

LIEE Standardization Project: Phase II Final Report

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Introduction

1.1 Overview

This report presents a set of recommendations for achieving greater consistency in the Low Income Energy Efficiency (LIEE) Programs administered by Pacific Gas & Electric Company, Southern California Edison Company, Southern California Gas Company, and San Diego Gas & Electric Company. These recommendations are the result of Phase II of an extensive effort by the utilities known as the LIEE Program Standardization Project. In the remainder of this Introduction, we review the background of the LIEE Program Standardization Project, identify the specific objectives of the three phases of the Project, summarize the process by which Phase II recommendations were developed, and preview the remainder of the report.

1.2 Background

Since the early 1980s, California's investor-owned natural gas and electricity utilities have offered programs designed to support energy services to the low income community. These programs have taken a number of forms. At this time, all four utilities administer both California Alternate Rates for Energy (CARE) and LIEE Programs. The sole focus of this report is on the LIEE programs.

The individual utilities' LIEE Programs have evolved somewhat differently over the last several years, and these programs are now characterized by a variety of differences. These differences range from fairly broad variations in policies and procedures to very specific technical differences in installation standards. There have been several attempts to diminish the differences across these programs. For instance, Resolution E-3586 mandated that certain measures be offered by individual utilities on a pilot basis. Even though this resolution permitted some differences to be maintained, it nonetheless moved the four utilities closer to consistency in measure eligibility.

The LIEE Standardization Project is an attempt by the utilities to achieve overall consistency across programs. Its specific scope has been based on three directives issued by the Commission. A brief chronology of the Project follows:

- On December 29, 1999, Commissioner Neeper issued an Assigned Commissioner’s Ruling (ACR) instructing California’s four investor-owned utilities to “work jointly with any interested participants to develop a joint proposal for standardizing the selection criteria and installation manuals for the utilities’ low income weatherization programs...” The ACR also instructed the utilities to conduct workshops and/or other forums to solicit input from interested participants, and to submit a joint proposal to the California Public Utilities Commission (“CPUC” or “Commission”).
- On March 22, 2000, Commissioner Neeper issued a second ACR relating to the standardization of LIEE programs. This ACR essentially clarified and extended the scope of standardization effort. As indicated in the March 22 ACR, the review of the Policy and Procedures Manuals “shall cover not only issues relating to installation standards, but also other policies and procedures that differ across programs.” Moreover, the ACR instructed the utilities to develop recommendations for standardizing inspection policies and procedures across programs.
- On May 8, the utilities filed a report on Phase I of the Project. That report provided recommendations on statewide Weatherization Installation Standards, a set of common measure-specific policies and procedures, and recommendations relating to measure selection criteria.
- Immediately after the filing of the Phase I report, the Standardization Team turned to Phase II of the Project. Phase II involved the production of the Weatherization Installation Standards Manuals and the development of recommendations for making general Program policies and procedures (including inspection policies and procedures) more consistent across utilities.
- In a July 5, 2000 follow-up filing, the utilities submitted additional recommendations relating to Weatherization Installation Standards. These recommendations were made in response to comments on the Phase I report made by contractors and other interested parties.
- On September 7, 2000, the Commission issued an Interim Opinion on Low-Income Assistance Program Policies for Program Year 2001 and the Standardization Project (Phase 1). This interim opinion accepted a set of recommendations submitted earlier by the utilities in a May 8, 2000 report and the July 5, 2000 follow-up filing, instructed the utilities to further consider a set of recommendations on Program Year 2001 low-income programs filed by the Low Income Advisory Board on May 10, 2000, and instructed the utilities to develop a Customer Bill of Rights.

1.3 Objectives

As defined by the ACRs described above, the primary goal of the overall Standardization Project is to assist the utilities in achieving consistency in LIEE program policies and procedures, installation standards, and inspection policies and procedures. The achievement of this broad goal is requiring a considerable effort on the part of both the utilities and the project team. The work is being conducted in three phases, and the specific objectives of the project differ across these phases.

Phase I of the project, which was the subject of the May 8, 2000 Phase I report, had the following objectives:

- To develop recommendations for a common set of installation standards to be used in all four utility programs;
- To develop recommendations for a consistent set of selection criteria to be used to select measures for inclusion in utility programs; and
- To develop recommendations relating to the achievement of greater consistency in program policies and procedures relating to measure installations.

Phase I generally achieved these objectives. Recommendations for common installation standards were developed, although the WIS Manuals were not actually completed by the end of Phase I. It was decided during Phase I that separate WIS manuals should be prepared for conventional “stick-built” homes and mobile homes, and this activity was deferred to Phase II. Recommendations for measure selection criteria were agreed upon, but these criteria were not applied to specific measures pending the collection of measure-related information on costs and benefits. Finally, several recommendations on measure-specific policies and procedures were constructed, but the development of recommendations on general policies and procedures was moved to Phase II.

The objectives of Phase II, which is the subject of this report, were:

- To implement the recommendations for a common set of installation standards, one for conventional homes and one for mobile homes;
- To continue the development of recommendations for increasing consistency in program policies and procedures; and
- To develop recommendations for improving consistency across utilities with regard to inspection policies and procedures.

As will be indicated in the remainder of this report, the Standardization Team (Team) was also generally (but not completely) successful in meeting the objectives of Phase II. WIS Manuals were completed for both conventional homes and mobile homes. However, some

measures offered by one or more utilities had never been covered by the existing WIS Manuals, and the preparation of standardized installation standards for some of these measures was not possible in the Phase II time frame. Moreover, recommendations for achieving consistency in a wide range of general policies and procedures (including several relating to inspection policies and procedures) were developed. However, the Team fell short of resolving all of the policy issues covered by Phase II, in four respects.

- First, no agreement was reached on a major issue referred to by the various utilities as either Combustion Appliance Safety (CAS) testing or gas appliance testing.
- Second, no consensus on appropriate ceiling insulation levels was achieved.
- Third, while agreements on most Program general policies and procedures were reached, it was not feasible for the Team to take this process to its ultimate conclusion through the development of a common Policy and Procedures Manual.
- Fourth, although the Team intended to demonstrate the measure selection criteria recommended in its Phase I report, this task was suspended in deference to the Commission's assignment of the responsibility for developing program evaluation and reporting requirements to the RRM Working Group.

These issues were tabbed for consideration under Phase III. Additionally, other needs were identified during Phase II and deferred to Phase III. One of these was the need for a set of materials relating to the new law on lead-safe practices; the other was the Commission directive to develop a Customer Bill of Rights.

The objectives of Phase III, which will begin within the next few weeks, are consequently as follows:

- To prepare a single statewide consolidated Policy and Procedures Manual to be used by all utility LIEE programs;
- To develop additional sections of the WIS Manuals for duct reconnection, refrigerator replacements, evaporative cooler installation, and furnace repair and replacement;
- To develop recommendations on CAS testing/gas appliance testing, and if such procedures are agreed to by the Team, to develop a set of installation standards for these procedures to be incorporated into the WIS Manuals;
- To develop a set materials relating to lead-safe practices;
- To apply the program evaluation methodology developed through the RRM Working Group (if approved by the Commission) to the assessment of certain LIEE measures; and
- To draft a Statewide Customer Bill of Rights.

1.4 Applicability of Recommendations to Program Years

It is the understanding of the Standardization Team that the conventional home and mobile home WIS Manuals, which incorporate both installation standards and the measure-specific policies and procedures recommended under Phase I, will be applicable to PY 2001. Other policies and procedures recommended on the basis of Phases II and III will (if adopted by the Commission) take effect for PY 2002.

1.5 Process of Developing Recommendations under Phase 2

In the course of developing the Phase II recommendations contained in this report, the four utilities, RER, and RHA actively solicited public comment. The Team took the following specific steps:

- On June 7, 2000, RER and RHA presented a Phase II overview to a public workshop held in conjunction with a meeting of the Low Income Advisory Board (LIAB) in San Francisco. At that point, comments from the public were received and attendees were invited to submit other comments and questions to the Standardization Team via mail or electronic mail.
- On June 21, 2000, RER and RHA provided a similar overview of Phase II to a public workshop held in conjunction with a meeting of the Low Income Advisory Board Technical Committee (LIAB-TC) in San Francisco. Again, public comments were received and further comments via mail or electronic mail were requested.
- On July 26, 2000, RER presented preliminary recommendations to a public workshop held in Los Angeles in conjunction with a meeting of the LIAB-TC.
- A somewhat updated set of preliminary recommendations was presented to the public at a workshop held in San Francisco on August 1 in association with a meeting of the LIAB.
- On August 29, 2000, RER presented the Team's Phase II draft recommendations to the public in a workshop held in association with a meeting of the LIAB in Garden Grove. As at other Standardization Project workshops, public comment was invited.

We appreciate the involvement of Commission staff and other interested parties in this process. While these parties may not agree with some or all of the recommendations contained in this report, they nonetheless had a considerable influence on these recommendations. Public comment was central to the entire process, but had a particularly strong influence on the development of recommendations on prior weatherization, minimum necessary weatherization, the treatment of public housing, and a variety of WIS issues.

1.6 Organization of the Report

The remainder of the report is organized as follows:

- Section 2 discusses the development of the conventional home and mobile home Weatherization Installation Manuals.
- Section 3 describes the Team's recommendations with respect to customer eligibility for the LIEE Program and for specific measures.
- Section 4 discusses policies relating to minor home repairs and furnace repairs and replacements.
- Section 5 provides recommendations relating to inspection policies and procedures.
- Section 6 enumerates a number of general differences in policies and procedures that will be addressed in Phase 3 of this project.
- Finally, Section 7 summarizes the results of the Phase II study, discusses remaining tasks facing the Standardization Project, and offers some general recommendations for the overall standardization process.

This report also has a set of appendices containing detailed information on Team recommendations

- Appendix A contains a list of Minor Home Repairs to which the Team has agreed; and
- Appendix B demonstrates the analysis currently being conducted by the Standardization Team to develop recommendations on ceiling insulation levels.
- Appendix C provides information on the climate zones used in the analysis of ceiling insulation options.

2

Statewide Weatherization Installation Manuals

2.1 Introduction

Three tasks were completed under Phase II relating to the Weatherization Installation Standards Manuals:

- The Installation Standards developed under Phase I were revised in response to various comments on the Phase I report;
- A Statewide Conventional Home Weatherization Installation Standards Manual was produced; and
- A Statewide Mobile Home Weatherization Installation Standards Manual was produced.

2.2 Revisions to Weatherization Installation Standards

At the end of Phase I of the LIEE Standardization Project, several parties made comments about the Weatherization Installation Standards proposed by the Standardization Team. To the extent possible, these comments were considered by the Team in its final Phase I recommendations. However, there was inadequate time to fully consider all such comments, so the Team reconsidered them at the beginning of Phase II. As a result of the reconsideration of these comments, the Team has revised some of its recommendations relating to the Weatherization Installation Standards. These new recommendations, which were conveyed to Commissioner Neepser on July 5, 2000, are summarized below. They are also integrated into the WIS Manuals that are being delivered as Phase II products.

2.2.1 Use of Specific Years when Citing Codes and Standards

In the Phase I draft of the WIS Manual, references to specific years for both codes and standards were integrated throughout the manual. The Team recommends putting references to specific codes in a central place at the front of the WIS manual, but keeping references to specific standards in the measure-specific standards. Standards should be reviewed periodically and any necessary changes should be made to the specific WIS sections. A loose-leaf binder format should be used to allow easy replacement of pages affected by changes in standards.

2.2.2 Inclusion of Sealing of HVAC Return Platform

The Phase I draft of the WIS Manual did not cover sealing of HVAC return platforms. The Team now recommends that HVAC return platforms be sealed, and that the procedure for doing so be included in the WIS manual in the section on ceiling insulation.

2.2.3 Allowance of More than One Showerhead per Neck

The Phase I WIS Manual prohibited the installation of more than one low-flow showerhead per neck. The Team now recommends that the replacement of all *existing* showerheads (greater than 3 gpm) with low-flow units be accepted, but that the *addition* of showerheads where none is currently present be prohibited.

2.2.4 Use of Shop-Built Wood Vent Covers

The Team recommends that installation standards for evaporative cooler covers be changed to require use of plastic covers if they are commercially available, and that standards recommended under Phase I for shop-built wood covers be retained for cases where no plastic covers are available.

2.2.5 Replacement of Broken Outlet Plates and Switch Plates

The Team considered suggestions that outlet gaskets be installed on interior walls (walls between conditioned spaces, but declined to accept this recommendation. The Team noted that the Phase I draft was not clear on the need to replace broken outlet plates and switch plates, and now recommends clear standards requiring the replacement of broken outlet plates and switch plates.

2.2.6 Unsafe Working Conditions as a General Nonfeasibility Condition

Several parties requested that a general statement relating to unsafe working conditions be added to the WIS Manual or the Policies and Procedures Manual. The Team now recommends that the Policy and Procedures Manual include a general statement in that: “The Contractor is responsible for the maintenance of worker safety. If the Contractor feels that the installation of a measure at the site is unsafe, the Contractor should call a program inspector to verify the condition and document the situation being cited. If the condition is verified as unsafe, the measure need not be installed.”

2.2.7 Egress Requirement for Window Replacements in Bedrooms

Reviewers of the Phase I draft WIS Manual expressed some concern that the egress requirement for window replacement in bedrooms was too stringent. The Team now recommends that, in the event that the Contractor replaces a window in a bedroom, the Contractor must meet the egress requirements of the local building department.

2.2.8 Water Heat Pipe Wrap

In its Phase I report, the Team recommended a minimum of 6” between combustible insulation materials and heat producing devices (draft hood and gas vent pipe). During the early part of Phase II the Team changed the requirements back to 3” to be consistent with combustible clearances in other sections of the standards. More discussion resulted in another change, which allowed the standards to be consistent with Title 24. This change included both a 6” and 3” requirement:

- Minimum 6” clearance from combustible insulation to single-wall gas pipe.
- Minimum 3” clearance, or as specified by listing, from listed Type B gas vent piping connectors.
- Minimum 3: clearance from draft hood opening.

2.3 Production of Conventional Home WIS Manual

Under Phase I, the Standardization Team developed a draft of a common Statewide Conventional Home WIS Manual. Under Phase II, the Team refined the wording of the Manual and incorporated the appropriate schematics. As mandated in the Commission’s Decision 00-09-036, the Conventional Home Manual will be delivered to the Commission on or before October 9, 2000. A hardcopy of the Conventional Home WIS Manual will be distributed to interested parties upon request. Requests can be addressed to Fred Sebold at fred@rer.com.

2.4 Mobile Home WIS Manual

The utilities currently have fairly different approaches to the specification of Weatherization Installation Standards for mobile homes. As a result, the Standardization Team decided to develop a separate set of standards for mobile homes under Phase II. These standards were incorporated into a Mobile Home WIS Manual that will be submitted to the Commission as a freestanding document on or before October 9, 2000. A hardcopy of the Mobile Home WIS Manual will be distributed to interested parties upon request. Requests can be addressed to Fred Sebold at fred@rer.com.

3

Customer Eligibility

3.1 Introduction

Several general policies and procedures fall under the category of customer eligibility criteria. In this context, customer eligibility criteria are defined to include:

- Income qualification, including fractional qualification of multifamily complexes and mobile homes as well as income documentation requirements;
- Prior weatherization under the LIEE Program;
- Minimum necessary weatherization; and
- Various other eligibility criteria relating to metering type, occupancy, rate class, housing age, and public ownership.

These policies are considered below. For each aspect of eligibility, we discuss current utility practices, present brief arguments for and against various options, and present recommendations for consistent statewide policies.

3.2 Income Qualification

3.2.1 Overview

The four utilities' approaches to income qualification are summarized in Table 3-1. As shown, all utilities use the same California Public Utilities Commission ("CPUC" or "Commission") established LIEE income guidelines¹ to qualify participants in the LIEE Program. However, there are various differences in the ways in which these guidelines are actually implemented.

¹ Commission Resolution E-3254, dated January 21, 1992 ordered utilities to use the CARE income guidelines for the low income weatherization programs, but permits utilities to use 200% of Federal Poverty Guidelines for low income customers who are 60 years of age or older and for handicapped persons.

Table 3-1: Income Qualification

Qualification Issue	Current Policy			
	PG&E	SoCalGas	SDG&E	SCE
- Income Levels	LIEE Standards	LIEE Standards	LIEE Standards	LIEE Standards
- Area Designation	No area designation used.	No area designation used.	Residents of Designated Area provide info on incomes and documentation is sometimes reviewed on site, but no documentation is collected; Residents outside DA must provide income documentation.	No area designation used.
Single Family Qualification and Documentation	All customers must be individually prequalified; income documentation reviewed but not collected.	CARE and some TANF or SSI customers w/o documentation; others must be prequalified and income documentation must be reviewed and collected.	Individually qualified. Income documentation sometimes reviewed within and always reviewed outside DA. Documentation collected outside but not inside DA.	Customer must be prequalified and income documentation must be reviewed and collected.
Multifamily (MF) Qualification and Documentation	Only units that qualify are treated.	66% rule used for MF units; applied to units not previously weatherized	80% rule used for MF.	66% rule used for MF units; applied to units not previously weatherized
Mobile Home (MH) Qualification and Documentation	Only units that qualify are treated.	66% rule used for MH units; applied to units not previously weatherized	80% rule used for MH.	66% rule used for MH units; applied to units not previously weatherized?

3.2.2 Area Targeting and Income Documentation

Current Practices. SDG&E is the only utility to differentiate the process of targeting and income documentation by area. SDG&E uses a targeted low-income Designated Area (DA) approach. DAs are defined on the basis of census block-face data as areas with a preponderance of low-income households. SDG&E and its third-party implementation contractor target these areas heavily in order to reach a large number of low-income households. Households outside the DA can still qualify for the LIEE Program, but only if they are referred to the third party implementation contractor by SDG&E or provide the service provider with hard copy documentation that they meet program income guidelines. For homes within the DA, income documentation is sometimes reviewed at the site, but no income documentation is collected. For homes outside the DA, income documentation is reviewed and collected.

Recommendation. The utilities recommend a modest change in the use of area targeting in order to bring programs into better consistency. The recommended policy is that, while area designations can be used for targeting customers, policies regarding income qualification should be identical across areas (both across service areas and across sub-areas within service areas).

3.2.3 Documentation Requirements

Current Practices. Practices with respect to the requirement for income documentation also differ across utilities:

- SoCalGas accepts CARE eligibility and proof of some types of SSI and TANF eligibility as proof of LIEE eligibility, and require no further documentation of income level. Neither SCE, nor PG&E, nor SDG&E accept proof of any other type of program eligibility as an alternative to LIEE eligibility documentation.
- Aside from the above cases, SoCalGas and SCE require that documentation be copied and retained.
- SDG&E requires the review and collection of income documentation outside the DA. Within the DA, documentation is only sometimes reviewed and is not required to be collected.
- PG&E requires that documentation be reviewed and recorded by the contractor, but does not require that it be collected.

Recommendations. The utilities recommend the following common policies for income documentation:

- Income documentation must be reviewed, recorded, and copied by service providers for all prospective participants. Qualification for other programs cannot be taken as adequate evidence of qualification for the LIEE Program, except in the event that the customer has been verified by the utility as eligible for the CARE Program over the past year. Self-certification will not be permitted.
- The utility will periodically audit the documentation maintained by the contractor. In the event that documentation is not available for a participant, payment to the contractor for the weatherization of that unit will be disallowed.

3.2.4 Fractional Qualification in Multifamily Complexes and Mobile Homes

Current Practices. Different approaches are now used to qualify households in multifamily complexes and mobile home parks. Specifically:

- SDG&E qualifies the entire multifamily complex or mobile home park if at least 80% of the individual dwelling units meet the LIEE Program's income requirements;
- SCE and SoCalGas qualify the entire complex/park if at least 66% of the households meet the LIEE Program's income requirements;
- PG&E qualifies multifamily households and mobile home dwellers on an individual basis. That is, if an individual unit is occupied by a household that does not qualify (or if a unit is unoccupied), that unit cannot be treated.

Recommendations. The Standardization Team makes the following recommendations relating to fractional qualification of multifamily complexes and mobile home parks:

- Fractional qualification should be used for multifamily complexes and mobile home parks, with the income-eligibility of 80% of all units not previously weatherized being required for the qualification of the entire complex/park.
- Service providers must review, record, and collect income documentation for all households used to qualify an apartment complex or a mobile home park. The provider must also make its best effort to collect income documentation for all other households in the complex (i.e., those not used to meet the 80% qualification standard). Documentation for households used to qualify an apartment complex or a mobile home park must be collected and maintained by the service provider for each unit.
- All utilities will define multifamily complexes as those with five (5) or more dwelling units. Duplexes, triplexes, and fourplexes will be treated as single family homes for the purposes of this Program.

3.3 Limits on Prior Participation in the LIEE Program

Current Practices. All programs have some policy with respect to dwelling units that have been weatherized previously by publicly funded programs. However, these policies differ as follows:

- SDG&E technically prohibits treating a home if it has been treated previously under the State's Community Services and Development's (CSD) or SDG&E's LIEE program. However, some exceptions are made on a case-by-case basis. Additionally, SDG&E allows the installation of measures not offered when a home was previously weatherized.
- PG&E prohibits the installation of any measures in dwelling units that have been weatherized under the LIEE program in the past five years.
- SCE prohibits the installation of measures that have been installed under the LIEE Program, but allows installation of other measures. Exceptions are made on a case-by-case basis.

- SoCalGas prohibits the installation of any measures if the unit has been weatherized under any LIEE program, and prohibits the installation of individual measures already installed under any other utility program.

Recommendations. The Team offers the following set of recommended common policies relating to prior participation in LIEE Programs:

- If utilities pre-screen customer lists before providing them to service providers, utilities should initially target homes that have not yet participated in the LIEE Program.
- In general, homes that have been treated under the LIEE Program within the past 10 years will not be eligible for participation in the current program, either for measure installation or for on-site energy education. However, a home that has been treated under the LIEE program during the past 10 years will be considered eligible for participation if the home needs ceiling insulation, and if ceiling insulation was previously deemed non-feasible as a result of a structural inadequacy (e.g., knob and tube wiring) that has since been resolved or is no longer considered to result in non-feasibility. Other exceptions may be granted with the written approval of the utility Administrator's Program Manager.
- In the event that a home is determined to be ineligible because of previous participation in the program, occupants may still be referred to group energy education if it is offered.

3.4 Minimum Necessary Weatherization

Current Practices. The utilities currently have no explicit policies with respect to the number of measures that must be needed by a home to qualify for participation in the LIEE Program.

Recommendations. The Standardization Team recommends the following policies with respect to minimum necessary weatherization:

- A home must need a minimum amount of weatherization in order to be eligible for participation in the Program, either for measure installation or for on-site energy education. The Standardization Team recommends the following operational definition of this minimum amount of weatherization.
 - In an area served by investor-owned gas and electric utilities, the minimum would be either ceiling insulation or three measures;
 - In an area served by an investor-owned gas utility but not an investor-owned electric utility, the minimum would be either ceiling insulation or three other measures that are covered under the gas utility's LIEE Program.

- In an area served by an investor-owned electric utility but not an investor-owned gas utility, the minimum would be ceiling insulation, an evaporative cooler, a refrigerator, or three other measures that are covered under the electric utility's LIEE Program.

However, the outreach/education personnel would install CFLs at the time of the assessment of the home. Moreover, occupants not meeting the minimum number of weatherization measures could be referred to group energy education if it is offered. The provision of CFLs and/or the provision of group education does not constitute program participation from the standpoint of Section 3.3. That is, it does not restart the 10-year clock used to determine program eligibility. However, the utilities will track the installation of CFLs and will not pay for the installation of additional CFLs in these homes within a period of seven years.

- If a utility uses a pre-approval process in its Program, the minimum standards will be applied only to pre-approved measures. If a utility uses pre-approval and the denial of pre-approval (e.g., because of CO problems) causes the home to fail to meet the minimum number of measures, on-site energy education may still be offered to the occupants of that home.
- For all homes meeting the minimum for necessary measures, all feasible measures must be installed. As stipulated in the standard non-feasibility criteria, if a measure is already in place and operating properly, even if it does not meet the current Installation Standards for new installations, it should not be removed and replaced.

3.5 Other Eligibility Criteria

Current Practices. Table 3-2 presents an overview of other eligibility requirements used in the four utility programs. These requirements are in addition to the utilities' requirements relating to customers' gas and electric services. They involve metering configuration, occupancy, public ownership, business use, and housing age.

Table 3-2: Customer and Structural Eligibility

Eligibility Criterion	Current Policy			
	PG&E	SoCalGas	SDG&E	SCE
Metering Configuration	Must be individually metered or sub-metered	Master-metered OK but cannot exceed 15% of any contractor’s allocation	Must be individually metered or sub-metered	Master-metered OK as long as units have electric space heating
Occupancy	Only occupied dwellings	Vacant MF units can be treated if 66% rule met	Unit must have at least a one-month rental agreement (except under 80% rule)	Must have active account, except under 66% rule
Public Housing	Doesn’t treat HUD-owned units unless they are individually metered, but no restrictions on others	Govt-owned housing not eligible	No military housing	No restrictions
Businesses	Not eligible	Not eligible	Not eligible; Structure must be on residential rate	Must be full time residential dwelling
Housing Age	No restrictions	Must be built Feb 1982 or earlier	No restrictions	Must be built Feb 1982 or earlier

As shown in Table 3-2, there are several differences in these criteria across the utility programs. Specifically:

- The treatment of master-metered dwellings varies across programs. PG&E and SDG&E require either individual metering or submetering. SoCalGas and SCE allow treatment of master-metered facilities under some circumstances.
- PG&E treats only occupied units, while the other utilities permit the treatment of vacant units when the fractional eligibility rule is in effect (although these units do not count as individually qualified).
- SoCalGas does not allow treatment of public housing. SDG&E does not typically weatherize military housing, and PG&E does not treat HUD-owned housing units unless they are individually metered. SCE has no restrictions on publicly owned housing.
- SCE and SoCalGas require homes to have been built in February 1982 or earlier, but the other utilities mention no such vintage requirement.

- All utilities restrict businesses from participating in the Program, although the means of enforcing this restriction seems to differ a bit.

Recommendations. The Standardization Team recommends the following common policies:

- **Occupation.** Unoccupied multifamily dwellings may be weatherized, as long as the multifamily complex satisfies the 80% rule for income qualification.
- **Publicly Owned Housing.** Public housing is eligible for participation in the LIEE Program, but must meet the standard terms and conditions of the program in order to participate. (Note that this does not include on-base military housing, insofar as these dwelling units are not served by the investor-owned utilities.)
- **Multifamily Dwellings.** The utility may limit expenditures on the treatment of multifamily dwellings to a specified percentage of the total program budget.
- **Businesses.** Businesses are not eligible to participate in the LIEE Program. Participants must be on residential rates.
- **Structural Age.** No restrictions will be placed on the eligibility of homes of different ages. However, it is to be expected that relatively new homes will generally be less likely to qualify on the basis of need for weatherization measures.

The utilities were not able to agree on a joint recommendation relating to the treatment of master-metered units and will reconsider this issue in Phase III.

3.5.1 Treatment of Rental Units

Current Practices. Table 3-3 summarizes the current practices relating to the treatment of rental units. As shown, there is almost complete consistency across utilities actually offering individual measures. To a great extent, this consistency stems directly from E-3586. The only difference is that the Commission, in D. 00-07-020, just approved SCE's request to continue offering permanently installed evaporative coolers for non owner-occupied dwellings.

Recommendation. The Team recommends the continuation of the current treatment of rental units for refrigerator replacement, hard-wired fixtures and furnace replacement. The Team is not yet prepared to make a recommendation on the treatment of evaporative coolers. This issue will be reconsidered under Phase III.

Table 3-3: Eligibility of Rental Units for Specific Measures

Measure	Current Policy			
	PG&E	SoCalGas	SDG&E	SCE
Refrigerator Replacement	Eligible if unit owned by customer ¹	Not Offered	Eligible if unit owned by customer ¹	Eligible if unit owned by customer ¹
Hard-Wired Fixtures	Not eligible ¹	Not Offered	Not eligible ¹	Not eligible ¹
Furnace Replacement	Not eligible ¹	Not eligible ¹	Not eligible ¹	Not eligible ¹
Evaporative Coolers	Not eligible ¹	Not Offered	Not eligible ¹	Eligible ²

¹ Mandated by E3586.

² Per D. 00-07-020.

4

Minor Home Repairs and Furnace Repairs and Replacements

4.1 Introduction

This section considers the standardization of policies relating to minor home repairs and furnace repairs and replacements. As part of Phase II, the Team developed recommendations for the following program features:

- A common list of Minor Home Repairs to be offered;
- Limits on expenditures on minor home repairs and furnace repairs and replacements; and
- Prioritization criteria for cases where not all needed minor home repairs can be made.

These recommendations are discussed below.

4.2 Common Minor Home Repairs

Current Practices. The utilities currently differ with respect to the specific minor home repairs that they offer under the LIEE Program. One reason for these differences is that the utilities seem to be using slightly different definitions of minor home repairs.

Recommendations. For the purposes of developing a common list of repairs, the Team has adopted the definition of a minor home repair as “a repair required to enable installation of weatherization measures or made to reduce infiltration.” The Team is taking the position that these repairs must be made if they are feasible. Using this definition, the Team has constructed a common set of minor home repairs to be offered under all utility programs. This common set of minor home repairs is contained in Appendix A.

4.3 Limits on Minor Home Repairs and Furnace Repairs and Replacements

Current Practices. Some programs place limits on the cost of installing minor home repairs and/or replacing furnaces. These limits, which were mandated by E-3586, are as follows:

- SDG&E imposes a limit of \$750/unit for minor home repairs and a limit of \$1,500 on furnace replacement.
- PG&E imposes a limit of \$750/unit for minor home repairs if no furnace replacement is done and a limit of \$1,500 on the combination of minor home repairs and furnace replacement if the furnace is replaced.
- SoCalGas has no specific limits at the household level for either minor home repairs or furnace replacement, which is handled separately from the weatherization program.
- SCE has no per-household limits on minor home repairs.

Recommendation. The Standardization Team recommends that E-3586 be modified to allow a common set of limits to be adopted by all programs. These limits would take two forms:

- **Average Cost Limits.** These are limits on the average cost of categories of service across all homes receiving the service in question. They are designed to provide overall cost control for the provision of these services. Note that the recommended limits on average costs exceed the current average costs of these services.
- **Individual Home Limits.** These are defined as limits on the cost that can be incurred for an individual home without the specific approval of the utility Program Manager. Individual home limits are meant to provide for equity in the distribution of program funds across individual households but yet provide Program Managers enough flexibility to respond to individual customer needs and hardship situations.

These limits are presented in Table 4-1. It should be noted that, in addition to these limits, SDG&E and PG&E were mandated by E-3586 to limit total expenditures on minor home repairs to no more than 20% of total program costs. The Standardization Team recommends that these limits on Minor Home Repair expenditures as a percentage of total program costs be dropped in favor of the limits presented in Table 4-1.

Table 4-1: Recommended Caps on MHRs and Furnace Repairs/Replacements

Service	Limit on Average Cost per Home Receiving Service	Limit on Cost for Individual Home without Approval of Program Manager
Minor Home Repairs	\$300	\$750
Furnace Repairs and Replacement (Total Combined Cost for home receiving one or the other)	\$1,200	\$1,750
Furnace Repairs (restriction on repair expenditures relative to cost of replacement)	-	Cost of furnace repair capped at 50% of the cost of a new unit.
Sum of MHR, Furnace Repair and Replacement	-	\$2,000

4.4 Prioritization of Minor Home Repairs

In the event that a contractor requests permission from the utility Program Manager to exceed the limit on minor home repairs, the Program Manager will base a decision on the status of the Contractor’s minor home repair budget, the overall program budget, and the need for the repairs in question. If the Program Manager deems it necessary to limit expenditures on the home, measures will be prioritized using the following general priority list:

- Repairs needed to mitigate imminent hazards (e.g., door repairs where doors will not close or lock);
- Repairs needed to mitigate major infiltration sources (e.g., broken windows, holes in doors, etc.);
- Repairs required to permit the installation of a measure;
- Other repairs.

5

Inspection Policies and Procedures

5.1 Introduction

This section focuses on LIEE inspection policies and procedures. Section 5.2 discusses general policies and procedures relating to inspections. Section 5.3 discusses the policies relating to the ability of job inspectors to make minor job corrections at the customer's site.

5.2 Inspection Policies and Procedures

Current Practices. There are several differences in the general inspection policies and procedures used by the utilities in their LIEE Programs. Table 5-1 summarizes these differences. The primary differences are:

- The percent of homes receiving post-installation inspections differs across programs. SDG&E conducts post-installation inspections on up to 100% of all homes. PG&E inspects 100% of all attic insulation jobs and 20% of other jobs. SCE conducts post-installation inspections on all homes in the non-overlap area. SoCalGas conducts 100% inspections of measures that are safety-related and inspects 20% of other jobs. Safety-related measures include ceiling insulation, water heater blankets, and water heater pipe insulation.
- SoCalGas outsources inspections, while the other utilities use in-house or utility contract labor inspectors.
- PG&E requires pre-approval prior to the installation of measures. The other utilities do not require pre-approval, except that SDG&E has inspectors conduct a “job start” on all multifamily jobs.
- PG&E and SDG&E fail jobs on which the contractor fails to install a feasible measure, while SoCalGas and SCE issue job corrections that revert to fails if not corrected within 10 days.
- SoCalGas requires contractors to correct hazardous fails within three days of notification, whereas the other utilities require correction within 24 hours.
- PG&E has a formal policy allowing non-mandatory inspections to be waived and for mandatory inspections to be assigned a “can’t get in” or “CGI” designation after a certain number of attempts. The purpose of the CGI designation is to allow

the payment of the contractor without an inspection when repeated attempts to inspect have been unsuccessful.

- The utilities have somewhat different dispute resolution procedures.

Table 5-1: Inspection Policies

Inspection Policy	PG&E	SoCalGas/SCE Overlap	SDG&E	SCE (non-overlap)
Post Inspection Frequency	Inspects all attic insulation jobs and a minimum of 20% of all other jobs	Inspects 100% of ceiling insulation, water heater blanket and pipe wrap jobs and a minimum of 20% of all other jobs	Inspects up to 100% of all jobs	Currently inspects 100% of jobs
Inspection Personnel	Uses contract labor inspectors to perform inspections	Outsources inspections, except those for furnace repair and replacement	Uses “in house” inspectors to perform inspections	Uses “in house” inspectors to perform inspections
Pre-Approval	Requires pre-approval of all measures.	Does not provide pre-approval.	Does not generally conduct pre-approval. However, inspectors conduct a “job start” on all multi-family complexes.	Does not provide pre-approval.
Failure to Install Feasible Measure	Fails a job when a feasible measure is not installed.	Issues a correction rather than fail. Contractor must make correction within ten days or inspection will convert to fail.	Fails a job when a feasible measure is not installed	Issues a correction rather than fail. Contractor corrections do not convert to a fail if not corrected within 10 days.

Table 5-1 (cont'd.): Inspection Policies

Inspection Policy	PG&E	SoCalGas/SCE Overlap	SDG&E	SCE (non-overlap)
Hazardous Fails	Requires contractors to reinstall or correct within 24 hours of notification. Codes infiltration measures as hazardous fails if installed prior to passing a CAS Test and/or CAS test fails.	Require contractor to make permanent correction within three days of notification.	Requires contractor to make corrections within 24 hours of notification.	Requires contractors to reinstall or correct any measure that failed because of hazardous condition within 24 hours of notification.
Inspection Waivers and Can't Get Ins (CGIs)	Non-mandatory inspections can be waived. Mandatory inspections must be CGI'ed.*	Does not waive inspections and continues attempts past thirty (30) days; does not track CGIs.	Does not waive inspections and continues its attempts past thirty (30) days.	Does not waive inspections and continue attempts past thirty (30) days; does not track CGIs.
Failed inspection dispute resolution	Involves two parties (the in-house utility inspection group and the weatherization contractor) to resolve disputes.	Involves three parties (inspection contractor, weatherization contractor, and SoCalGas arbitrator) to resolve disputes.	Involves two parties (the in-house utility inspection group and the weatherization contractor) to resolve disputes.	Involves two parties (the in-house utility inspection group and the weatherization contractor) to resolve disputes.

* The difference between a waive and a CGI is that there is no minimum number of customer contact attempts required before a non-mandatory inspection can be waived. Mandatory inspections require three phone or site customer contact attempts, plus a return receipt requested registered letter.

Recommendations. The Standardization Team offers several recommendations designed to make inspection policies more consistent:

- **Post Inspection Frequency.** Utilities or their inspection contractors will inspect all ceiling insulation jobs. For all other jobs not involving ceiling insulation, random inspections will be conducted for a sample of dwelling units. Minimum sample sizes will be determined for each contractor, and will depend upon the contractor's past pass rates and the total number of units allocated to the contractor. Minimum sample sizes are shown in Table 5-2. Note that these sample sizes are designed to provide 90% confidence that the true pass rate is within 5% of the estimated value.

Table 5-2: Minimum Sample Sizes for Inspections (90% / ±5% precision)

Pass Rate	Number of Homes Allocated to Contractor					
	200	500	1000	2000	5000	10000
0.70	140	241	317	377	425	444
0.75	129	210	265	306	337	348
0.80	115	176	213	239	257	264
0.85	98	139	161	175	184	188
0.90	76	97	108	114	118	119
0.95	45	51	54	56	57	57

- **Inspection Personnel.** Utilities may use either in-house personnel, contract employees, or contractors to conduct inspections, provided that the either the installation or the inspection function is outsourced.
- **Pre-Inspections and Measure Approval.** PG&E’s pre-inspections and pre-approval of measures are strongly tied to the CAS/gas appliance testing that PG&E conducts prior to installation of measures. As noted in Section 1 of this report, the Team is not yet prepared to make a recommendation on CAS/gas appliance testing. As a result, the issue of pre-inspections and pre-approval will be deferred until the issue of CAS testing has been resolved.
- **Hazardous Fails.** The Team recommends that Contractors be required to correct hazardous fails within 24 hours of notification by the utility and/or its inspector. Note: Treatment of fails relating to CO/CAS testing will be considered later after CO/CAS testing policies have been further considered.
- **Failed Inspection Dispute Resolution.** The Team recommends that the current dispute resolution practices be retained. They are different only because SoCalGas outsources inspections, and desires to have an in-house staff member involved in dispute resolution.
- **Failure to Install Feasible Measures.** The Team recommends a standard policy on failures to install feasible measures. In the event that a contractor fails to correctly install a feasible measure, it will be accorded the following treatment:
 - If the measure is installed, but installed incorrectly, the job will be given a fail.
 - If the measure is not installed at all, but is included in the invoice for the dwelling, the job will be given a fail.
 - If the measure is not installed at all, but is not included on the invoice and not on a pre-approval list, the job will be issued a correction. In the event that this correction is not made within 10 calendar days, the correction will revert to a job fail.

- If the measure is included on a pre-approval list but not installed, the job will receive a fail.
- **Charge for Reinspection.** If a utility uses a contract inspection service, the utility will levy a charge in the event that a job fail or a job correction is issued and the contractor contests this action. If the failure or correction is upheld, the utility will charge the contractor for the reinspection of the job by the utility arbitrator. If the job fail or correction is reversed, the utility will charge the inspection contractor for the reinspection of the job by the utility arbitrator.
- **Inspection Waivers.** The Team recommends that policies on inspection waivers vary between mandatory and non-mandatory inspections, as follows:
 - **Mandatory inspections** are those required for projects in which ceiling insulation is installed. An attempt will be made to inspect all such projects prior to making final approval of payment to the weatherization contractor. For mandatory inspections, three attempts will be made to arrange for a post-installation inspection within 30 calendar days of the notification of job completion. After three such attempts, the inspection provider will send a certified letter to the participant asking for permission to inspect the home. If the participant does not respond to this certified letter within two weeks, the inspection provider need not conduct the inspection prior to making final approval of payment for the weatherization job.¹
 - **Non-mandatory inspections** relate to projects not involving ceiling insulation. They are non-mandatory in the sense that only a sample of projects must be inspected. A non-mandatory inspection of a sampled project may be waived by the utility after three attempts to contact the participant, provided that the inspection provider replaces this project with another and completes a sufficient number of inspections as provided in the policy on post inspection frequency (see above).

5.3 Post Installation Job Correction Policies

Current Practices. Policies differ with respect to job corrections resulting from post-installation inspections:

- SDG&E and SoCalGas allow their inspectors to do very minor corrections on a very limited number of homes where fixing the problem costs significantly less than having a weatherization crew revisit the home to make the correction. If a problem is identified and requires more than three fixes for a particular measure, then the inspector correction ceases for this measure and subsequent jobs needing

¹ Even though SoCalGas pays the contractor prior to inspection, an adjustment to the payment may be made if an inspection reveals problems. Our interpretation is that the final approval of the SoCalGas payment is thus not made until after an inspection, presuming that an inspection can be made.

corrections are failed and the subcontractor is required to return to these homes to make the corrections.

- PG&E does not permit inspectors to correct any jobs, regardless of the size or type of correction needed to pass the job.
- SCE also has the contractor do all corrections, and requires the contractor to return to the site immediately if hazardous conditions exist.

All four utilities require contractors to do major corrections, even though SDG&E and SoCal allow inspectors to make minor corrections. The key issues here are the efficacy of having inspectors make minor corrections on a limited basis and the impact of such corrections on the ability of the utility to track contractor performance.

Recommendations. The Standardization Team recommends the following policy:

- Minor job corrections will be limited to corrections that satisfy the following conditions:
 - The error is the only error found at the site;
 - Are not associated with errors that create hazardous conditions;
 - Can be made with tools typically carried by inspectors;
 - Do not require materials other than those normally carried by inspectors;
 - Can be carried out within a few minutes by inspectors; and
 - Can be accomplished at a minimum of inconvenience to inspectors.
- Inspectors will be permitted to make minor corrections at the site. In the event that a minor correction is made, it will be recorded by the inspector. Minor corrections will become part of the contractor's record. Inspector reports will be entered into a database, and reports on contractor performance would be monitored.
- A maximum number of such post-installation minor corrections will be determined for each contractor and each measure. This maximum will be either three corrections, or 0.5% of the total number of a contractor's allocation of participants expected to be inspected, whichever is greater.
- Each time a minor job correction is made, the contractor will be notified.
- Inspection providers will develop monthly reports on minor job corrections by contractor and measure. As soon as a report indicates that a contractor has exceeded the maximum allowable number of job corrections for a specific measure during the program year, that contractor will be informed that no further minor job corrections will be made by inspectors on installations of the measure in question during the program year. Inspectors will also be informed that they should no longer perform minor job corrections on the measure in question for that particular contractor for the measure in question the remainder of the year.

- Minor corrections associated with a specific weatherization measure in a specific program year will not be counted as inspection failures for the contractor until the contractor is notified that the maximum number of allowable minor job corrections has been exceeded. Subsequent problems associated with the installation of the measure will be counted as fails in inspection records, and the contractor will be required to revisit the site to make corrections.
- In the event that a Contractor's overall performance falls short of Program standards, a corrective action plan may be instituted. Such a corrective action plan may be required if the Contractor fails to do one or more of the following:
 - Meet production standards
 - Complete work on time
 - Achieve and maintain a overall pass rate of 90% of all homes
 - Correct hazardous fails within 24 hours
 - Correct non-hazardous job fails within 30 calendar days
 - Provide field supervision
 - Submit accurate and legible invoices or other job related paperwork

In the event that a corrective action plan is instituted for a Contractor, minor job corrections will no longer be performed for that Contractor during the remainder of the Program Year.

6

Remaining Standardization Issues

6.1 Introduction

The recommendations advanced in Sections 2 through 5 of this report will significantly improve the consistency of the utility LIEE Programs. However, in spite of considerable efforts on the parts of the four investor-owned utilities in Phase II, consensus could not be reached on all policies and procedures. Many of the issues raised in the discussion of these policies and procedures are extremely complex and will require resolution prior to the development of sensible recommendations for standardization.

6.2 A Standardized Policy and Procedures Manual

On May 24, 2000, Meg Gottstein issued an Administrative Law Judge's Ruling confirming the overall scope of Phase II of this Standardization Project. This ruling indicated that one of the ultimate goals of the standardization process was "consolidating all four (policy and procedures) manuals into a single consolidated statewide P&P manual." This statewide manual could not be developed within the time frame available for Phase II. The utilities recommend that it be developed under Phase III, and note that the proposed schedule for Phase III would satisfy the ALJ's desire to complete this manual for use in the Program year 2002 planning cycle. Note that the development of a standardized policy and procedures manual will force the utilities to address many of the issues that were unresolved in Phase II, and the utilities expect that most of these issues will be resolved and the resultant policies and procedures incorporated into a statewide manual. However, it should be recognized that some differences across utility programs may be justified on the basis of inherent differences across service areas. In recognition of this possibility, the utilities recommend that the statewide manual include a common core of policies and procedures, with provisions for some utility-specific policies and procedures to be incorporated into utility-specific appendices.

6.3 Specific Policies and Procedures to be Addressed

6.3.1 Introduction

In the course of developing a statewide policy and procedures manual, several unresolved issues will need to be addressed under Phase III. These include:

- The implementation of measure selection criteria in the development of a common set of measures,
- Specific ceiling insulation levels to be installed in homes treated under the Program,
- Eligibility of evaporative coolers for rental units,
- Eligibility of master-metered units for participation in the Program,
- CO/CAS/gas appliance testing,
- Lead-safe practices, and
- Various other issues raised in the course of public input.

These issues are discussed below.

6.3.2 A Common Set of Measures

In its Phase I report, the Team recommended a conceptual framework for assessing specific measures for inclusion in the LIEE Program. The framework was designed to recognize the importance of cost-effectiveness, hardship (defined as comfort, health and safety) and equity. The Team's intent at that time was to demonstrate the implementation of that framework under Phase II by applying it to one or two specific measures. In the course of Phase II, however, the overall issue of evaluating the cost-effectiveness of low income programs was assigned to a Reporting Requirements Manual (RRM) Working Group by the Commission. Given the obvious need to use consistent approaches to evaluating LIEE programs and the measures they encompass, the Team decided to delay the implementation of its Phase I recommendations until the RRM Working Group and the Low Income Measurement and Evaluation Committee (LIMEC) submit their recommendations to the Commission and the Commission acts on these recommendations.

6.3.3 Specific Ceiling Insulation Levels

The Team and its consultants spent a considerable amount of time discussing the appropriate ceiling insulation levels to install in homes treated under the Program. Current policies with respect to these levels are summarized below:

- In the SCE/SoCalGas overlap area, SoCalGas installs R-19 if the existing level of insulation is R-0 through R-7, installs R-11 if the existing level is R-8 through R-15, and installs nothing if the existing level of insulation is R-16 or greater.
- In its non-overlap area, SCE installs insulation if the existing level is less than R-19, and installs nothing if the existing level is R-19 or above. Amounts of insulation added depend upon the degree-days in the area in question.
- SDG&E installs R-19 if the existing level of insulation is R-0 through R-7, installs R-11 if the existing level is R-8 through R-15, and installs nothing if the existing level of insulation is R-16 or greater.
- PG&E brings the total level of insulation to R-30 if the existing level is R-0 through R-11, and installs nothing if the existing level of insulation is R-12 or greater (unless specifically approved by the Program Manager).

The Team has not yet reached consensus on the specific policies to be followed with respect to ceiling insulation levels. The Team did agree on two recommendations relating to the eventual specification of ceiling insulation levels:

- First, it was agreed that these levels should be determined by climate zone, rather than by utility service area.
- Second, to keep the policy reasonably simple, it was agreed that only five climate zones would be used. The five climate zones are aggregations of CEC climate zones, and are based on zones developed for the California Window Initiative. Appendix C contains a full description of these climate zones.

The consultants conducted several analyses of the benefits and costs of different additions of ceiling insulation to various specific starting values. However, several issues were confronted in this process that made agreement to recommendations based on these analyses difficult to reach:

- The valuation of energy savings could be conducted from the perspective of participants (using retail rates) or from a resource cost perspective (using avoided costs). Our Phase I report discussed the implications of using these alternative approaches in assessing program cost-effectiveness, and recommended that an average of retail rates and avoided costs be used. However, the issue of valuing energy savings will undoubtedly be central to the deliberations of the RRM Working Group, so the utilities feel that choosing an option in this regard would prejudice the results of the RRM process.
- Whether avoided costs or retail rates or some combination of these is used to value energy savings from different ceiling insulation additions, a forecast of the chosen rate is necessary for the analysis. At this point, given recent events in the California electricity market, the accuracy of existing long-term forecasts of electricity prices and avoided costs may be subject to question. It is our

understanding that a series of workshops will be held over the next month or so to consider the development of such forecasts. The Team suggests that the analysis of ceiling insulation policies should await the results of these workshops.

- As of this point, the Team has focused primarily on cost-effectiveness of various insulation actions, and has only indirectly been able to address the consideration of hardship. However, the issue of integrating hardship and cost-effectiveness is now being considered by the RRM and LIMEC. Once these groups have made their recommendations for program evaluation criteria to the Commission, the Standardization Team will be better able to conduct a consistent analysis of policies relating to insulation levels.

Any recommendations would be very sensitive to specific assumptions made with regard to valuing energy savings from insulation. This point is illustrated in Appendix B, which discusses the procedures used to analyze insulation options. Pending the resolution of the valuation issues presented above, the Team considers any recommendations on ceiling insulation levels to be premature. We propose to address this policy as quickly as possible in Phase III.

6.3.4 Eligibility of Evaporative Coolers for Rental Units

SCE has been given Commission authorization to continue to provide permanently-installed (as opposed to portable) evaporative coolers for renter-occupied dwellings. SCE requires a co-payment from the tenant in order to defer part of the cost of this measure. The other utilities do not offer any type of evaporative coolers to rental units. The Team was unable to reach a consensus on the eligibility of rental units for this measure, partly because the issue arose late in Phase II. Because evaporative coolers play an extremely important role in the SCE Program, the Team decided to defer the resolution of this issue to Phase III. We anticipate including recommendations on this issue in an interim report to be delivered to the Commission on or before October 26, 2000.

6.3.5 Eligibility of Master Metered Units

No consensus was reached on the eligibility of master metered units. The arguments on both sides of this issue are compelling:

- In supporting eligibility of master-metered tenants, it can be argued that tenants in master metered units indirectly pay the Public Goods Charge through rents, and that the installation of measures could reduce these rents or at least reduce pressures for rent increases over time. It could also be argued that tenants receiving measures would enjoy increases in comfort, health and safety, all of which should be considered benefits of the Program as mandated by AB1393. Clearly, some of the possibly neediest households in the State, including migrant farm workers, live in master-metered dwellings.

- In opposing the eligibility of master-metered units, it could be contended that there is no guarantee that tenants will receive the benefits of reductions in energy bills associated with the installation of LIEE measures. The Commission took a similar position in D. 89-09-044. While landlords could be required to warrant that they would pass on bill saving to tenants, there is no feasible way to enforce this kind of a warranty. Indeed, one could even argue that the installation of minor home repairs could lead to increases in rents under some circumstances.

The Standardization Team will address this issue in a supplemental filing on or before October 26, 2000.

6.3.6 CO/CAS/Gas Appliance Testing

Perhaps no issue relating to the LIEE Program is as complex or controversial as CO/CAS/gas appliance testing. The Standardization Team discussed current utility policies with respect to such testing in several meetings, and made significant progress in identifying precisely what utilities currently do in this area and under what circumstances they do it. However, we were unable to find a means of resolving differences in the time frame of Phase II.

It is fair to say that policies relating to CO/CAS/gas appliance testing differ appreciably across utilities, especially with respect to the conditions under which testing is done. There are many reasons for these differences, one of which is the fundamental difference in the utilities' perception of the evidence on combustion appliance safety. The need for CO/CAS/gas appliance testing depends in general on three issues: the extent to which combustion appliance safety problems pre-exist treatment under the LIEE Program; the extent to which new problems can be caused by modifications of combustion appliances; and the reduction in air change rates caused by infiltration reduction measures installed through the Program. More information is needed on all of these issues before a well-informed consensus can be established.

The Team proposes that this issue be carried into Phase III. The Team will file a description of current utility practices in this area along with pros and cons of alternative options, on or before October 26, 2000, and will work diligently to attempt to develop a recommendation for greater consistency of testing practices across utility programs during Phase III.

6.3.7 Lead-Safe Practices

New federal laws and regulations on lead safe practices go into effect in October of 2000. These laws and regulations will apply to the weatherization retrofit activities undertaken by all California utility LIEE Programs. Rather than developing separate policies and procedures to comply with these new laws and regulations, the Team decided to develop standardized statewide policies and procedures as part of the Standardization Project.

Developing and promulgating these policies will entail several activities to be conducted under Phases II and III. Under Phase II, the Team has included notes in the Statewide WIS manuals requiring lead safe practices. In the course of Phase III, the Team will:

- Draft a lead-safe practice document that includes:
 - Lead-safe practices for each measure where lead paint may be disturbed.
 - Lead-safe practices hand-out for crews.
 - Equipment required for lead-safe field practices.
- Draft a training curriculum overview that includes:
 - A training overview
 - A broad training outline
 - A training agenda

This task was not mandated by the Commission as part of the Standardization Project, but it addresses the need for the utilities to comply with the new law on lead safe practices.

6.3.8 Other Issues to be Addressed

The Team proposes to address a variety of other issues relating to policies and procedures in Phase III as part of the development of a Statewide Policy and Procedures Manual. We anticipate that the Statewide Policy and Procedures Manual will constitute the final installment in the process of achieving greater consistency in Program policies and procedures. It is likely that some differences in program designs will be preserved, if they are based on verifiable differences in service area conditions, and if they do not diminish the equity of treatment of low-income customers across service areas. The Team proposes to accommodate such legitimate differences through the development of utility-specific appendices to the Statewide Policy and Procedures Manual.

7

Summary and Recommendations

7.1 Summary of Phase II

As noted in Section 1, the objectives of Phase II of the Standardization Project were:

- To implement the recommendations for a common set of installation standards for both conventional homes and mobile homes;
- To continue the development of recommendations for increasing consistency in program policies and procedures; and
- To develop recommendations for improving consistency across utilities with regard to inspection policies and procedures.

As indicated in this report, the Standardization Team was generally (but not completely) successful in meeting the objectives of Phase II. Accomplishments and shortcomings are summarized below:

- WIS Manuals were completed for both conventional homes and mobile homes. However, some measures offered by one or more utilities had never been covered by the existing WIS Manuals, and the preparation of standardized installation standards for some of these measures was not possible in the Phase II time frame.
- Moreover, recommendations for achieving consistency in a wide range of general policies and were developed. However, as indicated in Section 6, the Team fell short of resolving all of the policy issues covered by Phase II, and has had to defer resolution of differences in CO/CAS/gas appliance testing, ceiling insulation levels, specific measures offered by the utility Programs, and a host of minor policies and procedures.
- Several key recommendations for improving the consistency of inspection policies and procedures were developed, although some additional work needs to be done on policies relating to pre-approval of measures, an issue that is intertwined with the unresolved issue of CO/CAS/gas appliance testing.
- Finally, it was not feasible for the Team to take the process of standardizing policies and procedures to its ultimate conclusion through the development of a common Policy and Procedures Manual.

Additionally, other needs were identified during Phase II and deferred to Phase III. One of these was the need for a set of materials relating to the new law on lead-safe practices; the other was the Commission directive to develop a Customer Bill of Rights.

7.2 Phase II Recommendations

Phase II recommendations relating to WIS issues were filed on July 5, 2000. Phase II recommendations with respect to LIEE policies and procedures are summarized below.

7.2.1 Customer Eligibility

The Team makes the following recommendations relating to customer eligibility:

- Income documentation must be reviewed, recorded, and copied by service providers for all prospective participants. Qualification for other programs cannot be taken as adequate evidence of qualification for the LIEE Program, except in the event that the customer has been verified by the utility as eligible for the CARE Program over the past year. Self-certification will not be permitted.
- The utility will periodically audit the documentation maintained by the contractor. In the event that documentation is not available for a participant, payment to the contractor for the weatherization of that unit will be disallowed.
- Fractional qualification should be used for multifamily complexes and mobile home parks, with the income-eligibility of 80% of all units not previously weatherized being required for the qualification of the entire complex/park.
- Service providers must review, record, and collect income documentation for all households used to qualify an apartment complex or a mobile home park. The provider must also make its best effort to collect income documentation for all other households in the complex (i.e., those not used to meet the 80% qualification standard). Documentation for households used to qualify an apartment complex or a mobile home park must be collected and maintained by the service provider for each unit.
- All utilities must define multifamily complexes as those with five (5) or more dwelling units. Duplexes, triplexes, and fourplexes will be treated as single family homes for the purposes of this Program.
- If utilities pre-screen customer lists before providing them to service providers, utilities should initially target homes that have not yet participated in the LIEE Program.
- In general, homes that have been treated under the LIEE Program within the past 10 years should not be eligible for participation in the current program, either for measure installation or for on-site energy education. However, exceptions provided in Section 3.3 may be granted.

- In the event that a home is determined to be ineligible because of previous participation in the program, occupants may still be referred to group energy education if it is offered.
- A home must need a minimum amount of weatherization in order to be eligible for participation in the Program, either for measure installation or for on-site energy education. The minimum requirements are specified in Section 3.4.
- For all homes meeting the minimum for necessary measures, all feasible measures must be installed. If a measure is already in place and operating properly, even if it does not meet the current Installation Standards for new installations, it should not be removed and replaced.
- Unoccupied multifamily dwellings may be weatherized, as long as the multifamily complex satisfies the 80% rule for income qualification.
- Public housing is eligible for participation in the LIEE Program, but must meet the standard terms and conditions of the program in order to participate.
- The utility may limit expenditures on the treatment of multifamily dwellings to a specified percentage of the total program budget.
- Businesses are not eligible to participate in the LIEE Program. Participants must be on residential rates.
- No restrictions will be placed on the eligibility of homes of different ages.
- The current treatment of rental units for refrigerator replacement, hard-wired fixtures, and furnace replacement (per E-3586) should be continued.

7.2.2 Minor Home Repairs and Furnace Repairs and Replacements

The Team has adopted the definition of a minor home repair as “a repair required to enable installation of weatherization measures or made to reduce infiltration.” Proposed policies with respect to minor home repairs are:

- A common set of minor home repairs should be offered under all utility programs. Minor home repairs must be made if they are feasible. The common set of minor home repairs is contained in Appendix A.
- E-3586 should be modified to allow a common set of minor home and furnace repair and replacement limits to be adopted by all programs. Two kinds of limits should be applied: average cost limits and individual home limits. Average cost limits apply to the average cost of categories of service across all homes receiving the service in question. Individual home limits are defined as limits on the cost that can be incurred for an individual home without the specific approval of the utility Program Manager. The values of these limits are presented in Section 4.3.
- In the event that a contractor requests permission from the utility Program Manager to exceed the limit on minor home repairs, the Program Manager will base a decision on the status of the Contractor’s minor home repair budget, the

overall program budget, and the need for the repairs in question. If the Program Manager deems it necessary to limit expenditures on the home, measures will be prioritized using the general priority list shown in Section 4.4.

- The current limit on total expenditures on minor home repairs to no more than 20% of total program costs, as specified in E-3586, should be dropped.

7.2.3 Inspection Policies and Procedures

The Standardization Team offers several recommendations designed to make inspection policies more consistent:

- Utilities or their inspection contractors will inspect all ceiling insulation jobs. For all other jobs not involving ceiling insulation, random inspections will be conducted for a sample of dwelling units. Minimum sample sizes will be determined for each contractor, and will depend upon the contractor's past pass rates and the total number of units allocated to the contractor. Minimum sample sizes are shown in Table 5-2.
- Utilities may use either in-house personnel, contract employees, or contractors to conduct inspections, provided that either the installation or the inspection function is outsourced.
- The current dispute resolution practices should be retained.
- A standard policy on failures to install feasible measures, as detailed in Section 5.2, should be adopted.
- If a utility uses a contract inspection service, the utility will levy a charge in the event that a job fail or a job correction is issued and the contractor contests this action. If the failure or correction is upheld, the utility will charge the contractor for the reinspection of the job by the utility arbitrator. If the job fail or correction is reversed, the utility will charge the inspection contractor for the reinspection of the job by the utility arbitrator.
- A policy on inspection waivers that varies between mandatory and non-mandatory inspections, as specified in Section 5.2, should be adopted.
- Inspectors should make minor job corrections, subject to the restrictive conditions specified in Section 5.3.

7.3 Phase III Objectives

The objectives of Phase III, which the utilities propose to begin expeditiously, are as follows:

- To prepare a single statewide consolidated Policy and Procedures Manual to be used by all utility LIEE programs;

- To develop additional sections of the WIS Manuals for duct reconnection, refrigerator replacements, evaporative cooler installation, and furnace repair and replacement;
- To develop recommendations on CAS testing/gas appliance testing, and if such procedures are agreed to by the Team, to develop a set of installation standards for these procedures to be incorporated into the WIS Manuals;
- To develop a set materials relating to lead-safe practices;
- To apply the program evaluation methodology developed through the RRM Working Group (if approved by the Commission) to the assessment of certain LIEE measures; and
- To draft a Statewide Customer Bill of Rights.

7.4 Requested Action

The Standardization Team requests that the Commission approve the recommendations made in this Phase II report, and support the further consideration of unresolved issues under Phase III. This Phase III effort will be completed early enough to permit the inclusion of recommended changes in the utilities' Program Year 2000 LIEE Programs. We understand that the Commission may consider mandating certain means of standardizing policies and procedures for which the Team has not yet been able to develop recommendations. However, we would encourage the Commission to support the activities of the Standardization Team through Phase III.

Appendix A

Standardized List of Minor Home Repairs

STANDARDIZED LIST OF MINOR HOME REPAIRS

1.0 DEFINITION OF MINOR HOME REPAIR
--

A repair required to enable installation of weatherization measures or made to reduce infiltration.

STANDARDIZED LIST OF MINOR HOME REPAIRS

	STD	PG&E	SCGas	SDG&E	SCE
2.0 GENERAL REPAIRS/CATASTROPHIC ENVELOPE LEAKS					
2.1 Roof					
1. Replace missing shingles	NO	NO	NO	NO	NO
2. Place mastic over hole	NO	NO	NO	NO	YES
3. Flashing problems	NO	NO	NO	NO	NO
2.2 Small holes in interior surface of wall between conditioned and unconditioned space					
1. Repair holes 1" in diameter or smaller	YES	YES	YES	NO	YES
2. Repair holes between 1" and 6"	YES	YES	YES	NO	YES
2.3 Large holes in interior surface of wall between conditioned and unconditioned space¹					
1. Repair large portion of drywall or plaster (up to 4 ft ²).	YES ²	YES	NO	NO	YES
2. Replace entire drywall or wood panels (up to 8 ft ²).	YES ²	YES	NO	NO	YES ³
2.4 Exterior wall					
1. Patch stucco (up to 36 in ²)	YES	YES	YES	NO	YES
2. Replace siding	NO	YES	NO	NO	NO
3. Replace shingles	NO	YES	NO	NO	NO
2.5 Vents/Fans					
1. Repair range hood	NO	NO	NO	NO	NO
2. Repair range	NO	NO	NO	NO	NO
3. Repair exhaust vents	NO	NO	NO	NO	YES
4. Install exhaust vents	NO	NO	NO	NO	YES
2.6 Fireplace damper					
1. Adjust damper	NO	NO	NO	NO	NO
2. Clean damper	NO	NO	NO	NO	NO
3. Install new damper	NO	NO	NO	NO	NO
2.7 Windows					
1. Replace glazing compound	YES	YES	YES	YES	YES
2. Replace glass	YES	YES	YES	YES	YES
3. Replace sash	YES ³	YES	YES	NO	YES
4. Repair or replace mullions/muntins	YES ³	YES	NO	NO	YES
5. Install new window (not just glass)	YES ³	YES	YES	NO	YES
6. Install casing	YES	YES	YES	YES	YES

¹ Structural/framing members not included

² Surface left in a prepared-for-paint condition.

³ Replaced only on a case-by-case basis with Program Manager's prior approval.

STANDARDIZED LIST OF MINOR HOME REPAIRS

	STD	PG&E	SCGas	SDG&E	SCE
3.0 REPAIRS REQUIRED TO SUPPORT WEATHERSTRIPPING					
3.1 Door Replacement					
1. Install door stops	YES	YES	YES	YES	YES
2. Replace door	YES	YES	YES	YES	YES
3. Replace door jamb	YES	YES	YES	YES	YES
4. Plane bottom of door	YES	YES	YES	YES	YES
5. Cut off bottom of door	YES	YES	YES	YES	YES
6. Replace interior casing	YES	YES	YES	YES	YES
7. Replace exterior casing	YES	YES	YES	YES	YES
8. Replace complete pre-hung door unit	YES ³	YES	NO	YES	YES
9. Adjust hinges	YES	YES	YES	YES	YES
10. Replace hinges	YES	YES	YES	YES	YES
11. Adjust loose screws	YES	YES	YES	YES	YES
12. Replace lock	YES	YES	YES	YES	YES
13. Replace existing night latch	YES	YES	YES	YES	YES
14. Install/adjust striker plate	YES	YES	YES	YES	YES
15. Repair/replace subseal ⁴	YES	YES	YES	YES	YES
3.2 Threshold					
1. Install new threshold	YES	YES	YES	YES	YES
2. Seal threshold	YES	YES	YES	YES	YES
3. Install riser	YES	YES	YES	YES	YES

⁴ Subseal is directly under the riser which is directly under the threshold.

STANDARDIZED LIST OF MINOR HOME REPAIRS

	STD	PG&E	SCGas	SDG&E	SCE
4.0 REPAIRS REQUIRED TO SUPPORT CAULKING					
1. Install backer rod	YES	YES	YES	YES	YES
2. Remove old paint	NO	NO	NO	NO	NO
3. Remove dry rot	NO	NO	NO	NO	NO
4. Surface must be free of dirt and oils	YES	YES	YES	YES	YES
5.0 REPAIRS REQUIRED TO SUPPORT INSTALLATION OF CEILING INSULATION					
5.1 Attic access					
1. Install weatherstripping	YES	YES	YES	YES	YES
2. Repair access panel	YES	YES	YES	YES	YES
3. Replace molding around access	YES	YES	YES	YES	YES
4. Cut new access hole/opening (interior only and only between joists)	YES	YES	YES	YES	YES
5.2 Reconnect Duct	YES	YES	NO	YES	YES
5.3 Seal Return Plenum	YES	NO	NO	YES	YES
5.4 Closet vent/ceiling					
1. Cover vent with flexible insulation	YES	YES	NO	NO	NO
2. Install solid material to cover opening	YES	YES	YES	YES	YES
5.5 Retractable ladder					
1. Install cover	YES	NO	NO	YES	NO
2. Install frame and cover	YES	NO	NO	YES	NO
3. Weatherstrip opening	YES	YES	NO	YES	NO
5.6 Repair holes in ceiling	YES	YES	NO	YES	YES
5.7 Exhaust vent					
1. Repair/replace bath vent pipe	YES	NO	YES	YES	YES
2. Repair/replace kitchen vent pipe	YES	NO	YES	YES	YES

STANDARDIZED LIST OF MINOR HOME REPAIRS

	STD	PG&E	SCGas	SDG&E	SCE
6.0 REPAIRS REQUIRED TO INSTALL ATTIC VENTILATION⁵					
6.1 Gable vent					
1. Install new vent	YES	YES	YES	YES	YES
2. Replace screen	YES	NO	YES	YES	YES
3. Repair existing wooden vent	YES	NO	NO	YES	YES
6.2 Turbine/dormer					
1. Install new vent	YES	YES	YES	YES	NO
2. Repair existing vent	YES	NO	NO	YES	NO
6.3 Eave/soffit					
1. Clean screen	YES	YES	YES	YES	NO
2. Replace screen	YES	NO	YES	YES	NO
3. Install new vent	YES	YES	YES	YES	NO
7.0 REPAIRS REQUIRED TO INSTALL WATER HEATER INSULATION					
7.1 P/T valve					
1. Install valve	NO	NO	NO	NO	NO
2. Reposition valve	NO	NO	NO	NO	NO
7.2 P/T drain line					
1. Install new P/T drain line	NO	NO	NO	NO	NO
2. Extend drain to exterior	NO	NO	NO	NO	NO
7.3 Install gas shut off valve					
7.4 Install combustion air vent⁶					
	ON HOLD	YES	NO	YES	NO
7.5 Repair floor					
	NO	NO	NO	NO	NO
7.6 Repair outside closet					
	NO	NO	NO	NO	NO
8.0 REPAIRS REQUIRED TO INSTALL ENERGY SAVER SHOWERHEADS					
1. Install adapter	YES	YES	YES	YES	YES

⁵ Attic ventilation only installed in support of attic/ceiling insulation.

⁶ Hold this one for CO/CAS discussion.

Appendix B

Ceiling Insulation Analysis

B.1 Introduction

This appendix discusses the Standardization Team's current approach to the analysis of ceiling insulation levels. The general approach is described in Section 2. As will be pointed out in Section 3, the implementation of this approach requires a variety of assumptions relating to insulation costs and benefits. At the present time, the analysis must be based on several highly uncertain assumptions with respect to electricity markets. Moreover, assumptions must be made that anticipate the recommendations of the RRM and LIMEC with respect to cost-effectiveness analysis. These issues are discussed in Section 4. As demonstrated in Section 5, variations in key assumptions can dramatically affect the results of the analysis. Section 6 offers some conclusions and recommendations.

B.2 General Approach

After discussion of existing policies, the reasons for those existing policies, and some of the issues surrounding ceiling insulation, it was decided that a cost analysis should be performed to help assess what levels of insulation made sense. The first attempt by the group was to examine cost effectiveness by comparing the value of customer energy savings versus installed costs. Installed cost estimates were derived from utility costs and an independent source, 1996 Means Residential Cost Data. However, calculation of the value of customer savings was a more involved process.

First, energy savings (in kWh and therms) had to be estimated. Standard ASHRAE (American Society of Heating, Refrigeration, and Air Conditioning Engineers) procedures were used for calculating U-Values.¹ These procedures are also incorporated in to the Title 24 Standards. Next, Heating/Cooling Degree Day (HDD/CDD) estimates were obtained from CEC Climate Zone weather data, and condensed down to the five climate zones to be used for the weatherization effort (see Appendix C). These two components were used to estimate heat loss/gain through the roof, which was then converted to source energy (gas/electric) energy use (therms or kWh). Assumed energy costs were then applied to obtain customer savings.

¹ 1997 ASHRAE Handbook of Fundamentals, Chapter 24.

An extensive range of insulation levels was examined for each climate zone. The base analyses were performed for both electric and gas heating systems with air conditioning. Since the team thought fuel-based insulation levels might be hard to implement, we also looked at an average of these two runs; one that weighted the natural gas/electric results as 90% /10% to reflect current fuels shares for space heating in California.

B.3 Assumptions

In order to conduct the analysis of ceiling insulation savings, several assumptions must be made. These assumptions relate to the installed cost of various levels of ceiling insulation, the lifetime of the insulation, the discount rate used to convert forecasted values to present discounted values, the current valuation of electricity and natural gas savings, and forecasted escalation rates for these valuations. Table B-1 contains the assumptions used in the baseline analysis.

Table B-1: Baseline Assumptions

Concept	Assumed Value
Installed Cost of Ceiling Insulation	
R-11	\$0.35 per square foot
R-19	\$0.47 per square foot
R-30	\$0.63 per square foot
R-38	\$0.75 per square foot
Lifetime of Ceiling Insulation	25 years
Discount Rate	8%
Retail Electricity Rate in 2000	\$0.125
Avoided Electricity Cost (G, T & D) in 2000	\$0.071
Natural Gas Rate in 2000	\$1.00
Natural Gas Avoided Cost in 2000	\$0.70
Escalation Rate for Retail Electricity Rate	3%
Escalation Rate for Avoided Electricity Cost	3%
Escalation Rate for Retail Natural Gas Rate	3%
Escalation Rate for Avoided natural Gas Cost	3%

Under the baseline scenario, we used the average of retail rates and avoided costs to value electricity and natural gas savings.

B.4 Issues Considered and Discussed

The issues that arose from team discussions are summarized briefly below.

- **The Hardship/Comfort Issue.** Adding insulation reduces heat losses/gains through the roof, and may also indirectly reduce infiltration. Increased comfort that might be experienced by the resident would include a reduction in radiative heat loss through the roof (similar to what is experienced when you stand next to a single-paned window in the winter time) and possibly a reduction in cold drafts originating from the attic. In the case of a bare, uninsulated attic, the comfort benefits are relatively clear. However, in the case where an existing level of insulation is present and more is to be added, the issue becomes one more of energy savings than comfort (i.e. running the heating system six hours instead of eight hours).

However, comfort may be an important issue in the consideration of air conditioning savings. Because of the low air conditioning saturations among low income customers, the installation of ceiling insulation will affect cooling bills for only a small fraction of participants. However, insulation will affect comfort during hot days by keeping internal temperatures lower. In order to take this into account, we used an intentionally overstated assumption about the air conditioning saturation among low income customers: 50%.

Comfort has also been taken into account indirectly through the use of engineering calculations of savings. These estimates ignore the well-documented fact that customers receiving conservation measures often take some of the potential savings from these measures in the form of comfort. That is, they choose a higher level of energy service (e.g., warmer homes in the winter) as a result of the increased efficiency of the home. This is sometimes called the “rebound effect.” If we were to consider the rebound effect, we would use lower estimates of savings based on the general results of billing analyses of programs like this one. Ignoring the potential for the rebound effect essentially implies that we are treating increases in comfort associated with comfort tradeoffs as part of the benefits of insulation additions.

- **Valuing Energy Savings.** As noted in our Phase I Report, the valuation of energy savings could be conducted from the perspective of participants (using retail rates) or from a resource cost perspective (using avoided costs). Our Phase I report discussed the implications of using these alternative approaches in assessing program cost-effectiveness, and recommended that an average of retail rates and avoided costs be used. Our baseline analysis was based on this assumption. However, we conducted other analyses using retail rates or avoided costs.
- **Forecasted Values.** Whether avoided costs or retail rates or some combination of these is used to value energy savings from different ceiling insulation additions, a forecast of the chosen rate is necessary for the analysis. At this point, given recent events in the California electricity market, the accuracy of existing long-term forecasts of electricity prices and avoided costs may be subject to question.

In our baseline scenario, we used a 3% growth rate for retail rates and avoided costs. However, we tested the sensitivity of the results to this assumption by positing a 6% rate of escalation for one scenario.

- **Specification of Insulation Level to be Installed.** Two approaches are represented in the current policies and both were discussed. The PG&E approach is to install up to a specified, final R-value (R-30). The explanation for using this approach was ease of inspection and to address customer equity concerns. The approach utilized by the other utilities is to install a discrete R-value of insulation (R-11, R-19, R-30) based on the existing level of insulation. This explanation for using this approach was that it best reflects the standard practice of insulation installation for insulation contractors. The Team adopted the latter approach for the purposes of the analysis.
- **Attic Access/Clearance Issue.** Some homeowners may want to ensure adequate access to their attic. Installation of R-30 could drastically reduce homeowner access to attic. However, the customer now has the right to refuse the measure, which should prevent these types of situations, as long as the customer is presented with the option to refuse treatment.
- **Fuel-Dependent Insulation Levels.** The cost analysis showed clearly that the cost-effectiveness of attic insulation depends strongly on the heating fuel. However, some Program staff are reluctant to have separate policies on insulation levels for customers with gas and electric space heating. In recognition of this, the group developed analyses for three cases: electric space heating, gas space heating, and a mix of 90% gas and 10% electric. The analysis shown in this appendix focuses on the last approach.

B.5 Sensitivity of Results to Variation in Assumptions

B.5.1 Baseline Analysis

A baseline analysis was conducted using the baseline assumptions displayed in Table B-1. It also assumes a mix of 90% gas and 10% electric space heating. The results indicate *the present value of net benefits* associated with the installation of different levels of insulation in homes with different starting values. That is, they reflect the difference between the present value of 25 years' worth of energy savings and the installed cost of the insulation. Table B-2 presents the results of this analysis for the North Coast Climate Zone.

Table B-2: Baseline Results for North Coast Climate Zone

Initial R-Value	Amount of Ceiling Insulation Added to Existing Level			
	R-11	R-19	R-30	R-38
R-0	\$4765.18	\$5273.35	\$5401.92	\$5366.57
R-11	\$296.10	\$356.19	\$350.86	>R-38
R-19	-\$151.99	-\$187.35	>R-38	>R-38

As shown in Table B-2, for a home with no existing ceiling insulation in the North Coast climate zone, the present value of net benefits is highest for the installation of R-30. For a comparable home with R-11 existing insulation, the present value of net benefits is highest for the installation of R-19. For homes with existing levels of insulation of R-19, no addition of insulation yields positive net benefits. As shown in Table B-3 for the North Coast, the implications of this analysis would be that R-30 would be installed where no insulation is present, R-19 would be installed where R-11 is present, and no insulation would be installed where R-19 is already present. The results of similar analyses for the other four climate zones are also presented in Table B-3.

Table B-3: Implied Ceiling Insulation Policies (Baseline Assumptions)

Climate Zone	Existing Ceiling Insulation Level	Insulation to be Added
North Coast	R-0	R-30
	R-11	R-19
	R-19	None
South Coast	R-0	R-19
	R-11	None
	R-19	None
Inland	R-0	R-30
	R-11	R-19
	R-19	None
Desert	R-0	R-30
	R-11	R-19
	R-19	None
Mountain	R-0	R-38
	R-11	R-19
	R-19	R-19

B.5.2 Impact of Variations in Assumptions

It should be recognized that the results of the analysis are very sensitive to specific assumptions about which there is considerable uncertainty. Tables B.3a, B.3b and B.3c illustrate the sensitive of the implied insulation policies for three alternative scenarios, defined as follows:

- **Scenario 3a.** Scenario 3a uses avoided costs to value gas and electricity savings, rather than an average of retail rates and avoided costs. Since avoided costs are lower than retail rates under our assumptions, scenario places a lower valuation on energy savings than the baseline case.
- **Scenario 3b.** Scenario 3b uses retail prices to value gas and electricity savings. This scenario places a higher valuation on savings than the baseline case.
- **Scenario 3c.** Scenario 3c uses retail prices, but assumes that retail rates escalate at 6% rather than 3% over the next 25 years. Of course, this implies a higher valuation of energy savings than the baseline case.

Table B-3a: Implied Ceiling Insulation Policies (Scenario 3a)

Climate Zone	Existing Ceiling Insulation Level	Insulation to be Added
North Coast	R-0	R-30
	R-11	R-19
	R-19	None
South Coast	R-0	R-19
	R-11	None
	R-19	None
Inland	R-0	R-30
	R-11	R-19
	R-19	None
Desert	R-0	R-30
	R-11	R-19
	R-19	None
Mountain	R-0	R-38
	R-11	R-19
	R-19	R-19

Table B-3b: Implied Ceiling Insulation Policies (Scenario 3b)

Climate Zone	Existing Ceiling Insulation Level	Insulation to be Added
North Coast	R-0	R-30
	R-11	R-19
	R-19	None
South Coast	R-0	R-30
	R-11	R-11
	R-19	None
Inland	R-0	R-30
	R-11	R-19
	R-19	None
Desert	R-0	R-30
	R-11	R-19
	R-19	None
Mountain	R-0	R-38
	R-11	R-19
	R-19	R-19

Table B-3c: Implied Ceiling Insulation Policies (Scenario 3c)

Climate Zone	Existing Ceiling Insulation Level	Insulation to be Added
North Coast	R-0	R-38
	R-11	R-19
	R-19	R-19
South Coast	R-0	R-30
	R-11	R-19
	R-19	None
Inland	R-0	R-38
	R-11	R-19
	R-19	R-19
Desert	R-0	R-38
	R-11	R-19
	R-19	R-19
Mountain	R-0	R-38
	R-11	R-19
	R-19	R-19

Table B-4 summarizes the results of the analyses under the four scenarios. As shown, the implied insulation values vary substantially across scenarios. Hidden in these results is the fact that implied values also change as assumptions with respect to installed costs and other factors vary.

Table B-4: Scenario Comparisons

Climate Zone	Existing Insulation	Most Cost-Effective Increases in Insulation			
		Baseline Scenario	Scenario 3a (avoided costs)	Scenario 3b (retail prices)	Scenario 3c (higher escalation)
North Coast	R-0	R-30	R-30	R-30	R-38
	R-11	R-19	R-19	R-19	R-19
	R-19	None	None	None	R-19
South Coast	R-0	R-19	R-19	R-30	R-30
	R-11	None	None	R-11	R-19
	R-19	None	None	None	None
Inland	R-0	R-30	R-30	R-30	R-38
	R-11	R-19	R-19	R-19	R-19
	R-19	None	None	None	R-19
Desert	R-0	R-30	R-30	R-30	R-38
	R-11	R-19	R-19	R-19	R-19
	R-19	None	None	None	R-19
Mountain	R-0	R-38	R-38	R-38	R-38
	R-11	R-19	R-19	R-19	R-19
	R-19	R-19	R-19	R-19	R-19

B.6 Conclusions and Recommendations

We conclude that there are several issues that need to be decided before the analysis discussed in this appendix can be finalized. Clearly, the results of discussions at RRM and LIMEC need to be reviewed carefully before the analysis is completed.

Appendix C

Climate Zones to be Used for Determining Attic/Ceiling Insulation Levels

Figure C-1: Proposed Climate Zones for Attic/Ceiling Insulation Levels

NOTE

California Energy Commission (CEC) climate zones (numbers on figure) are mapped to the five proposed ceiling/attic insulation climate zones as shown in Table C-1.

Table C-1 Attic/Ceiling Insulation Climate Zones versus CEC Climate Zones

Ceiling Insulation Climate Zone	CEC Climate Zone
NORTH COAST	1
	2
	3
	4
	5
SOUTH COAST	6
	7
	8
	9
INLAND	10
	11
	12
	13
DESERT	14
	15
MOUNTAIN	16