

Final Report

EM&V STUDY OF THE H&L ENERGY SAVERS PERFORMANCE4 2004-2005 NON-UTILITY PROGRAM IMPLEMENTATION

Program 1066-04 – SCE Service Territory

CALMAC Study ID: HLE0001.01

Submitted to H&L Energy Savers and the CPUC Energy Division
October 19, 2006

Funded with California Public Goods Charge Energy Efficiency Funds:

Submitted by
SISSON AND ASSOCIATES, INC. (S&A)

Contact Information:

MR. PHIL SISSON, PRESIDENT
SISSON AND ASSOCIATES, INC.
42 MOODY COURT
SAN RAFAEL, CA 94901
VOICE 415-845-8820
FAX 415-454-6591
EMAIL: PHILSISSON1@COMCAST.NET

Table of Contents

1. Executive Summary	3
2. Introduction.....	9
3. General Comments and Observations.....	11
3.1. Methodologies and Approaches Utilized.....	11
3.2. Actual Versus Originally Intended Program Implementation	12
3.3. Program Issues Not Explored	12
4. Sample.....	13
4.1. Design	13
4.2. Results.....	13
5. Participant Survey.....	16
6. Process Evaluation.....	27
6.1. Serving of Intended Markets / Participation Reasons.....	27
6.2. Environmental Factor Impacts.....	30
6.3. Onsite EM&V Observations	31
6.4. Service and Procedure Improvement Opportunities	32
7. Impact Evaluation	35
7.1. Step A.....	36
7.2. Step B.....	36
7.3. Step C.....	39
7.4. Step D.....	40
7.5. Cost-Effectiveness Evaluations	42
7.6. Year-by-Year Impacts.....	48
Appendix A. Full Participant Phone Survey Instrument	50
Appendix B. Full Participant Phone Survey Coded Dataset.....	56
Appendix C. Impact Evaluation Workbook.....	57
Appendix D. Cost-Effectiveness Assessment.....	58
Appendix E. Year-by-Year Impacts	59
Appendix F. Draft Final Report Reviewer Comments and S&A Responses	60

1. Executive Summary

This section briefly identifies “top level” EM&V findings regarding the 2004-2005 Performance4 (P4) programs implemented by H&L Energy Savers (H&L) in the Southern California Edison (SCE) service territory.

Study Linkages to CPUC Energy Efficiency Policy Manual (EPPM) EM&V Objectives

EEPM EM&V Objective	Conclusion	Report Reference
Measuring level of energy and peak demand savings achieved	The implementation fell far short of goals (whether measured as gross <i>ex ante</i> intermediate, net <i>ex ante</i> intermediate or net <i>ex post</i> final ¹) for kW, annual kWh, and annual therms.	Sections 7.2, 7.3, and 7.4
Measuring cost-effectiveness	The implementation was not cost effective (with respect to a TRC Test).	Section 7.5
Providing up-front market assessments and baseline analysis, especially for new programs	Significant numbers of homes in the program area have minimal amounts of “pre” shell insulation and/or high “pre” duct system leakage rates.	Section 7.4 and impact evaluation workbook
Providing ongoing feedback, and corrective and constructive guidance regarding program implementation	Original program design assumptions regarding marketing approaches and use of regional contractor networks were seriously flawed.	Section 6.4
Measuring indicators of the effectiveness of specific programs, including testing of the assumptions that underlie the program theory / approach	Customer participated in the program for utility bill reduction and/or home comfort reasons. Original program assumptions regarding customer interest in home quietness and participation at time of home sale were erroneous.	Section 5
Assessing the overall levels of performance and success of programs	Program unsuccessful – participants generally satisfied, but number of participants was far below plan, and significant free ridership occurred.	Sections 5, 6.1, and 7.4
Informing decisions regarding compensation and final payments	Performance award not applicable – the implementation fell far short of goals (whether measured as gross <i>ex ante</i> intermediate, net <i>ex ante</i> intermediate or net <i>ex post</i> final) for kW, annual kWh, and annual therms.	Sections 7.2, 7.3, and 7.4
Helping to assess whether there is a continuing need for the program.	Significant energy-savings potential appears to remain in targeted program population, but different approaches should be utilized.	Sections 6.1, 7.4, and 7.5

¹ Definitions of these terms are provided on the next page, and at the beginning of Section 7.

Primary Methodologies and Approaches Utilized

- Conducted reviews of program documents and tracking system databases, with follow-up program staff interviews; external data sources consulted/utilized to fill in gaps/update assumptions as appropriate.
- Performed participant phone surveys and associated paperwork reviews for a representative stratified sample of 82 data points.
- Conducted onsite measure verification work at 14 of the 82 sampled sites.
- Performed detailed reviews of and adjustments to measure savings data. For ceiling insulation, wall insulation, and duct sealing measures, 2005 DEER savings values were adjusted as appropriate based on site-specific factors. For CFL's, 2005 DEER savings values were adjusted based on phone survey responses regarding utilization.
- Conducted impact evaluation statistical analysis of program performance per CPUC California Evaluation Framework guidelines. Per instructions from the CPUC, three distinct sets of realization rate-based analyses were conducted (note that "Step A" is defined as gross savings *ex ante* as reported values):
 - Gross *ex ante* intermediate ("Step B") – savings for measures verified as installed, using *ex ante* values.
 - Net *ex ante* intermediate ("Step C") – savings for measures verified as installed, using *ex ante* values, and adjusted for *ex ante* net-to-gross (NTG) values.
 - Net *ex post* final ("Step D") – savings for measures verified as installed, using best available savings estimates, and measured NTG values.
- Developed *ex post* cost-effectiveness assessment (i.e., TRC Test) using 1) EEGA workbook, 2) impact evaluation Step D statistical analysis key findings, 3) actually incurred program costs, and 4) relevant EUL measure assumptions.

Key Survey Findings

- Customers participated in the program most frequently because of 1) utility bill savings opportunities and 2) wanting to make homes more comfortable.
- Customers fully participating in the P4 program were highly satisfied with the program's general and measure-specific attributes (although it should be noted that satisfaction was lowest regarding the incentive – probably the result of the incentives' covering a relatively low portion of measure costs).
- Free ridership appears to have been moderately high for the “core” measures of ceiling insulation and wall insulation.

Key Process Evaluation Findings

- Participants served by the P4 program involved single family homes built in 1978 or earlier in inland Southern California. Program activity was concentrated in Climate Zones 9 and 10; the program was either non-existent or essentially non-existent in Climate Zones 14 and 15.
- “Macro” environmental business factors had little or no impact on the program implementation.
- Program volumes appear to have been adversely affected by the following:
 - Marketing materials that were relatively “fuzzy” and overly conceptual in nature.
 - Incentives that typically covered a small percentage of measure costs.
 - Failure to recruit the intended marketing actors of 1) mortgage brokers, 2) local governments, and 3) regional contractors in any meaningful quantities.

Key Impact Evaluation Findings

- Gross *ex ante* intermediate analysis (Step B). The H&L P4 implementation fell far short of goal for gross *ex ante* intermediate on-peak kW, gross *ex ante* intermediate annual kWh, and gross *ex ante* intermediate annual therms.

Impact Evaluation Step B Statistics	Peak kW	Annual kWh	Annual Therms
Realization Rate (RR)	0.772	0.739	0.870
Standard Error	0.034	0.028	0.023
Error Bound @ 90% confidence level	0.055	0.047	0.038
Upper Error Bound re Realization Rate	0.828	0.786	0.908
Lower Error Bound re Realization Rate	0.717	0.693	0.833
Relative Precision	7.1%	6.3%	4.3%
Tracking System Population Gross Savings	352	543,521	91,421
Gross <i>Ex ante</i> Intermediate Savings (= Tracking Savings Population Gross Savings * RR)	272	401,783	79,567
Program Goal Gross Savings (= Program Goal Net Savings / 89% NTG)	2,373	5,120,196	726,801
S&A estimate of Gross <i>Ex ante</i> Intermediate Savings as % of Goal	11.5%	7.8%	10.9%

- Net *ex ante* intermediate analysis (Step C). The H&L P4 implementation fell far short of goal for net *ex ante* intermediate on-peak kW, net *ex ante* intermediate annual kWh, and net *ex ante* intermediate annual therms.

Impact Evaluation Step C Statistics	Peak kW	Annual kWh	Annual Therms
Realization Rate (RR)	0.687	0.658	0.775
Standard Error	0.030	0.025	0.020
Error Bound @ 90% confidence level	0.049	0.041	0.033
Upper Error Bound re Realization Rate	0.736	0.699	0.808
Lower Error Bound re Realization Rate	0.638	0.616	0.741
Relative Precision	7.1%	6.3%	4.3%
Tracking System Population Gross Savings	352	543,521	91,421
Total Net <i>Ex ante</i> Intermediate Savings (= Tracking Savings Population Gross Savings * RR)	242	357,587	70,814
Program Goal Net Savings	2,112	4,556,975	646,853
S&A estimate of Net <i>Ex ante</i> Intermediate Savings as % of Goal	11.5%	7.8%	10.9%

Key Impact Evaluation Findings (continued)

- Net *ex post* final analysis (Step D). The H&L P4 implementation fell far short of goal for net *ex post* final on-peak kW, net *ex post* final annual kWh, and net *ex post* final annual therms.

Impact Evaluation Step D Statistics	Peak kW	Annual kWh	Annual Therms
Realization Rate (RR)	0.347	0.688	0.607
Standard Error	0.026	0.047	0.035
Error Bound @ 90% confidence level	0.043	0.077	0.057
Upper Error Bound re Realization Rate	0.390	0.766	0.664
Lower Error Bound re Realization Rate	0.303	0.611	0.550
Relative Precision	12.5%	11.3%	9.4%
Tracking System Population Gross Savings	352	543,521	91,421
Total Net <i>Ex post</i> Final Savings (= Tracking Savings Population Gross Savings * RR)	122	373,991	55,455
Program Goal Net Savings	2,112	4,556,975	646,853
S&A estimate of Net <i>Ex post</i> Final Savings as % of Goal	5.8%	8.2%	8.6%

- Based on actual program costs, actual savings impacts (per impact evaluation Step D findings), and appropriate EUL assumptions, the H&L P4 implementation was not cost-effective. TRC Test key metrics are summarized below.

Metric	H&L P4 Proposed	H&L P4 Actual
Net <i>ex post</i> final peak kW	2,112	122
Net <i>ex post</i> final annual kWh	4,556,975	373,943
Net <i>ex post</i> final lifecycle kWh	73,119,384	5,220,626
Net <i>ex post</i> final annual Therms	646,883	55,492
Net <i>ex post</i> final lifecycle Therms	11,726,069	1,000,003
TRC Test Benefits	\$6,634,304	\$527,635
TRC Test Costs	\$3,447,442	\$858,553
TRC Test Net Benefits	\$3,186,862	-\$330,918
TRC Test BCR	1.92	0.61

Key Impact Evaluation Findings (continued)

- Year-by-year gross *ex ante* reported and net *ex post* final load impacts are summarized below. Data are applicable to the SCE service territory only.

Program ID: 1066-04

Program Name: H&L Energy Savers – Performance4

Year	Calendar Year	Gross Program-Projected MWh Savings	Net Evaluation Confirmed Program MWh Savings	Gross Program-Projected Peak MW Savings	Evaluation Projected Peak MW Savings**	Gross Program-Projected Therm Savings	Net Evaluation Confirmed Program Therm Savings
1	2004	217	149	0.14	0.05	36,604	22,218
2	2005	526	362	0.33	0.12	86,564	52,544
3	2006	544	374	0.35	0.12	91,421	55,492
4	2007	544	374	0.35	0.12	91,421	55,492
5	2008	544	374	0.35	0.12	91,421	55,492
6	2009	544	374	0.35	0.12	91,421	55,492
7	2010	544	374	0.35	0.12	91,421	55,492
8	2011	544	374	0.35	0.12	91,421	55,492
9	2012	445	306	0.32	0.11	91,421	55,492
10	2013	285	196	0.27	0.10	89,917	54,579
11	2014	285	196	0.27	0.09	83,189	50,495
12	2015	281	194	0.28	0.10	75,573	45,873
13	2016	280	193	0.28	0.10	75,183	45,636
14	2017	280	193	0.28	0.10	75,183	45,636
15	2018	280	193	0.28	0.10	75,183	45,636
16	2019	272	187	0.28	0.10	74,778	45,390
17	2020	266	183	0.28	0.10	74,288	45,093
18	2021	266	183	0.28	0.10	74,248	45,068
19	2022	253	174	0.26	0.09	72,165	43,804
20	2023	236	162	0.24	0.08	69,448	42,155
21	2024	138	95	0.14	0.05	40,861	24,803
22	2025	14	10	0.01	0.01	4,327	2,626
TOTAL	2004-2025	7,588	5,221	6	2	1,647,451	1,000,003

** Definition of Peak MW as used in this evaluation: on-peak

2. Introduction

This document is the formal EM&V report by Sisson and Associates Inc. (S&A) for the 2004-2005 Performance4 (P4) program implemented by H&L Energy Savers (H&L) in the Southern California Edison service territory. This study was conducted at the request of the California Public Utilities Commission, and was funded through the public goods charge (PGC) for energy efficiency. It is available for download at www.calmac.org.

Its intended audiences and associated uses are as follows:

- CPUC: independent party findings and assessment regarding the programs; final payment evaluation
- H&L: obtain information useful in modifying / improving various aspects of the program in possible future implementations

This document assumes reader general familiarity with and/or access to the following:

- H&L program proposal from September 2003
- H&L monthly reports, including the EEGA program tracking workbooks. Note, however, that this EM&V report has been prepared independently of H&L's final reports.
- S&A EM&V Research Plan
- The CPUC's California Evaluation Framework report dated June 2004 (as prepared by the TecMarket Works team)

With respect to the S&A EM&V Research Plan, please note the following changes:

- *Midstream feedback.* Initial feedback regarding the program implementations was provided mostly verbally and via informal email communications (e.g., related to content of marketing materials), rather than in the form of a distinct Interim Report. Program quantities through end of 2004 were far below plan, and accordingly, relatively few respondent data pts had been collected and formally analyzed (since it was possible that program activities might rebound during 2005, thereby implying that most EM&V data points would be from 2005 activities).
- *Process evaluation.* The research was expanded slightly to include consideration of insights gained through the onsite measurement and verification work.

- *Impact evaluation.* The five step approach regarding the development of net savings numbers was modified significantly – per instructions from the CPUC – so that gross *ex ante* intermediate and net *ex ante* intermediate savings numbers could be ascertained, in addition net *ex post* final savings numbers. Note that definitions of these impact evaluation measurement terms are provided at the beginning of Section 7 (and in the Executive Summary).

By reference, this final EM&V report includes the following:

- Full participant phone survey instrument (Appendix A)
- Full participant survey response coded dataset (in Excel workbook format; Appendix B)
- Impact evaluation workbook (in Excel workbook format; Appendix C)
- EEGA workbooks of actual program cost-effectiveness (in Excel workbook format; Appendix D)
- Year-by-Year impact analyses (in Excel workbook format; Appendix E)
- Draft report review comments and responses (Appendix F)

3. General Comments and Observations

3.1. Methodologies and Approaches Utilized

The bulk of the EM&V research utilized in this particular study involved the following types of methodologies and approaches:

- Program document reviews and associated program staff interviews
- Program tracking system reviews
- Full participant phone surveying and associated application paperwork reviews
- Onsite verification work

Each type of research is briefly summarized in turn.

Program document reviews and associated program staff interviews. This research mostly featured a front-loaded review of program documents and follow-up program staff discussions to familiarize S&A with program operational details. Subsequent research in this area happened as-needed periodically over the course of the program (e.g., when program participation characteristics changed significantly). The subsequent research was usually characterized by as-needed document reviews which in turn generated iterative question and answer sessions conducted by S&A staff via either email or phone with H&L program staff until adequate resolution was attained.

Program tracking system reviews. This research involved analyzing monthly updates to the H&L tracking system database files, and assessing the cumulative program population and sample in the context of the stratified sample's structural characteristics (see Section 4 discussion).

Full participant phone surveying and associated application paperwork reviews. This research built off of the monthly program tracking system reviews. All other things equal, the pragmatic intent of the sample design was to sample a relatively even number of participants completing the program in each relevant month so as to survey participants approximately 45 to 75 days after completing the program (hence attempting to hold reasonably constant time-related recollections regarding the program). For any given monthly sample bin, the then-current version of each program's tracking database would be screened for records with program completion dates in the desired time frame. Participant data points were then sampled as needed to maintain general consistency between the program's cumulative population and the sample. Once successful participant phone surveys were obtained, paperwork application packets were then requested from H&L for those surveyed participants to conduct paperwork application verification audits, and to aid more generally in the impact evaluation quantification. As

part of the impact evaluation, sampled application paperwork materials were cross checked with corresponding electronic records in the tracking database.

Onsite verification work. This research was conducted for a subset of sampled sites. This work involved validating – and photo documenting – that the “post” measures were appropriately specified (in terms of both characteristics and unit quantities).

3.2. Actual Versus Originally Intended Program Implementation

The P4 actual 2004-2005 program implementation in one sense resembled what was proposed: mostly insulation-oriented measure activities, as installed at a broad mix of residential low rise homes (mostly detached single family) in inland Southern California. Unfortunately, actual program measure volumes for the most part were a small fraction of goal measure volumes.

The most significant modifications in program delivery during the 2004-2005 implementations (in S&A’s opinion) consisted of the following:

- *Geography.* The actual program featured much heavier relative emphasis on Climate Zones 9 (San Gabriel Valley) and 10 (Inland Empire) – and much lower relative emphasis on Climate Zones 14 (high desert) and 15 (low desert) than was originally envisioned.
- *Contractor mix.* The actual program was implemented entirely by H&L, rather than through a network of southern California contractors.
- *Marketing channels.* The actual program was largely promoted through H&L Energy Savers directly, rather than through local governments/cities (e.g., building departments) and financial service industry organizations (e.g., mortgage brokers).

Please refer to additional related discussion on this topic in Section 6.1.

3.3. Program Issues Not Explored

As Section 5 describes in more detail, process evaluation efforts focused on “big ticket” reasons for the program’s falling far short of goals.

Accordingly, relatively little effort was spent by S&A on “incidental” program issues such as:

- What methods H&L used to “close” P4 program sales, or
- What optimized incentive levels or measure definitions might have been (relative to what was implemented)

The broader intent of S&A’s EM&V work efforts involved focusing efforts and resources on key areas of / reasons for program shortfalls and program uncertainty.

4. Sample

4.1. Design

Core aspects of the P4 program implementation's sample design as articulated in the EM&V Research Plan were as follows:

- A total of 68 data points
- Use of a stratified sample, most likely with 3 to 4 strata
- For between 14 (20%) and 23 (33%) of the 68 data points, S&A EM&V staff would be present for measure verification work.

Data collection for the sample was implemented generally consistent with the above design principles, and with the following additional key attributes:

- Two strata were used for the stratified sample. The strata were defined based on program measure participation, and consisted of 1) those participants implementing both ceiling insulation *and* wall insulation, and 2) all other program participants. These particular strata definitions were utilized since these attributes were straightforward to discern from the program tracking system, and likely to correlate effectively with gross energy savings (i.e., the former stratum was likely to have disproportionately large per-site energy savings). Use of two strata also was beneficial for purposes of seeing to what degree customer satisfaction scores differed between the two groups.
- Sample points were to be allocated across the two strata in approximately equal amounts, in order to create a reasonably balanced sample for purposes of assessing customer program satisfaction across the two strata.
- Most sampled participants were to be surveyed within 45 to 75 days of the date of EEM implementation. This timing was intended to optimize the tradeoff between respondents' 1) having program experience be "fresh" (and clearly recalled) on the one hand versus 2) having multiple months of "post" installation utility bills and measure general experience to be able to form conclusive opinions regarding the pragmatic effects of the program.
- Onsite measure verification work was to span a reasonably representative variety of jobs conducted through the P4 program.

4.2. Results

High level attributes of the attained sample are summarized in tabular form below. These results indicate that both of the indicated design attributes were either met or exceeded.

Attribute	Design	Results
Total sample size (n)	68	82
Sites Where EM&V Staff Present for Measure Verification Work	14 (minimum) to 23 (maximum)	14

The overall actual sample of 82 data points exceeded the design of 68 data points, since it was decided to administer participant surveys at all 14 sites where onsite measure verification work was conducted. Only the minimum number of 14 onsite verifications were conducted; given the cost of onsite verification work, and given the large gap between program goals and actual results, S&A did not see further benefits to conducting additional onsite verification work.

Survey calls to sampled program participants were made between January 2005 and April 2006. These calls covered program participants reported by H&L for the program months of February 2004 through March 2006. The sample's range of program months compares with the overall program population's program months of February 2004 through March 2006. Survey calls featured a "burst" of activity in early 2005 (reflective of "catching up" with 2004 program activity), then shifted to a significantly lower average number of completed calls per month thereafter.

Onsite measure verification and participant surveying occurred between January 2006 and March 2006, and spanned a reasonably diverse mix of implemented measures and climate zones.

Strata-specific results for the program population and sample are summarized in tabular form below.

Stratum	Population N	Target n	Actual n	Actual – Target n
Stratum 1: Did ceiling insulation and wall insulation	123	34	35	+1
Stratum 0: All other program participants	254	34	47	+13
Total	377	68	82	+14

Key "oddities" associated with the sample and/or sample data collection are summarized in bullet form below.

- Onsite measure verification work for the 14 included sites was typically conducted at customer sites on the day of measure installation, at the end of the work day. The intent of this timing was to minimize customer disruption, since access to attic areas, duct systems – and installed measures in general – was uncomplicated and straightforward. At these sites, customers were surveyed in-person by S&A EM&V staff using the same survey instrument used in the phone interviews. Only approximately 90% of the survey instrument questions were asked at that time, however, because it was inappropriate to ask respondents to assess certain measures on the day of their

installation. These program participants were then tracked down and asked the remaining 10% of the survey questions via phone two to three months later.

- The “all other program participants” stratum ended up being slightly overrepresented, since the measure work at the sites selected for onsite measure verification skewed significantly towards that particular sample group.

5. Participant Survey

This section summarizes responses for H&L P4 program participants with respect to the phone survey instrument utilized. Survey questions 1-27 (and associated response findings) are listed in order, and have been grouped together where logically appropriate. Stratum-specific results are presented for survey questions 13-18 and 22-23.

Key pragmatic findings associated with the survey results are provided in the Section 6 Process Evaluation.

Note that scores associated with survey questions 13-19 utilize a 5-point scale (where 5 is best possible score and 1 is the worst possible score; additional possible responses are “don’t remember” (DR) and “not applicable” (NA)).

Q1.) Verify name _____

Q2.) Verify home location (street address / city) _____

H&L respondents. Interviewees were promised their names would remain confidential. 82 of the 82 respondents (100%) were verified (with respect to P4 program tracking system data) regarding their name and location).

Q3.) Verify home vintage (year) _____

H&L respondents. Listed home vintage information was verified for 80 of the 82 respondents (98%). The other two instances involved minor date modifications. All respondents confirmed home vintages of prior to 1978 (per program eligibility requirements).

Q4.) Do you recall participating in the Performance 4 program sponsored by H&L Energy Savers? _____ *If cannot recall, add more information such as: have you recently had insulation installed, ducts sealed, etc. If still no recollection, END SURVEY, and thank the respondent for his/her time.*

H&L respondents. 82 of the 82 respondents (100%) verified participation in the P4 program.

Q5.) How did you *initially* learn about the program?
(pre-coded list; multiple responses allowed; probe until reasonably exhausted)

___ Contractor

___ City government

___ Bank or credit union

___ Newspaper/media

___ Friend/colleague

___ Other _____ (record)

H&L respondents. The leading response (with 37 of the 82 respondents who verified program participation; 45%) was “other”. The second place response (23 responses; 28%) was friend/colleague. The third place response (17 responses; 21%) was newspaper/media. The fourth place response (14 responses; 17%) was contractor. All other responses were far behind.

“Other” responses were scattered, but lead by “mail flyer” (or variations thereof) and “utility bill stuffer” (or variations thereof).

Q6.) Our records indicate that you had the following energy efficiency measures implemented (*read from data extract*):

- CFL’s installed (note: up to 5 given out / installed as part of free energy audit)
- Faucet aerator installed (note: installed as part of free energy audit)
- Low-flow showerhead installed (note: installed as part of free energy audit)
- Ceiling insulation added
- Wall insulation added
- Air conditioning diagnostic work conducted (e.g., Freon refrigerant added)
- Ducts sealed
- Whole house fan installed
- Setback thermostat installed
- Water heater pipe insulation added
- Non-prog. measure #1 (identified if nec. for 2nd call) _____ (record)
- Non-prog. measure #2 (identified if nec. for 2nd call) _____ (record)
- Non-prog. measure #3 (identified if nec. for 2nd call) _____ (record)
- Non-prog. measure #4 (identified if nec. for 2nd call) _____ (record)

Does this scope of work sound correct?

(If answer is no, record their version of what happened.)

H&L respondents. 43 of the 82 respondents who verified program participation (52%) confirmed the indicated scope of implemented measures.

The overwhelming majority of the remaining instances pertained to either the respondent not being given some or all of the program “freebies” (i.e., the CFL’s, aerators, and showerheads), or the respondent not having installed some or all of the program “freebies”.

Q7.) a.) Is the measure(s) and/or tuned-up equipment still fully installed and operational? (*ask about each measure verified in #6 – note that some CFL’s might have been put into storage*)

If “no” regarding any of the measures, ask: b.) What % of the measures remain installed and operational? _____

7a. Fully installed/operational (yes/no) 7b. % Remaining installed/operational?

- CFL's installed _____
- Faucet aerator installed _____
- Low-flow showerhead installed _____
- Ceiling insulation added _____
- Wall insulation added _____
- Air conditioning diagnostic work conducted _____
- Ducts sealed _____
- Whole house fan installed _____
- Setback thermostat installed _____
- Water heater pipe insulation added _____
- Non-prog. measure #1 _____
- Non-prog. measure #2 _____
- Non-prog. measure #3 _____
- Non-prog. measure #4 _____

(Treat situations where a piece of equipment promptly failed and was satisfactorily replaced as part of the Performance 4 program as still installed/operational)

H&L respondents. Measure-specific responses are summarized below in tabular form.

Measure	Instances Recorded in P4 Program Database	Instances Confirmed as Still Fully Installed / Operational	Discussion Regarding Other Instances
CFL's	81	23	Mix of instances where units either not received or not installed. In many instances, some but not all of the units were installed. In a few instances, units were being stockpiled until existing light bulbs burned out.
Faucet aerators	73	18	Mix of instances where units either not received or not installed. A few instances where units were not compatible with existing faucets. A few instances where claimed reason for non-installation was that there was no one to install the unit.
Low-flow showerheads	78	24	Mix of instances where units either not received or not installed. A few instances where claimed reason for non-installation was that there was no one to install the unit.
Ceiling insulation	62	62	--
Wall insulation	45	44	One instance where database showed work was done, but respondent indicated otherwise (note: paperwork in file corroborated respondent's claim).
AC diagnostic	0	0	--
Duct sealing	31	31	--

Whole house fan	9	9	--
Setback thermostat	0	0	--
Water heater pipe insulation	26	22	Three instances where respondent indicated work not performed. One instance where response not available since initial portion of survey was conducted onsite, and multiple follow-up phone survey attempts were unsuccessful.
Non-program measures	7	7	Instances involving spillover. Included several instances of non-program ceiling insulation (i.e., where "pre" insulation amounts made the work not eligible for P4 program incentives). Note: 7 instances of self-reported spillover is significantly lower than the 24 instances discerned from the impact evaluation (see Section 7 discussion). S&A attributes these differences to 1) spillover measures not being top-of-mind when respondents were prompted on an open-ended basis, 2) respondents chose to not mention spillover measures so as to keep the survey as short as possible, and 3) the fact that certain spillover measures (e.g., related to kneewall insulation) were originally [incorrectly] reported/classified as P4 measures.

Q8.) Regarding the CFL's that were installed and that are presently operational: how many hours per day would you say that they typically are on (to the nearest half-hour)? _____.

H&L respondents. Respondents having at least some CFL's currently installed and operational indicated that the CFL's were used an average of 4.2 hours per day.

Q9.) (Ask if customer implemented setback thermostat in #6)

9a.) What were pre-setback thermostat settings for your space heating and/or air conditioning systems?

(record degrees information by time of day, day of week, and/or heating/cooling season as appropriate)

9b.) What were settings on your setback thermostat when it was installed?

(record degrees information by time of day, day of week, and/or heating/cooling season as appropriate)

9c.) If settings have been changed since installation, what are current settings?

(record degrees information by time of day, day of week, and/or heating/cooling season as appropriate)

No instances occurred in the sample pertaining to setback thermostat measures.

Q10.) What made you decide to participate in the program? (pre-coded list; multiple responses allowed; probe until reasonably exhausted)

- Incentive(s) / discount(s) / rebate(s)
- Wanted to make home quieter
- Wanted to make home more comfortable (e.g., cooler in summer)
- Wanted to make home cleaner
- Wanted to make home cheaper to operate (i.e., reduce utility bill)
- Wanted to make home worth more
- Wanted to support a local contractor
- Clear/compelling program literature
- Clear/compelling program web site
- Turnkey service program made the upgrades easy
- Not disruptive to my home
- Good word-of-mouth from other program participants
- Good testimonials in program ads from respected persons / organizations
- Other _____ (record)

H&L respondents. Among the 82 respondents who verified program participation, the top three responses – which dominated all other responses – were “wanted to make home cheaper to operate/save on utility bill” (51 respondents; 62%), “wanted to make home more comfortable” (47 respondents; 57%), and “other” (45 respondents; 55%). All other responses (e.g., “wanted to make home quieter”, “incentive”) were far behind.

Within the “other” category, the most commonly cited responses were “save energy” (or variations thereof), and “needed insulation”. Other responses were widely scattered.

Q11.) What was the single most important reason for deciding to participate in the program? (circle the answer from the prior pre-coded list)

H&L respondents. Responses among the 82 respondents who verified program participation generally resembled the responses for question 9. The two most frequently cited most important reasons were “wanted to make home cheaper to operate/save on utility bill” (34 respondents; 41%) and “wanted to make home more comfortable” (27 respondents; 33%).

Q12.) Did you receive incentives or rebates from any other source as a result of installing the Performance 4 program measures? _____ (If yes, record description of what happened)

H&L respondents. Zero respondents (0%) among the 82 respondents who verified program participation indicated using incentives/rebates from other sources.

- Q13.) ___ Overall, how satisfied are you with the Performance 4 program?**
- Q14.) ___ How easy was it to participate in the program?**
- Q15.) ___ How satisfied were you with the energy audit?**
- Q16.) ___ How satisfied were you with the incentive / discount / rebate?**
- Q17.) ___ How satisfied were you with the contractor(s) who performed the work**
- Q18.) ___ How satisfied were you with the level of disruption to your home being minimized during the work?**

H&L respondents. Respondents scored all seven elements of program satisfaction quite evenly and favorably, both overall and within each stratum. Incentives fared the least favorably on a relative basis.

Attributes are listed in tabular form below in declining order of average satisfaction score for the overall sample.

Program Attribute	Average Score – Overall Sample	Average Score – Stratum 1	Average Score – Stratum 0
Easy to participate	4.9	4.9	4.9
Information in energy audit	4.7	4.7	4.8
Overall program	4.6	4.7	4.6
Contractor	4.6	4.6	4.6
Level of disruption	4.5	4.4	4.6
Incentive	4.1	4.3	4.0

Interestingly, the largest absolute score differences between Stratum 1 and Stratum 0 pertain to the incentive (Stratum 1 participants were slightly more satisfied – probably because of the absolute dollar size of the incentive being greater) and the level of disruption (Stratum 1 participants were slightly less satisfied – probably because of the greater amount of work done to the home and/or longer job times).

- Q19.) How satisfied are you with the performance of each measure? (*per Q6 measure list*)**
 - ___ CFL's
 - ___ Faucet aerator
 - ___ Low-flow showerhead installed
 - ___ Ceiling insulation
 - ___ Wall insulation

- ___ **Air conditioning diagnostic work**
- ___ **Ducts sealed**
- ___ **Whole house fan**
- ___ **Setback thermostat**
- ___ **Water heater pipe insulation**
- ___ **Non-prog. measure #1**
- ___ **Non-prog. measure #2**
- ___ **Non-prog. measure #3**
- ___ **Non-prog. measure #4**

H&L respondents. Respondents generally scored measures quite favorably. Results are for program measures in listed below in tabular form in declining order of average score. The table also lists the number of sample data points associated with the average scores, since the degree of coverage “thickness” varies significantly across the measures.

Measure	Average Score	Sample Data Points
Non-program measures	5.0	7
Ceiling insulation	4.6	61
Duct sealing	4.6	30
CFL's	4.5	55
Wall insulation	4.5	43
Faucet aerator	4.4	19
Low-flow showerhead	4.4	24
Whole house fan	4.3	7
Water heater pipe insulation	4.4	19
AC diagnostic work	--	0
Setback thermostat	--	0

Q20.) *(For each measure verified by the participant in Q6)* Assuming you had not been contacted by the Performance 4 program in the first place, what is the likelihood (in percent) that you would have implemented or installed the measure during 2004 or 2005 in the absence of this program, where 0% = no chance and 100% = definitely would have had?

Q21.) *(For respondents answering any portion of Q20 as >0%)* How much sooner (in months) was the measure implemented because of this program?

Q20. Implementation likelihood %?

Q21. Months sooner implemented?

- | | |
|--------------------------------------|-------|
| ___ CFL's | _____ |
| ___ Faucet aerator | _____ |
| ___ Low-flow showerhead installed | _____ |
| ___ Ceiling insulation | _____ |
| ___ Wall insulation | _____ |
| ___ Air conditioning diagnostic work | _____ |
| ___ Ducts sealed | _____ |
| ___ Whole house fan | _____ |
| ___ Setback thermostat | _____ |

- ___ **Water heater pipe insulation** _____
- ___ **Non-prog. measure #1** _____
- ___ **Non-prog. measure #2** _____
- ___ **Non-prog. measure #3** _____
- ___ **Non-prog. measure #4** _____

H&L respondents. Average implementation likelihood percentages and associated months sooner data are summarized in tabular format below. The data indicate low rates of free ridership for the aerator, showerhead, duct sealing, and non-program measures, and moderately high rates of free ridership for the CFL's, ceiling insulation, wall insulation, and whole house fan. It should be noted that these data are arithmetic averages, and are different from the site-specific data used in the impact evaluation.

Measure	Average Implementation Likelihood %	Average Months Sooner Implemented
CFL's	37	7
Faucet aerator	12	8
Low-flow showerhead	18	6
Ceiling insulation	49	12
Wall insulation	35	11
AC diagnostic work	--	--
Duct sealing	18	15
Whole house fan	48	14
Setback thermostat	--	--
Water heater pipe insulation	23	17
Non-program measures	7	22

Q22.) Are you at all familiar with the energy usage (as opposed to the energy costs) at your home? _____

Q23.) (if answered "yes" to Q22 above) Adjusting for things like seasons and weather, what do you think has happened to your home's overall energy usage following completion of the Performance 4 program work?

(Choose the one most appropriate response)

- a.) Much less
- b.) Slightly less
- c.) About the same
- d.) Slightly more
- e.) Much more
- f.) I look at costs much more than usage
- g.) Unsure

H&L respondents. Among the 82 respondents who verified program participation, 72 (88%) reported being at least generally familiar with home energy usage.

Among the 72 respondents who were at least generally familiar with home energy usage, the most common answers regarding post-P4 program energy usage were “slightly less” (27 respondents; 38%), “much less” (22 respondents; 31%), and “unsure” (11 respondents; 15%).

Frequency count results are presented in tabular form below for the overall sample and by stratum. Interestingly (and perhaps not surprisingly), the percentage of respondents indicating that their post-P4 program energy usage was “much less” or “slightly less” were substantially higher for Stratum 1 (79%) than for Stratum 0 (59%).

Survey Response	Frequency Counts – Overall Sample	Frequency Counts – Stratum 1	Frequency Counts – Stratum 0
Q22. Familiarity with energy usage	72	33	39
Q23. Post P4 program energy usage			
- Much less	22	12	10
- Slightly less	27	14	13
- Same	9	2	7
- Much more	2	0	2
- Focus on costs	0	0	0
- Unsure	11	4	7
% of responses indicated as “much less” or “slightly less”	68%	79%	59%

Q24.) Do you think the California Public Utilities Commission should continue to fund programs such as the Performance 4 program to operate energy efficiency programs?

- a.) **Definitely**
- b.) **Probably**
- c.) **Unsure**
- d.) **Probably not**
- e.) **Definitely not**
- f.) **Don’t know / no opinion**

H&L respondents. Among the 82 respondents who verified program participation, the most common answers were “definitely” (76 respondents; 93%), followed by “probably” (4 respondents; 5%).

Q25.) a.) In the course of your involvement with the Performance 4 program, did you become familiar with other energy efficiency programs authorized by the CPUC (e.g., through promotional materials left behind by H&L Energy Savers)? _____

b.) (if answered “yes” to Q25a above) Did you let other persons know about these other energy efficiency programs? _____

c.) (if answered "yes" to Q25b above) Approximately how many other persons did you inform? _____

H&L respondents. Among the 82 respondents who verified program participation, 39 respondents (48%) had become familiar with other energy efficiency programs authorized by the CPUC. Twelve of the 39 respondents reported telling a total of approximately 100 other persons about these programs.

Q26.) Can you please verify the type of air conditioning system that we have listed for you in our records? (indicate central, wall/room, or none) _____

H&L respondents. Among the 82 respondents who verified program participation, 78 respondents (95%) confirmed the general type of AC system that had been reported in the energy audit portion of the program.

Among the four other instances, two involved the energy audit reporting no AC unit, with the respondent reporting a room AC unit. The other two instances involved the energy audit reporting a room AC unit, with the respondent reporting either no AC unit or a swamp cooler only.

Across all 82 respondents, 75 respondents (91%) reported having central AC, 3 respondents (4%) reported having room AC/wall units, and 4 respondents (5%) reported having either no AC or a swamp cooler only.

Q27.) Do you have any other feedback or suggestions regarding the Performance 4 program that we have not covered? _____

H&L respondents. General feedback and suggestions generally fell into one of three categories: 1) generally positive process improvement suggestions, 2) strong program praise, and 3) criticism of the program and/or technologies used. Illustrative quotes for each category are provided below.

Process improvement suggestions

- "It would be helpful to give out info that describes what's expected of the home occupant prior to and while the work is being done; that said, everyone on the job knows what they are doing."
- "[There is a] tremendous need for this work with houses built in the 50's with no wall insulation; announce it with the mayor, then have sales people go door to door."

Program praise

- "H&L was an excellent company; the people were really professional and knowledgeable."

- “Everyone affiliated with the program has been impressive. No worries whether contractor is doing the right thing or not. It eliminated all the hassle of finding a contractor.”
- “Everyone has been very helpful; [auditor] Mike [Winters] was very helpful and clear explaining the audit.”
- “The people who came were extremely helpful and very professional. They found out they could only do part of the planned work, and so reduced the bill.”
- “Without this program – especially the energy audit, I would have had to struggle to learn exactly what needed to be done, or who could do the work.”

Program / technologies criticism

- “[I] wish the incentive had been bigger, and had been led to believe I’d get more than \$200 back on a \$700 job.”
- “I wish I had not gotten the insulation blown in and instead had the kind where they put batting down. There has been a mess and dust for 6 weeks afterwards.”

6. Process Evaluation

Based in large part on the EM&V Research Plan, four main topic areas have been investigated:

- Did the programs serve their intended markets (and for reasons originally hypothesized)?
- Did key “environmental” (i.e., marketplace and regulatory) factors significantly affect the program’s performance?
- Did onsite EM&V work yield additional insights regarding the program implementation?
- Is the program implementation consistent with and logical for the proposed design? Are there significant opportunities for program service and procedure improvements?

Each topic is approached in turn.

Recommendations emerging from these topic areas are provided as part of Section 6.4.

Note that the process evaluation does not include any reviews of prior EM&V recommendations since the P4 program was not implemented during the 2002-2003 program cycle.

6.1. *Serving of Intended Markets / Participation Reasons*

Intended and actual markets – program volumes. The table below summarizes goal versus actual program activity. The analysis indicates that actual audit activity, actual measure installation activity, and actual yield rates all lagged substantially relative to plan.

Statistic	Goal Sites (per 9/2003 proposal)	Actual Sites (per H&L final database, 7/2006)	Actual Sites as % of Goal Sites
Audits	3,500	1,141	33%
Installations	1,800 (number of homes doing ceiling insulation – the measure with the highest assumed installation rate)	377 (distinct customer ID’s)	18%
Yield Rate	60% (per note above)	33% (per note above)	55%

Intended and actual markets – measure mix. The table below summarizes goal versus actual measure activity for all climate zone-indexed measures². The figures indicate that actual program activity lagged goal substantially for all listed measures, with whole house fans and the basic HVAC diagnostic doing the best and worst, respectively, in relative terms.

Measure (for all instances, data are summed across Climate Zones 9, 10, 14, and 15)	Goal Homes (per 9/2003 proposal)	Actual Homes (per H&L final database, 7/2006)	Actual as % of Goal Homes
Ceiling insulation	2,100	268	13%
Wall insulation	1,575	174	11%
Basic HVAC diagnostic	1,400	7	0%
Duct sealing	875	149	17%
Whole house fan	175	72	41%
P-stat	1,050	8	1%

Intended and actual markets – geographic and vintage characteristics. The original September 2003 H&L proposal regarding the 2004-2005 implementation identified that its general intended markets/customers were pre-1978 vintage single family homes in the SCE service territory in the geographies of the San Gabriel Valley, Inland Empire, High Desert, and Low Desert. Further, the intention was that many of these homes would be in the process of 1) being purchased from a previous owner, 2) being refinanced by an existing owner, or 3) being renovated/upgraded.

The vintage and geographic attributes do indeed appear to characterize all or essentially all the participants served through the P4 program. However, based on phone survey responses, very few homes appear to have been in the process of being either bought or refinanced; a small proportion of homes implemented P4 program measures as part of renovation/upgrade activities.

The table below summarizes goal versus actual program activity as measured by home-installations for all climate zone-indexed measures within each climate zone. This particular statistic admittedly involves the aggregation of “apples and oranges” (since cross-measure tallies are involved by definition), but is intended to depict succinctly program volumes by geography. The figures indicate that program activity was highly concentrated in Climate Zones 9 and 10. These findings are not surprising, given H&L’s location in Upland (western edge of Climate Zone 10, and in close proximity to the eastern edge of Climate Zone 9).

	Goal Home-Measure Installations (per 9/2003 proposal)	Actual Home-Measure Installations (per H&L final database, 7/2006)	Actual as % of Goal Home-Measure Installations
Home-Measure Installations			
Climate Zone 9 – San Gabriel Valley	718	233	32%

² The following program measures were not climate-zone indexed: water heater pipe insulation, low-flow showerhead, faucet aerator, and CFL’s

(all climate zone -indexed measures)			
Climate Zone 10 – Inland Empire (all climate zone -indexed measures)	2,870	411	14%
Climate Zone 14 – High Desert (all climate zone -indexed measures)	1,435	32	2%
Climate Zone 15 – Low Desert (all climate zone -indexed measures)	2,153	0	0%
Climate Zone 16 – Mountains (all climate zone -indexed measures)	0	2	INF
Sum, all Climate Zones (all climate zone -indexed measures)	7,175	678	9

Divergences. Two relatively major divergences from intended markets/program plans were observed, and appear to explain much of the reasons for the program’s shortfalls:

- Outreach efforts to the local government (e.g., city redevelopment agency), realtor, and mortgage finance communities – a centerpiece of the P4 program design – were largely ineffective, and for basically the same two reasons historically observed in California over the last 20+ years. First, city redevelopment agencies were mainly interested in high efficiency window improvements – which have poor energy efficiency cost-effectiveness attributes – for their value in boosting home “curb appeal”. Second, realtor and mortgage brokers (marketed to largely through Rotary and Kiwanis Clubs) saw energy efficiency program work more as potential deal-breakers or deal-slowers than as property value-enhancers. As a result, H&L shifted its primary marketing emphasis in late 2004 to focus on direct mail campaigns to owners of pre-1978 vintage homes; this tactical shift subsequently resulted in steady but relatively low volumes of program business. In summary, the P4 program 1) got off to an extremely slow start in 2004 and early 2005 owing to well-intended but faulty program design assumptions, 2) transformed itself in early 2005 into a more conventional turnkey audit services / insulation contracting program, and 3) was only able to deliver a small fraction of goal energy savings benefits.
- Attempts to create a broad geographic coalition of participating contractors in Southern California were unsuccessful, and based on erroneous assumptions. Contractors were unwilling to 1) buy needed P4 program gear for duct sealing measures (e.g., Duct Blaster equipment) and 2) comply with program documentation and payment requirements (which were perceived as relatively excessive and slow, respectively). As a result, H&L had to do essentially all the P4 implementation work itself. Given transportation costs and travel times, work in most of Climate Zones 14 and 15 – and in significant portions of Climate Zones 9 and 10 – was uneconomic to pursue relative to closer-in opportunities in Climate Zones 9 and 10. Pragmatically, then, the P4 program was implemented in a far smaller geographic footprint than was assumed in the program design.

Participation reasons. The original September 2003 H&L proposal regarding the 2004-2005 implementation addressed specific reasons for customer participation implicitly rather than explicitly, since it describes why target market customers are unlikely to implement energy efficiency measures. The table below identifies energy efficiency market barriers and ways in which the P4 program presumably would overcome them, and then cross-checks these methods with phone survey results regarding customer reasons for program participation [see also discussion in Section 5 regarding survey questions 10 and 11].

Market Barrier(s) (Implication)	P4 Program Remedy(s) to Market Barrier	Remedy Relevance Confirmed in Phone Survey Results?
Lack of consumer information about measure energy efficiency benefits (hence targeted customers are often simply unaware of opportunities, or where to begin)	No cost, objective home energy audits; turnkey services	Yes – “wanted to make home cheaper to operate/save on utility bill” and “wanted to make home more comfortable” were the two most frequently cited reasons for program participation cited by surveyed participants.
Hassle or transaction costs, particularly at the time of home purchase or remodeling, since realtors, mortgage brokers, and/or contractors don’t want to complicate deal-related matters (hence opportunities are left “fallow”)	Outreach to / training of city government, credit union, realtor, and mortgage finance communities; publicizing of home certification standards	No – not surprising since the city government, credit union, realtor, and mortgage finance communities’ outreach was not effective (see previous discussion regarding program divergences).
Measure economics that are better for society than for the individual, in the absence of rebates/incentives (hence customers often either can’t afford, or are wary regarding the measure economics)	Rebates (provided through contractors)	Only weakly so – “incentives” came in a fairly distant 4 th place in terms of reasons for program participation cited by surveyed participants.

6.2. Environmental Factor Impacts

Findings regarding the impact of “macro” environmental factors on the 2004-2005 P4 program implementation are presented in tabular form below. None of these factors appear to have had *major* impacts on program performance.

Factor	Impact on 2004-2005 Prog. Impl.	Discussion
Actual measure costs (relative to <i>ex ante</i> assumptions)	Minor (somewhat harmful, in the	Material costs for ceiling and wall insulation rose dramatically in summer and fall 2005, necessitating per-unit measure price increases in job costs newly quoted to prospective customers beginning in September 2005 (note:

	aggregate)	measure costs for duct sealing and whole house fans also were raised at that time). Since incentive levels could not be modified, the pragmatic impact was that incentives covered a significantly smaller percentage of the measure costs for late 2005 program activity for those indicated measure items than was initially envisioned.
Utility energy prices (directly affect customer economics of implemented and recommended measures)	Minor (slightly helpful, in the aggregate)	Annual adjustments to SCE electric rates for residential customers were modest in 2004 and 2005. The most noteworthy 2004-2005 rates developments – significant procurement-related hikes for SCG in natural gas prices in 2005 Q4 – were minimally applicable, since they occurred late in the program implementation.
Competition from other energy efficiency programs and/or ESCOs	Minor (largely not applicable)	For the most part, H&L had its core program activity areas of the eastern San Gabriel Valley and the Upland-Ontario area to itself. SCG ceiling and wall insulation rebates were universally available in the same geographies, but were not actively marketed in P4 program areas other than through usual methods (e.g., awareness built mainly through bill stuffers).
Timeliness of CPUC/IOU program implementation approval	Minor (neutral influence)	H&L was able to begin its implementation in March 2004 – the same timeframe as almost all other utility and non-utility energy efficiency programs operating in Southern California during the 2004-2005 program cycle.
Regulatory standards	Minor (largely nonexistent)	Not applicable to the retrofit-oriented measures representing the core of the P4 program’s <i>ex ante</i> energy savings.

6.3. Onsite EM&V Observations

Onsite EM&V work focused on 1) measure installation verification (primarily regarding the types and quantities of “core” program measures such as the square feet and inches of ceiling insulation added, secondarily regarding the CFL’s, low-flow showerheads, and faucet aerators given out at the time of the home energy audit) and 2) participant surveying. Note that the selected sites were a mix of S&A-H&L jointly-planned and S&A surprise inspections of jobs on the days that the measures were installed by H&L.

In general, listed measure types and implied quantities generally appear to have been accurately logged in the program tracking system and associated paperwork, and with technical performance consistent with P4 program requirements. In many instances, surveyed participants admitted that CFL’s, showerheads, and faucet aerators had not been installed, despite having been provided at the time of the energy audit at no charge. (These particular findings regarding the “giveaway” measures were generally consistent with findings from the broader phone survey responses.)

Site-specific findings are reflected in the Section 7 impact evaluation analyses.

6.4. Service and Procedure Improvement Opportunities

This section provides a relatively short discussion regarding program improvement opportunities. In many respects this particular analysis is a “Monday morning quarterbacking” academic exercise (since the program is not continuing in 2006-2008).

Improvement opportunities are classified in tabular form below into one of four program functional areas: 1) marketing and sales, 2) direct implementation, 3) tracking systems/data collection, and 4) general and administrative. Within each functional area, improvement opportunities are classified as “major” or “minor” importance in nature (depending on the perceived importance). Within a given functional area/importance level combination, there can be one, multiple, or no issues identified. For each identified issue, a brief discussion of the basis for the improvement opportunity is provided.

Functional Area / Relative Importance	Recommendation	Basis / Other Comments
Marketing and Sales – Major Importance	Make [initial program exposure] advertising - postcards, bill stuffers, & website - significantly more tangible/specific re what's being offered (i.e., up-front comprehensive no cost home energy audits; incentives for certain measures).	<p>Reviews of P4 marketing materials (postcard, brochures) and web site. Postcard content was vague regarding scope of services; brochure and website discussed conceptual benefits in the abstract (i.e., have a home that is cleaner, quieter, more comfortable, and cheaper to operate; P4 certifications), at the expense of measure specifics (including the incentive structure and measure qualification requirements). Program promotional “fuzziness” – in combination with lack of utility branding – probably contributed to much lower than anticipated 1) audit request responses and 2) audit “yield rates” (see Section 6.1 data).</p> <p>On a related topic: note that EM&V work deliberately excluded reviews/assessments of materials and methods used in selling to city governments, realtors, and mortgage brokers (and thus targeting homes being sold or refinanced), since per previous comments it appears that portion of the program design was well-intended but flawed at a basic level.</p>
Marketing and Sales – Minor Importance	Focus program benefits on utility bill impacts and home comfort. Secondly, mention green/energy savings aspects. De-emphasize aspects related to making the home quieter and cleaner, and regarding the P4 certifications. Note: the approach of printing additional “conceptual” brochures in spring 2005 was well-intended but ultimately were simply	Phone survey results indicate certain marketing aspects (home comfort and making home cheaper to operate) were significantly more compelling than others (quieter or cleaner home). Note too that P4 certifications were not at all of an important issue (i.e., not mentioned once in either closed-end or open-end surveys).

	more quantities of materials involving a fundamentally inefficient/fuzzy marketing message.	
Direct Implementation – Major Importance	No distinct improvement opportunities were classified in this category.	--
Direct Implementation – Minor Importance	Installation standards needed to be more consistently adhered to. For example, for ceiling insulation, the indicated performance spec of "minimum of R-30 installed" sometimes was interpreted as R-30 added, sometimes as R-30 attained.	Paperwork reviews and program staff interviews.
Direct Implementation – Minor Importance	Kneewall insulation needed to be consistently tallied within the reporting systems (as spillover, rather than as P4-incented measures). For the most part it is correctly classified, but occasionally appears as a wall insulation measure.	Paperwork reviews and program staff interviews.
Tracking Systems/Data Collection – Major Importance	No distinct improvement opportunities were classified in this category.	--
Tracking Systems/Data Collection – Minor Importance	Measure tallies in database and monthly activities in EEGA workbook should reflect "fractional home" situations (e.g., when only part of a home's ceiling or wall area was insulated -- mainly happens for homes that had additions built in the Title 24, i.e., post-1977 era). Especially appropriate for EEGA workbook since most "core" P4 program measure tallies got applied to a[n entire] typical home.	Database and monthly invoicing /EEGA workbook program activity reviews.
Tracking Systems/Data Collection – Minor Importance	In paperwork and tracking system database regarding work performed, add/use "date contractor paid" field (in addition to "date work completed" and "date accepted" fields). Also, include date of audit in tracking system.	Database reviews. Intent is to more accurately/reliably capture the program month in which program activities occur. Approaches actually used by H&L program staff for CPUC monthly reporting involved manual tallying.
Tracking Systems/Data Collection – Minor Importance	Track measure costs by specific measure item, rather than for the overall customer application.	Paperwork and database reviews. Intent is to aid program cost-effectiveness assessments.

<p>General and Administrative – Major Importance</p>	<p>Rely more on tracking system database fields for preparation of monthly reports; perform less duplicative (and more directly QC-able) work efforts, especially for measure tallies.</p>	<p>Detailed reviews and comparisons of database records and monthly invoice materials for several sampled program operational months (e.g., 11/05). While measure tallies could have been obtained from database extracts (e.g., to Excel), they instead were manually tallied using a labor-intensive counting system that was prone to error (and sometimes inconsistent with already-entered database records); further, such manual tallies were presented in relatively unusable format (e.g., the text-based customer-specific "EE Measures Completed" lists in the monthly "spreadsheet" materials furnished with the monthly invoice).</p>
<p>General and Administrative – Major Importance</p>	<p>In monthly invoice materials and EEGA workbook, include quantities and associated costs of the giveaway measures (CFL's, showerhead, aerator) in the month and quantities that the audits occurred. In comparison, what was recorded were <i>quantities</i> (and <i>energy savings</i>) only for those homes completing incentive measures, and only in the month that the work was completed/contractor paid.</p>	<p>Detailed reviews and comparisons of database records and monthly invoice materials for several sampled program operational months (e.g., 11/05).</p>
<p>General and Administrative – Minor Importance</p>	<p>In monthly invoice materials where customers are identified, utilize the audit ID as the main record locator (as opposed to last name/first name).</p>	<p>Detailed reviews and comparisons of database records and monthly invoice materials for several sampled program operational months (e.g., 11/05).</p>

7. Impact Evaluation

The impact evaluation has been conducted utilizing A) database reviews, B) reviews of/updates to “pre” and “post measure data, C) participant phone survey data, D) onsite verification work (for 14 of the 82 sample data points), and E) verification audits/reviews of application paperwork.

A four step approach has been utilized for sampled applications for the impact evaluation, per instructions from the CPUC:³

- Step A: Development of Gross *Ex ante* Reported Reference Information
- Step B: Development of Gross *Ex ante* Intermediate Savings – savings for measures verified as installed, using *ex ante* values.
- Step C: Development of Net *Ex ante* Intermediate Savings – savings for measures verified as installed, using *ex ante* values, and adjusted for *ex ante* net-to-gross (NTG) values.
- Step D: Development of Net *Ex post* Final Savings – savings for measures verified as installed, using best available savings estimates, and measured NTG values.

The four-step approach is utilized (and visually presented) for each of the sampled H&L P4 program applications in the impact evaluation workbook (Appendix C).

For each of Steps B, C, and D, the analyses have been used to develop realization rates for each of the sampled applications that translate Step A-based gross *ex ante* reported savings estimates into “vetted” savings data. In turn, the “vetted” savings data then have been weighted by strata to yield weighted realization rates and associated statistics for the overall sample. The sample-wide statistics then have been extrapolated to the overall program populations regarding program performance.

Each of the four steps is discussed in turn. Step-specific issues and findings are discussed in relatively general terms since highly detailed sampled application-specific calculations are presented in the impact evaluation workbooks. Overall impact evaluation and cost-effectiveness findings are then reported.

It should be noted that the impact evaluation does not include savings from spillover measures. Based on a detailed review of paperwork, spillover was discerned in 24 of the 82 sampled applications (29% of the sample). Spillover measures most frequently encountered included kneewall insulation, door weather-stripping, extra ceiling insulation (e.g., from R-19 “pre” to R-38 “post”), double pane windows, and turbines. Spillover

³ Email from Nick Hall (on behalf of the CPUC) to Phil Sisson, 10/6/06.

measures were not included in the impact evaluation since 1) less descriptive/technical information was typically available (e.g., written in program contracting documents) for energy savings estimation purposes, and 2) NTG and persistence information usually was not available (since survey respondents a majority of the time did not report spillover measures in their verifications/characterizations of program participation)⁴. The pragmatic implication is that the P4 impact evaluation is probably slightly conservative with respect to energy savings attained. Note that the cost-effectiveness assessment conducted for the P4 program adjusts TRC Test-related measure cost data to back out spillover measure-related costs.

7.1. Step A

Introduction. Step A involved deriving measure-specific gross savings values from *ex ante* values (per the 2001 DEER) and relevant unit quantities. Step A savings data have been used as the starting points for subsequent work in Steps B, C, and D.

Step A Key Issues. For each sampled application, information regarding measure type, climate zone (where applicable), and unit quantities has been discerned from the program tracking system, and then multiplied by *ex ante* gross savings values. Measure-specific data then have been summed to yield overall application-specific gross savings.

Step A Observations and Conclusions. Step A savings data function as the denominator values used in the realization rates derived at the conclusion of Steps B, C, and D.

7.2. Step B

Introduction. Step B involved developing gross *ex ante* intermediate savings based on *ex ante* measure data and 1) reviews of application paperwork high-level issues, 2) reviews of application paperwork measure-specific issues, and 3) certain survey-obtained information.

Step B Key Issues. Each of the three subject areas just identified is described in turn.

First, the following application paperwork high-level attributes were evaluated:

- Was the customer building type acceptable (i.e., single family/low rise residential)?
- Was the service location address acceptable (i.e., in a CPUC-approved geography)?
- Was the measure equipment scope acceptable? (i.e., explicitly approved by CPUC)?

⁴ Surveyed participants self-reported spillover – and associated measure characteristics – in 7 of the 24 discerned spillover situations.

- Were key aspects of the application completed in a timely manner with respect to the 2004-2005 program cycle (e.g., completed between 1/1/2004 and 3/15/06)?

All of the above data were treated as binary. Only one sampled application had a “fatal flaw” with respect to the evaluative criteria described above. The one incident involved audit backdating, and was discerned during an onsite survey interview.

Second, the following application paperwork measure-specific issues were investigated:

- Measure types, climate zones (where applicable), and unit quantities were verified. While a number of measure classification and/or tallying errors was discerned, the overall impact on “vetted” savings appears to have been extremely small.
- The presence or absence of central air conditioning was discerned. Sites without central air conditioning have had electric-side energy savings zeroed out for the ceiling insulation, wall insulation, duct sealing, and programmable thermostat measures (since measure benefits in those situations accrue only to the [gas] space heating end use). This particular adjustment had a relatively major impact on the electric side realization rates.
- The fraction of the total ceiling area insulated by the P4 program was discerned. Whole-home energy savings values for ceiling insulation measures have been adjusted proportionately for homes where less than the full ceiling area was upgraded for some reason (e.g., cathedral ceilings). This particular adjustment had a very small impact on electric and gas realization rates.
- The fraction of the total exterior wall area insulated by the P4 program was discerned. Whole-home energy savings values for wall insulation measures have been adjusted proportionately for homes where less than the total exterior wall area was upgraded for some reason. This particular adjustment had a very small impact on electric and gas realization rates.

Third, the following phone survey-related issues were incorporated into the analysis:

- Basic customer / contact / service location verification (survey Q’s 1-2 and 4). This information was treated as a binary variable. Pragmatically, all of the 82 sampled applications were successfully verified by survey respondents.
- Basic program participation and measure quantity implementation verification (survey Q 6). This information was treated as a proportional variable. Only 42 of the 82 sampled applications were successfully verified regarding this aspects of the program by survey respondents – exceptions mainly pertained to showerheads, aerators, and/or CFL’s not received. Exceptions also

occasionally referred to spillover measures not incented through the P4 program.

- Measure persistence verification (survey Q’s 7a and 7b). This information was treated as a proportional variable. The most important pragmatic finding was that a clear majority of the 82 sampled respondents had never installed/utilized some or all of the audit-related “giveaway” measures (i.e., showerheads, aerators, and CFLs).

“Vetted” measure-specific data have been developed based on the above considerations, and then have been summed to yield overall application-specific gross *ex ante* intermediate savings.

Step B Impact Evaluation Findings. Overall results of the Step B impact evaluation are presented in tabular form below (they also can be found in the “Stats-Step B” worksheet of the impact evaluation workbook). These statistical analyses follow the approaches and steps described in pages 375-380 of the CPUC’s June 2004 California Evaluation Framework reference document.

The analyses indicate that realization rates were reasonably high (i.e., relatively close to 1.0) on the gas side, and somewhat lower on the electric side. Electric side realization rates were relatively low owing to a number of homes upgraded that did not have central air conditioning). Realization rates for both fuel types were slightly adversely affected by audit-related “giveaway” measures that were not received or not still installed/utilized.

Given very low program volumes (see Tracking System Population Gross Savings in the table below; see also Section 6.1 discussion) and the indicated realization rates, the H&L P4 implementation fell far short of goal for gross *ex ante* intermediate on-peak kW, gross *ex ante* intermediate annual kWh, and gross *ex ante* intermediate annual therms.

Impact Evaluation Step B Statistics	Peak kW	Annual kWh	Annual Therms
Realization Rate (RR)	0.772	0.739	0.870
Standard Error	0.034	0.028	0.023
Error Bound @ 90% confidence level	0.055	0.047	0.038
Upper Error Bound re Realization Rate	0.828	0.786	0.908
Lower Error Bound re Realization Rate	0.717	0.693	0.833
Relative Precision	7.1%	6.3%	4.3%
Tracking System Population Gross Savings	352	543,521	91,421
Gross <i>Ex ante</i> Intermediate Savings (= Tracking Savings Population Gross Savings * RR)	272	401,783	79,567
Standard Error	12	15,379	2,085
Error Bound @ 90% confidence level	19	25,299	3,430
Upper Error Bound re Realization Rate	291	427,082	82,997
Lower Error Bound re Realization Rate	252	376,484	76,137

Program Goal Gross Savings (= Program Goal Net Savings / 89% NTG)	2,373	5,120,196	726,801
S&A estimate of Gross <i>Ex ante</i> Intermediate Savings as % of Goal	11.5%	7.8%	10.9%
Upper Error Bound - S&A estimate of Gross <i>Ex ante</i> Intermediate Savings as % of Goal	12.3%	8.3%	11.4%
Lower Error Bound - S&A estimate of Gross <i>Ex ante</i> Intermediate Savings as % of Goal	10.6%	7.4%	10.5%

7.3. Step C

Introduction. Step C involved developing net *ex ante* intermediate savings based on 1) Step B data and 2) September 2003 H&L proposal-based NTG values.

Step C Key Issues. Step C data are simply the Step B gross savings data, multiplied by the 89% NTG values assumed for all measures in H&L's September 2003 proposal to the CPUC.

Step C Impact Evaluation Findings. Overall results of the Step C impact evaluation are presented in tabular form below (they also can be found in the "Stats-Step C" worksheet of the impact evaluation workbook). As with the Step B impact evaluation, these statistical analyses follow the approaches and steps described in pages 375-380 of the CPUC's June 2004 California Evaluation Framework reference document.

The results for the realization rates mirror Step B data, except that Step C realization rates are .89x of the corresponding Step B values. As the table indicates, the H&L P4 implementation fell far short of goal for net *ex ante* intermediate on-peak kW, net *ex ante* intermediate annual kWh, and net *ex ante* intermediate annual therms.

Impact Evaluation Step C Statistics	Peak kW	Annual kWh	Annual Therms
Realization Rate (RR)	0.687	0.658	0.775
Standard Error	0.030	0.025	0.020
Error Bound @ 90% confidence level	0.049	0.041	0.033
Upper Error Bound re Realization Rate	0.736	0.699	0.808
Lower Error Bound re Realization Rate	0.638	0.616	0.741
Relative Precision	7.1%	6.3%	4.3%
Tracking System Population Gross Savings	352	543,521	91,421
Total Net <i>Ex ante</i> Intermediate Savings (= Tracking Savings Population Gross Savings * RR)	242	357,587	70,814
Standard Error	11	13,688	1,856
Error Bound @ 90% confidence level	17	22,516	3,053
Upper Error Bound re Realization Rate	259	380,103	73,867
Lower Error Bound re Realization Rate	225	335,071	67,762
Program Goal Net Savings	2,112	4,556,975	646,853
S&A estimate of Net <i>Ex ante</i> Intermediate Savings as % of	11.5%	7.8%	10.9%

Goal			
Upper Error Bound - S&A estimate of Net <i>Ex ante</i> Intermediate Savings as % of Goal	12.3%	8.3%	11.4%
Lower Error Bound - S&A estimate of Net <i>Ex ante</i> Intermediate Savings as % of Goal	10.6%	7.4%	10.5%

7.4. Step D

Introduction. Step D involved developing net *ex post* final savings based on 1) certain application paperwork reviews utilized in Step B, 2) certain survey data utilized in Step B, 3) updated measure data from the 2005 DEER, 4) measure savings adjustments based on additional application paperwork reviews, and 5) measure savings adjustments based on additional survey results.

Step D Key Issues. Each of the five subject areas just identified is described in turn.

First, the application paperwork high-level attributes (e.g., acceptable completion dates) and measure-specific issues attributes (e.g., presence or absence of central air conditioning) described in Step B were “recycled” (i.e., re-utilized in Step D).

Second, phone survey results related to survey questions 1-2, 4, 6, and 7 described in Step B were similarly “recycled”.

Third, per-unit measure savings characteristics have been updated using information for corresponding measures from the 2005 DEER. These measure data completely replace the corresponding original *ex ante* measure savings information referenced in Step A.

Fourth, measure savings were adjusted for two of the measure types as follows, based on application paperwork reviews:

- Ceiling insulation measures. 2005 DEER savings values were adjusted by site-specific pre- and post-insulation levels (i.e., to reflect the fact that the P4 program frequently added insulation to nominal “pre” levels – often approximately R-4, as opposed to the 2005 DEER-assumed R-0). Percentage savings values were estimated for the various encountered combinations of “pre” insulation, “post” insulation, and climate zones using reference data sources such as the 2001 DEER (which contained more extensive combinations of “pre” and “post” insulation levels than the 2005 DEER) and S&A prior experience with heat load modeling for the southern California climate zones.
- Duct sealing measures. 2005 DEER energy savings values for the measures involving duct sealing leakage reductions from 24% “pre” to 12% “post” were used as starting points. These savings then were adjusted based on site-specific leakage reductions – either as reported by P4 installation contractors in application paperwork, or as measured/verified by S&A in onsite work. Site-specific savings were adjusted linearly relative to the 12% leakage

reduction (from 24% “pre” to 12% “post”) assumed in the 2005 DEER. For example, a site that reduced leakage from 39% “pre” to 15% “post” – a leakage reduction of 24% – doubled the 2005 DEER savings values for the applicable measure. It should be noted that frequently the experienced duct leakage reduction was significantly greater than the 2005 DEER-assumed 12% figure.

Fifth, measure savings were adjusted as follows, based on additional survey data not utilized in Steps A-C:

- CFL measure utilization information (survey Q 8). This information was treated as a proportional variable, and was used to scale per-unit CFL gross annual energy savings.
- Measure-specific free ridership and associated timeframe information (survey Q’s 20 and 21). This information was treated as a proportional variable. It should be noted that S&A took an approach of resetting measure-specific NTG data to 100% if the indicated timeframe for measure adoption in the absence of the program would have been one year or greater. This approach was taken since 1) the EEGA workbook cannot accurately model the cost-effectiveness of early replacement situations involving multi-year time shifts between the no-program and with-program cases, 2) claims of measure investment rapidly become highly speculative when customer-asserted periods of years rather than months are involved, 3) it makes P4 measure NTG data more consistent/comparable with NTG survey-based data for many other PGC-funded programs, and 4) it is consistent with time-indexed approaches to NTG energy efficiency program data taken by utilities such as SMUD.

“Vetted” measure-specific data have been developed based on the above considerations, and then have been summed to yield overall application-specific gross *ex ante* intermediate savings.

Step D Impact Evaluation Findings. Overall results of the Step D impact evaluation are presented in tabular form below (they also can be found in the “Stats-Step D” worksheet of the impact evaluation workbook). As with the Step B and Step C impact evaluations, these statistical analyses follow the approaches and steps described in pages 375-380 of the CPUC’s June 2004 California Evaluation Framework reference document.

The analyses indicate that realization rates were rather low (i.e., .6 to .7) for kWh and therms, and very low (i.e., approximately .35) for kW. Relative to corresponding values derived in Step C, Step D realization rates in the aggregate appear to have been positively affected by increases in savings for duct sealing and CFL’s, and negatively affected by 1) significant decreases in savings for ceiling insulation and 2) higher free ridership rates than was assumed in H&L’s proposal⁵. Realization rates for kW values have been

⁵ See, for example, the free ridership discussion in Section 5 regarding survey questions 20 and 21.

additionally negatively affected by dramatically lower “starting” kW values in the 2005 DEER for the insulation and duct sealing measures.

Given very low program volumes (see Tracking System Population Gross Savings in the table below; see also Section 6.1 discussion) and the indicated realization rates, the H&L P4 implementation fell far short of goal for net *ex post* final on-peak kW, net *ex post* final annual kWh, and net *ex post* final annual therms.

Impact Evaluation Step D Statistics	Peak kW	Annual kWh	Annual Therms
Realization Rate (RR)	0.347	0.688	0.607
Standard Error	0.026	0.047	0.035
Error Bound @ 90% confidence level	0.043	0.077	0.057
Upper Error Bound re Realization Rate	0.390	0.766	0.664
Lower Error Bound re Realization Rate	0.303	0.611	0.550
Relative Precision	12.5%	11.3%	9.4%
Tracking System Population Gross Savings	352	543,521	91,421
Total Net <i>Ex post</i> Final Savings (= Tracking Savings Population Gross Savings * RR)	122	373,991	55,455
Standard Error	9	25,582	3,163
Error Bound @ 90% confidence level	15	42,083	5,203
Upper Error Bound re Realization Rate	137	416,074	60,658
Lower Error Bound re Realization Rate	107	331,908	50,252
Program Goal Net Savings	2,112	4,556,975	646,853
S&A estimate of Net <i>Ex post</i> Final Savings as % of Goal	5.8%	8.2%	8.6%
Upper Error Bound - S&A estimate of Net <i>Ex post</i> Final Savings as % of Goal	6.5%	9.1%	9.4%
Lower Error Bound - S&A estimate of Net <i>Ex post</i> Final Savings as % of Goal	5.1%	7.3%	7.8%

7.5. Cost-Effectiveness Evaluations

TRC Test cost-effectiveness evaluations have been conducted for the H&L P4 implementation using 1) the 2004-2005 EEGA workbook model’s structure (and associated avoided costs and discount rate) and 2) 2004-2005 program “actual” data based on impact evaluation Step D.

Data Inputs. Key TRC Test data inputs for the H&L P4 implementation are listed and described in tabular format below. Certain measure data inputs have been finessed within the EEGA workbooks in order to address certain shortcomings of the EEGA workbook structure (e.g., the inability to model savings metric-specific realization rate factors) and the P4 database (e.g., the fact that pre-incentive measure costs are tracked by application only in the aggregate, rather than by measure).

Input Variable	Value	Comments
Administrative Costs	\$95,211	Actual 2004-2005 costs – H&L P4 Final EEGA

EM&V of H&L P4 2004-2005 Program

		workbook, provided to S&A 5/2006.
Marketing Costs	\$220,555	Actual 2004-2005 costs – H&L P4 Final EEGA workbook, provided to S&A 5/2006.
Direct Implementation – Non-Incentive Portion	\$324,286 – \$124,257 = \$200,029	Actual 2004-2005 costs – H&L P4 Final EEGA workbook, provided to S&A 5/2006. Derived as the difference between total Direct Implementation costs and total incentives paid.
EM&V Costs	\$56,996	Actual 2004-2005 costs – H&L P4 Final EEGA workbook, provided to S&A 5/2006.
Performance Award	\$48,793	Included since EEGA workbook does not allow this value (7% of program budget, less financing costs) to be readily zeroed-out. Calculated by EEGA workbook.
Units – Line item for aggregate program incremental measure costs and incentives	1	By structural definition – pertains to measure costs and incentives (see related line items).
Units – R30 ceiling insulation, <78 home	T24 CZ 9: 93 T24 CZ 10: 163 T24 CZ 14: 11 T24 CZ 15: 0 T24 CZ 16: 1	Actual 2004-2005 volumes – H&L P4 final database, 7/2006.
Units – R13 wall insulation, <78 home	T24 CZ 9: 64 T24 CZ 10: 100 T24 CZ 14: 10 T24 CZ 15: 0 T24 CZ 16: 0	Actual 2004-2005 volumes – H&L P4 final database, 7/2006.
Units – Basic HVAC Diagnostic, <78 home	T24 CZ 9: 2 T24 CZ 10: 5 T24 CZ 14: 0 T24 CZ 15: 0 T24 CZ 16: 0	Actual 2004-2005 volumes – H&L P4 final database, 7/2006.
Units – Duct Seal, <78 home	T24 CZ 9: 48 T24 CZ 10: 96 T24 CZ 14: 4 T24 CZ 15: 0 T24 CZ 16: 1	Actual 2004-2005 volumes – H&L P4 final database, 7/2006.
Units – Whole House Fan, <78 home	T24 CZ 9: 24 T24 CZ 10: 42 T24 CZ 14: 6 T24 CZ 15: 0 T24 CZ 16: 0	Actual 2004-2005 volumes – H&L P4 final database, 7/2006.
Units – P-stat, <78 home	T24 CZ 9: 2 T24 CZ 10: 5 T24 CZ 13: 1 T24 CZ 14: 0 T24 CZ 15: 0	Actual 2004-2005 volumes – H&L P4 final database, 7/2006.
Units – Water Heater Pipe Insulation (with Gas WH unit)	187	Actual 2004-2005 volumes – H&L P4 final database, 7/2006.

Units – Low Flow Showerheads (with Gas WH unit)	1,094	Actual 2004-2005 volumes – H&L P4 final database, 7/2006. Conveyed at time of audit. Counted for all program participants receiving audit services – not just for participants doing non-free P4 program measures (and receiving P4 program incentives)
Units – Faucet Aerator (with Gas WH unit)	1,078	Actual 2004-2005 volumes – H&L P4 final database, 7/2006. Conveyed at time of audit. Counted for all program participants receiving audit services – not just for participants doing non-free P4 program measures (and receiving P4 program incentives)
Units – CFL (15 watt, 2.5 hr/day)	5,685	Actual 2004-2005 volumes – H&L P4 final database, 7/2006. Conveyed at time of audit. Counted for all program participants receiving audit services – not just for participants doing non-free P4 program measures (and receiving P4 program incentives)
Incentives / Unit – Line item for aggregate program incentives	\$124,257	Actual 2004-2005 total dollar value – H&L P4 final database, 7/2006. Modeled as aggregate line item for simplicity purposes.
Incentives / Unit – All other line items	\$0	Per comment in line above.
Gross Peak kW Savings / Unit – R30 ceiling insulation, <78 home	T24 CZ 9: .21 T24 CZ 10: .23 T24 CZ 14: .21 T24 CZ 15: .22 T24 CZ 16: .00	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kW realization rate of 0.347. Values listed here are rounded to 2 digits.
Gross Peak kW Savings / Unit – R13 wall insulation, <78 home	T24 CZ 9: .16 T24 CZ 10: .10 T24 CZ 14: .16 T24 CZ 15: .10 T24 CZ 16: .00	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kW realization rate of 0.347. Values listed here are rounded to 2 digits.
Gross Peak kW Savings / Unit – Basic HVAC Diagnostic, <78 home	T24 CZ 9: .14 T24 CZ 10: .13 T24 CZ 14: .14 T24 CZ 15: .20 T24 CZ 16: .00	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kW realization rate of 0.347. Values listed here are rounded to 2 digits.
Gross Peak kW Savings / Unit – Duct Seal, <78 home	T24 CZ 9: .10 T24 CZ 10: .10 T24 CZ 14: .10 T24 CZ 15: .14 T24 CZ 16: .00	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kW realization rate of 0.347. Values listed here are rounded to 2 digits.
Gross Peak kW Savings / Unit – Whole House Fan, <78 home	T24 CZ 9: .00 T24 CZ 10: .00 T24 CZ 14: .00 T24 CZ 15: .00 T24 CZ 16: .00	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kW realization rate of 0.347. Values listed here are rounded to 2 digits.
Gross Peak kW Savings / Unit – P-stat, <78 home	T24 CZ 9: -.24 T24 CZ 10: -.26 T24 CZ 14: -.24 T24 CZ 15: -.13 T24 CZ 16: .00	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kW realization rate of 0.347. Values listed here are rounded to 2 digits.

Gross Peak kW Savings / Unit – Water Heater Pipe Insulation (with Gas WH unit)	.00	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kW realization rate of 0.347. Values listed here are rounded to 2 digits.
Gross Peak kW Savings / Unit – Low Flow Showerheads (with Gas WH unit)	.00	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kW realization rate of 0.347. Values listed here are rounded to 2 digits.
Gross Peak kW Savings / Unit – Faucet Aerator (with Gas WH unit)	.00	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kW realization rate of 0.347. Values listed here are rounded to 2 digits.
Gross Peak kW Savings / Unit – CFL (15 watt, 2.5 hr/day)	.00	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kW realization rate of 0.347. Values listed here are rounded to 2 digits.
Gross Annual kWh Savings / Unit – R30 ceiling insulation, <78 home	T24 CZ 9: 400 T24 CZ 10: 512 T24 CZ 14: 400 T24 CZ 15: 1,402 T24 CZ 16: 0	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kWh realization rate of 0.688. Values listed here are rounded to nearest whole number.
Gross Annual kWh Savings / Unit – R13 wall insulation, <78 home	T24 CZ 9: 216 T24 CZ 10: 141 T24 CZ 14: 216 T24 CZ 15: 406 T24 CZ 16: 0	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kWh realization rate of 0.688. Values listed here are rounded to nearest whole number.
Gross Annual kWh Savings / Unit – Basic HVAC Diagnostic, <78 home	T24 CZ 9: 172 T24 CZ 10: 221 T24 CZ 14: 172 T24 CZ 15: 645 T24 CZ 16: 0	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kWh realization rate of 0.688. Values listed here are rounded to nearest whole number.
Gross Annual kWh Savings / Unit – Duct Seal, <78 home	T24 CZ 9: 125 T24 CZ 10: 174 T24 CZ 14: 125 T24 CZ 15: 503 T24 CZ 16: 0	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kWh realization rate of 0.688. Values listed here are rounded to nearest whole number.
Gross Annual kWh Savings / Unit – Whole House Fan, <78 home	T24 CZ 9: 129 T24 CZ 10: 136 T24 CZ 14: 129 T24 CZ 15: 106 T24 CZ 16: 0	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kWh realization rate of 0.688. Values listed here are rounded to nearest whole number.
Gross Annual kWh Savings / Unit – P-stat, <78 home	T24 CZ 9: 290 T24 CZ 10: 241 T24 CZ 14: 290 T24 CZ 15: 303 T24 CZ 16: 0	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kWh realization rate of 0.688. Values listed here are rounded to nearest whole number.
Gross Annual kWh Savings / Unit – Water Heater Pipe Insulation (with Gas WH unit)	0	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kWh realization rate of 0.688. Values listed here are rounded to nearest whole number.
Gross Annual kWh Savings / Unit – Low	0	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kWh realization rate of 0.688.

Flow Showerheads (with Gas WH unit)		Values listed here are rounded to nearest whole number.
Gross Annual kWh Savings / Unit – Faucet Aerator (with Gas WH unit)	0	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kWh realization rate of 0.688. Values listed here are rounded to nearest whole number.
Gross Annual kWh Savings / Unit – CFL (15 watt, 2.5 hr/day)	31	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation kWh realization rate of 0.688. Values listed here are rounded to nearest whole number.
Gross Annual Therm Savings / Unit – R30 ceiling insulation, <78 home	T24 CZ 9: 79 T24 CZ 10: 114 T24 CZ 14: 79 T24 CZ 15: 79 T24 CZ 16: 0	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation therms realization rate of .607. Values listed here are rounded to nearest whole number.
Gross Annual Therm Savings / Unit – R13 wall insulation, <78 home	T24 CZ 9: 92 T24 CZ 10: 83 T24 CZ 14: 92 T24 CZ 15: 56 T24 CZ 16: 0	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation therms realization rate of .607. Values listed here are rounded to nearest whole number.
Gross Annual Therm Savings / Unit – Basic HVAC Diagnostic, <78 home	T24 CZ 9: 0 T24 CZ 10: 0 T24 CZ 14: 0 T24 CZ 15: 0 T24 CZ 16: 0	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation therms realization rate of .607. Values listed here are rounded to nearest whole number.
Gross Annual Therm Savings / Unit – Duct Seal, <78 home	T24 CZ 9: 20 T24 CZ 10: 23 T24 CZ 14: 20 T24 CZ 15: 12 T24 CZ 16: 0	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation therms realization rate of .607. Values listed here are rounded to nearest whole number.
Gross Annual Therm Savings / Unit – Whole House Fan, <78 home	T24 CZ 9: 0 T24 CZ 10: 0 T24 CZ 14: 0 T24 CZ 15: 0 T24 CZ 16: 0	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation therms realization rate of .607. Values listed here are rounded to nearest whole number.
Gross Annual Therm Savings / Unit – P-stat, <78 home	T24 CZ 9: 68 T24 CZ 10: 79 T24 CZ 14: 68 T24 CZ 15: 57 T24 CZ 16: 0	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation therms realization rate of .607. Values listed here are rounded to nearest whole number.
Gross Annual Therm Savings / Unit – Water Heater Pipe Insulation (with Gas WH unit)	3	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation therms realization rate of .607. Values listed here are rounded to nearest whole number.
Gross Annual Therm Savings / Unit – Low Flow Showerheads (with Gas WH unit)	6	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation therms realization rate of .607. Values listed here are rounded to nearest whole number.
Gross Annual Therm Savings / Unit – Faucet	2	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation therms realization rate of .607.

Aerator (with Gas WH unit)		Values listed here are rounded to nearest whole number.
Gross Annual Therm Savings / Unit – CFL (15 watt, 2.5 hr/day)	0	<i>Ex ante</i> values from 9/2003 proposal, adjusted by impact evaluation therms realization rate of .607. Values listed here are rounded to nearest whole number.
Gross Incremental Measure Cost / Unit – Line item for aggregate program measure costs	\$806,727 * 93% * AVG (.688, .607) = \$485,791	Utilized number = starting number * spillover adjustment factor * realization rate adjustment. Modeled as aggregate line item for simplicity purposes. Starting number: actual 2004-2005 total dollar cost of home improvements conducted on projects involving P4 program H&L P4 final database, 7/2006 = \$806,727. Spillover adjustment factor: 24 of 82 sampled projects (29%) reviewed for the impact evaluation had aspects of spillover; estimated price premium of spillover items relative to P4 work for affected applications = 25%; 29% * 25% = 7%; 100 – 7% = 93% factor to use for gross IMC. Realization rate adjustment: average of electric and gas realization rates of .688 and .607 used per impact evaluation; intended to capture NTG aspects of gross IMC.
Gross Incremental Measure Cost / Unit – All other line items	\$0	Per comment in line above.
EUL (years) – Ceiling Insulation (all CZs)	20	8/2003 EEPM value for Insulation.
EUL (years) – Wall Insulation (all CZs)	20	8/2003 EEPM value for Insulation.
EUL (years) – Basic Diagnostic (all CZs)	10	2005 DEER for typical refrigeration charge adjustment (e.g., measure ID D03-403).
EUL (years) – Duct Seal (all CZs)	18	2005 DEER for duct sealing measure – 24% leakage to 12% leakage (e.g., measure ID D03-408).
EUL (years) – Whole House Fan (all CZs)	15	2005 DEER for whole house fan (e.g., measure ID D03-441).
EUL (years) – P-stat (all CZs)	11	8/2003 EEPM value for Set-Back Thermostat.
EUL (years) – Water Heater Pipe Insulation (with Gas WH units)	15	2005 DEER for pipe wrap (e.g., measure ID D03-936).
EUL (years) – Low Flow Showerheads (with Gas WH unit)	10	2005 DEER for low flow showerhead (e.g., measure ID D03-937).
EUL (years) – Faucet Aerator (with Gas WH unit)	9	2005 DEER for faucet aerator (e.g., measure ID D03-934).

unit)		
EUL (years) – CFL (all situations)	8	8/2003 EEPM value for CF Screw-in Replaceable Lamp (Modular).
NTG – All measures	1	Unitary values used – per related measure data assumptions.

Model Outputs. Key TRC Test performance indicators are summarized for the H&L P4 implementation below (Appendix D contains the actual EEGA workbook utilized).

The data indicate that the implementation was not cost-effective — as net *ex post* final peak kW, net *ex post* final annual kWh, and net *ex post* final annual therm impacts all fell far short of goal, while essentially all budgeted program costs except for incentives were utilized. Lifecycle net *ex post* final energy savings also ended up far below goal.

Note that minor differences in “actual” energy savings values between the impact evaluation statistics in the Section 7.4 table (regarding impact evaluation Step D) and the EEGA-based data in the following table pertain to rounding errors associated with the realization rates utilized in the EEGA workbook.

Metric	H&L P4 Proposed	H&L P4 Actual
Net <i>ex post</i> final peak kW	2,112	122
Net <i>ex post</i> final annual kWh	4,556,975	373,943
Net <i>ex post</i> final lifecycle kWh	73,119,384	5,220,626
Net <i>ex post</i> final annual Therms	646,883	55,492
Net <i>ex post</i> final lifecycle Therms	11,726,069	1,000,003
TRC Test Benefits	\$6,634,304	\$527,635
TRC Test Costs	\$3,447,442	\$858,553
TRC Test Net Benefits	\$3,186,862	\$-330,918
TRC Test BCR	1.92	0.61

7.6. Year-by-Year Impacts

Year-specific gross and net lifecycle savings impacts are summarized provided in tabular form below, and in Appendix E, consistent with reporting formats identified by CPUC Energy Division staff in January 17, 2006 materials communicated to program evaluators.

Key assumptions regarding these analyses include the following:

- Gross savings are based on 1) measure-specific, site-aggregated *ex ante* savings values utilized in impact evaluation Step A, and 2) calendar year-specific site completions (per final report EEGA worksheet “2A – RecordedEEActivities” data).
- Net savings are based on gross savings data and associated implementation-specific peak kW, annual kWh net *ex post* final realization rates as developed in Section 7.4 (regarding impact evaluation Step D). Any minor differences in

values between EEGA workbook-based data (see Section 7.5) and the Energy Division-developed workbook regarding net lifecycle savings for 2004-2023 cumulative values (see following tables) pertain to rounding errors associated with the realization rates.

Note that this methodology – consistent with 2004-2005 EEGA workbook general calculation approaches – assumes that all sites completed in a given calendar year have full annualized impacts beginning that year.

H&L P4 Implementation – SCE Service Territory Energy Impact Reporting

Program ID: 1066-04

Program Name: H&L Energy Savers – Performance4

Year	Calendar Year	Gross Program-Projected MWh Savings	Net Evaluation Confirmed Program MWh Savings	Gross Program-Projected Peak MW Savings	Evaluation Projected Peak MW Savings**	Gross Program-Projected Therm Savings	Net Evaluation Confirmed Program Therm Savings
1	2004	217	149	0.14	0.05	36,604	22,218
2	2005	526	362	0.33	0.12	86,564	52,544
3	2006	544	374	0.35	0.12	91,421	55,492
4	2007	544	374	0.35	0.12	91,421	55,492
5	2008	544	374	0.35	0.12	91,421	55,492
6	2009	544	374	0.35	0.12	91,421	55,492
7	2010	544	374	0.35	0.12	91,421	55,492
8	2011	544	374	0.35	0.12	91,421	55,492
9	2012	445	306	0.32	0.11	91,421	55,492
10	2013	285	196	0.27	0.10	89,917	54,579
11	2014	285	196	0.27	0.09	83,189	50,495
12	2015	281	194	0.28	0.10	75,573	45,873
13	2016	280	193	0.28	0.10	75,183	45,636
14	2017	280	193	0.28	0.10	75,183	45,636
15	2018	280	193	0.28	0.10	75,183	45,636
16	2019	272	187	0.28	0.10	74,778	45,390
17	2020	266	183	0.28	0.10	74,288	45,093
18	2021	266	183	0.28	0.10	74,248	45,068
19	2022	253	174	0.26	0.09	72,165	43,804
20	2023	236	162	0.24	0.08	69,448	42,155
21	2024	138	95	0.14	0.05	40,861	24,803
22	2025	14	10	0.01	0.01	4,327	2,626
TOTAL	2004-2025	7,588	5,221	6	2	1,647,451	1,000,003

** Definition of Peak MW as used in this evaluation: on-peak

Appendix A. Full Participant Phone Survey Instrument

Open with preamble about who is calling, why, and the fact that we want to talk with them for approximately five minutes. Mention respondent anonymity, and the fact that we are not trying to sell the customer anything. Sample script:

I am sorry to bother you when I know you are busy. My name is _____, and I am not trying to sell you anything. I am calling from Sisson and Associates, an independent market research firm. We are doing some follow-up work required by the California Public Utilities Commission (CPUC) regarding the Performance 4 program implemented by H&L Energy Savers. Our records indicate your home participated in this program during 2004 or 2005. I will only need five to seven minutes of your time – or I can arrange to call back at another time if that is more convenient.

(If get agreement to proceed) I want to assure you that your responses will be anonymous, and will be combined with many other program participants' answers to help evaluate this program for the CPUC.

Verify respondent and home:

Q1.) Verify name _____

Q2.) Verify home location (street address / city) _____

Q3.) Verify home vintage (year) _____

Verify program participation (and assess communication about program)

Q4.) Do you recall participating in the Performance 4 program sponsored by H&L Energy Savers? _____ *If cannot recall, add more information such as: have you recently had insulation installed, ducts sealed, etc. If still no recollection, END SURVEY, and thank the respondent for his/her time.*

Q5.) How did you *initially* learn about the program?

(pre-coded list; multiple responses allowed; probe until reasonably exhausted)

___ Contractor

___ City government

___ Bank or credit union

___ Newspaper/media

___ Friend/colleague

___ Other _____ (record)

Q6.) Our records indicate that you had the following energy efficiency measures implemented (*read from data extract*):

- CFL's installed (note: up to 5 given out as part of energy audit)
- Faucet aerator installed (note: given out as part of energy audit)
- Low-flow showerhead installed (note: given out as part of energy audit)
- Ceiling insulation added
- Wall insulation added
- AC diagnostic work conducted (e.g., Freon refrigerant added)
- Ducts sealed
- Whole house fan installed
- Setback thermostat installed
- Water heater pipe insulation added
- Non-prog. measure #1 (identified if nec. for 2nd call) _____ (record)
- Non-prog. measure #2 (identified if nec. for 2nd call) _____ (record)
- Non-prog. measure #3 (identified if nec. for 2nd call) _____ (record)
- Non-prog. measure #4 (identified if nec. for 2nd call) _____ (record)

Does this scope of work sound correct? _____
 (*If answer is no, record their version of what happened.*)

Q7.) a.) Is the measure(s) and/or tuned-up equipment still fully installed and operational?
 (*ask about each measure verified in #6 – note that some CFL's might have been put into storage*)

If "no" regarding any of the measures, ask: b.) What % of the measures remain installed and operational? _____

<u>7a. Fully installed/operational (yes/no)</u>	<u>7b. % Remaining installed/operational?</u>
<input type="checkbox"/> CFL's installed	_____
<input type="checkbox"/> Faucet aerator installed	_____
<input type="checkbox"/> Low-flow showerhead installed	_____
<input type="checkbox"/> Ceiling insulation added	_____
<input type="checkbox"/> Wall insulation added	_____
<input type="checkbox"/> Air conditioning diagnostic work conducted	_____
<input type="checkbox"/> Ducts sealed	_____
<input type="checkbox"/> Whole house fan installed	_____
<input type="checkbox"/> Setback thermostat installed	_____
<input type="checkbox"/> Water heater pipe insulation added	_____
<input type="checkbox"/> Non-prog. measure #1	_____
<input type="checkbox"/> Non-prog. measure #2	_____
<input type="checkbox"/> Non-prog. measure #3	_____
<input type="checkbox"/> Non-prog. measure #4	_____

(Treat situations where a piece of equipment promptly failed and was satisfactorily replaced as part of the Performance 4 program as still installed/operational)

Q8.) Regarding the CFL's that were installed and that are presently operational: how many hours per day would you say that they typically are on (to the nearest half-hour)?

_____.

Q9.) (*Ask if customer implemented setback thermostat in #6*) a.) What were pre-setback thermostat settings for your space heating and/or air conditioning systems?

(record degrees information by time of day, day of week, and/or heating/cooling season as appropriate)

b.) What were settings on your setback thermostat when it was installed?

(record degrees information by time of day, day of week, and/or heating/cooling season as appropriate)

c.) If settings have been changed since installation, what are current settings?

(record degrees information by time of day, day of week, and/or heating/cooling season as appropriate)

Q10.) What made you decide to participate in the program? (*pre-coded list; multiple responses allowed; probe until reasonably exhausted*)

- ___ Incentive(s) / discount(s) / rebate(s)
- ___ Wanted to make home quieter
- ___ Wanted to make home more comfortable (e.g., cooler in summer)
- ___ Wanted to make home cleaner
- ___ Wanted to make home cheaper to operate (i.e., reduce utility bill)
- ___ Wanted to make home worth more
- ___ Wanted to support a local contractor
- ___ Clear/compelling program literature
- ___ Clear/compelling program web site
- ___ Turnkey service program made the upgrades easy
- ___ Not disruptive to my home
- ___ Good word-of-mouth from other program participants
- ___ Good testimonials in program ads from respected persons / organizations
- ___ Other _____ (record)

Q11.) What was the single most important reason for deciding to participate in the program?

(circle the answer from the prior pre-coded list)

Q12.) Did you receive incentives or rebates from any other source as a result of installing the Performance 4 program measures? _____
(If yes, record description of what happened)

Program Satisfaction and Effectiveness

I am going to read you a short list of questions that I would like you to respond to using a 5-point scale (where 5 is best possible score and 1 is the worst possible score).

- Q13.) ___ Overall, how satisfied are you with the Performance 4 program?
- Q14.) ___ How easy was it to participate in the program?
- Q15.) ___ How satisfied were you with the energy audit?
- Q16.) ___ How satisfied were you with the incentive / discount / rebate?
- Q17.) ___ How satisfied were you with the contractor(s) who performed the work
- Q18.) ___ How satisfied were you with the level of disruption to your home being minimized during the work?
- Q19.) How satisfied are you with the performance of each measure? (*per #6 measure list*)
- ___ CFL's
 - ___ Faucet aerator
 - ___ Low-flow showerhead installed
 - ___ Ceiling insulation
 - ___ Wall insulation
 - ___ Air conditioning diagnostic work
 - ___ Ducts sealed
 - ___ Whole house fan
 - ___ Setback thermostat
 - ___ Water heater pipe insulation
 - ___ Non-prog. measure #1
 - ___ Non-prog. measure #2
 - ___ Non-prog. measure #3
 - ___ Non-prog. measure #4
- Q20.) (*For each measure verified by the participant in #6*) Assuming you had not been contacted by the Performance 4 program in the first place, what is the likelihood (in percent) that you would have implemented or installed the measure during 2004 or 2005 in the absence of this program, where 0% = no chance and 100% = definitely would have had?

Q21.) (For respondents answering any portion of Q20 as >0%) How much sooner (in months) was the measure implemented because of this program?

<u>Q20. Implementation likelihood %?</u>	<u>Q21. Months sooner implemented?</u>
<input type="checkbox"/> CFL's	_____
<input type="checkbox"/> Faucet aerator	_____
<input type="checkbox"/> Low-flow showerhead installed	_____
<input type="checkbox"/> Ceiling insulation	_____
<input type="checkbox"/> Wall insulation	_____
<input type="checkbox"/> Air conditioning diagnostic work	_____
<input type="checkbox"/> Ducts sealed	_____
<input type="checkbox"/> Whole house fan	_____
<input type="checkbox"/> Setback thermostat	_____
<input type="checkbox"/> Water heater pipe insulation	_____
<input type="checkbox"/> Non-prog. measure #1	_____
<input type="checkbox"/> Non-prog. measure #2	_____
<input type="checkbox"/> Non-prog. measure #3	_____
<input type="checkbox"/> Non-prog. measure #4	_____

Q22.) Are you at all familiar with the energy *usage* (as opposed to the energy *costs*) at your home? _____

Q23.) (if answered "yes" to #22 above) Adjusting for things like seasons and weather, what do you think has happened to your home's overall energy usage following completion of the Performance 4 program work?

(Choose the one most appropriate response)

- a.) Much less
- b.) Slightly less
- c.) About the same
- d.) Slightly more
- e.) Much more
- f.) I look at costs much more than usage
- g.) Unsure

Q24.) Do you think the California Public Utilities Commission should continue to fund programs such as the Performance 4 program to operate energy efficiency programs?

- a.) Definitely
- b.) Probably
- c.) Unsure
- d.) Probably not
- e.) Definitely not
- f.) Don't know / no opinion

Q25.) a.) In the course of your involvement with the Performance 4 program, did you become familiar with other energy efficiency programs authorized by the CPUC (e.g., through promotional materials left behind by H&L Energy Savers)?

b.) (*if answered "yes" to #25a above*) Did you let other persons know about these other energy efficiency programs? _____

c.) (*if answered "yes" to #25b above*) Approximately how many other persons did you inform? _____

Q26.) Can you please verify the type of air conditioning system that we have listed for you in our records? (indicate central, wall/room, or none) _____

Q27.) Do you have any other feedback or suggestions regarding the Performance 4 program that we have not covered? _____

Thank you.

Appendix B. Full Participant Phone Survey Coded Dataset

The dataset is an Excel workbook, and was provided to the CPUC in electronic format (owing to printing length and viewing format considerations). A copy is available upon request. Explicit customer identifiers have been removed.

Appendix C. Impact Evaluation Workbook

The dataset is an Excel workbook, and was provided to the CPUC in electronic format (owing to printing length considerations). A copy is available upon request.

Appendix D. Cost-Effectiveness Assessment

The TRC Test cost-effectiveness analysis has been conducted using an updated version of the original September 2003 H&L P4 EEGA workbook. Note that only the “Program Summary”, “1 - Budget Worksheet”, and “2 – MeasurableEEActivities” worksheets have been updated per the data inputs described in Section 7.5; all other worksheets have been left unchanged.

The dataset is an Excel workbook, and was provided to the CPUC in electronic format (owing to printing length considerations). A copy is available upon request.

Appendix E. Year-by-Year Impacts

The H&L P4 year-by-year impact analysis has been conducted using 1) the Section 7.6-identified approaches and 2) the workbook format identified by CPUC Energy Division staff in January 17, 2006 materials communicated to program evaluators.

The dataset is an Excel workbook, and was provided to the CPUC in electronic format (owing to printing length considerations). A copy is available upon request.

Appendix F. Draft Final Report Reviewer Comments and S&A Responses

The following table summarizes draft final report reviewer comments and associated S&A responses.

Reviewer	Draft Report Reviewer Comments (paraphrased)	S&A Response
Master Evaluation Contractor Team	Impact evaluation shows net <i>ex post</i> final results. Given the implementer's use of 2001 DEER-based deemed savings values for program measures, the analysis should be extended to also show gross <i>ex ante</i> intermediate results and net <i>ex ante</i> intermediate results.	Requested additional sets of results have been provided – see Sections 7.2 and 7.3. Note that net <i>ex post</i> final results are now provided in Section 7.4.
Master Evaluation Contractor Team	Various typographical errors and slightly inaccurate text characterizations of program findings need to be corrected.	Requested modifications have been made – appear sporadically throughout the document.
Master Evaluation Contractor Team	There are possible concerns regarding the use of phone survey results for measure verification ... should onsite results be utilized instead (since they may be more accurate/robust)?	Nature of phone survey approach and “directionality” of findings satisfactorily explained to reviewer (e.g., respondents in fact were recalling <i>non</i> -installation/operation of certain measures – and in patterns similar to what was encountered in onsite verification work – as opposed to respondents falsely verifying measure adoption).
Master Evaluation Contractor Team	Descriptions of impact evaluation sub-sections need to be renamed from “process pragmatics” (hard-to-understand phrase).	Impact evaluation sub-sections now renamed as “key issues”.
Master Evaluation Contractor Team	Comments made regarding IOU program administrator SCE's making errors in interpreting the counting of certain energy savings and the reimbursement of certain measure costs need to be documented and resolved outside of this EM&V report.	Relevant materials have been deleted, and are being provided to CPUC staff in memorandum report format.
Self [issues discovered while making other revisions]	Very small errors in draft report impact evaluation net <i>ex post</i> final analysis need to be fixed. Errors pertained to 1) savings data for ceiling insulation measure in Climate Zone 14, 2) accidental exclusion of survey-reported CFL hours/day usage from the analysis, and 3) accidental omission of the presence of a central AC unit at one sampled site.	Errors fixed.