and propose some improvements.

The Working Group will incorporate comments received on this White Paper with its ongoing research, and present a more detailed proposal at (or before) a public workshop, which will be held by or before June 1, 2013. Final recommendations will be presented to the Assigned Administrative Law Judge by July 15, 2013, the deadline established in Decision 12-08-044.

III. Background

The First Energy-Related Low Income Programs: Health, Safety, Comfort, Heating and, later, Cooling Costs

In 1976, as a result of the 1973 OPEC Oil Embargo, the US Congress passed the Energy Conservation and Production Act which created the Weatherization Assistance Program (WAP) to be administered by the newly-formed Department of Energy (DOE). The program would "winterize" or "weatherize" low income dwellings in order to assist low-income households, including senior citizens living on fixed incomes and Social Security, who were especially hard hit by rising heating bills, especially in frigid climates.

The first DOE program weatherization providers dealt with the health and safety issues in cold winter climates by installing emergency and temporary low-cost measures such as covering windows with plastic sheets, and caulking and weather-stripping windows and doors. As the providers gained experience the program gradually included different types of weatherization measures, including storm windows, storm doors and attic insulation. However, it was a program designed primarily for cold climates. Not until 1994 were cooling measures, such as air conditioner replacements, ventilation equipment, and screening and shading devices, permitted in the DOE Weatherization Assistance Program.[2]

The next oil supply disruption came with the overthrow of the Shah of Iran in 1979. In 1981 Congress established the Low Income Home Energy Assistance Program (LIHEAP). In addition to allowing states the *option* to provide "weatherization" services, it primarily provides "one time" utility bill assistance to low income households. At first it provided assistance only for heating bills, but in 1984, the Human Services Reauthorization Act added a new goal to provide funds for cooling costs of low income households. This required shifting funds from solely cold-weather states to warm-weather states.

Thus, the first energy related low income programs were established to help low income households deal with the issues of health, safety, comfort, and energy costs.

Then, Providing "Equity"

In the 1980s the CPUC and the CEC approved ratepayer-funded, utility-administered energy audit, rebate, and low interest loan programs to subsidize the cost of the installation of weatherization measures in residential homes. In 1982, a study commissioned by PG&E[3] showed that while low income households paid those subsidies in rates, they were unable or unwilling to participate in the programs. This meant that low income ratepayers would be subsidizing non-low income ratepayers while receiving little direct benefit. The Heath Report asked: With the amount of ratepayer money the Commission was spending trying to get low

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[2] U.S. Department of Energy, History of the Weatherization Assistance Program. http://www1.eere.energy.gov/wip/wap_history.html

[3] The Final Report: Phase I Zero Interest Program Low Income Outreach Demonstration Project, conducted by the California/Nevada Community Action Association under contract with Pacific Gas and Electric Company, prepared by Richard Heath and Associates, Inc., April, 1982; generally referred to as "the Heath report"

income households to take out zero-interest loans, why not just weatherize the home at no cost to the low income occupant?

SDG&E agreed and, thus in 1983, for reasons of fairness, or *equity,* SDG&E implemented California's first IOU low income "direct weatherization" program to ensure that low income households received some benefits from the programs they helped fund through rates. It was called "direct" weatherization because it bypassed the steps of loans or rebates and installed the measure "directly." The list of eligible measures was based on the measures installed in the WAP and LIHEAP programs. Cost-effectiveness tests for measures were not required and utilities were generally instructed to strive to provide services in a "cost efficient" manner, that is, a reasonable and efficient use of ratepayer dollars.

Next, "Energy-Related Hardships"

In 1989 SB845 was signed into law (becoming PUCode 2790) which told the Commission to direct IOUs to implement the low-income weatherization program "taking into consideration for all measures both the cost-effectiveness of the measures as a whole and the policy of reducing energy-related hardships facing low-income households." The bill was silent on what those "hardships" were but gradually Commission decisions and state legislation began to fill in the blanks.

The original idea, that "fairness" or "equity" dictates that low income households should not be required to subsidize non-low income households, grew to encompass the new legislative requirement to consider "energy-related hardships" when designing the low income program. It is now generally accepted that "equity measures" are those measures which are intended to deal with the issues of health, safety, comfort, and energy costs. Health, safety, and comfort are "non-energy benefits" of the program.

But is it Cost-Effective?

The ESA program, like all demand-side resources (energy efficiency, demand response, and distributed generation) must undergo a cost-effectiveness analysis. The basis of cost-effectiveness analysis of demand-side programs in California is the Standard Practice Manual (SPM), which outlines several different tests of cost-effectiveness, each based on a different perspective (e.g., the utility or other program administration, the participant, the participant and utility combined). Different combinations of costs and benefits are used for the different tests.

From the perspective of the participant, the primary benefit is bill savings. From the perspective of the utilities and ratepayers in general, the primary benefits are the avoided costs of supplying electricity. The avoided costs can be described as how much ratepayers would have to pay to build, maintain and operate the electric and gas networks, including power plants and transmission and distribution lines, to supply the electricity and natural gas that is being avoided by energy efficiency programs.

To determine the costs of these programs, we look at what would it cost to reduce demand. This includes utilitys' costs of administering programs as well as the costs of purchasing and

installing the energy efficient equipment. Then, we compare the two to determine if we could avoid the costs on the supply side by investing in reducing the demand side.

The primary test used to determine the cost-effectiveness of most energy efficiency programs is called the Total Resource Cost (TRC) test. This test measures the costs and benefits from the perspective of the utility and the participant together. The costs are the utility's administrative costs and the capital costs of the energy-efficient equipment (usually referred to as the "measure costs"). The benefits are the avoided costs, as discussed above.

However, this framework is not totally applicable to low income programs. This is because in the low income program measures are installed not only for quantifiable energy reasons but also for hard-to-quantify reasons of health, safety, comfort, and bill assistance. In addition, the participant does not pay for the equipment installation. As a result, additional tests have been developed for the ESA program, as discussed in the next section

Modifying the Cost-Effectiveness Tests for Low Income Programs

SB845 was passed in 1988, becoming CA Pub. Util. Code § 2790 in 1989. CA PUCode § 2790(a) directed the Commission to consider "*both the cost-effectiveness of the services and the policy of reducing the hardships facing low-income households*" in designing energy efficiency programs for low income customers. In 1999, workshops were held regarding the limited applicability of economic tests to low income programs. Parties discussed the possibility of modifying the traditional cost-effectiveness tests that were used to assess low income energy efficiency programs to include non-energy benefits (NEBs).

The Commission's implementation of SB 845 expressed multiple goals of the program, which are still relevant today. D.00-07-020 stated "*Because this segment of the population needs bill savings the most, we should strive to maximize the participation of eligible participants and work to reduce their electric and gas bills as much as possible, within the constraint of limited funding. At the same time, to protect the interests of non-participating ratepayers that subsidize the costs of the program, we need to ensure that service delivery is as efficient as possible*."[4]

In 2000, D.00-09-036 called for a technical subcommittee to be formed to explore developing a low income program cost-effectiveness test which would include NEBs. This Working Group's Phase 1 Report, filed on October 2, 2000, provided background and laid a foundation for future consideration of low income cost-effectiveness.

In 2001, D.01-03-028 ordered utilities to develop a cost benefit test that included NEBs, and to use it to assess both program and measure cost-effectiveness. The Low Income Public Purpose Test (LIPPT) model was developed by TekMRKT Works, Skumatz Economic Research, Inc. and Megdal Associates. This Phase 2 Report was filed by the Reporting Requirements Manual (RRM) Working Group in April 2001.[5]

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[4] D.00-07-020, mimeo, p. 36, reaffirmed in D.00-09-035, mimeo, p.14.

[5]The Low Income Public Purpose Test (LIPPT). Final Report. Prepared for the RRM Working Group Cost-effectiveness Committee. By TecMarket Works, Skumatz Economic Research, Inc., and Megdal and Associates. May 25, 2001.

In 2001, D.01-12-020 adopted the NEBs developed for the LIPPT model. However, rather than use the LIPPT model itself, D.01-12-020 instructed the subcommittee to update and modify the Utility Cost Test and Participant Cost Test to: a) evaluate low income energy efficiency cost-effectiveness on both a program and individual measure basis, and b) to capture non-energy benefits. The RRM Working Group/Standardization Team's Joint Report describing the updated tests was filed March 28, 2002.[6]

D.02-08-034 adopted the updated Utility Cost Test and Participant Cost Test and instructed that utilities use them in their program applications. The ACR issued on August 21, 2002 reiterated use of both the Utility Cost Test and Participant Cost Test as modified with NEBs to evaluate low income energy efficiency at both the program and measure level. Both the utility filings and the Standardization Team's preliminary report were filed September 30, 2002. The Utility Cost Test (UCT) and the Modified Participant Cost Test (MPT), adopted in D.02-08-034 are the cost benefit tests currently used by the California IOUs to analyze the low income energy efficiency programs and measures.

On February 24, 2003, the Commission approved a revised work plan for Phase 4 of the Low Income Energy Efficiency (LIEE) Standardization Project and Cost-effectiveness Studies. The resulting LIEE Measure Cost-effectiveness Final Report was filed June 2, 2003.[7] (D.03-11-020 adopted the measures recommended in the June 2 report for PY2004 and concluded that new measures would be considered for the 2006 LIEE program.)

The ACR dated October 22, 2004 directed the Standardization Team to institute a process for considering new energy efficiency measures for the PY2006 program. In 2005, the Standardization Team solicited proposals for new program measures and assessed them using the cost-effectiveness criteria approved by the Commission. A report on the measure assessment was submitted on May 2, 2005.[8] (D.05-12-026 approved the recommended new measures for the 2006 LIEE program.)

In 2007, the Commission began developing the California Energy Efficiency Strategic Plan. The low income program was included in this plan. In doing so, the Commission established that the earlier goals of the low income energy efficiency program would coexist with a renewed focus on energy savings. D.07-12-051 stated, "*Today we clarify that the complementary objectives of LIEE programs are to provide an energy resource for California, consistent with our "loading order" that establishes energy efficiency as our first priority, while reducing low-income customers' bills and improving their quality of life*."[9]

This direction was incorporated into the Strategic Plan as "*The LIEE programs will be an energy resource by delivering increasingly cost-effective and longer-term savings.*"[10]

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[6] LIEE Program and Measure Cost-effectiveness. Final report. Submitted by Cost-effectiveness Subcommittee of the RRM Working Group and Standardization Project Team. March 28, 2002.
[7] LIEE Measure Cost-effectiveness Final Report. Prepared by LIEE Standardization Team. June 2, 2003.
[8] Report on the Assessment of Proposed New Program Year 2006 Low Income Energy Efficiency Program Measures. Proposed by the Low Income Energy Efficiency Standardization Team. May 2, 2005.
[9] D.07-12-051, p. 2.
[10] California Energy Efficiency Strategic Plan, January 2011 update, Section 2, pp. 23-24.

In 2008, D.08-11-031 established new cost-effectiveness criteria for determining which measures could be in the program. In particular, the Commission adopted a threshold for future measure inclusion of a 0.25 benefit-cost ratio for both the MPT and UCT, but also established that existing measures with a less than 0.25 benefit-cost ratio on either the MPT or the UCT would be retained in the program. However, the Commission also deemed that the non-energy comfort, health and safety benefits of some measures outweighed their low cost-effectiveness results. Thus D.08-11-031, also stated that certain measures, such as furnace and water heater repair and replacement, and air conditioning and evaporative cooling (in hot climate zones only) could be included in the LIEE program without regard to their cost-effectiveness results, based on the health, comfort and safety benefits provided to participants.

Pursuant to D.08-11-031, a study was conducted in 2010 to look at the status of NEBs, research what other states are using, and report the value range. The report provided information on NEBs reported in other states and programs, including a table of reported values.[11] The study found that NEBs are very difficult to quantify, and no precise methods are being used. Many of the other values are reported as a percent of energy savings. The study team noted that any additional studies and customer surveys would cost much more than originally budgeted.

Hence, the ESA program has evolved into a program with multiple goals: 1) provide significant bill savings and improve the quality of life for low income customers, 2) extend energy efficiency as an energy resource, and 3) protect the interests of non-participating ratepayers by evaluating the program in terms of cost-effectiveness.[12] As a result, the current cost-effectiveness analysis of the ESA program is done from both the perspective of the utility and the participant.

Current Cost-effectiveness Tests Used by the IOUs

Currently, the IOUs report three cost-effectiveness test results: the Utility Cost test (UCT), the Modified Participant Test (MPT), and the Total Resource Test (TRC). Only the UCT and the MPT are used to determine which measures are included in the ESA program. The TRC is included in IOU Annual Reports and Applications for information purposes only.

Additionally, only the UCT and the MPT include non-energy benefits (utility NEBs in the UCT, for some utilities, and participant NEBs in the MPT). A modified version of the Low Income Public Purpose Test (LIPPT) model (developed in 2001) is used to estimate NEBs. The LIPPT model allows input of basic assumptions regarding NEBs, which are estimated on a per-household basis and then allocated across measures based on each measure's share of energy savings. Administrative costs are also allocated across measures based on the share of energy savings. The E3 Calculator for Energy Efficiency is used to calculate the other costs and benefits for the UCT and the TRC. The cost and benefits inputs used for these tests are shown in Table 1.

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[11] Non-Energy Benefits: Status, Findings, Next Steps, and Implications for Low income Program Analyses in California. Skumatz Economic Research Associates and The Cadmus Group. May 12, 2010.

[12] see D.00-07-020, mimeo, p. 36, reaffirmed in D.00-09-035, mimeo, p.14. Also D.07-12-051, p. 2, and California Energy Efficiency Strategic Plan, January 2011 update, Section 2, pp. 23-24.

Table 1

Current ESA Program Cost-effectiveness Tests			
	TRC	**MPT**	**UCT**
Administrative costs	COST	COST	COST
Avoided costs of supplying electricity	BENEFIT		BENEFIT
Net Bill Reductions		BENEFIT	
Capital (measure) costs to landlords/3rd parties	COST*		
Capital (measure) costs to utility	COST	COST	COST
Participant non-energy benefits		BENEFIT	
Utility non-energy benefits			BENEFIT

**Costs of third parties have been included, although not consistently, by some (but not all) utilities.*

The IOUs report cost-effectiveness test results for the portfolio and for each measure by fuel type, housing type and climate zone in their program applications. Continuing ESA measures are required to have a minimum benefit-cost ratio of 0.25 on either the UCT or MPT. New measures are required to have a minimum benefit-cost ratio of 0.25 on both the UCT and MPT. In cases where the measure does not pass but does provide health or safety benefits, it may be kept in the program regardless of the test result. The process used to determine whether to keep measures with a less than 0.25 benefit-cost ratio (other than those measures specifically included in D.08-11-031), has historically been somewhat informal – although this determination has been directed by the Commission and based on stakeholder input, it has been made on an individual measure basis rather than any standardized method.

While the ESA program, unlike other demand-side programs, includes non-energy benefits which accrue to participants and the utilities, it has not been considered appropriate to include NEBs which accrue to society at large, such as environmental benefits. However, regulatory and legislative decision makers consistently point to job creation as a benefit of low income programs. For example, Public Utilities Code section 327, specifically addressing the ESA program, directs that, "to the extent practical," program administrators shall, "(a) (3) Encourage local employment and job skill development." The California Energy Efficiency Strategic Plan envisions "the growth of a trained LIEE [ESAP] workforce."

The Working Group has not yet given this issue enough consideration to reach consensus, although some Working Group members, including TELACU, Maravilla, and ACCES, strongly believe job creation should be a factor considered by the Commission when determining ESA Program design. Although these factors may be hard to measure, and may have off-setting costs, those parties believe they should be a part of the decision-making process for Commissioners. Where the Working Group does have consensus is in its support for the current efforts in the wider demand-side cost-effectiveness proceeding to determine how to value the societal non-energy impacts of demand-side programs.

IV. Proposed Modifications

As noted above, parties in the low income proceeding have questioned whether the current cost-effectiveness tests and methods adequately account for both energy savings and quality of life improvements, such as health, comfort, and safety benefits.

A major concern is that many of the individual measures in the ESA program provide energy savings, but some do not. Those measures which provide no or few energy savings are generally referred to as "equity" measures, whereas those which provide some level of energy savings are called "resource" measures. However, there is no clear or consistent definition of a "resource" measure – for example, how much energy savings does it need to be considered a "resource?" Neither is there a clear or consistent definition of an "equity" measure – some measures are included in ESA simply because some stakeholders believe that they provide health, comfort and safety benefits to participants.

In addition, even when it is universally agreed that a particular measure is an equity measure (i.e., that it is providing an essential service to low income ratepayers that all stakeholders agree should be provided), there is no way to determine the extent to which health, comfort and safety benefits are being provided. This means that even when it is agreed that a group of measures provide important benefits to low income ratepayers, it is difficult to determine which of those measures should be included in the ESA program, since we have no clear or consistent method of determining their *relative* value.

Another frequent criticism is that the requirement to provide a benefit-cost ratio for each ESA measure is giving us a distorted view of the value of these measures. Because both administrative costs and non-energy benefits are allocated to the measures in proportion to the measure's energy savings, resource measures receive a disproportionate share of the costs and the non-energy benefits. This distorts the analysis of all the ESA measures.

Parties have also expressed the need to improve several other aspects of the cost-effectiveness framework, such as the way NEBs are calculated, the tests which are used to determine cost-effectiveness, and the way in which cost-effectiveness results are reported.

The Working Group proposes five modifications to the ESA program cost-effectiveness framework which we believe will help remedy some of these problems.

Proposed Modification 1: Categorizing Measures as "Equity" or "Resource"

In considering ways to improve ESA program cost-effectiveness, the Working Group started by trying to assess what benefits each measure in the program provides to program participants. Because the ESA program provides both energy savings and improved quality of life (i.e., health, comfort, and safety), the approach taken was to categorize program measures as either "resource" measures (those that provided measureable energy savings) or "equity" measures (those that provide relatively small energy savings but were widely accepted as important measures for health, comfort or safety). This approach is intended to give program administrators, evaluators, and stakeholders a better idea of why a measure is included in the

ESA program. Because not all of the program measures readily fall into one category or another, a third category of "uncertain" measures was allowed when there was sufficient uncertainty about the category. For example, past evaluations have reported energy savings for some measures in only certain climate zones or housing types. In addition, the average energy savings for ESA measure installations may change over time. SDG&E reviewed the typical energy and non-energy benefits that were allocated to the various measures in the last analysis and suggested the preliminary categorization shown in Table 2. **Note this list is provided only as an example.**

Table 2: SDG&E's Proposed Preliminary Measure Categorization

Category	Measure
Equity	Furnace repair or replace
Equity	Hot water heater repair or replace
Equity	Air conditioning in hot climate zones
Resource	Lighting
Resource	Refrigerators
Resource	Hot water conservation measures
Resource	Clothes washers
Resource	Microwaves
Resource	Smart Strip
Resource	Furnace pilot light conversion
Resource	Central AC Tune-up
Uncertain	Air Sealing
Uncertain	Attic Insulation
Uncertain	Duct Test & Seal
Uncertain	Furnace Clean & Tune
Uncertain	Air conditioning in milder climate zones

Another possible method, proposed by DRA and TURN, would be to define a resource measure as any measure with verified energy savings, regardless of whether or not it also provides health, comfort and safety benefits. An equity measure would be defined as a measure with no measurable energy savings (perhaps even increasing energy consumption) but providing health, comfort and safety benefits. Table 3 shows an example of a designation of this type. Note that a few measures would be designated as both, depending on the circumstances surrounding the measure. Note also that other Working Group members have expressed the opinion that while certain measures, such as repair and replacement of hot water heaters and air conditioners, have the potential to save energy, previous evaluations of the ESA program have shown that on average these types of measures have not resulted in energy savings because of customer behavior (i.e., customers tend to use more hot water and AC after their appliances have been repaired or replaced).

An additional possible method for measure categorization would be the use of relative cost-effectiveness rankings to define equity or resource measures. Since the utilities already perform a measure-level cost-effectiveness ranking in their program applications, this could serve as a way to define equity and resource measures. The measures that in the past did not achieve the required threshold for cost-effectiveness, but were included in the ESA program for other

reasons (referred to as "add-back measures"), could perhaps be considered to be equity measures, whereas the measures which did meet the cost-effectiveness requirements could be perhaps be considered resource measures. One difficulty with this method, however, is that the list of add-back measures has changed frequently in the past. The utilities most recently filed lists of these measures on October 1, 2012 in proceeding A.11-05-017.

Table 3: DRA and TURN's Proposed Preliminary Measure Categorization*

RESOURCE			EQUITY	
Category	Measures		Category	Measure
HVAC	Heating System Cooling System (A/C) Standing Pilot Evaporative Cooler Duct Sealing A/C Time Delay Relay Program. Thermostat		Mitigation of a hazardous condition associated with gas appliance	Repair/replacement of faulty gas appliances
Infiltration/Building Shell	Caulking, Weather-stripping, Outlet Cover Plate Gaskets, AC Cover, Insulation		Proper ventilation, consideration of outdoor and indoor air quality	NGAT, other air quality tests, asbestos removal, lead safe practices
Water Heating	Water Heater Faucet Aerator Low-Flow Showerhead Thermostatic Shower Valve Tank & Pipe Wraps		Safety enhancements	Smoke alarms, carbon monoxide alarms, outdoor lighting, CFL disposal information
Lighting	CFLs, Hard Wired CFL fixtures, Occupancy sensors, LED nightlights		Bill Management	Energy Education
Plugload & Appliances	Smart Strips, Clothes Washer and Refrigerator & Freezer Recycling/Replacement, Microwave Ovens			
Behavioral	Energy Education, Training on Product Use and Maintenance			

**not all of the measures in this example are current ESA measures.*

The Working Group has discussed these and other possible approaches to defining resource and equity measures, and has assigned a subcommittee to continue to refine these definitions. A more complete analysis, which will include all the measures from the four IOUs, will be completed by the subcommittee This analysis will incorporate stakeholder feedback and be presented to stakeholder at (or before) the planned workshop.

Proposed Modification 2: Base ESA program approval on the cost-effectiveness of the entire ESA program, with possible modification of cost-effectiveness tests used for program approval

The Working Group proposes that ESA program approval be based on the cost-effectiveness of the entire ESA program, rather than approving individual ESA measures using measure-level cost-effectiveness. Measure-level cost-effectiveness results should be used as an informative tool which affects ESA program design.

The Working Group has not yet been able to reach a consensus recommendation on the best cost-effectiveness test or threshold appropriate for ESA program approval, nor on whether certain tests should be used for ESA program approval, and other tests to inform program design. The following options lay out the working group's initial thoughts on possible modified cost-effectiveness tests and approval thresholds. The Working Group will continue to discuss this issue to try to reach consensus and provide a specific recommendations to the Commission.

Proposed New Cost-effectiveness Tests

Most Working Group members believe there is a need for new cost-effectiveness tests, which are proposed below. SCE has proposed a modified version of the TRC which would include all costs and benefits associated with the ESA program, and DRA has proposed several tests which do not include any NEBs.

DRA's proposal is based upon the view that cost-effectiveness tests should express various perspectives, in keeping with the goals of the ESA program. DRA believes that since participant wellbeing remains the priority of the program, even with the recent greater emphasis on resource goals that is discussed above, the primary cost-effectiveness test should reflect this perspective. An additional cost-effectiveness test should incorporate all viewpoints, including both participants and non-participants. In some respects, the UCT and MPT capture these viewpoints. For example, the MPT partially expresses the participant perspective, in that it uses the benefits accruing to the participants. However, because the cost inputs to the MPT are those of the non-participant, DRA believes that the MPT is not useful for determining the cost-effectiveness of the ESA program. The UCT expresses the perspective of the program administrator, which DRA believes is synonymous with the perspective of the non-participating ratepayer.

DRA believes that another problem with the UCT and MPT is that they each contains only a portion of the NEBs. Because of this, it is not clear how much of the participants' benefits accrue via energy savings, and how much accrue via NEBs. It is important to all ratepayers that we know how much of the ESA program benefits will offset utility generation, and how much will result in participant bill savings. DRA believes that at least one test should omit NEBs so as to be able to compare results with other tests that include NEBs. This will give us more information about impact of NEBs on ESA program cost-effectiveness.

Since the perspective of the ESA program participant is difficult to express, it may be best expressed in combination with other perspectives. The test that captures is design to capture all perspectives is TRC test. However, relying solely on the TRC to determine ESA program cost-effectiveness does not prioritize participants' benefit, which is the primary goal of the ESA

program. DRA believes that the only way to prioritize participants' benefit is to use a test that captures the participant perspective as the primary cost-effectiveness test. DRA believes that it is critical to have the cost-effectiveness tests properly aligned with goals, because the test results should motivate specific program changes.

DRA proposes that one of the following three options be used to capture the ESA program participant perspective:

- Considering participant net benefits
- The Participant Bill Savings Test
- The Resource TRC

Participant Net Benefits

Other demand side programs measure cost-effectiveness from the participant perspective using the Participant test, which includes all costs incurred by and benefits accruing to program participants. A problem specific to the ESA program is that participants do not pay anything for the program. Because participant costs are zero, it is not possible to determine a useful benefit cost ratio using the Participant test . However, it would be possible to look at the magnitude of the participant net benefit, which consists of the participant bill savings. DRA believes that it may also be useful advantageous to calculate this net benefit using both the discounted rate that most low income customers pay and the regular residential rate, to allow comparisons across programs.

Participant Bill Savings Test

The participant bill savings test compares participant bill savings with the administrative and measure costs of the ESA program. It differs from the MPT in that it does not include participant NEBs and it would only be applied to resource measures. It is designed to narrowly focus on the portion of participant benefits accruing to participants in the form of bill savings by restricting the analysis only to measures that can reasonably be expected to deliver energy savings.

DRA believes that this test is needed to focus on tangible bill savings of the participants. The ESA program is often pointed to as a means to helping low income households make their energy bills manageable. The Participant Bill Savings test could be used to test this claim. DRA believes that although the Participant Bill Savings test may have drawbacks it is an improvement on the MPT because it is more transparent, in that it provides a clear picture of how participants' bills will be affected by the ESA program.

One drawback of the Participant Bill Savings test is that is has the same flaw as the MPT, in that it is does not clearly represent the participant perspective because of the lack of participant costs. However, it does show whether the ESA program efficiently transfers fund received from non-participants to the ESA program participants via bill savings.

If the Participant Bill Savings test is used, the question remains of whether to calculate bill savings using the regular residential rate or the discounted residential rate that most low income customers pay. DRA believes that it may be advantageous to calculate this benefit using both the discounted rate and the regular residential rate to allow comparisons across programs.

The Resource TRC

The Resource TRC is identical to the traditional TRC used for all demand-side programs, but would only include resource measures. DRA believes that, like the Participant Benefits test, the Resource TRC is a way of prioritizing participant bill savings. DRA believes that even though the benefits used are avoided costs, it will still test whether the group of resource measures can reasonably be expected to provide bill savings to participants. Its advantage over the Participant Benefits test is that it is consistent with the way cost-effectiveness is calculated for other demand-side programs.

DRA believes that since the primary purpose of resource measures is to produce energy savings, reduce carbon emissions, and avoid supply side costs, then they should be evaluated accordingly. DRA believes that at least one ESA program cost-effectiveness test should focus solely on the resource measures, because they are designed to produce energy and bill savings. However, the Resource TRC does not use bill savings of low income households, which are based on discounted retail rate, and so avoids possible underestimation of benefits that is likely to result from use of the Participant Bill Savings test. Although the benefits used in the Resource TRC are avoided costs, which are lower than retail rates, the Resource TRC still captures energy savings. However, rather than assigning a flat value to each unit of energy saved, the avoided cost value depends on other factors, such as the level of energy consumption at different times and the hourly variation in energy prices. Even though the Resource TRC uses benefits which are lower than actual participant bill savings, DRA believes this is an acceptable tradeoff because it overcomes other problems inherent in the Participant Bill Savings test.

The Modified Resource Test

SCE has proposed the Modified Resource Test, which is a modified version of the TRC test which includes participant and utility NEBs as well as "copayments," which are the portion of the measure costs which are paid by landlords or third parties. This test would include all the costs and benefits, both energy and non-energy, associated with the ESA program, SCE believes it is therefore comparable with the TRC currently used for evaluating other energy efficiency programs.

SCE believes that it is logical to start with the TRC test, then add the participant and utility NEBs to account for health, safety, and comfort benefits, which is a goal of the ESA Program. SCE believes a test based on the TRC, which is used for all demand-side programs, with modifications appropriate to the ESA program, provides a strong foundation that will facilitate acceptance of this test as a means to evaluate the total resource efficiency of the ESA Program.

Table 4

ESA Program Cost-effectiveness Tests						
	Current			**Proposed**		
	TRC	**MPT**	**UCT**	**Modified Resource Test**	**Participant Bill Savings Test**	**Resource TRC***
Administrative costs	COST	COST	COST	COST	COST	COST
Avoided costs of supplying electricity	BENEFIT		BENEFIT	BENEFIT		BENEFIT
Net Bill Reductions		BENEFIT			BENEFIT	
Capital (measure) costs to landlords/3rd parties	COST**			COST		
Capital (measure) costs to utility	COST	COST	COST	COST	COST	COST
Participant non-energy benefits		BENEFIT		BENEFIT		
Utility non-energy benefits			BENEFIT	BENEFIT		

**The proposed Resource TRC has the same cost and benefit inputs as the current TRC, but includes resources measures only.*
*** Costs of third parties have been included, although not consistently, by some (but not all) utilities.*

Once it is determined which of the existing and proposed cost-effectiveness tests are the most useful and appropriate for determining ESA program approval, we can then determine the best threshold to recommend for approval. Several questions have been raised by Working Group, members and require continuing discussion and stakeholder input before final recommendations can be made. These questions include:

- Should the threshold for ESA program approval be "firm" (e.g. the benefit-cost ratio on a particular test or tests must be greater than a certain number), or should it be based on past performance (e.g., the benefit-cost ratio on a particular test or tests must be greater in one year than it was in a previous year).

- To what extent should the threshold for ESA program approval be based on tests which include <u>only</u> resource measures, and to what extent on tests which include both resource and equity measures?

- Which of the existing or proposed tests should be used for ESA program approval? Should only one test be used for approval, with others used for informational purposes only? Or should some combination of two or more tests be used? If we use a combination of tests, how should they be weighed?

- What are the results when existing cost and benefit data from previous ESA program cost-effectiveness analyses are used to determine benefit-cost ratios using the proposed tests? Do those results indicate or suggest which tests, or combinations of tests, are the most useful or appropriate for determining a threshold for ESA program approval?

The Working Group is continuing to discuss possible combinations of these three proposed tests and the three current tests to determine a recommendation as to the best approach for ESA program approval, and will make recommendations in the future after more stakeholder input has been received.

Proposed Modification 3: Develop an "Equity Evaluation"

As discussed above, in addition to providing a certain level of energy savings to program participants, the ESA program strives to improve the lives of low-income ratepayers by improving their homes beyond cost-effective energy efficiency. However, currently the program lacks a formal and consistent procedure for determining the extent to which the individual ESA measures are providing these improvements to program participants. The Non-Energy Benefits (NEBs) values included in the cost-effectiveness analysis do provide some of this information, but only for those health, comfort and safety benefits which are quantifiable, and only at the program level. The Working Group believes it is essential, in terms of improving program delivery and design to maximize benefits for all program participants, to develop a new type of evaluation tool to determine the relative value of the various ESA measures. We are proposing a new method to determine the extent to which these "equity measures" achieve improvements in the health, comfort and safety of program participants in order to inform program needs and cost-effectiveness for the 2015-2017 program cycle.

Categorization of the measures offered through the ESA program will ensure that the subsequent evaluation is considering an agreed upon list of equity measures. Prior to conducting an evaluation, it needs to be determined which ESA measures should be subject to the equity evaluation: (1) all ESA measures, (2) only those measures which are deemed to be "uncertain" (reflecting current uncertainty as to whether they are equity or resource measures), or (3) all measures which are NOT resource measures (i.e., equity measures and uncertain measures). As discussed above, a Working Group subcommittee has done some preliminary work on this and will be submitting a proposal for measure categorization subsequent to release of this whitepaper.

An outstanding issue which will need to be resolved is whether subjecting any particular measure to both a traditional cost-effectiveness evaluation using the UCT, MPT, or other test which includes non-energy benefits, and then subjecting the same measure to an equity evaluation, which is essentially a qualitative evaluation of non-energy benefits, is appropriate. DRA has expressed a preference that the non-energy benefits associated with measures should undergo either a quantifiable or qualitative evaluation, but not both.

There are 3 sets of primary questions the Working Group seeks to answer as part of an Equity Evaluation, the first of which the Working Group is already actively examining (as discussed above):

1. *What are the distinctions between equity measures and resource measures?* One way to distinguish between equity and resources measures is by the level of energy savings they provide, where resource measures provide some level of energy savings, and equity

measures provide little or no energy savings. While most measures provide some level of savings, those savings are not equal for all measures, and some measure savings are negligible. The Working Group would establish a threshold at which a measure is defined as either an equity (low or no-savings) or resource (relatively high savings) measure. Alternatively, equity measures may be classified as those which provide some level (which would need to be determined) of health, comfort and safety benefits, based on metrics which would be determined by the Working Group. Once measures are determined to be "equity" or "resource" how do we then measure their effectiveness?

2. *How are "health," "comfort," and "safety" defined?* Other organizations, such as public health agencies, have definitions of these terms. The Working Group would determine how applicable these existing definitions are to the measures specific to the ESA program and whether they are consistent with the goals of ESA program. The Working Group may use existing NEBs research to help define health, safety and comfort How can the existing NEBs research be leveraged to define health, comfort, and safety in the ESA program? How do we use the definitions we develop to determine health, comfort and safety criteria which could be used to measure equity value?
3. *Based on the equity measure criteria, how are measures within the ESA program assessed for their contributions to the health, comfort, and safety of ESA program participants?* Should the various criteria be weighted? If so, how? How should we measure whether measures meet each criterion? Are there also negative benefits (costs) attributable to some measures?

In consideration of the set of questions listed above and time constraints in this proceeding in regard to program planning needs for the 2015-2017 budget cycle, the Working Group proposes the following approach, which it believes is sufficient based on time constraints vis a vis program planning for the next ESA program cycle.

Basic Equity Evaluation

The Working Group proposes the establishment of a stakeholder process which would, over the short-term, establish criteria for "health, comfort and safety" that would be used to define equity by the IOUs for the 2015-2017 application process. (The Working Group acknowledges the importance of "education" as a component of the ESA program and, based on its continued work, may decide to include it for consideration as part of the equity evaluation. While educational efforts have, in the past, been included as part of the ESA program administration costs, it may make more sense to categorize them as "equity measures." Additionally, an energy education study authorized by D.12-08-044 is currently underway that may address energy education considerations.) To establish these criteria, the Working Group may leverage research conducted in and for other jurisdictions, including existing NEBs research, similar work done by public agencies (including health, fire and home safety research), and research performed by public advocacy groups such as AARP. The initial results of the literature review, including proposed draft criteria and their application to equity measures as a means of grouping measures by whether or not they provide some level of health, comfort and safety, would be presented to stakeholders in a workshop held by or before June 1, 2013. At the workshop, stakeholders would be able to review and comment on proposed criteria and their relevance to specific measures, which would be revised and finalized based on stakeholder input.

An example of a basic equity evaluation is shown in Table 5 below. Note that these are sample criteria shown for explanatory purposes only. More definitive criteria, based on the literature review, will be proposed by the Working Group in the coming months.

In the basic equity evaluation, each ESA measures would be given a yes, no, or maybe score by the IOUs. These would be proposed in each IOU's application, as a reflection of their judgment and knowledge of these measures. Other stakeholders could then offer their own perspective on the IOUs' judgments in their comments and protests.

Table 5: Example of a Basic Equity Evaluation

Measure Description: Replacement widget in Climate Zone 32		
Health	Reduced extreme temperatures	Yes
	Improved indoor air quality	Yes
Comfort	Better lighting	No
	Decreased noise	Yes
	Fewer moves	Maybe
Safety	Decreased likelihood of fire	Yes
	Improved building structure	No

Once the criteria are finalized and applied to the measures as suggested above, the measures may then be grouped for evaluation purposes. Some measures may be evaluated either statewide or by utility (such as lighting), while others (HVAC, for example) would need to be assessed by climate zone (or more locally, if feasible) to determine their equity benefits. Once measure groupings are finalized, the IOUs would then apply these criteria to specific ESA program measures by employing a simple "yes/no/maybe" framework to answer the question of "does this measure meet these criteria?". This evaluation recognizes time constraints inherent in the proceeding and assists the IOUs as they move ahead with program planning for the 2015-2017 applications.

Post 2015-2017 Equity Evaluation

The Working Group proposes that during the 2015-17 program cycle, we work on developing a more sophisticated equity evaluation model, which could be used in subsequent program cycles. This model would rely on more detailed criteria and a measure-based assessment implemented by an independent evaluator using participant surveys in place of the IOUs' assessments. The table below is included as an example of what this more sophisticated evaluation may look like, in terms of the level of detail of the health, comfort and safety criteria, the weighted importance of those criteria, and a score that reflects how each measure meets the criteria. In the example below, a detailed, standard list of criteria is established, with a weight given to each one depending on their relative importance. For each measure (or group of measures), participant surveys are used to develop a "score" for each criterion – in the example below we have used scores of 1, 2 or 3 to represent whether low, medium or high levels of each benefit resulted from the measure. We then multiply the weight by the score for each criterion, then add the results to get a total score for each measure.

For example, the measure " Replace Widget in Climate Zone 32" scores high in certain health, comfort and safety criteria and poorly in others, resulting in an overall total score of 64 for the measure. A broad range of measures and related scores could then be reviewed in order to determine which measures merit inclusion in subsequent program cycles.

Table 6: Example of a More Sophisticated Equity Evaluation

Measure Description: Replace widget in Climate Zone 32				
Category	**Criteria**	**Weight**	**Score**	**Total**
Health	health criterion tbd	3	3	9
	health criterion tbd	3	2	6
	health criterion tbd	2	0	6
	health criterion tbd	2	1	2
	health criterion tbd	1	3	3
	health criterion tbd	1	1	1
Comfort	comfort criterion tbd	2	0	0
	comfort criterion tbd	2	2	4
	comfort criterion tbd	3	1	3
	comfort criterion tbd	2	2	4
	comfort criterion tbd	3	3	9
	comfort criterion tbd	1	0	0
	comfort criterion tbd	1	2	2
Safety	safety criterion tbd	3	1	3
	safety criterion tbd	2	0	0
	safety criterion tbd	1	2	2
	safety criterion tbd	1	0	0
	safety criterion tbd	2	3	6
	safety criterion tbd	2	1	2
	safety criterion tbd	1	2	2
TOTAL				64

Typically, in the low-income proceeding, the IOUs propose studies and the Commission either approves or denies the proposal and sets asides the study budget. In some instances, the Commission has proposed studies not originally envisioned by the IOUs. Either way dedicated specific funds are allocated for the studies. By including a proposal in this whitepaper, the Working Group seeks to establish the record necessary to inform a subsequent Phase II ALJ ruling that will order the study and set aside funds. The IOUs would propose such a study in their 2015 applications and should consider either of the following approaches:

Option 1: Energy Division and the IOUs select a consultant to conduct a California-specific approach that would essentially start from scratch to define and evaluate equity measures within the ESA program. While this approach might consider research performed in other jurisdictions, it would essentially be "micro-level" level and unique to California, producing a distinct set of definitions, equity values, and measurement for California.

Option 2: Rely on the Working Group to answer what are essentially phases 1 and 2 of the research (see questions 1 and 2 above), then select a consultant to take the Working Group's

findings and expand them to determine how measures within the ESA program contribute to the health, comfort and safety of ESA program participants as noted in question 3. This approach warrants consideration in that it would be more cost-effective than a micro-level approach; however it may present some challenges with regard to consistency and adherence to standard evaluation approaches, as difficulties may arise from a two-phased research approach that has the Working Group conducting Phases 1 and 2 and an independent evaluator conducting Phase 3.

While IOU judgments regarding whether ESA program equity measures are providing certain levels of health, safety and comfort may be useful in a short-term evaluation based on time constraints and program planning needs related to the 2015-2017 application process, independent evaluation research as proposed here would be more useful for subsequent program planning, delivery and evaluation efforts. Research that moves beyond IOU judgment calls to rely instead on in-depth participant surveys can provide more thorough and robust information on the specific benefits engendered by ESA program equity measures. Consequently, the IOUs and program participants will mutually benefit from research findings that should lead to improved program design, measure offerings, and program satisfaction and allow the ESA program to continue to strive for improved health, comfort and safety for low-income participants. It would be particularly beneficial for this research to be conducted in the earlier phases of the 2015-2017 program cycle so that it may inform program planning efforts for the next ESA program cycle.

Proposed Modification 4: Modification of the NEBs calculation

Non-energy benefits (NEBs) have been included in the cost-effectiveness analyses of the California IOU low-income program since 2003. In 2001, TecMarket Works with Skumatz Economic Research, Inc. and Megdal and Associates completed a study for the Reporting Requirements Manual Working Group that included a model designed to test the cost-effectiveness of low-income programs with NEBs. In 2003, Itron, Inc. modified the model to use with the Low Income Energy Efficiency (LIEE) program. The IOUs have been using the model, with some minor modifications, since then.

In 2010 Skumatz Economic Research Associates, Inc. completed a scoping study designed to evaluate the use of NEBs in other low-income programs and provide recommendations for updating the methodology used for the LIEE (now ESA) program. The work scope consisted of an extensive literature review and synopsis of relevant ranges of values used in other programs.

The results of the study showed that the current NEB values used by the utilities for the most part fell within the range of values reported from other programs, although in some cases the range was broad. The study results also indicated that for the most part the NEBs being used were difficult to estimate, that the values were inconsistent with large variances and would require additional expensive studies to quantify with any reliability. Table 7 illustrates some of the results.

Table 7: Example of NEB Value Ranges from SERA Study

NEB	Value Range from SERA Study
Fewer reconnects	$0.03 to $0.08
Fewer shutoffs	$0.03 to $12
Fewer calls to utility	$0.18 to $0.30
Moving costs / mobility	< $1
Net benefits for comfort & noise	$15 to $20
Fewer illnesses and lost days from work/school	$4 to $12
Property Value benefits	$3 to $20
Fewer fires	$0.02 to $0.16
Water/sewer savings	$4 to $15
Total	$26 to $80

Recommendations for changing or updating the methodology for estimating NEBs in the cost-effectiveness analyses were considered and included the following:

1. Continue to use the same model and NEB values that have been used since 2003 with no changes or only minor updates where feasible.
2. Continue as above with the addition of sensitivity analysis on key NEBs, such as "comfort and noise," whose values are relatively high.
3. Fund a study that will provide updated values for the NEB calculations that are currently used. The study would likely require extensive customer surveys and analysis.
4. Calculate only certain NEBs which are substantial and easy to calculate and use an adder to estimate any remaining NEBs.
5. Use an adder to estimate all NEBs (this was the most common methodology found in the SERA study literature search).

All of these options have merit. Options one and two require the least amount of additional research and cost. However, parties have voiced reasonable concern that the values currently used to calculate many of the NEBs are not only outdated but in many cases based on unsubstantiated assumptions. The third option, a study to update the values, would be the most expensive option but also the only option to result in updated specific values for NEBs related to the ESA program. The fourth and fifth options, involving an adder, would also require additional research but would be less expensive than option three.

To further describe the fourth option, the NEBs that could easily be measured directly include water savings and property values for participants and the reduced rate subsidy for utilities. Water savings would be measured by estimating the average gallons of water saved per water measure and an average retail water rate. Property values would continue to be estimated using the average cost of minor home repairs provided in the program. The remaining NEBs would then be estimated with an adder, and would be expected to include the net benefit of fewer fires, fewer illnesses, comfort, and reduced hardship for the participant and reduced cost for arrearages and fewer customer calls for the utilities. In addition, any other net non-energy benefits not explicitly described in this paper would be included in the adder estimation.[13]

[13] Other NEBs from the 2003 model that were found to be so low in value they could be eliminated from the analysis with minimal effect included fewer shutoffs, fewer calls to the utility, fewer reconnects and moving costs

The SERA study reported that where adders were used in other programs, they covered a broad range and their values are mostly arbitrary. Additional research would be needed to develop an appropriate adder for the ESA program. Some of the questions to be researched include a methodology for estimating the adder, the basis the adder will be applied to, and the possible need for different adders for different mixes of measures or fuel types.

One approach for developing a potential adder would involve looking at each of the utilities' analyses for the PY2012 to 2014 filing and assessing the NEBs, energy savings and bill savings that were allocated to various measures and measure groups. This would provide information on what a typical adder would have been to produce the PY2012 to 2014 results. While this approach relies on what has been done in the past, it would provide at least a starting point and further qualitative considerations could be evaluated to either increase or decrease the result.

This approach could be addressed within the statewide working group in 2013. Alternatively, a study could be funded to develop an appropriate adder that would include additional research or more comprehensive analyses.

Proposed Modification 5. Reporting cost-effectiveness by household type

This proposal, put forth by DRA, is to add a reporting requirement that requires that cost-effectiveness results be grouped by household type, as well as reported for individual measures. This would provide a more concrete picture of the level of cost-effectiveness achieved by the ESA program, by grouping cost-effectiveness results by approximately twelve groupings of dwellings receiving program services. These groupings will be defined by dwelling and/or occupant characteristics and the climate conditions surrounding the dwelling. A Working Group subcommittee discussed this proposal and agreed that the additional analysis could be completed in the near future, and that the data to perform the analysis is available.

The utilities are currently required to report ESA program data based on similar groupings. With some additional analysis, the groupings could be further broken down by climate areas. Having these groupings would allow the opportunity of further understanding how the costs and benefits differ across these groups. On the benefits side, DRA believes that the current energy savings estimates, which are generally the savings estimates which were made when the programs were approved, should be continued.

This new reporting will provide information on how costs and benefits vary for different groupings of households. It will support the identification of new services that may be more appropriate to these groupings. It will make more transparent "who is getting what" from the program. This proposal is aligned with the customer segmentation approach to program planning which has been the focus of several utility ESA program studies in the last few years.[14]

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for participants; and fewer shutoffs, fewer reconnects, fewer notices, and reduction in emergency gas service calls for the utilities.

[14] PG&E ESA program Customer Segmentation study report February 22, 2012, SCE ESA program Customer Segmentation study report December 1, 2011, and SCE ESA program High Usage Needs Assessment Report September 1, 2011.

A preliminary list of household groupings is proposed below. These groupings will continue to be refined by the Working Group, based on stakeholder input.

1.MH in Cooling Climate Zones (6, 7, 8, 9 10, 15)
2.MH in Heating Climate Zones (1, 2, 3)
3.MH in neither (5)
4.MH in both Heating & Cooling Climate Zones (4, 11, 12, 13, 14, 16)

5.MF 5+ in Cooling Climate Zones (6, 7, 8, 9 10, 15)
6.MF 5+ in Heating Climate Zones (1, 2, 3)
7.MF 5+ in neither (5)
8.MF 5+ in both Heating & Cooling Climate Zones (4, 11, 12, 13, 14, 16)

(SF includes small MF of 2-4 units)
9.SF in Cooling Climate Zones (6, 7, 8, 9 10, 15)
10.SF in Heating Climate Zones (1, 2, 3)
11.SF in neither (5)
12.SF in both Heating & Cooling Climate Zones (4, 11, 12, 13, 14, 16)

Finally, there should be an opportunity in the future to add additional variables to better define logical groupings. The next variable might be the owner/renter designation, as the utilities have indicated program records might make this possible without much additional work. The sorting of ESA program records could take place outside the E3 model. In addition, it may be possible to use pre-program usage data to distinguish which households which use heating and cooling.

The above groupings use Climate Zone designation as a proxy for determining which households are expected to have heating and cooling usage. However, actual household behavior may differ, particularly for low income households that have nonfunctioning heating or cooling equipment.

As a further refinement, it may be possible that by examining individual energy use and bills, program administrators could identify households that have atypical heating or cooling patterns. If such a review reveals a special circumstance (such as elderly or disabled occupants that require year-round heating in a temperate climate), the program administrator could override the climate zone designation and group individual households in heating/cooling/both/neither areas as appropriate.