2000 MARKET EFFECTS STUDY OF THE TOSER EEM PROGRAM – UPDATED FINAL REPORT

Prepared for

Pacific Gas and Electric Company and
Staples-Hutchinson
San Francisco, California

Prepared by

XENERGY Inc.
Oakland, California

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EXECUTIVE SUMMARY

This report presents the results of an assessment and market effects study by XENERGY, Inc., of Pacific Gas and Electric's (PG&E's) Time of Sale Energy Renovation (TOSER) Program. This report updates the results presented in a report on the Program published on December 15, 2000. This is the third assessment of this Program and its preceding third-party Program (the EAHAP). The TOSER Program addresses energy efficient mortgages (EEMs) for homes, primarily when existing homes are being resold.

E.1 THE EEM PROCESS

An EEM, coupled with a rating from a home energy rating system (HERS), aims to address many of the reasons buyers do not invest in residential efficiency improvements at the time they purchase a home. The rating can answer questions about the energy use and utility bills of the existing home, as well as what different types of efficiency improvements cost, which ones are cost-effective, and how much they will reduce utility bills. The EEM has the potential to overcome the financial impediments by allowing the buyer to qualify for financing for the efficiency improvements and by making the buyer aware that, even with higher monthly loan payments, her combined financing and utility costs will decline.

Both real estate agents and lenders can be key players in the EEM process. The real estate agent can play a major role in the EEM process by acting as a "gatekeeper" and first point-of-contact for the home buyer.[1] Often the agent is the conduit through which potential buyers learn what EEMs are and their benefits. The lender's role is critical because he must be knowledgeable about EEMs and willing to implement them with minimum complications.

Although an EEM process can alleviate several buyer barriers to *installing efficiency improvements*, implementation of the *EEM process itself* faces its own barriers. They include the following generic impediments:

- Lenders are not fully aware of or knowledgeable about EEMs and lenders often view an EEM as a complication of the lending process.
- Real estate agents are not very aware of EEMs and fear that EEMs can interfere with the orderly home sale/purchase transaction.
- Buyers are generally unaware of and lack knowledge about EEMs and often find the process complicated.
- The home energy rating process can be perceived to be relatively costly.

[1] Staples-Hutchinson and Associates, Inc. June 3, 1999. "Time of Sale Energy Renovation Program 1999 Communications Plan."

E.2 THE TOSER PROGRAM

The TOSER Program is a PG&E program initiated in 1999, which builds upon the 1998 third-party Energy-Aware Housing Agent Program (EAHAP). The TOSER Program focuses on increasing the use of EEMs for all PG&E-area homes purchased through the U.S. Department of Housing and Urban Development's (HUD's) Federal Housing Administration (FHA) loans and homes financed through the Department of Agriculture's Rural Housing Program. TOSER is being conducted in PG&E's service territory, which is approximately contiguous with the Fresno, Sacramento, and San Francisco HUD regions.

TOSER's primary intervention is training aimed directly at influencing the key housing supply-side market actors—lenders and real estate agents. Its secondary activities are directed at facilitators (contractors who provide EEM/HERS services) and home loan consultants, and new efforts in 2000 were implemented to reach home buyers.

E.3 THE STUDY APPROACH

This market effects study addresses principally the changes that the TOSER Program is causing in the *market for EEMs*, rather than the overall market for residential efficiency improvements. We used the Theory-Based Evaluation (TBE) approach to develop a program theory to provide a framework for data collection and analysis.

This study concentrates on the effects of the TOSER Program training seminars attended by real estate agents and lenders. These trainings were intended to increase agent and lender EEM awareness and knowledge and implementation of EEMs. It also addresses to a lesser degree the role of HUD, facilitators, and home loan consultants. The study also was designed to facilitate longitudinal comparisons with the 1998 Market Effects Study of the EAHAP, which established the basic framework for the TOSER Program, and 1999 TOSER Program.

In addition to effects on EEM knowledge and implementation, the Program's effectiveness is linked to changes in market actor awareness, knowledge, and perceptions of *energy efficiency*. Consequently, we do investigate these market changes as part of this study, but to a lesser extent than our assessment of *market effects related directly to EEMs*.

This study also included an analysis of the energy savings of home upgrades financed through EEMs and a preliminary analysis of the relationship between the penetration rate of EEMs and the extent of Program training.

E.4 DATA COLLECTION

This study is based on both surveys and statistical data. The surveys were conducted by telephone with the three key market actors in the housing transaction: real estate agents, lenders, and home buyers distributed throughout the Program area. We conducted interviews with three different groups of agents and lenders. First, we interviewed 68 agents and 30 lenders who participated in training in 2000, and 45 buyers who obtained EEMs in 2000. Second, we

reinterviewed 14 agents and 10 lenders who attended training in 1999 and whom we had interviewed last year. Third, to develop baseline market information, we interviewed 45 agents and 30 lenders who have never participated in Program training. Sample sizes were limited by the budget available for data collection, and we caution the reader that these modest sample sizes limited the precision and generalizability of the findings from the surveys.

The statistical data included total numbers of EEM closures and FHA loan closures in the HUD regions served by the TOSER program. We also obtained energy savings estimates from ratings of 150 houses in which efficiency upgrades were performed through EEMs.

E.5 FINDINGS

The key findings from the study are summarized in this subsection.

E.5.1 EEM Energy Savings

We estimated, based on HERS rating data for 150 houses in the PG&E area, that the upgrades conducted through each EEM saved the home buyer 3,261 kWh per year and 384 therms of natural gas per year. Combining these energy savings, the equivalent annual total source energy savings were estimated to be 71 million Btus.

Since the TOSER Program (and preceding EAHAP) began, 4,804 EEMs were implemented in the PG&E area. For these houses, the total estimated energy savings were the following:

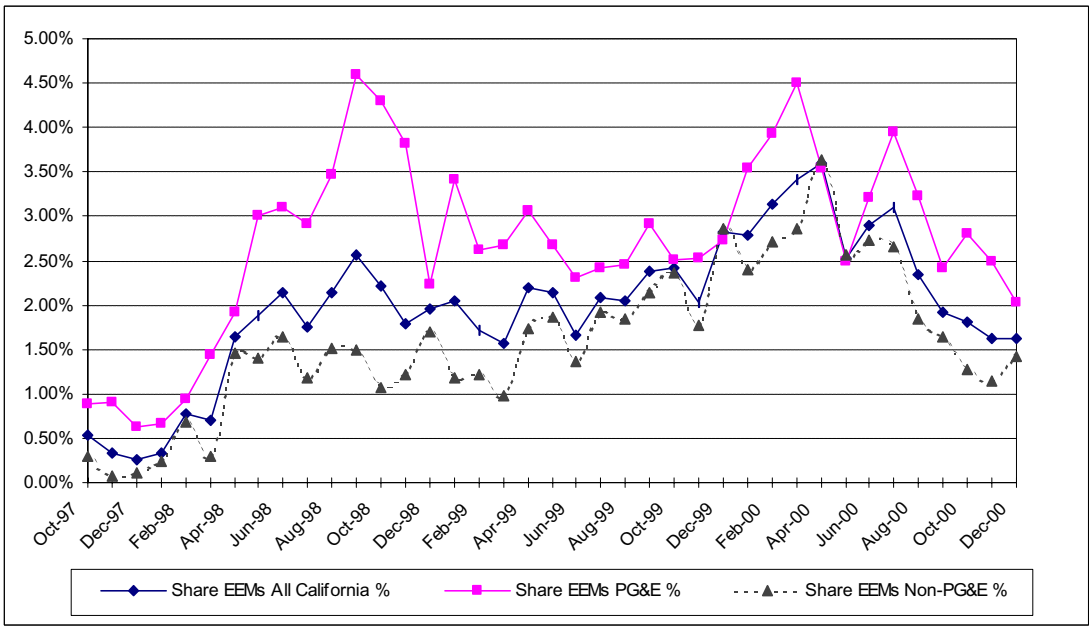
- 15.7 million kWh (15.7 GWh) per year
- 1.84 million therms per year
- 341 billion Btu of source energy per year
- electricity demand savings totaling 3.73 average megawatts.

E.5.2 The EEM Market

Although the number of EEMs decreased in the PG&E area in 2000, the EEM penetration rate continued to increase. The number of EEMs issued in the PG&E Program area declined this year after a steady rise the past two years. However, much of the decline appeared to be due to a dramatic decrease in the number of FHA loans transacted.

Normalizing by the number of FHA loans, the EEM penetration rate (percent of FHA loans that were EEMs) in the PG&E area increased from 2.7% for all of 1999 to 3.2% for all of 2000. Figure E-1 shows the penetration rate for the PG&E Program area, non-Program area, and California as a whole. The penetration rate in the Program area reached 4.5% in March 2000. The EEM penetration rate in the Program area continued to exceed the rate outside the area, which was 2.2% during 2000. These data were consistent with the hypothesis that the Program was having a positive effect on the penetration of EEMs in this market.

Figure E-1
EEMs as Percentage of FHA Loans



Preliminary analysis indicated that several factors, including the Program training, had a statistically significant effect on the number of EEMs in a geographic region within the PG&E service territory. The number of EEMs increased with the proportion of the population that was Hispanic, lower family incomes, and higher household growth rates. Preliminary analyses of the effects of Program training produced mixed results because of analytic limitations. However, based on initial statistical analyses, the number of EEMs in the PG&E territory appeared to have increased by somewhere between 3.4% and 27% as a result of Program training.

E.5.3 Supply Side Results

This subsection discusses findings for real estate agents and lenders.

Seminar Effectiveness

As they did last year, this year's attendees generally found the seminars to be very effective.

Attendees found the seminars very useful. Approximately 91% of the agents and 94% of the lenders said that the seminars had "provided everything they needed" to discuss EEMs with potential buyers. Suggestions for improving the seminar included providing more information about implementation of EEMs, energy savings, energy audits, cost comparisons, where EEMs are available, how EEMs compare with other efficiency programs, and using EEMs with

conventional loans; providing materials that could be used after the seminars; and offering refresher classes.

Seminars were effective in increasing agents' and lenders' understanding of EEMs. Overall, the data indicated that the seminars appeared to substantially increase understanding of EEMs for both real estate agents and lenders. Agents reported that their understanding level, on a scale from 0 to 5, increased from 1.6 before the seminar to 3.2 after the seminar and lenders reported an increase from 2.4 to 3.8.

Seminars were effective in reducing perceived EEM barriers for real estate agents and lenders. The seminars reduced the perception of barriers to implementing EEMs for both groups. Tables E-1 and E-2 provide the overall rating of key barriers after the seminar and the percentage change in the average ratings of barriers from before to after the seminar, for agents and lenders respectively.

Some significant barriers remained. Significant supply-side barriers that remained after the seminar included these:

- Lack of agents/lenders who acted as examples or "EEM champions"
- Lack of buyer interest in or understanding of EEMs.

Table E-1
Effects of TOSER Seminar on Perception of EEM Barriers for Real Estate Agents

Barriers	Real Estate Agents	
	Rating After Seminar	Difference
Complicating the sales/lending transaction	2.0	-11%
Difficulty of understanding and explaining EEMs	1.9	-45%
Lack of buyer interest in or understanding of EEMs	3.1	-16%
Lack of benefits for buyers	1.7	-22%
Lack of information on EEMs	2.7	-26%
Lack of assistance available to implement EEMs	2.1	-31%
Incompatibility with selling practices	2.8	-10%
Lender resistance to using EEMs	2.1	6%
Difficulty finding lenders to process EEMs	2.6	-5%
Lack of examples of lenders or agents who actively promote EEMs	3.2	-4%
Lack of EEM facilitators to recommend to buyers	2.5	-15%
Time required to process EEMs	2.2	-26%
Front-end cost is too high	2.3	-25%
Note:: Scale ranges from 0 = no barrier at all to 5 = major barrier. Differences are based on only participants who were aware of EEMs prior to the training.		

Table E-2
Effects of TOSER Seminar on Perception of EEM Barriers for Lenders

Barriers	Lenders	
	Rating After Seminar	Difference
Complicating the sales/lending transaction	2.5	-16%
Difficulty of understanding and explaining EEMs	1.7	-41%
Lack of buyer interest in or understanding of EEMs	3.3	-3%
Lack of benefits for buyers	1.3	-10%
Lack of information on EEMs	2.1	-33%
Lack of assistance available to implement EEMs	1.8	-31%
Incompatibility with lending practices	1.6	-18%
Little support for EEMs in the refinancing market	2.6	-8%
It's the agent's or buyer's responsibility to mention	1.8	-20%
Lack of examples of lenders or agents who actively promote EEMs	3.1	-4%
Lack of EEM facilitators to recommend to buyers	1.3	-28%
Loan pre-qualification doesn't include EEMs	1.0	-34%
Time required to process EEMs	1.9	-24%
Front-end cost is too high	1.9	-13%
Note:: Scale ranges from 0 = no barrier at all to 5 = major barrier. Differences are based on only participants who were aware of EEMs prior to the training.		

Effects of training generally appeared to persist over time. Reinterviews of 1999 Program participants showed that the effects of the TOSER training in reducing most perceived EEM barriers persisted this year. Real estate agents, however, rated "lack of assistance to implement EEMs" and "poor fit with how agents do business" as considerably more significant barriers this year than they did after last year's training, possibly because of experiences during the past year.

Supply-Side Market Effects

Program activities have increased real estate agents' and lenders' understanding and knowledge of EEMs. Nearly 1,200 real estate agents and over 400 lenders have attended TOSER Program (or EAHAP) training courses since 1998. Interviews with Program participants this year and last showed a substantial increase in their understanding and knowledge of EEMs. At least as important, trends for participants, prior to training, and nonparticipants suggested that the overall awareness and understanding levels have increased among the lender and agent populations. Although we could not determine how much of the trend was due to the Program, these results were consistent with possible spillover effects of the Program into the overall marketplace.

Increased understanding and knowledge of EEMs have led to increased promotion of EEMs. Participating agents and lenders this year indicated that they were much more likely to discuss and promote EEMs after the seminar than before. This likelihood was also considerably higher than the likelihood indicated by nonparticipants. Participating agents and lenders also reported that they were twice as likely as nonparticipants to have actually discussed EEMs with buyers.

Lenders were more likely than real estate agents to have discussed EEMs with other professionals after the seminar, but dissemination of information about EEMs was still relatively low.

Increased EEM awareness and experience have helped integrate EEMs into supply-side business practices. Interviews with training attendees for the past three years have shown consistently that agents and lenders increased their implementation of EEMs after the training. Reinterviews in 2000 with agents who participated in 1999 training indicated that the effects may be long-lasting; in fact, the share of homes they closed with EEMs during 2000 was even higher than it was shortly after training (although this was not the case with lenders). It appeared that EEM knowledge and familiarity have increased EEM implementation, but it was not possible to quantify the broad effects on the market.

E.5.4 Home Buyer Results

Because the Program did not focus its efforts significantly on buyers, our findings for home buyers were based primarily on the experiences they had with EEMs and their attitudes, knowledge, and behaviors related to energy efficiency and EEMs.[2] To a limited extent, the TOSER Program influenced the buyers that we interviewed indirectly through the participating agents and lenders and other Program activities. However, without analysis of data from buyers in a non-Program area, it was not possible to infer Program effects on buyers.

Buyers were satisfied with EEMs overall. On a scale from 0 to 5, the average satisfaction rating of the buyers surveyed regarding the EEM process was 4.3.

Ninety-six percent (96%) of the buyers we interviewed said they would recommend an EEM to other buyers.

EEMS were useful in overcoming barriers to energy-efficiency upgrades for buyers. Buyers found EEMs very useful in reducing barriers to installing energy-efficiency upgrades overall. The buyers surveyed found EEMs to be particularly useful in reducing the difficulty of understanding energy-efficiency and financing improvements and reducing the time required to select and make improvements.

[2] The Consumer Awareness Campaign initiated this year was not in full force earlier enough to affect most home buyers that we interviewed.

Buyers reported very low levels of difficulty with the EEM process. No step in the EEM process received an average difficulty rating from buyers greater than 1.6 on a 0 to 5 point scale. The most difficult step was reported to be "choosing measures to install."

Some buyers had concerns about working with contractors. While buyers were satisfied with the process overall, several expressed dissatisfaction with various aspects of working with project contractors. The concerns usually had to do with the contractor not performing as expected by the home buyer.

E.5.5 Overall Effects

This study, the third in a series of market effects studies, added to the strength of the evidence available on Program market effects. Additional evidence alone increased the certainty of our market effects findings. In addition, the findings have tended to be quite consistent across the studies, thus increasing the reliability of our findings.

The clearest and most extensive evidence of Program market effects involved the direct effects of the training on participants' awareness, understanding, and promotion of energy efficiency and EEMs. The Program has focused primarily on these objectives and it appeared to be quite successful at achieving them. Training of lenders and agents appeared to have notable effects on the demand side as well: buyers have increased their knowledge and awareness as a result of working with agents and lenders who were educated about energy efficiency and EEMs. The expected outcomes from buyers using EEMs also appeared to be realized through their benefiting from EEMs, communicating positively to others about EEMs, and increasing general buyer demand for EEMs.

The more tenuous and less clear market effects occurred in two general areas—institutionalized changes in the practices of lenders and agents in implementing EEMs and follow-through of buyers to obtain EEMs. Both types of market effects are essential for market transformation to occur. On the supply side, lenders and agents noted that the lack of EEM "champions" in their industry was a significant impediment to their embracing EEMs; this impediment could be related to the observed gaps in the supply-side market effects. On the buyer side, buyers, lenders, and real estate agents all mentioned that more third-party education of buyers about EEMs was needed, and this could be related to the lack of buyer follow-through to obtain EEMs, even after being informed by a lender or agent about EEMs.

As noted earlier, the effects of Program training on the number of EEMs implemented were not always consistent and varied depending on the type of model estimated and which time period we examined. However, as noted earlier, our results suggested that between 3.4% and 27% of the EEMs in the PG&E territory during the 39-month Program period resulted from the Program training.

E.5.6 Comparisons with 1999 Market Effects Study Findings

The results for real estate agents suggested that the seminars in 1999 generally reduced their perceived barriers more than the 2000 seminars did. Although this was true, the main reason was that agents came into the seminars with a much higher level of understanding of EEMs in 2000. Although the amount attributable to the Program was uncertain, part of this increase was probably due to the cumulative effects of the Program and a resulting general increase in understanding and awareness.

In most cases, the *extent of the evidence* available on the hypotheses increased this year. For all but two hypotheses, we judged the *strength of the evidence* supporting the hypotheses to be the same this year as last. This should not be interpreted to mean that evidence of the postulated Program cause-effect relationships has not continued to remain significant; there appeared to be moderate or strong evidence supporting most of the hypothesized relationships.

The key difference between the results for 1999 and 2000 was that the extent of the evidence supporting most of the hypothesized relationships has continued to grow as more data have been accumulated. Consequently, the results this year suggested that the market effects observed last year were supported more strongly by the larger body of evidence acquired through this study.

E.6 RECOMMENDATIONS

Based on our analysis of the qualitative and quantitative data evaluated, we have developed the following recommendations to improve the TOSER program:

- Continue to increase marketing to potential buyers
- Target EEM promotions to areas identified that are more likely to implement EEMs
- Continue recent efforts to increase the visibility of industry leaders who have successfully promoted EEMs actively
- Implement follow-up with the training attendees
- Develop and make available additional EEM cost and benefit information
- Investigate ways to address buyer concerns about facilitators and contractors
- Clarify the dollar limits for EEMs in the training course and materials
- Improve the training components that address home energy ratings
- Tailor training to the different market actors
- Expand the training to increase the emphasis on EEMs with conventional loans.

The following recommendations address ways to improve future Program evaluation efforts:

- Extend the quantitative analyses of training effects on the number of EEMs implemented

- Analyze EEMs implemented through conventional loans
- Establish processes for providing fuller documentation on buyers with EEMs and agents, lenders, and others participating in the Program
- Analyze the other Program components that have not been analyzed already
- Include buyers who did not obtain EEMs in the next Market Effects Study
- Continue analysis of the long-term effects of the Program.

1 INTRODUCTION AND PROGRAM DESCRIPTION

This report presents the results of an assessment and market effects study by XENERGY, Inc., of Pacific Gas and Electric's (PG&E's) Time of Sale Energy Renovation (TOSER) Program. The TOSER Program is designed to promote the use of energy efficiency mortgages (EEMs) for energy-efficiency upgrades in existing homes when they are being resold. This document updates the information presented in a report completed on December 15, 2000.

1.1 INTRODUCTION

This study follows the same basic format of the 1999 Market Effects Study[1], also conducted by XENERGY, which assessed market effects of the TOSER Program for that year. As in 1999, we focused on data collection from key market actors. We were able to add continuity and comparisons to this year's study by re-interviewing some of the people we had spoken to last year and by including in our study agents and lenders who did not participate in the TOSER program (the nonparticipants). We also obtained self-reported information from supply-side market actors about the perceived effects of the Program on their awareness, behavior, and market barriers, and this permitted us to examine the market effects of the training component of the Program. Because the Program targets real estate agents and lenders as change agents to influence home buyers, we concentrated on assessing market effects from the perspective of these key actors on the supply side, but also examined market effects more indirectly from the buyers' perspective.

The following subsection describes the context in which this Program operates. The remainder of this section provides more detailed information on the Program, followed by a description of the scope of this study.

1.2 THE HOME PURCHASE AND EEM PROCESS

When an existing home is sold, the transaction presents a unique opportunity for making extensive energy-efficiency improvements to the home. It is not very common, however, for home buyers to take the steps to make such improvements before moving into their newly purchased home. The reasons buyers might not act include that they

- are unaware of the energy efficiency and utility bills of the existing home;
- are unaware or doubtful about how much the efficiency level could be improved and the benefits they would enjoy;

[1] *1999 Market Effects Study of the TOSER EEM Program,* prepared by XENERGY for Pacific Gas and Electric Company, March 28, 2000.

- don't know how to go about making the efficiency improvements;
- expect the added costs to be high;
- can't afford to pay cash, are unsure whether the costs could be financed, or can't afford the added finance costs; and
- are concerned that making the improvements would delay closing on the transaction.

EEMs were first proposed at least 20 years ago as one way to alleviate many of these impediments and were first implemented in 1980.[2] The most common features of EEMs have been that they allow the buyer to include the cost of the efficiency upgrades in the mortgage and the added cost is not counted toward the maximum loan amount for which the buyer can qualify (or, alternatively, the qualifying debt-to-income ratio is "stretched").[3]

Through a number of efforts, not the least of which was the 1992 Energy Policy Act (EPAct), EEMs have been implemented in conjunction with energy ratings provided through home energy rating systems (HERS). The use of some form of consistent, reliable, and accurate rating system is critical because it helps answer questions about how much energy and utility bill savings can be expected from specific efficiency improvements.

An EEM, coupled with a home energy rating, aims to address many of the reasons listed earlier why buyers do not make the investments in efficiency improvements. An EEM is a mechanism for promoting and delivering efficiency improvements and overcoming some of the fundamental barriers. The rating can answer questions about the energy use and utility bills of the existing home, as well as what different types of efficiency improvements cost, which ones are cost-effective, and how much they will reduce utility bills. The EEM has the potential to overcome the financial impediments by allowing the buyer to qualify for financing the efficiency improvements and by making the buyer aware that, even with higher monthly loan payments, her combined financing and utility costs will decline.

Despite the potential that the EEM process offers to mitigate many of the energy-efficiency upgrade barriers faced by buyers, other barriers remain. Two likely remaining barriers are that 1) buyers may still not know how to go about making the efficiency improvements and 2) the procedure required to make the improvements may interfere with the overall sales process.

Although an EEM can alleviate several of the barriers, implementation of the EEM process itself faces its own barriers. These are discussed in more detail later, but they include the following

[2] Farhar, Barbara, Nancy Collins, and Roberta Walsh. 1997. *Case Studies of Energy Efficiency Financing in the Original Five Pilot States, 1993-1996*, National Renewable Energy Laboratory, Golden, Colorado.

[3] Note that various EEM programs, such as some funded by utilities, have offered better lending terms such as lower interest rates, longer loan terms, or reduced downpayments.

generic impediments identified in the 1999 Market Effects Study and the Market Effects Study of the preceding third-party program (discussed later):[4]

- Lenders are not fully aware of or knowledgeable about EEMs and lenders often view an EEM as a complication of the lending process.
- Real estate agents are not very aware of EEMs and fear that EEMs can interfere with the orderly home sale/purchase transaction.
- Buyers are generally unaware of and lack knowledge about EEMs and often find the process complicated.
- The home energy rating process can be perceived to be relatively costly.

Both real estate agents and lenders can be key players in the EEM process. The real estate agent can play a major role by acting as a "gatekeeper" and first point-of-contact for the home buyer.[5] Often the agent is the conduit through which potential buyers learn what EEMs are and their benefits. Consequently, the real estate agent can be instrumental in initiating the EEM process. Lenders, on the other hand, often view their own role in the EEM and energy-efficiency process as being more passive. They expect the real estate agent to bring up the EEM concept with the buyer. However, lenders obviously are the most important player when it comes to implementing an EEM and lender attitudes, perceptions, and behavior can be critical determinants of the extent to which EEMs are applied.

1.3 THE TIME OF SALE ENERGY RENOVATION (TOSER) PROGRAM

The TOSER Program is an integrated set of activities that aims to increase the use of EEMs. It does so primarily by tackling the factors that impede the application of EEMs.

TOSER evolved out of a third-party program funded by PG&E: the Energy-Aware Housing Agent Program (EAHAP). The EAHAP, conducted in 1998, focused principally on increasing the use of EEMs in the sales of HUD homes. HUD homes are those homes owned by the Department of Housing and Urban Development (HUD) as a result of foreclosures of properties with HUD-insured loans. They are usually referred to as Real Estate Owned (REO) homes.

TOSER was initiated in 1999. It is a PG&E program that builds upon the EAHAP. It has been expanded to a target market that includes all PG&E-area existing homes purchased through Federal Housing Administration (FHA) loans and homes financed through the Department of Agriculture's Rural Housing Program and the Veteran's Affairs (VA) program. Although the focus has been on homes bought through these federal programs, Program efforts to include conventionally financed homes have increased this year.

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[4] *Energy-Aware Housing Agent Program: A Market Effects Study,* prepared by Schiller Associates for Pacific Gas and Electric, December 15, 1998.

[5] Staples-Hutchinson and Associates, Inc. June 3, 1999. *Time of Sale Energy Renovation Program 1999 Communications Plan*.

Briefly, TOSER's primary activities aim directly at influencing the key housing sales market actors: lenders, real estate agents, and home buyers. Its secondary activities are directed at facilitators (contractors who facilitate the provision of EEM/HERS services) and home loan consultants. The Program is implemented for PG&E by Staples-Hutchinson and this year employed[6]

- intensive training to increase the awareness and knowledge of lenders and real estate agents;
- the provision of follow-up information to training attendees;
- research and tracking to identify impacts of the Program's communications plan;
- a broad-based promotion and communication strategy to inform and educate home buyers;
- recognition of Program "champions" among participating lenders and real estate agents;
- a multi-component consumer awareness campaign;
- an Energy Snapshot that provides HERS rating information to prospective buyers,[7] and
- other training and facilitation efforts.

The major activity of the Program in 2000 was the implementation of a large number of training sessions aimed at real estate agents and lenders. Our study, therefore, concentrates on assessing the effects of these seminars.

Table 1-1 presents the number of training sessions held and attendees at these sessions for the period 1998 through 2000. Note that the 1998 sessions were conducted under EAHAP, the program that preceded the TOSER Program. In both 1998 and 1999, the training sessions did not begin until the middle of the calendar year.[8] Over the three-year period, 1,299 real estate agents and 451 lenders attended training. In accordance with the lower FHA loan activity in the San Francisco region, the fewest sessions have been conducted in this region.

[6] These Program activities are described in detail in the two following references: Staples/Hutchinson. 2000. *Time of Sale Energy Renovation Program, Communications Plan 2000, May 2000 – January 2001*; Staples/Hutchinson. 2000. *Time of Sale Energy Renovation Program (TOSER), Consumer Awareness Campaign, October –December 2000.*

[7] Note that the Energy Snapshot was modified this year from being a pre-HERS assessment of the home to a complete HERS rating. The buyer receives on-line access to the rating, but must pay for a hard copy that can be used to apply for an EEM. Staples-Hutchinson provides an incentive to the HERS provider.

[8] Note that the two prior market effects study reports focused on the fiscal years 1998 and 1999, which spanned the period of October through September. In this report, we shifted the assessment period to the calendar year to be consistent with PG&E's program year.

Table 1-1
Summary of TOSER EEM Training Statistics

	Total		Occupations			
	# of Trainings	# Attending	RE Agent	Lender	Facilitator	Other
Fresno						
1998	23	488	405	77	0	6
1999	13	174	123	39	3	9
2000	16 (9)	172 (145)	128 (106)	32 (29)	0	12 (10)
Sacramento						
1998	11	223	138	82	1	2
1999	16	198	122	63	3	10
2000	26 (19)	318 (259)	234 (182)	79 (74)	0	5 (3)
San Francisco						
1998	14	117	62	40	0	15
1999	5	79	52	26	1	0
2000	3 (3)	52 (52)	35 (35)	13 (13)	0	4 (4)
Total						
1998	48	828	605	199	1	23
1999	34	451	297	128	7	19
2000	45 (31)	542 (456)	397 (323)	124 (116)	0	21 (17)
All years	127	1,821	1,299	451	8	63

Note: In 2000, both standard and mini-courses were conducted. First number shown is the total for all courses and number in parentheses applies to standard courses only.
RE=real estate.

1.4 STUDY SCOPE

As discussed earlier, the combined HERS/EEM process is a mechanism designed to alleviate some of the barriers that stand in the way of energy-efficiency improvements at the time of a home purchase. TOSER is a program designed primarily to overcome some of the known reasons why EEMs are not implemented widely in these circumstances. Consequently, *an evaluation of the market effects of the TOSER Program needs to focus primarily on how the Program is changing the market for EEMs.*

The major implication of the above is that this Market Effects Study was designed to address principally the changes that the TOSER Program is causing in the *market for EEMs*, rather than the overall market for residential efficiency improvements. This study does not address the question of how the EEM process compares with others that could lead to residential efficiency

improvements. It also does not compare EEMs (e.g., in terms of the number of efficiency measures implemented) resulting from the TOSER Program with EEMs that occur as a result of other activities, such as marketing by firms specializing in HERS. This scope is consistent with that of the 1999 Market Effects Study.

As noted earlier, this study concentrates on the three key market actors in the housing transaction: home buyers, real estate agents, and lenders. The TOSER Program targets these three groups and they are the most critical in the decision to conduct a HERS rating and obtain an EEM. This study also addresses to a lesser degree the role of HUD, facilitators, and home loan consultants.

Although our study's focal point is the effect the Program is having on the market for EEMs, the Program's effectiveness is linked to changes in market actor awareness, knowledge, and perceptions of energy efficiency in general. Consequently, we also investigate these market changes as part of this study, but to a lesser extent than our assessment of market effects related directly to EEMs.

1.5 REPORT CONTENTS

Section 2 describes the methodology employed in each of the steps of this study. Section 3 discusses loan and EEM statistics. Section 4 presents our findings for supply-side actors—real estate agents and lenders. Section 5 presents findings for home buyers. Section 6 presents results from two analyses. The first summarizes the energy savings associated with homes that were upgraded through EEMs. The second examines the relationship between the Program and the number of EEMs and their penetration rate. Section 7 presents the conclusions we have drawn from this study and our recommendations to improve both the Program and future evaluations.

Appendix A presents the survey instruments we used to collect data from real estate agents, lenders, and home buyers. Appendix B presents details of analyses we conducted to explore the relationship between Program training and the number of EEMs implemented in PG&E's service territory.

2 METHODOLOGY

This section describes the methodology used to conduct this market effects study and program evaluation. As discussed in Section 1, this study focuses on the *effects of the TOSER Program on the market for EEMs*, because the Program has the goal of increasing the market for EEMs rather than enhancing the residential energy-efficiency market in general. The fundamental presumption is that EEMs lead to efficiency improvements. This is the case because an EEM can only be granted if the home buyer implements cost-effective energy-efficiency improvements.

This section first provides an overview of the approach. It next discusses the data collection that was conducted. The following subsection discusses the interview instruments used to conduct interviews with key market participants. The final subsection describes the data analysis.

2.1 OVERVIEW OF APPROACH

The methodology used in this study is similar to that applied in the market effects study conducted last year.[1] For this reason, this section provides only an overview of the approach and the reader is referred to the prior study for details.

2.1.1 Program Theory

An integral part of the study design phase was development of a program theory, an essential step under a theory-based evaluation (TBE) approach. According to Bickman and Peterson, "Program theory is essential for deciding what to measure in a program…With a good sense of program theory, the evaluator can move to observing program process and operation, rather than focusing on simple (and frequently uninterpretable) outcomes."[2]

A program theory, or model, provides a framework for understanding the hypothesized mechanisms through which a program is anticipated to influence, and ultimately transform, the market—in this case, the market for EEMs. The model provides a basis for structuring data collection and analyzing the data to determine whether the hypothesized cause-effect relations expected under the program in fact exist and whether they are working as expected. The model also provides the foundation for determining which processes are not working as anticipated and merit further attention and possibly revisions.

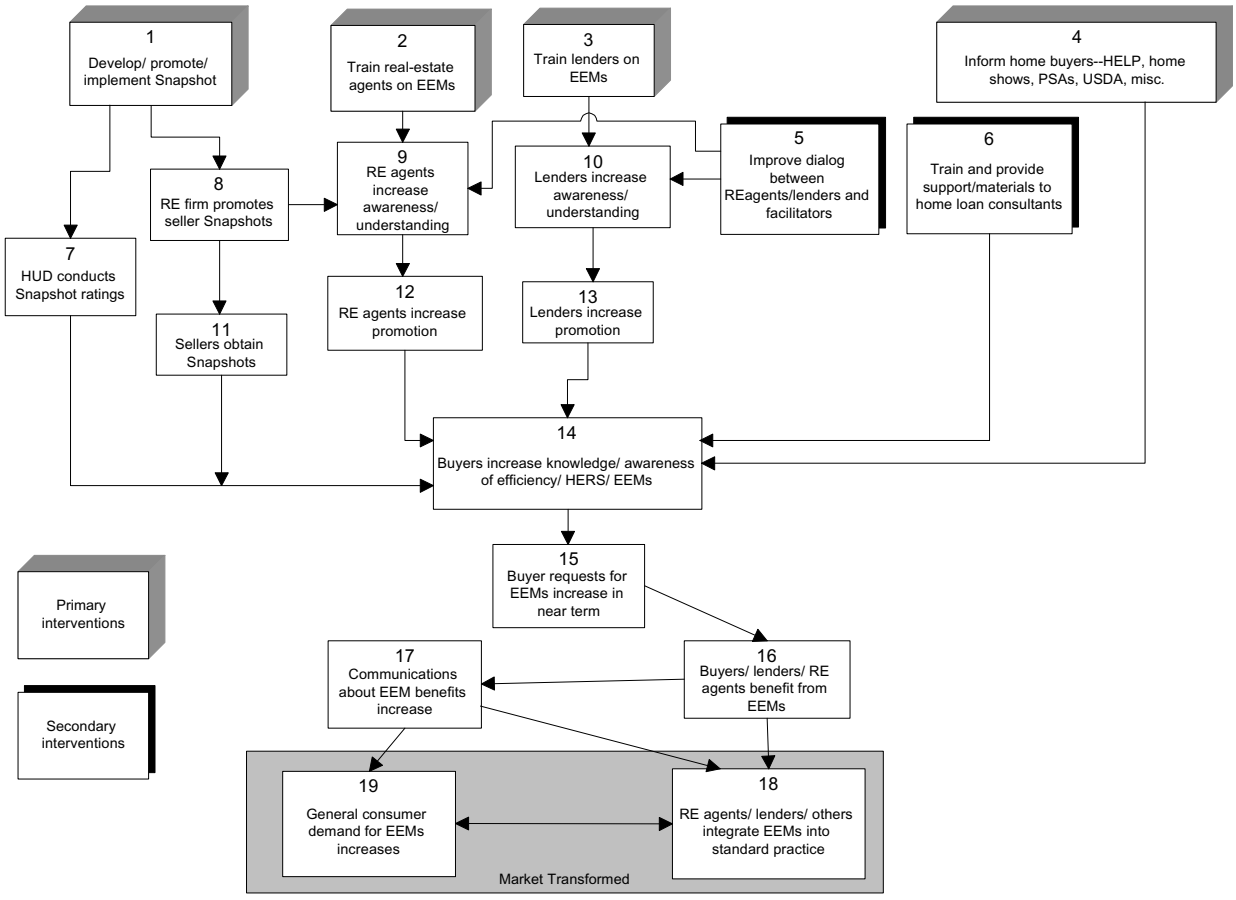
[1] XENERGY. 2000. *1999 Market Effects Study of the TOSER EEM Program*, prepared for Staples-Hutchinson and Pacific Gas and Electric Company.

[2] Bickman, Leonard and Keith Peterson, "Using Program Theory to Describe and Measure Program Quality," New direction for Program Evaluation, No. 47, Fall 1990, p. 63.

A broader view of factors relating to market transformation was derived from additionally examining diffusion-of-innovation theory (DOIT) and its communications implications. Factors of diffusion from DOIT and elements of communication are examined alongside the anticipated market barriers and in the selection of indicators of market transformation (MT) measurement.

The theory developed for the TOSER Program was delineated in the prior study referenced above. The Program theory, or model, is shown in Figure 2-1.

Figure 2-1
Model for TOSER Program



Note: RE refers to real estate agent.

Figure 2-1 shows the expected causal chains associated with the Program interventions. The Program was anticipated to have several direct effects, which, in turn, were expected to induce other changes in the market. All these direct and indirect effects can be formulated as hypotheses about the expected market effects of the Program.

Table 2-1 presents the hypotheses that we developed for the TOSER Program. The table separately lists the hypotheses postulated for the supply-side actors (lenders and real estate

agents) and buyers. It also presents a brief description of each hypothesis and lists the barriers expected to be diminished through each postulated cause-effect relationship.

Table 2-1
Hypothesized Program Effects

Hypotheses	Description	Barriers Potentially Addressed
Supply-Side Actors		
SS1. Real estate (RE) firm promotion of Energy Snapshots {8} leads to increased RE agent awareness/ understanding {9}	Familiarity with the Energy Snapshot is likely to lead to increased RE agent awareness and understanding of energy efficiency and EEMs	RE agent • information costs • transaction/hassle costs • performance uncertainty • complexity
SS2. Training of real estate agents {2} leads to increased RE agent awareness/ understanding of energy efficiency and EEMs {9}	Program training increases RE agent knowledge/awareness and understanding of energy efficiency and benefits of EEMs	RE agent • EEM lack of availability • information costs • transaction/hassle costs • organizational practices • performance/market uncertainty • compatibility • relative advantage • complexity
SS3. Increased RE agent awareness/ understanding {9} leads to RE agent EEM promotion {12}	Increased RE agent awareness/ understanding of efficiency and EEM benefits to agent and buyer increases promotion	RE agent • lack of availability • organizational practices • championing
SS4. Training of lenders {3} leads to increased lender awareness/ understanding of efficiency and EEMs {10}	Program training increases lender knowledge/awareness and understanding of energy efficiency and benefits of EEMs	Lender • EEM lack of availability • information costs • transaction/hassle costs • organizational practices • performance/market uncertainty • compatibility • relative advantage • complexity
SS5. Increased lender awareness/ understanding {10} leads to increased promotion {13}	Increased lender awareness/ understanding of efficiency and EEM benefits to lender and buyer increases promotion	Lender • organizational practices • championing
SS6. Improved dialog between RE agents/lenders and facilitators {5} leads to increased lender awareness/ understanding of EEMs {10}	Improved understanding between lenders and facilitators eases process of implementing EEMs	Lender • market uncertainty • follow-up availability • complexity
SS7. Improved dialog between RE agents/lenders and facilitators {5} leads	Improved understanding between RE agents and facilitators eases process of	RE agent • EEM lack of availability

Hypotheses	Description	Barriers Potentially Addressed
to increased RE agent awareness/ understanding of EEMs {9}	implementing EEMs	• market uncertainty • follow-up availability • complexity
SS8. Increased buyer requests for EEMs {15} lead to lender/RE agent benefits from EEMs {16}	Buyer requests for and use of EEMs demonstrates buyer demand, and RE agents and lenders perceive benefits from facilitating EEMs	RE agent and lender • organizational practices • performance/market uncertainty • compatibility • relative advantage • complexity • observability
SS9. Lender/RE agent benefits from EEMs {16} lead to increased lender/ RE agent positive communications about EEMs {17}	RE agents and lenders communicate positive experiences with EEMs to others	RE agent and lender • information costs • organizational practices • performance/market uncertainty • championing • compatibility • relative advantage • complexity • observability
SS10. Lender/RE agent benefits from EEMs {16} lead to lender/RE agents integrating EEMs into standard practices {18}	RE agents and lenders who implement EEMs recognize benefits and incorporate into standard practices	Participating RE agents and lenders • all major barriers
SS11. Increased lender/RE agent positive communications about EEMs {17} lead to lender/RE agents integrating EEMs into standard practices {18}	RE agents and lenders who implement EEMs communicate benefits to others and EEMs are incorporated into widespread standard practices	Market-wide RE agents and lenders implement EEMs based on communications and observations of the market
Home Buyers		
HB1. Energy Snapshot ratings {7, 11} lead to increased buyer knowledge/awareness of energy efficiency, HERS, EEMs {14}	Snapshots provide simple information about efficiency and increase buyer interest in efficiency and EEMs	Buyer • information costs • asymmetric information • complexity
HB2. Real estate agent EEM promotion {12} leads to increased buyer knowledge/awareness of energy efficiency, HERS, EEMs {14}	RE agent promotion increases buyer overall knowledge and awareness and interest in efficiency and EEMs	Buyer • information costs • transaction/hassle costs • hidden costs • relative advantage • complexity
HB3. Increased lender EEM promotion {13} leads to increased buyer knowledge/awareness of energy efficiency, HERS, EEMs {14}	Lender promotion increases buyer overall knowledge and awareness and interest in efficiency and EEMs	Buyer • lack of availability • information costs • transaction/hassle costs

Hypotheses	Description	Barriers Potentially Addressed
		• hidden costs • relative advantage • complexity
HB4.Home loan consultant training and materials {6} lead to increased buyer knowledge/awareness of energy efficiency, HERS, EEMs {14}	Home loan consultants inform/educate first-time buyers	Buyer • information costs • asymmetric information • transaction/hassle costs • hidden costs • relative advantage • complexity
HB5.Home buyer education {4} leads to increased buyer knowledge/awareness of energy efficiency, HERS, EEMs {14}	Direct outreach and promotion to buyers increases knowledge and awareness	Buyer • lack of availability • information costs • asymmetric information • transaction/hassle costs • bounded rationality • hidden costs • relative advantage • complexity
HB6.Increased buyer knowledge/awareness of energy efficiency, HERS, EEMs {14} leads to near-term buyer requests for EEMs {15}	Near-term increased buyer knowledge/ awareness leads buyers to request EEMs	Buyer • transaction/hassle costs
HB7.Buyer requests for EEMs {15} lead to buyer EEM benefits {16}	Buyers experience benefits of energy efficiency and EEMs	Buyer • performance uncertainty • hidden costs • relative advantage • complexity
HB8.Buyer EEM benefits {16} lead to positive buyer communications about EEMs {17}	Buyers communicate positive experiences to others	Buyer • lack of availability • information costs • performance uncertainty • hidden costs • relative advantage • complexity • observability
HB9.Positive communications from buyers and others about EEMs {17} lead to general increase in consumer demand for EEMs {19}	Widespread buyer market is informed about efficiency and EEMs and market demand increases	Market-wide buyers request and implement EEMs
Note: Numbers in brackets refer to actions and effects shown in the program theory modeled in Figure 2-1.		

Our data collection and analysis methodologies were designed to investigate these causal relationships and the extent to which the Program alleviated anticipated barriers. As described in last year's study, we created a matrix showing the links between the Program hypotheses and data collection and analysis activities.

2.1.2 Additional Interviews

To supplement the methodology used last year, we collected two additional types of data this year. First, we reinterviewed those real estate agents and lenders who participated in the 1999 Program and were interviewed last year. This provided information about the longer-term effects of the Program on market actor awareness, knowledge, and behavior. Second, this year we interviewed a sample of agents and lenders who have never participated in Program training seminars to develop baseline information about market actors' awareness, knowledge, and behavior.

2.2 DATA COLLECTION

The study utilized both surveys and statistical data. The surveys were conducted by telephone with real estate agents, lenders, and home owners. The statistical data used included the number of EEM closures and FHA loan closures by month in all areas of California.

In the previous Market Effects Studies, data were collected and reported primarily by HUD region because the Program was focused on the three HUD regions that closely coincide with the PG&E service territory—the Fresno, Sacramento, and San Francisco HUD regions. The counties in each HUD region are shown in Table 2-2.

Table 2-2
California Counties in HUD Regions

Fresno Region	Sacramento Region	San Francisco Region
Fresno, Kern, Kings, Madera, Mariposa, Merced, Stanislaus, Tulare	Alpine, Amador, Butte, Calavera, El Dorado, Glenn, Lassen, Modoc, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Siskiyou, Sutter, Tehama, Trinity, Tuolumne, Yolo, Yuba	Alameda, Contra Costa, Del Norte, Humboldt, Lake, Marin, Mendocino, Monterey, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma

To increase the accuracy of the match to PG&E's service territory this year, we used a zip code-based approach to define the geographic areas of interest. For comparability with the past studies, we continued to use the HUD regions to guide our sampling plan and to report some of the results.

2.2.1 Survey Sampling

We conducted interviews with the following groups:

- real estate agents who participated in Program training during 2000,
- lenders who participated in Program training during 2000,
- home buyers who purchased homes with EEMs during 2000,
- real estate agents who participated in Program training during 1999 and were interviewed last year,
- lenders who participated in Program training during 1999 and were interviewed last year, and
- real estate agents and lenders who have not participated in TOSER Program training.

Table 2-3 shows the survey quotas and numbers of completed interviews for the 2000 Program participant groups. We targeted completing about 50% more interviews with participants than we completed last year. Because Program activities were concentrated in the Fresno and Sacramento HUD regions, the largest samples were targeted in these areas. As can be seen in the table, the total number of interviews completed agreed closely with our targets, but the distribution across the geographic areas was considerably overrepresented in the Sacramento area and underrepresented in the San Francisco area. Significant efforts were made to match the targeted geographic distribution more closely, but in all groups we found it very difficult to find an adequate sample of respondents in the San Francisco HUD region.

Table 2-3
2000 Program Participants Survey Quotas and Completes by HUD Region

HUD Region	Agents		Lenders		Home Owners		Totals	
	Target	Achieved	Target	Achieved	Target	Achieved	Target	Achieved
Fresno	*27*	24	*12*	8	*20*	10	*59*	42
Sacramento	*27*	38	*12*	23	*20*	29	*59*	90
San Francisco	*14*	8	*6*	1	*10*	6	*30*	15
Totals	*68*	70	*30*	32	*50*	45	*148*	147

Table 2-4 summarizes the targets and number of completed interviews for follow-up interviews with 1999 Program participants and interviews with nonparticipants. We were able to complete interviews with less than half the real estate agents and lenders interviewed last year. This was due primarily to the fact that many of the people we interviewed last year were no longer with the same employer or we were unable to reach them after up to five phone calls. We were able to complete interviews with the target numbers of nonparticipants in each HUD region.

Table 2-4
Participant Follow-Up and Nonparticipant Survey Quotas and Completes by HUD Region

HUD Region	1999 Participant Follow-Up Interviews				Nonparticipants			
	Agents		Lenders		Agents		Lenders	
	Target	Achieved	Target	Achieved	Target	Achieved	Target	Achieved
Fresno	*14*	7	*8*	4	*18*	18	*12*	12
Sacramento	*14*	5	*8*	5	*18*	18	*12*	12
San Francisco	*7*	2	*4*	1	*9*	9	*6*	6
Totals	*35*	14	*20*	10	*45*	45	*30*	30

Supply-Side Actors

The samples of real estate agents and lenders who participated in 2000 Program training were selected randomly from the listing of records of EEM training attendees. As noted in Section 1, there was a total of 542 EEM training attendees in 2000, consisting of 397 real estate agents, 124 lenders, and 21 facilitator/energy specialists and others.

We used the census of 1999 Program participants whom we interviewed last year as the basis for follow-up interviews with real estate agents and lenders. We attempted to contact all 35 agents and 20 lenders interviewed last year, but, as noted above, we were able to complete interviews with only 24 of these 55 supply-side actors. Interviews were distributed across the companies to minimize the number of interviewees from a single company.

The samples of nonparticipant agents and lenders interviewed this year were drawn randomly from lists for these market actors in the counties served by PG&E. Those respondents who said that they had attended the TOSER training were screened out.

Home Owners

The sample of home owners was drawn from the HUD database of EEMs issued during 2000. We obtained phone numbers using reverse directories and other sources for addresses listed in the database. We were unable to obtain viable phone numbers for the majority of the listed addresses.

After obtaining phone number listings, we were still unable to complete interviews with nearly half the occupants because the phone was disconnected, the owner did not recall obtaining an EEM, the respondent refused, etc. As a result, the overall completion rate was very low—about 7% of the original address listing.

2.2.2 Loan and EEM Data

We obtained data on all EEM closures for the entire state of California from the HUD Santa Ana Home-ownership Center for 2000. This list allowed us to calculate the total number of EEM closures by month by zip code and HUD region.

We also obtained data on all FHA loan closures for 2000 from the same source. These data allowed us to compare the number of EEMs and FHA loans by zip code and HUD region.

HERS raters provided rating data for 150 homes in the PG&E service territory. These ratings provided information on the characteristics of homes before they were upgraded, the measures that were installed through the EEMs, and estimates of energy savings associated with the installed measures.

2.3 INSTRUMENT DESIGN

Surveys of real estate agents, lenders, and home owners provided key data on the market effects of the TOSER Program. The survey instruments utilized both structured and open-ended questions in order to permit quantification of most results, while allowing for commentary and anecdotal information from survey respondents. Several of the open-ended questions had a set of verbal "prompts" that served to motivate responses and ensure we obtained information on specific important issues. Additional substantive comments were recorded throughout the interviews and are incorporated in the discussion of results in this report.

To a large extent, the instruments used this year to interview Program participants were as consistent as possible with those employed last year. This consistency helped facilitate comparisons of responses across years. New instruments were developed for the interviews with nonparticipants and reinterviews of 1999 Program participants, but the questions were designed to maximize our ability to compare responses to those for the 2000 Program participants. Copies of the survey instruments can be found in Appendix A.

2.3.1 Real Estate Agent Instruments

The instrument for real estate agents who participated in the 2000 Program training consisted of 23 questions addressing the following topics:

- The value of the EEM training session
- Understanding of the EEM process, pre- and post-training
- Understanding and discussion of energy efficiency, pre- and post-training
- EEM promotional activity, pre- and post-training
- Motivations for promoting EEMs, pre- and post-training
- Perceived barriers to increased use and promotion of EEMs, pre and post training
- Suggestions for increasing overall EEM use and acceptance.

As indicated above, several of the questions asked respondents to provide ratings, using a six-point scale, both prior to the training as well as after the training in order to provide data on the effect of the training on knowledge and behaviors.

The instrument used to reinterview those 1999 participating real estate agents interviewed last year consisted of 12 questions. The questions were a subset of those in the instrument for 2000 participants. They were modified slightly to capture information over the longer time period that had elapsed since these participants took the Program training.

The instrument for interviewing nonparticipating real estate agents comprised 12 questions plus several questions to obtain statistical and descriptive business information. The questionnaire also included a screening question to eliminate those agents who had participated in the TOSER Program training. The primary questions addressed the following:

- Awareness and knowledge of EEMs
- Understanding of the EEM process
- Understanding and discussion of energy efficiency with customers
- Understanding of EEMs and discussion with customers
- Motivations for promoting EEMs
- Perceived barriers to increased use and promotion of EEMs
- Level of interest in receiving training on EEMs
- Suggestions for increasing overall EEM use and acceptance.

2.3.2 Lender Instruments

The instrument used to interview lenders who participated in the 2000 Program training contained 23 questions and addressed the same topics as the real estate agent instrument listed above. Where appropriate, prompts were edited to reflect the difference in role and perspective of the lender.

The instrument used to reinterview those 1999 participating lenders interviewed last year was essentially the same as the corresponding instrument used to reinterview agents.

The interview instrument for nonparticipating lenders contained essentially the same questions as the instrument for nonparticipating agents.

2.3.3 Home Owner Instrument

The survey instrument for home owners consisted of 19 substantive questions and several demographics questions. It began with screening questions designed to eliminate respondents who did not obtain or recall obtaining an EEM or who had bought a new home. The instrument addressed the following topics:

- Understanding of the EEM process
- EEM information sources

- Familiarity with the home energy rating process
- Energy-efficiency measures installed
- Motivations for using an EEM
- Problems (barriers) associated with using an EEM
- Satisfaction with the EEM process
- General suggestions for improving the EEM process
- Demographics.

2.4 DATA ANALYSIS

This subsection outlines the data analysis methods used with the survey and statistical data collected for this study.

2.4.1 Survey Data

As noted earlier, the survey instruments contained both structured and open-ended questions. The structured questions provided quantitative data using 4- or 6-point scales. For these quantitative variables, analysis techniques included 1) determining the ranges of values, 2) calculating percentages, 3) calculating differences in means for pre- and post-intervention ratings, and 4) calculating correlations between variables. The qualitative data provided through the open-ended questions were reviewed and summarized and incorporated as appropriate into the discussion of results.

We used the survey data from reinterviewing 1999 Program participants to examine changes in understanding and practices since last year. We calculated quantitative measures for the agents and lenders who were reinterviewed; because the original and current sample sizes were so small the quantitative comparisons could not be made with statistical confidence. Consequently, our analysis stressed the identification of patterns and trends rather than numerical differences.

The survey data from nonparticipating lenders and agents were analyzed using the same approaches used with the participants' data. The results for nonparticipants permitted us to make comparisons with the participants' results and draw some inferences about the effects of the Program.

2.4.2 Statistical Data

The total number of EEMs and FHA loan closures in 2000 were calculated by month, by zip code and overlapping HUD region. These data were obtained from the U.S. Department of Housing and Urban Development (HUD) CHUMS database. The EEMs were only those issued in conjunction with FHA loans. These EEMs, therefore, excluded any that were implemented through conventional loans; however, the number of conventional loan EEMs has been very small so far.

We used the FHA loan and EEM data in two ways. First, we aggregated the data to calculate the overall numbers of loans and EEMs and to determine trends over time. These data provided aggregate statistics. Second, we used these data to investigate the relationship between the Program training statistics and trends in EEMs and the EEM penetration rate (number of EEMs/number of FHA loans). We used statistical techniques to examine these relationships and looked at various levels of data aggregation from the 5-digit zip code level to the county level.

2.4.3 HERS Ratings Data

The HERS ratings we obtained for 150 homes allowed us to analyze the energy savings associated with EEMs.

We entered the key data from each rating into an Access database and analyzed the electricity (kWh) and natural gas (therms) savings for each building component and equipment upgraded through the EEM. These analyses provided estimates of the savings by measure installed and also overall savings for each home that was upgraded through an EEM.

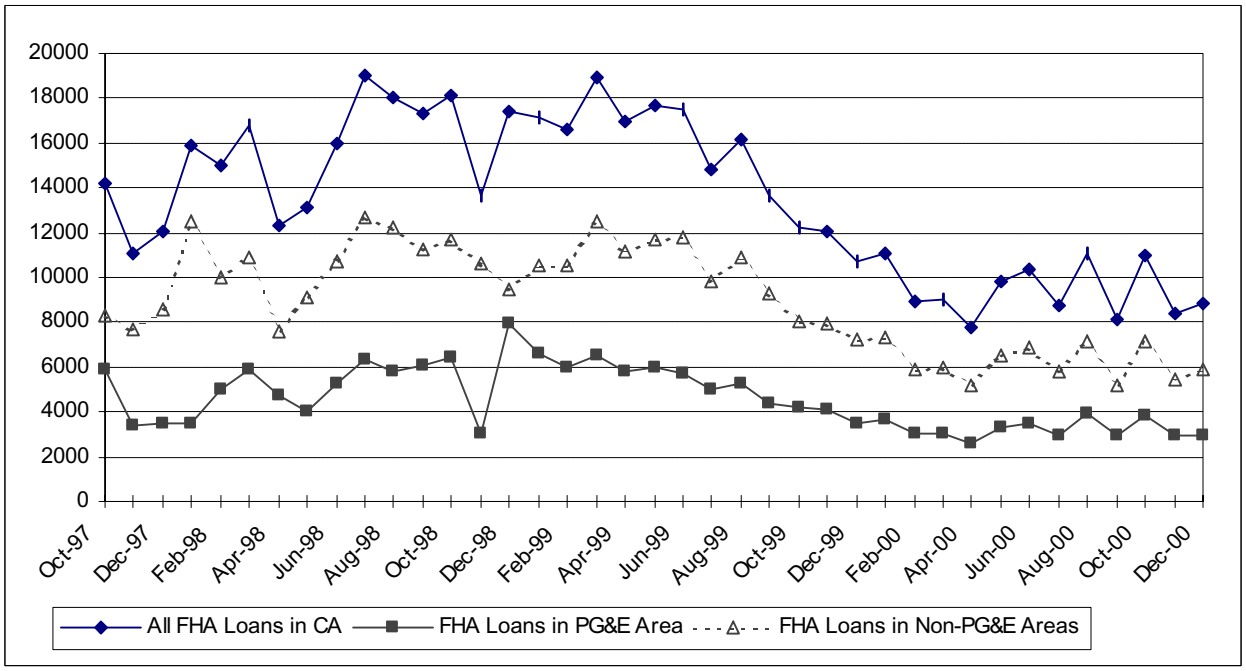
3 LOAN AND EEM DATA

This section presents FHA loan and EEM data. HUD provided these data in electronic databases from its CHUMS data system. The EEMs recorded in this database were those issued in conjunction with FHA loans, which have traditionally been the vast majority of EEMs. We used these data to document how the numbers of FHA loans and EEMs, and the percentage of FHA loans that were EEMs, have varied over time.

3.1 FHA LOANS

Figure 3-1 shows the number of FHA loans closed by month from October 1997 through December 2000 for the regions with PG&E territory zip codes, those with zip codes outside of PG&E territory, and for California as a whole. In 1999 there were 184,285 FHA loans closed in California—62,953 of the loans were within PG&E territory and 121,332 were outside it. In 2000, the number of FHA loans closed totaled113,113 statewide; 38,723 of them were within PG&E territory. As shown in the graph below, the number of FHA loans has decreased almost steadily since mid-1999; between 1999 and 2000 the number of FHA loans in the PG&E area fell 38% and outside the PG&E area the number declined 39%. Within the PG&E territory, the number of closed FHA loans has been on the decline since December 1998. Outside of the PG&E territory, the decline began in April 1999.

Figure 3-1
FHA Loans in California

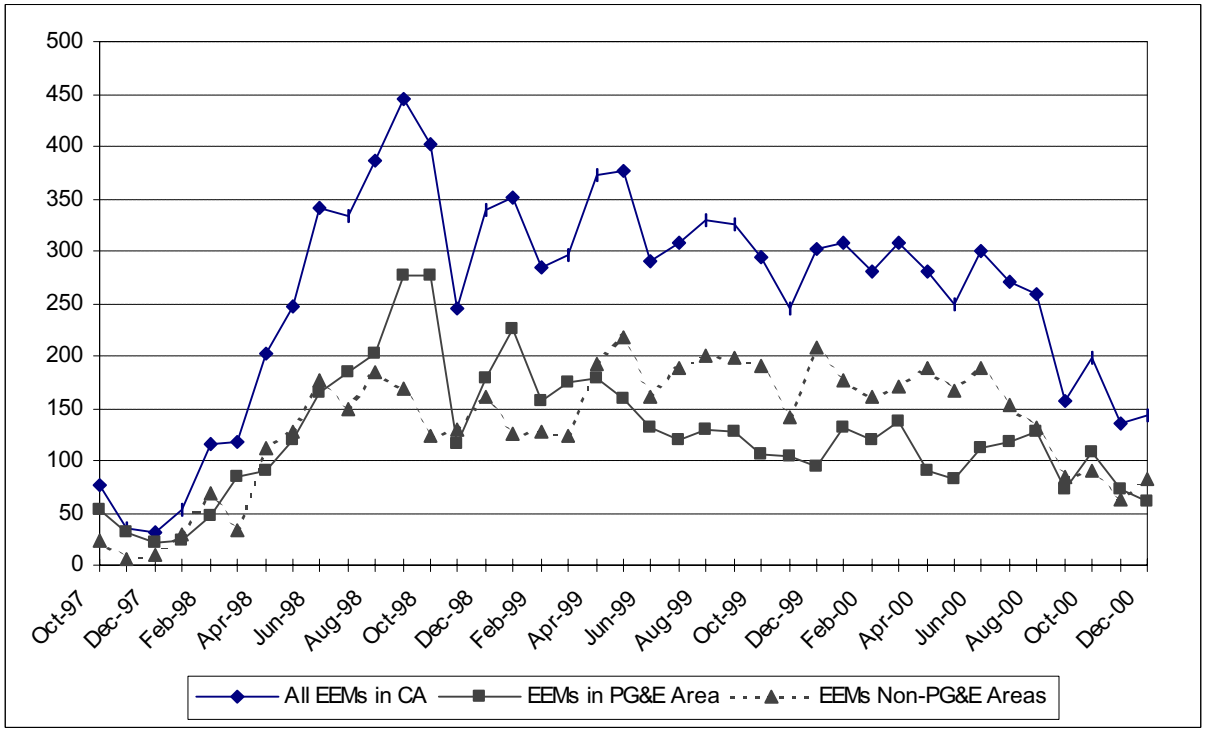


3.2 EEMs

Figure 3-2 illustrates the trends in the number of FHA EEMs during the past three years. From October 1997 through December 2000, the number of EEMs implemented in the PG&E area has totaled 4,804. Between 1997 and 1998, the number of EEMs increased dramatically both in the PG&E territory and outside it. The increase was more significant in the PG&E area, where the initial third-party EEM program was conducted. The number of EEMs in the PG&E area peaked in late 1998.

In 1999, there were 1,706 EEMs in the PG&E area and 2,072 in the rest of the state. In 2000, there were 1,229 EEMs in the PG&E area and 1,659 in the rest of the state. The number of EEMs declined by 28% in the PG&E area and 20% in the rest of the state between 1999 and 2000. For most of 1999 there were more EEMs outside of PG&E territory each month than within it. In the non-PG&E territory there was a sharp decrease in EEMs in November 1999, followed by a jump in December. Since then the number of EEMs per month has fluctuated with a slight downward trend at the end of 2000.

Figure 3-2
EEMs by Area

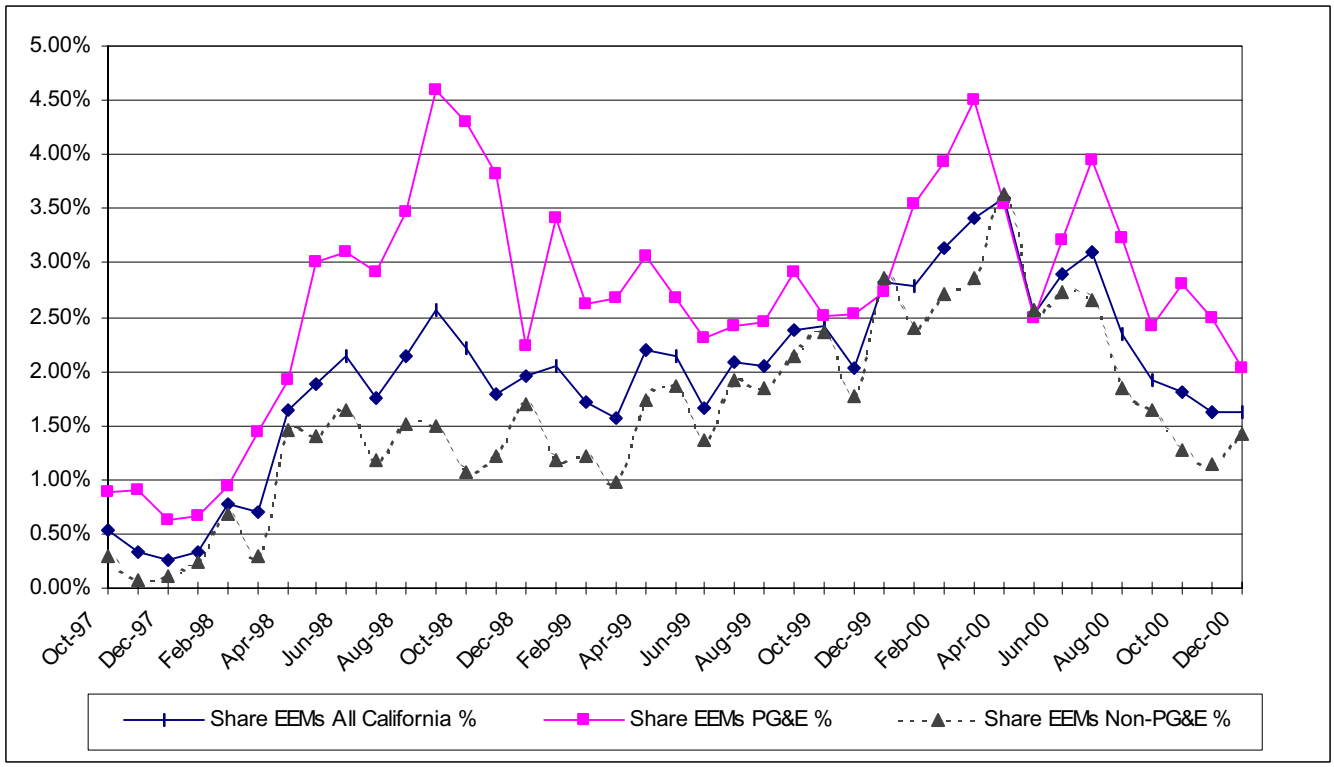


3.3 EEM PENETRATION RATES

To partially control for the trend in FHA loans and provide a more accurate comparison of EEM activity, Figure 3-3 shows EEMs as a percentage of the total number of FHA loans over this period. We defined this percentage as the EEM penetration rate. This percentage partially controlled for overall trends in home sales, so that remaining trends were more likely to be due to the TOSER Program (and its predecessor, the EAHAP). Of course, these numbers did not account for other major factors such as the number of loans that were not FHA insured or demographic changes that might have affected the number of EEMs.

The EEM penetration rate in the PG&E region has been higher than the rate in the remainder of California for all but three months. The penetration rate in the PG&E area jumped significantly in mid-1998, which, as was noted earlier, was the period when the EAHAP training began.

Figure 3-3
EEMs as Percentage of FHA Loans



As Table 3-1 illustrates, the EEM penetration rate increased between 1999 and 2000 both within the PG&E area and outside it. The statewide average penetration rate for 2000 was 2.6%, compared to 2.1% for all of 1999. The average percentage within the PG&E territory increased from 2.7% for all of 1999 to 3.2% in 2000, while the percentage outside of PG&E territory increased from 1.7% for all of 1999 to 2.2% during 2000. Within the PG&E territory, the EEM

penetration rate in 2000 peaked in March, with EEMs that month representing 4.5% of FHA loans.

Table 3-1
EEM and FHA Loan Activity

	Within PG&E Territory		Outside of PG&E Territory		All of California	
	1999	2000	1999	2000	1999	2000
EEM Loans	1706	1229	2072	1659	3778	2888
FHA Loans	62953	38723	121332	74390	184285	113113
Percentage	2.7%	3.2%	1.7%	2.2%	2.1%	2.6%

Table 3-1 illustrates clearly why normalizing the EEM activity by FHA loan activity is important when comparing the number of EEMs over time and across areas. The number of FHA loans decreased markedly from 1999 to 2000, with a statewide monthly average of 15,357 in 1999 and 9,426 in 2000. While the average number of FHA loans per month statewide decreased by 39%, the average number of EEMs closed per month statewide decreased only 24%, from 315 per month in 1999 to 241 in 2000. Within PG&E's territory, the monthly average of FHA loans dropped by 38% from 5,246 in 1999 to 3,227 in 2000 and the monthly average of EEMs dropped 28% from 142 in 1999 to 102 in 2000.

Comparing EEM to FHA loan ratios between the area covered by the TOSER Program and the rest of California provided a better indication of whether or not the TOSER Program has played a role in increasing the penetration of EEMs than just considering the number of EEMs. Normalizing the EEM numbers using the total number of FHA loans shows that, despite a drop in the absolute number of EEMs, the EEM penetration rate in the PG&E Program area continued to increase in 2000 and the difference between the penetration rates in the PG&E and non-PG&E areas was the same as it was last year.

While these data alone were not complete enough to control for other factors, they showed that the trends were consistent with the hypothesis that the Program has had an effect on the penetration of EEMs in the Program area. The 1999 Market Effects Study made the same observation in comparing data for 1998 and 1999.

4 AGENTS AND LENDERS

This section presents results from our interviews with real estate agents and lenders. We conducted three sets of interviews. The first was with market actors who attended TOSER Program training in 2000. The second was with lenders and agents who had not attended any Program training. The final group interviewed was those agents and lenders we interviewed last year who had attended 1999 Program training.

We note that the sample sizes were relatively small for all groups, especially in cases where we examined differences across HUD regions or between specific subgroups. In these cases, statistically valid comparisons were often not possible. For example, we were able to reinterview only 10 of the 1999 lender participants so inferences about changes from last year to this year were difficult to make, as were comparisons to other groups.

This section presents summary information about the interviewees first. This is followed by results for the 2000 Program participants. Results from the nonparticipant interviews are presented next. Finally, survey data are presented from the reinterviews of 1999 participants.

4.1 CHARACTERISTICS OF INTERVIEWEES

This subsection presents summary information for the three primary interviewee groups.

4.1.1 2000 Program Participants

During late-September and early October 2000, we interviewed 70 real estate agents and 32 lenders who had attended TOSER Program seminars within the preceding few months. The real estate agents represented 47 different companies or offices, and no more than 6 were from any individual office. The lenders interviewed represented a total of 17 different lending or mortgage companies.

Table 4-1 presents summary information about the 2000 Program participating real estate agents and lenders interviewed. On the average, the agents had attended the training about 6 months and the lenders about 4 months earlier. The agents averaged 1.5 closures per month and the lenders averaged 3.8 homes financed per month. The share of HUD Real Estate Owned (REO) homes was over 10% for both groups, significantly more than last year. The agents indicated that about 11% of the homes they closed had EEMs and the lenders stated that 3.5% of their loans were EEMs (based on both existing and new homes).

Table 4-1
2000 Program Real Estate Agent and Lender Interviewee Summary Information

	Real Estate Agents	Lenders
Number interviewed by HUD region		
Fresno	24	8
Sacramento	38	23
San Francisco	8	1
Total	70	32
Number of days since attending training, mean	177	139
Homes closed/financed per month since training, mean	1.5	3.8
REO homes sold/financed since training, %	13%	11%
Homes with EEMs since training, %	11%	3.5%
Note: The relatively large proportion of REO homes sold/financed is due to a small number of agents/lenders who were very active in this market.		

4.1.2 Nonparticipants

Table 4-2 presents summary information about the nonparticipating real estate agents and lenders interviewed. In the last six months, the agents had 2 closures per month, on the average, and the lenders averaged 6.6 homes financed per month. The share of HUD Real Estate Owned (REO) homes was 12% for the agents and 10% for the lenders. The percentage of homes financed with EEMs was much lower than for Program participants as shown in Table 4-1.

Table 4-2
Nonparticipant Real Estate Agent and Lender Interviewee Summary Information

	Real Estate Agents	Lenders
Number by HUD region		
Fresno	18	12
Sacramento	18	12
San Francisco	9	6
Total	45	30
Homes closed/financed per month for the last 6 months, mean	2.0	6.6
REO homes sold/financed since training, %	12%	10%
Homes with EEMs in past 6 months, %	1.0%	1.3%

4.1.3 1999 Participants

During October and November 2000, we also conducted follow-up interviews with 1999 Program participants whom we interviewed last year. Table 4-3 shows that 40% of these real estate agents and 50% of these lenders were reinterviewed. As noted above, because of the small sample sizes, the results from the follow-up interviews should be treated as qualitative indications of differences and similarities, but not statistically reliable quantitative results.

Approximately 15 months had elapsed on the average since the 1999 participants had attended training. The number of closings for the agents ranged between one every 4 months to 10 per month. The number of homes financed by the lenders varied from one (1) to 33 per month. Consistent with the findings for the 2000 Program participants, the agents and lenders significantly increased their transactions of HUD real estate owned (REO) homes in 2000. EEMs constituted almost 13% of home sales by these agents in 2000, compared to 2.5% in 1999, but comprised only 0.4% of the lenders' loans this year compared to 4% last year. The agents' EEMs were dominated by a small number of agents, while no lender indicated she had processed more than four (4) EEMs since taking the training. As noted above, the small sample sizes prevented these statistical results from being reliable estimates for the 1999 Program participant population.

Table 4-3
1999 Program Interviewee Summary Information

	Real Estate Agents	Lenders
Number interviewed in 1999	35	20
Number reinterviewed in 2000	14	10
Number of days since attending training, mean	447	457
Homes (existing) closed/financed per month since training, mean	2.0	6.6
REO homes sold/financed since training, %		
1999 interview	4.1%	5.9%
2000 interview	9.6%	11.8%
Homes with EEMs since training, %		
1999 interview	2.5%	4.0%
2000 interview	12.6%	0.4%
Note: The relatively large proportion of REO homes sold/financed is due to a small number of agents/lenders who were very active in this market.		

Section 4.2 presents results for the 2000 Program participants. Section 4.3 presents the nonparticipant results. Section 4.4 presents results for 1999 Program participants whom were reinterviewed this year.

4.2 2000 PROGRAM PARTICIPANTS

The following discussion summarizes the data for both real estate agents and lenders who participated in TOSER Program training during 2000.

4.2.1 Effectiveness of Seminars

This subsection discusses the effectiveness of the 2000 Program seminars in communicating information and understanding about EEMs.

Awareness and Understanding of EEMs

Table 4-4 shows the percentage of real estate agents and lenders interviewed who indicated that they were aware of EEMs prior to the seminars. The lenders showed a very high pre-seminar awareness rate. The overall awareness rate was higher this year than last, especially among the participating Sacramento lenders, of whom only 38% had prior awareness in 1999. The level of prior awareness for the other groups increased between one and 13 percentage points compared to values for the 1999 participants.

Table 4-4
Prior Awareness of EEMs

Location	Real Estate Agents	Lenders
Fresno	63%	75%
Sacramento	37%	100%
San Francisco	38%	100%
Average for all areas	46%	94%

To determine what understanding the seminars had communicated to the attendees about EEMs and what information attendees would communicate to buyers, we asked how each person would describe an EEM to a buyer. Prior to the interviews, we identified several key characteristics that are fundamental to EEMs. If a respondent did not mention one of these characteristics in his description, we prompted him to determine whether he agreed that it was an important characteristic and had neglected to mention it initially. For real estate agents these characteristics were the following:

- EEMs facilitate making energy-efficiency retrofits in existing homes.
- EEMs can increase a home's value by making it more efficient.
- EEMs reduce bills for heating and cooling.

Because of the different role and perspective of lenders, we prompted on the following characteristic instead of heating/cooling bill reductions when we interviewed lenders:

- EEMs stretch the amount that a buyer can borrow to cover the cost of efficiency improvements.

Table 4-5 summarizes the responses of the two groups. Real estate agents were most likely to mention (unprompted) the benefit of EEMs in 1) making efficiency retrofits possible, 2) reducing utility bills, and 3) increasing the home value by making it more efficient. These results were similar to those from the 1999 interviews, but the percentage of agents that gave these responses was considerably lower in this year's survey. When the real estate agents were prompted on these three characteristics, at least 70% said that they *did* mention them to buyers. Very few agents mentioned the EEM dollar limits, how utility bill savings offset the higher monthly

payment, or the eligibility of new homes. Similar to the results from 1999, other comments from agents indicated that they would mention comfort and environmental improvements to buyers.

Table 4-5
EEM Characteristics Mentioned To Buyers

EEM Characteristics Mentioned	Real Estate Agents	Lenders
Facilitate efficiency retrofits (in existing homes)	40% (70% when prompted)	28% (75% when prompted)
Can increase home value by making it more efficient	27% (83% when prompted)	38% (91% when prompted)
Saves on utility bills	39% (90% when prompted)	41%
Stretches qualifying ratio	13%	6% (34% when prompted)
Dollar amount that can be included in the EEM	11%	9%
Increases monthly mortgage payments, which are offset by utility savings	1%	16%
Eligible homes include existing and new construction	1%	0%
Other characteristics volunteered by respondents	24%	19%

The lenders' most common response, unprompted, was that they would mention that an EEM would reduce utility bills. The second most common response was that an EEM could increase the home value by making it more efficient. The third most common response was that EEMs facilitate efficiency retrofits in existing homes. When prompted, at least 75% of the lenders indicated that they mentioned the latter two characteristics. Although the rankings were similar to the results from 1999, the percentages differed considerably. Because of the small sample sizes, however, these differences were not deemed to be statistically significant.

It is important to note that only about 10% of the real estate agents and lenders indicated that they would mention the EEM dollar ceilings. In addition, almost two-thirds of the agents and over 40% of the lenders said they did not know what the dollar limits were. Only about 20% of the agents could identify the correct EEM limits, while over 40% of the lenders could do so.

We next asked respondents to describe the process used to obtain and implement an EEM. Their responses provided insights into what they had learned from the seminar about the EEM process.

Table 4-6 shows that, as was the case in the 1999 survey, the lenders were generally more likely than real estate agents to mention the major features of the process. Lenders and agents both mentioned most often that the buyer had to find a lender who would include the upgrade costs in the loan or mortgage. In 1999, this feature also was the one most often mentioned by agents, and

Table 4-6
EEM Process Features Mentioned to Buyers

EEM Process Features Mentioned	Real Estate Agents	Lenders
Energy rating (HERS) required for efficiency retrofits	11% (41% when prompted)	22% (44% when prompted)
Lender will process loan as an EEM	54%	81%
Can work with facilitator to implement retrofits	11%	34%
Installs efficiency retrofits in existing homes	6%	9%
Role of real estate agent	41%	25%
Other features volunteered by respondents	30%	28%

it was mentioned second most often by the lenders. Real estate agents also frequently mentioned the involvement of agents in the process, while lenders focused more on the role of facilitators. There was a substantial decrease from 1999 in the proportion of lenders and agents who said they mentioned the HERS energy rating; the shares dropped from 85% for lenders and 50% for agents in 1999 (when prompted).

To assess the effect of the seminars on participants' understanding of EEMs we asked participants to rate their understanding of EEMs currently and prior to attending the seminar, on a scale from 0 to 5. The ratings (see Table 4-7) indicated that prior to the training, the lenders had a better understanding of EEMs than the real estate agents—only 16% of the agents rated their prior understanding as high (4 or 5 on the 0 to 5 scale), but 30% of the lenders did so. Both agents and lenders increased their average self-rated understanding significantly after the seminar. About 40% of the agents rated their post-seminar understanding as a 4 or 5 and two-thirds of the lenders did so. Based on these self-reported ratings, the seminar substantially increased the average understanding reported by the participants.

Table 4-7
Understanding of EEMs Before and After Seminar

Level of Understanding	Real Estate Agents		Lenders	
	Before	After	Before	After
High (4-5)	16%	39%	30%	66%
Medium (2-3)	34%	54%	33%	31%
Low (0-1)	50%	7%	37%	3%
Average	1.6	3.2	2.4	3.8
Note: Scale ranges from 0 = no understanding to 5 = complete understanding. Results before training are reported only for agents and lenders who were aware of EEMs.				

The average level of understanding after the seminar was very close to the results for 1999, which showed averages of 3.5 for agents and 4.0 for lenders. It is important to note, however, that the average level of understanding before the seminar this year increased significantly from last year's averages of 0.7 for agents and 1.9 for lenders.

Understanding of HERS and Energy Snapshot

We also asked seminar participants to rate their understanding of the HERS before and after the seminar (see Table 4-8). The percentage increase in the high level ratings for understanding HERS was similar to that for EEMs. The average rating after the seminar was slightly lower for both groups than the average EEM understanding rating.

Table 4-8
Understanding of HERS Before and After Seminar

Level of Understanding	Real Estate Agents		Lenders	
	Before	After	Before	After
High (4-5)	6%	27%	10%	45%
Medium (2-3)	18%	56%	32%	48%
Low (0-1)	76%	16%	58%	6%
Average	0.9	2.9	1.4	3.2
Note: Scale ranges from 0 = no understanding to 5 = complete understanding. Results before training are reported only for agents and lenders who were aware of HERS.				

We asked each respondent whether she had heard of the Energy Snapshot. Awareness was considerably higher than in 1999—55% of the agents said they had heard of it, an increase from 21% in 1999, and 61% of the lenders said they had, up from 35% in 1999. When asked what they considered the advantages of the Energy Snapshot to be, agent and lender responses indicated that they had a good understanding of the Energy Snapshot, and both groups stressed the value of the information to the home buyer.[1]

- "Saves the $200 to do a full HERS. If the house is in a location of high energy use you can find out without having to start the process of a HERS and leave the decision open for an EEM."
- "You have to have a starting point and the Energy Snapshot tells you if you need any upgrades."
- "It does give you an evaluation of where the house currently stands. It provides the homeowner with options of what can be done to lessen the home's energy use."
- "Somebody could have this done and find out what needs to be done and if the EEM can't pay for it all they still know what improvements can be done after escrow closes."

[1] We note that the Energy Snapshot was modified during this year and the comments provided by interviewees may have reflected different versions of the Energy Snapshot.

Usefulness of Information and Dissemination

When asked whether the training provided each participant with all the information, resources, and contacts necessary to discuss an EEM with buyers, the responses were mostly affirmative, as they were in 1999. Ninety-one percent of the agents and 94% of the lenders said that the seminars had provided everything they needed.

Each participant was asked to identify what information from the training class was most useful. In 1999, the most common response for agents and lenders was simply that the program existed. This year, consistent with the higher pre-training EEM awareness levels, this factor was mentioned far less frequently. As shown in Table 4-9, the lenders most often said that information on how to implement EEMs was the most useful—50% of the lenders indicated that this was the most helpful information from the seminar. About 20% of the agents said that either the class materials, the benefits of EEMs, or the class overall were the most helpful.

Table 4-9
Information from the Class Considered Most Helpful

Information Category	Real Estate Agents	Lenders
Existence of the EEM program	14%	3%
Refresh memory	3%	0%
Materials: handouts and presentation	22%	9%
How to implement	11%	50%
No one thing/overall class and materials, presenter	21%	6%
Benefits of EEMs	21%	13%
Sources of help	3%	6%
Nothing	3%	13%
Continuing Education Credits	2%	0%
Note: Some respondents gave multiple responses		

In 1999, one-fifth of the lenders indicated that they had received previous information or training about EEMs *and* that the most useful information from the seminar was just an overall refresher of what they already had learned. This year, 30 (of 32) lenders had prior knowledge about EEMs and none of them thought it was important that the course refreshed their previous knowledge. Eleven percent of the agents said that information about different aspects of implementation was the most important, down from 20% in 1999. Consistent with the higher pre-training EEM awareness level in 2000, only 14% of the agents thought that just learning of the existence of the EEM program was the most helpful information gained, down from 23% in 1999.

When asked why they rated the type of information they did as the most important, the most common response of the agents and lenders was that it made them more helpful to the buyers

they worked with. A few agents called the EEM information a good selling tool, offering a way for the buyer to achieve energy savings.

To assess the dissemination of information from the training, we asked each respondent how often he or she had told other lenders or agents about EEMs since taking the class. Table 4-10 shows that, as was the case in 1999, real estate agents were less likely than lenders to have told other professionals about EEMs. One-fifth of the agents said they had not told any other professionals; but only 3% of the lenders gave this response. Nineteen percent of the agents said they had told other professionals often or very often and 38% of the lenders said they had told other professionals often or very often. These results were very comparable to those from the 1999 surveys.

Table 4-10
How Often Respondent Has Told Other Professionals about EEMs

Frequency	Real Estate Agents	Lenders
0 = Never	21%	3%
1 = Rarely	28%	23%
2 = Sometimes	32%	35%
3 = Often	12%	19%
4 = Very often	7%	19%
Average	1.6	2.4

Suggestions for Improving Seminars

We asked the participants to provide their suggestions for improving the training and materials. Forty-four percent of the agents and 62 % of the lenders offered suggestions. The others felt there were no changes that they would suggest.

The recommendations were concentrated in the following areas for both real estate agents and lenders, listed in the order of how often they were mentioned:

- More information should be provided, especially about implementation of EEMs, energy savings, energy audits, cost comparisons and breakdowns, where EEMs are available, how EEMs compare with other efficiency programs, and using EEMs with conventional loans.
- Additional materials should be provided such as lists of EEM lenders and contacts, illustrated handouts or pamphlets for review and to give to buyers, a qualification sheet for HUD borrowers, and a list of exactly what can be obtained with an EEM.
- Refresher classes should be conducted to maintain their level of awareness and understanding after the seminar. Some suggested mail-out updates.

- The information should be presented more clearly, with longer classes and more repetitive lessons. One respondent wanted a clearer explanation of the Energy Snapshot. One suggested that an opportunity should be provided to watch an EEM being prepared.
- EEMs should be more widespread, advertised to the public, and accepted among conventional lenders. It was suggested that energy-efficiency raters educate and work with appraisers.
- Other suggestions included using instructors with good speaking skills instead of videotapes, and allowing any general contractor to do the improvements rather than just those on an approved list.

The gist of the suggestions was to gather clear, step-by-step information on every aspect of the EEM process from start to finish to allow the lender and agent to be of better assistance to buyers. These recommendations were consistent with those made in 1999.

4.2.2 Program Market Effects—Energy Efficiency

As noted earlier, the objective of the TOSER Program is primarily to alleviate many of the barriers related to implementing EEMs rather than directly reducing barriers to energy efficiency—efficiency barriers are targeted by the EEM mechanism itself. Nevertheless, the TOSER seminars provided information about energy efficiency that would be expected to help increase awareness and alter behaviors related to energy efficiency.

We asked participants to rate their general understanding of energy efficiency prior to and after attending the seminar. Based on the self-reported information, Table 4-11 shows that the understanding of both lenders and agents improved significantly as a result of the seminar. After the seminars, between 60% and 66% of respondents in both groups rated their understanding as a 4 or 5 on a scale from 0 to 5, down from about 90% for both groups in 1999. Keeping the small sample sizes in mind, these results suggested that the seminars had been less effective this year than in 1999 at increasing participants' understanding of energy efficiency in general.

Table 4-11
Understanding of Energy Efficiency Before and After Seminar

Level of Understanding	Real Estate Agents		Lenders	
	Before	After	Before	After
High (4-5)	25%	61%	19%	66%
Medium (2-3)	33%	36%	47%	31%
Low (0-1)	42%	3%	34%	3%
Average	2.3	3.9	2.2	3.8
Note: Scale ranges from 0 = no understanding to 5 = complete understanding				

To assess the influence of the seminars on general communications about energy efficiency to buyers, we also asked agents and lenders to rate their likelihood of discussing energy efficiency with clients before and after the seminar. Table 4-12 shows that, as was the case in 1999, both

groups increased their likelihood of discussing efficiency by a significant amount. Real estate agents were less likely, on the average, to discuss efficiency before the seminar. The results for lenders were similar to those from the 1999 surveys, but agents were considerably less likely this year than in 1999 to discuss energy efficiency after the seminar. The results for agents were consistent with the fact that they rated their post-seminar level of energy-efficiency understanding lower this year.

Table 4-12
Likelihood of Discussing Energy Efficiency with Buyers Before and After Seminar

Likelihood of Discussing Energy Efficiency	Real Estate Agents		Lenders	
	Before	After	Before	After
High (4-5)	17%	27%	34%	59%
Medium (2-3)	16%	41%	28%	25%
Low (0-1)	67%	31%	38%	16%
Average	*1.4*	*2.5*	*2.3*	*3.5*
Note: Scale ranges from 0=not at all likely to 5=very likely				

4.2.3 Program Market Effects—EEM Promotion and Market Barriers

This subsection discusses the EEM market barriers and the effects of the Program on these barriers. It first presents agent and lender perceptions *after attending the seminar* about the benefits of being knowledgeable about EEMs and the type and level of EEM promotion they provide. It next presents results involving a set of potential barriers that could impede the implementation of EEMs and how the Program has affected them. The final subsection presents suggestions for improving the EEM process.

EEM Promotion

One anticipated effect of the TOSER Program seminars is an increase in the level of EEM promotion by agents and lenders. We obtained information through the interviews about several aspects of promotion.

Discussing and Recommending EEMs

We asked the seminar attendees questions related to their promotion of EEMs and the effects of the seminar. Table 4-13 shows that, prior to the seminar, 63% of the real estate agents were unlikely to mention EEMs to buyers. After attending the seminar, however, about 80% had a medium to high likelihood of discussing EEMs. Although the likelihood of discussing EEMs increased substantially, the likelihood after the seminar was notably less than in 1999. In 2000, 68% of the agents reported discussing EEMs with at least one buyer since taking the training. The agents who did not discuss EEMs after the seminar cited the lack of knowledge and information on both the supply and demand sides as the main barriers.

Table 4-13 also shows that, after the seminar, lenders were more likely than agents to discuss EEMs. In 1999, the real estate agents and lenders were about equally likely to discuss EEMs after the seminar. Only 6% of the lenders said that even after the seminar they were very unlikely to discuss EEMs, a decrease from 20% in 1999. Ninety-three percent of the lenders in 2000 reported discussing EEMs with at least one buyer. Most of the lenders said they described EEMs to buyers by explaining the amount that could be added to a loan.

Table 4-13
Likelihood of Discussing EEMs with Buyers Before and After Seminar

Likelihood	Real Estate Agents		Lenders	
	Before	After	Before	After
High (4-5)	16%	39%	37%	63%
Medium (2-3)	22%	39%	30%	31%
Low (0-1)	63%	23%	33%	6%
Average	1.5	2.9	2.6	4.0
Note: Scale ranges from 0 = not at all likely to 5 = very likely				

We also asked each interviewee about the likelihood that she would recommend an EEM to a buyer. As shown in Table 4-14, real estate agents were slightly more likely to recommend EEMs than to discuss them, probably because of the knowledge level required for discussion of the various aspects of EEMs. Lenders, on the other hand, were slightly less likely to recommend EEMs than to discuss them. As with the likelihood of discussing EEMs, the share of agents who were likely to recommend EEMs dropped from 1999.

Table 4-14
Likelihood of Recommending EEMs to Buyers Before and After Seminar

Likelihood	Real Estate Agents		Lenders	
	Before	After	Before	After
High (4-5)	10%	46%	28%	55%
Medium (2-3)	29%	41%	41%	32%
Low (0-1)	61%	13%	31%	13%
Average	1.5	3.4	2.4	3.7
Note: Scale ranges from 0 = not at all likely to 5 = very likely				

The results by area showed that real estate agents in the Sacramento region were the least likely to discuss or recommend EEMs. As was the case in 1999, agents in the Fresno area were the most likely to recommend EEMs.

We also obtained data on how often each respondent actually had discussed or recommended EEMs since the training. These data showed the following:

- On the average, each real estate agent had discussed or recommended an EEM to eight (8) buyers. Last year's survey showed an average of two (2) per agent, but during a post-training time span about half what it was this year. Sixty three percent had mentioned EEMs to at least one buyer, up from 45% in 1999.
- Lenders had discussed EEMs with or recommended them to a much larger number of buyers than agents had—16 on the average (only one more than last year). Seventy-eight percent had mentioned EEMs to at least one buyer, similar to 80% last year.

Reasons for Promoting EEMs

In addition to informing the attendees about the EEM program, the seminars were likely to increase awareness about factors that might motivate agents and lenders to promote EEMs. We asked attendees to indicate how important they thought several possible reasons were to them for being prepared to discuss and promote EEMs. These questions helped identify what factors they learned about through the seminar and their own experience that might motivate them to promote EEMs. Table 4-15 presents the results.

Table 4-15
Importance of Reasons for Promoting EEMs

Reasons for Promoting EEMs	Importance					
	Real Estate Agents			Lenders		
	None	Somewhat	Very	None	Somewhat	Very
Useful as a sales tool	23%	48%	29%	34%	34%	31%
Part of better customer service	1%	34%	64%	0%	41%	59%
Allow buyers to improve efficiency and qualify for financing	1%	52%	46%	0%	25%	75%
Reduce loan default rate	*	*	*	22%	38%	38%
More buyers are asking about them	42%	27%	32%	41%	34%	16%
More real estate agents are promoting them	*	*	*	34%	31%	28%
More lenders are promoting them	28%	38%	34%	*	*	*
Help conserve resources and improve the environment	3%	13%	84%	3%	16%	81%

Real estate agents mentioned conservation of resources and environmental benefits most often (84%) as a very important reason to promote EEMs. However, only 19% identified this as the *most* important reason. This was in contrast to 1999 when the reason mentioned most often as being very important was that EEMs allowed the buyer to improve the efficiency of a home and still qualify for a loan. Sixty-four percent of the agents also thought that promoting EEMs was an important part of better customer service, as did 63% of the agents in 1999. Agents'

comments suggested that from their perspective EEMs added value to the home and made it more sellable.

Lenders also were most likely to rate the resource/environmental benefits as very important. The percentages were similar for this year and last—85% in 1999 and 81% this year. When asked to identify the most important reason, however, the share that rated resource/environmental benefits as most important dropped to a little under 40%. Seventy-five percent of the lenders rated as very important the ability of buyers to do efficiency improvements and qualify for financing, comparable to the 80% in 1999. Fifty-nine percent indicated that EEMs were a part of better customer service, and lenders most often rated this as the most important reason (47%). In addition to the reasons shown in the table, lenders also commented that the EEMs had financial benefits in increased profit for lenders and reduced utility bills for buyers.

Although "more buyers are asking about them" was not among the most important reasons, the percentages of real estate agents (32%) and lenders (16%) who said that this was a very important reason were much higher this year than last—only 6% of agents and no lenders last year rated this as a very important reason. This result suggested that customer awareness of and interest in EEMs has increased substantially in the past year.

Buyer Response to EEM Promotion

Survey results this year showed an increase in homes actually transacted with EEMs. This year, 49 (of 70) agents said they had spoken about EEMs to buyers and, on the average, 17% of the time the buyers obtained an EEM. The share of lenders reporting that buyers followed through was 20%. As shown in Table 4-1, the agents reported that they had closed 11% of their homes with EEMs since taking the training and lenders reported 3.5% of their home loans included EEMs.

We asked why buyers had not followed through to get EEMs after the agents and lenders had discussed or recommended them. According to agents, some of the reasons involved were avoidance of higher mortgage payments, choosing to retrofit on their own, feeling overwhelmed by the mortgage process, inability to get the loan, lack of interest, and lack of program availability with the lender. Often the deal fell through for reasons that had nothing to do with the EEM.

The lenders said the main problems were related to cost, complications, and the time the process would take. Some buyers just were not interested in the program. However, one lender commented, "Usually if it's talked about, it's needed. I don't think I've ever had someone get an energy audit and not go through with [an EEM]."

Effects on EEM Barriers

Based on the program theory we developed and the Market Effects Study conducted for the 1998 and 1999 Programs, a number of potential barriers were identified that might impede

implementation of EEMs. Table 4-16 shows real estate agent and lender post-training ratings of the magnitude of several postulated barriers.

Prior to attending the training, the average magnitude across all the barriers was 2.5 (based on a scale from 0=no barrier at all to 5=major barrier) for lenders and 2.8 for real estate agents. This was a significant decrease from the 1999 average magnitudes of 3.1 for lenders and 3.9 for real estate agents. (Note that these numbers are not presented in the table.)

The table shows the average post-training rating for each barrier by the agents and lenders we interviewed and the percentage change in the average rating from before the seminar. Note that a few barriers were relevant to one group but not the other.

For all but two barriers, the average rating decreased after the seminar.[2] The seminars had the largest percentage effect in reducing the magnitude of barriers of the following types:

- For both real estate agents and lenders:
  - ⇒ Difficulty understanding and explaining EEMs
  - ⇒ Lack of assistance available to implement EEMs
  - ⇒ Lack of information about EEMs
  - ⇒ Time required to process EEMs
- For real estate agents:
  - ⇒ Lack of benefits for buyers
  - ⇒ High front-end cost
- For lenders:
  - ⇒ Lack of facilitators to recommend EEMs to buyers
  - ⇒ Lack of EEM integration in loan pre-qualification process.

The most significant barriers that remained after the seminar were the following:

- For real estate agents and lenders:
  - ⇒ Lack of examples of lenders or agents who actively promote EEMs
  - ⇒ Lack of buyer interest in or understanding of EEMs

[2] Real estate agents rated "lender resistance to using EEMs" slightly higher after the seminar, but the change was not significant. The average ratings in the "other" category were slightly higher for real estate agents after the training, but the "other" barriers mentioned tended to duplicate existing categories.

Table 4-16
Effect of TOSER Seminars on Perceptions of EEM Barriers

Barriers	Real Estate Agents		Lenders	
	Rating After Seminar	Difference	Rating After Seminar	Difference
Complicating the sales/lending transaction	2.0	-11%	2.5	-16%
Difficulty of understanding and explaining EEMs	1.9	-45%	1.7	-41%
Lack of buyer interest in or understanding of EEMs	3.1	-16%	3.3	-3%
Lack of benefits for buyers	1.7	-22%	1.3	-10%
Lack of information on EEMs	2.7	-26%	2.1	-33%
Lack of assistance available to implement EEMs	2.1	-31%	1.8	-31%
Incompatibility with selling/lending practices	2.8	-10%	1.6	-18%
Little support for EEMs in the refinancing market	*	*	2.6	-8%
It's the agent's or buyer's responsibility to mention	*	*	1.8	-20%
Lender resistance to using EEMs	2.1	6%	*	*
Difficulty finding lenders to process EEMs	2.6	-5%	*	*
Lack of examples of lenders or agents who actively promote EEMs	3.2	-4%	3.1	-4%
Lack of EEM facilitators to recommend to buyers	2.5	-15%	1.3	-28%
Loan pre-qualification doesn't include EEMs	2.1	-16%	1.0	-34%
Time required to process EEMs	2.2	-26%	1.9	-24%
Front-end cost is too high	2.3	-25%	1.9	-13%
Other	3.2	12%	3.6	-4%
Note that the difference is calculated based on values for only those participants who were aware of EEMs prior to the training.				

- For real estate agents:
  - ⇒ Lack of information on EEMs
  - ⇒ Incompatibility with sales practices.

The results showed that, after the seminar, the following were considered to be only minor barriers for real estate agents and lenders:

- Lack of EEM benefits for home buyers
- Difficulty understanding and explaining EEMs.

The lack of buyer interest/understanding and the lack of lenders and agents who champion EEMs were the most significant barriers identified in both the 1999 and 2000 surveys. The average value for both barriers decreased, however, between 1999 and 2000. Most notably, the ratings for a lack of champions was considerably lower this year, suggesting that the Program has had some effect on making champions more visible.

Suggestions for Reducing EEM Barriers

We asked the real estate agents and lenders to provide their suggestions for overcoming the barriers that they felt impeded the implementation of EEMs. They also had the opportunity to provide general comments about EEMs and these included recommendations on how to improve the EEM process. Table 4-17 summarizes comments from agents and lenders by general category. Lenders had more suggestions for improvements than the real estate agents. This year a common theme was improvement of the EEM process through more availability of facilitators, compatibility with conventional loans (especially Fannie Mae and Freddie Mac), and decreased expenditure of time and money. Increased promotion to buyers was also emphasized, with suggestions for advertising and distribution of EEM information. These suggestions were similar to the ones given in 1999, reiterating the overall idea of making the EEM process quicker, easier, and better known to all participants.

In 1999, agents and lenders indicated that they were unsure what dollar amount could be included in an EEM. This was brought up again in the current survey, though by fewer respondents. In this year's survey there were many comments on the need for more information on the specifics of the EEM process. Lenders wanted to know more about who is eligible for an EEM, what improvements qualify for the program, and how to work an EEM into the different kinds of loans. Some spoke of learning more about energy audits and the breakdown of costs for each retrofit. They expressed the need to see EEMs from a buyer's point of view because "we service the buyer and need to understand the process." Some were relieved that they could contact a facilitator or EEM specialist for assistance.

The real estate agents were concerned about retaining their knowledge of EEMs. In the words of one of the agents, "Just make it so familiar to us that we don't forget about it." There were many comments about the need for a simple, illustrated brochure outlining the benefits, costs, and savings involved in the EEM process. Agents were happy with the seminars and wanted more of them. One agent felt that education of agents and lenders should continue so that EEMs became part of the flow of actions in brokering a house.

Table 4-17
Suggestions for Improvement of the EEM Process

Category of Suggestion	Real Estate Agents	Lenders
Increase promotion to buyers	Brochures, materials available at realty offices Advertise to buyers	Advertise on television Advertise to owners, not agents and lenders Involve more contractors Distribute the promotional material to the Sacramento Association of Realtors
Improve EEM process	Need more facilitators, easier process	Streamline the process Make it more affordable for the consumer Allow EEMs to be done on conventional loans Offer EEMs to anyone willing to improve efficiency of their home
Target lenders or agents	Educate/promote to lenders and realtors More classes and refresher courses Get more lenders into the program HUD should loosen requirements	Facilitate the process of buyers asking lenders for EEMs Increase realtor awareness Have the real estate agents and lenders mention it more often Get the information to the loan officers Work with the top investors in the state for buying these
Other	Amount of money should be higher Incentives to subsidize first costs Use local contractors Increase the availability of contractors Inspection should cost less/be paid through the mortgage process	Shorten the [market effects study] surveys; have them done by mail Reduce the cost barrier for a HERS

4.3 NONPARTICIPANTS

We interviewed 45 real estate agents and 30 lenders who had not participated in the TOSER Program training. We note again that these relatively small sample sizes imply fairly large confidence intervals around population estimates.

The main purpose of these interviews was to determine baseline information about nonparticipating agents and lenders related to EEM and energy-efficiency knowledge, awareness, and behavior. The results presented here compare the responses of nonparticipants to those of participants. The primary categories of findings presented include the following:

- Awareness and understanding of EEMs
- Perceptions about barriers to implementing EEMs

- Behaviors involving energy efficiency and EEMs
- Suggestions and recommendations
- Interest in attending EEM training.

4.3.1 Awareness and Understanding of EEMs

Table 4-18 shows the percentage of nonparticipating real estate agents and lenders interviewed who indicated that they had awareness of EEMs prior to our interviews, compared to the program participants' EEM awareness levels prior to attending the training. Lenders in the Fresno region had the highest awareness rate among the nonparticipants; we note, however, that differences across HUD regions were based on very small sample sizes that limited their statistical significance. Overall, the nonparticipating agents showed more prior awareness than the participating agents, and the nonparticipating lenders showed less prior awareness than the participating lenders; neither difference was statistically significant, however.

Table 4-18
Nonparticipants' and Participants' Prior Awareness of EEMs

Location	Nonparticipants		Participants	
	Real Estate Agents	Lenders	Real Estate Agents	Lenders
Fresno	61%	92%	63%	75%
Sacramento	66%	58%	37%	100%
San Francisco	44%	50%	38%	100%
Average for all areas	60%	70%	46%	94%
n=	*45*	*30*	*70*	*32*

Those nonparticipants who were aware of EEMs rated their level of understanding, on the average, to be in the mid-range (see Table 4-19). Generally, the nonparticipants rated their level of understanding to be approximately the same as the participants' rating prior to training.

Table 4-19
Nonparticipants' and Participants' Understanding of EEMs

Rating	Nonparticipants		Participants			
	Agents	Lenders	Agents		Lenders	
			Before	After	Before	After
High (4-5)	26%	29%	16%	39%	30%	66%
Medium (2-3)	33%	29%	34%	54%	33%	31%
Low (0-1)	41%	43%	50%	7%	37%	3%
Average	2.3	2.3	1.6	3.2	2.4	3.8
Note: Scale ranges from 0 = no understanding to 5 = complete understanding.						

To determine the nonparticipants' understanding of EEMs, we asked how they would describe an EEM to a buyer. Table 4-20 summarizes the responses of the nonparticipants compared to the participants. Generally, both participants and nonparticipants were most likely to mention 1) facilitating efficiency retrofits, 2) increasing home value by making it more efficient, and 3) saving on utility bills. In almost all cases, the shares of participants who mentioned each characteristic were larger than for the nonparticipants, often by a factor of two or more. The only case where nonparticipants mentioned a characteristic more often than participants was lenders who mentioned that EEMs facilitate efficiency retrofits. It is noted, however, that when the lenders were prompted, 50% more participants than nonparticipants mentioned this characteristic.

Table 4-20
EEM Characteristics Mentioned To Buyers by Nonparticipants and Participants

EEM Characteristics Mentioned	Nonparticipants		Participants	
	Agents	Lenders	Agents	Lenders
Facilitate efficiency retrofits (in existing homes)	20% (36% when prompted)	37% (50% when prompted)	40% (70% when prompted)	28% (75% when prompted)
Can increase home value by making it more efficient	6% (33% when prompted)	13% (43% when prompted)	27% (83% when prompted)	38% (91% when prompted)
Saves on utility bills	16% (49% when prompted)	27%	39% (90% when prompted)	41%
Stretches qualifying ratio	4%	3% (27% when prompted)	13%	6% (34% when prompted)
Increases monthly mortgage payments, which are offset by utility savings	7%	13%	1%	16%
Other characteristics volunteered by respondents	11%	7%	24%	19%

We next asked the nonparticipants to describe how a buyer obtains an EEM. Their responses provided insights into their knowledge of EEMs without the benefit of taking a TOSER Program seminar. Table 4-21 compares the nonparticipants to the participants in terms of the EEM process features mentioned to buyers. Both the participants and nonparticipants most often mentioned the role played by the lender. The results showed in all cases that the nonparticipants were considerably less likely than the participants to mention each of the EEM process features.

Table 4-21
EEM Process Features Mentioned to Buyers by Nonparticipants and Participants

EEM Process Features Mentioned	Nonparticipants		Participants	
	Real Estate Agents	Lenders	Real Estate Agents	Lenders
Energy rating (HERS) required for efficiency retrofits	4% (11% when prompted)	7% (20% when prompted)	11% (41% when prompted)	22% (44% when prompted)
Lender will process loan as an EEM	22%	27%	54%	81%
Can work with facilitator to implement retrofits	2%	7%	11%	34%
Installs efficiency retrofits in existing homes	0%	7%	6%	9%
Role of real estate agent	7%	10%	41%	25%
Other features volunteered by respondents	11%	13%	30%	28%

4.3.2 EEM Barriers

The primary goal of the TOSER Program is to reduce or eliminate perceived barriers to the use of EEMs. Looking at how nonparticipants rated various barriers and comparing their ratings to those of Program participants helped reveal which barriers were most significant and the effects of the TOSER training. Following are some key findings regarding how nonparticipants rated EEM barriers:

- For nonparticipating agents, the most significant barriers were lack of information on EEMs and lack of assistance available to implement EEMs.
- Nonparticipating lenders considered lack of support in the refinancing market to be the most significant barrier, closely followed by lack of information and lack of assistance to implement EEMs.
- Both nonparticipating agents and lenders also rated the lack of examples of leaders in the business that were implementing EEMs as an important barrier.
- For nonparticipating agents and lenders, the least significant barriers were lack of buyer benefits and incompatibility with business practices.

Table 4-22 shows the average ratings given to several potential EEM barriers by the nonparticipants compared to the participants' ratings. In almost every case, barriers were perceived to be more serious by the nonparticipants. This was consistent with the results shown in Table 4-16 that compare participant perceptions about barriers before and after the TOSER Program training. Two areas in which the largest differences appeared related to lack of information and lack of assistance to implement EEMs. As noted above, the lack of "champions" who actively promoted EEMs was a significant barrier among the nonparticipants and was only slightly less significant to the participants. These results supported the finding that

the training had reduced the magnitude of participants' perceived EEM barriers. The responses of nonparticipants also suggested that the self-reports of participants about the magnitude of barriers before the training were reliable estimates for typical lenders and agents before training.

Table 4-22
Comparison of Perceptions of EEM Barriers—Participants (after Training) and Nonparticipants

Potential Barrier	Real Estate Agents			Lenders		
	Partici-pants	Non-partici-pants	Difference	Partici-pants	Non-partici-pants	Difference
Complicating the sales/lending transaction	2.0	2.6	-0.6	2.5	3.2	-0.7
Difficulty of understanding and explaining EEMs	1.9	3.0	-1.1	1.7	2.6	-0.9
Lack of buyer interest in or understanding of EEMs	3.1	3.2	-0.1	3.3	2.6	0.7
Lack of benefits for buyers	1.7	2.3	-0.6	1.3	1.8	-0.5
Lack of information on EEMs	2.7	3.8	-1.1	2.1	3.5	-1.4
Lack of assistance available to implement EEMs	2.1	3.8	-1.7	1.8	3.3	-1.5
Incompatibility with selling/lending practices	2.8	2.1	0.7	1.6	1.9	-0.3
Little support for EEMs in the refinancing market	*	*	*	2.6	3.8	-1.2
It's the agent's or buyer's responsibility to mention	*	*	*	1.8	2.9	-1.1
Lender resistance to using EEMs	2.1	2.7	-0.6	*	*	*
Difficulty finding lenders to process EEMs	2.6	2.6	0	*	*	*
Lack of examples of lenders or agents who actively promote EEMs	3.2	3.7	-0.5	3.1	3.5	-0.4
Lack of EEM facilitators to recommend to buyers	2.5	*	*	1.3	*	*
Loan pre-qualification doesn't include EEMs	2.1	3.2	-1.1	1.0	3.1	-2.1
Time required to process EEMs	2.2	2.7	-0.5	1.9	3.0	-1.1
Front-end cost is too high	2.3	3.0	-0.7	1.9	2.8	-0.9
Note: Scale ranges from 0 = no barrier at all to 5 = major barrier.						

Concerns about EEMs not being included in the loan pre-qualification process were significant for nonparticipating lenders and agents. However, the participants in both categories indicated

that the training diminished the magnitude of this barrier. Both participating and nonparticipating lenders indicated that little support for EEMs in the refinancing market was a notable barrier.

4.3.3 Behaviors and Actions Involving Energy-Efficiency and EEMs

This subsection presents results involving nonparticipants' behaviors related to energy efficiency and EEMs and compares these results to those for participants.

Discussion of Energy Efficiency with Buyers

Nonparticipant real estate agents indicated that they were somewhat likely to discuss energy efficiency with customers, with an average score of 2.6 (on a scale from 0=not at all likely to 5=very likely). This rating was considerably higher than the average for participating agents prior to training and, unexpectedly, was about the same as the participants' score after the training. One possible explanation for these results was simply that the agents who attended the training chose to attend because they were not very knowledgeable about EEMs before the training.

The results for lenders were more consistent with expectations. Nonparticipating lenders indicated, on the average, that they were considerably less likely to discuss energy efficiency than participating lenders who had attended the training.

Discussion of EEMs with Buyers

The nonparticipants were asked about their likelihood of discussing EEMs with potential buyers on a scale from 0 to 5. Both the agents and the lenders averaged 2.1, meaning that they had a moderate likelihood of discussing EEMs. Consistent with the observations above, the agents who participated in the Program training were less likely before the training than the nonparticipants to discuss EEMs with their customers, suggesting again that the participating agents had chosen to participate because of their lack of EEM knowledge and promotion.

The nonparticipating lenders were more likely to discuss EEMs with their customers than energy efficiency in general.

We also asked both groups of nonparticipants what types of information about EEMs they conveyed to buyers. The facts mentioned most often by both groups were that EEMs helped conserve resources, improve the environment, and allow buyers to increase the home's energy efficiency and still qualify for a mortgage.

When nonparticipants were asked how important they felt different reasons were for promoting EEMs, their responses were similar to those for participants (shown in Table 4-15). Table 4-23 presents the nonparticipant results. The most noteworthy differences for nonparticipants were that much lower percentages of real estate agents indicated that "more buyers are asking about them" and "more lenders are promoting them" were very important reasons. Nonparticipants

Table 4-23
Importance of Reasons for Promoting EEMs (Nonparticipants)

Reasons for Promoting EEMs	Importance					
	Real Estate Agents			Lenders		
	None	Somewhat	Very	None	Somewhat	Very
Useful as a sales tool	18%	53%	29%	23%	40%	37%
Part of better customer service	11%	42%	47%	7%	33%	60%
Allow buyers to improve efficiency and qualify for financing	11%	13%	76%	10%	27%	63%
Reduce loan default rate	*	*	*	30%	20%	50%
More buyers are asking about them	62%	27%	11%	57%	23%	20%
More real estate agents are promoting them	*	*	*	46%	27%	27%
More lenders are promoting them	67%	24%	9%	*	*	*
Help conserve resources and improve the environment	9%	18%	73%	3%	13%	83%

rated these reasons as very important only about one-third as often as participants did. Part of the difference might be attributable to the TOSER training. Another factor might be that some real estate agents elected to take the training because they had observed increased customer demand and lender EEM promotion, and they wanted to be better informed about EEMs.

We point out also that, even though the nonparticipants did not rate either of these reasons to be as important as participants did, the nonparticipants' ratings were still considerably higher than the participants' ratings in 1999. This supports the earlier observation that customer interest in and demand for EEMs appears to have increased substantially in the past year.

Implementation of EEMs

The nonparticipating agents we interviewed had closed 482 existing home sales in the past six months and 1% of them were with EEMs. The nonparticipating lenders had issued loans on 1,041 existing homes during this period, and 1.3% had EEMs. The percentages of EEMs were much lower than they were for the Program participants—the share of homes sold with EEMs by nonparticipating agents was about one-tenth as large as it was for the participants and it was about one-third as large for nonparticipating lenders than it was for participants.

Seven of the 45 nonparticipant agents said they had discussed or recommended EEMs in the last 6 months, with 16 recommendations total. Only two of the agents said that buyers had followed through after the agents recommended or discussed an EEM. Eight of the 30 nonparticipant

lenders had discussed or recommended EEMs in the past 6 months, and half of these said that buyers had followed through.

When asked why buyers did not follow through with EEMs after a recommendation, the most common reasons given by nonparticipating agents and lenders included that buyers did not see the benefits, felt it was too expensive, and found EEMs were too confusing or complicated, or the buyers wanted to do the work themselves.

4.3.4 Suggestions and Recommendations

The nonparticipating agents and lenders were asked to give suggestions on how to reduce the most significant barriers that kept EEMs from being promoted. Those mentioned most frequently, listed according to how often they were mentioned, included the following:

- educate and inform buyers,
- provide more information and promotion,
- simplify the process,
- decrease the cost of obtaining an EEM, and
- provide incentives to the agent and lender.

The nonparticipants were asked for suggestions on how to improve EEMs or the process used to implement them. Only 13 of the 75 respondents provided suggestions. The most common suggestion (provided by five respondents) was more training for lenders and agents. Three interviewees suggested that real estate agents' awareness should be increased and three recommended increased advertising to the public. Two interviewees suggested making the EEM process easier to implement.

Finally, we asked the interviewees how interested they would be in attending an EEM training seminar. In view of their emphasis on the need for increased education regarding EEMs, it seemed likely that most of the nonparticipants would be interested in attending a training seminar. Table 4-24 shows that, in fact, 64% of the agents and 63% of the lenders expressed a moderate to high level of interest in attending EEM training.

Table 4-24
Nonparticipants' Interest in Attending an EEM Training Seminar

Level of Interest	% of Agents	% of Lenders
Very much	22%	33%
A moderate amount	42%	30%
A little	11%	20%
None	24%	16%

4.4 1999 PROGRAM PARTICIPANTS

We attempted to reinterview every participating real estate agent and lender that we interviewed in 1999 and, overall, were able to reach and interview only 44% (24) of them. As noted earlier, this small sample size means that the findings presented here can be viewed as indicative of general trends and patterns, but quantitative estimates for the 1999 participants necessarily have large confidence intervals around them.

The main purpose of the reinterviews was to determine if and how participating agents' and lenders' knowledge, perceptions, and behavior involving energy efficiency and EEMs have changed in the past year. In part, this analysis was intended to address whether Program effects observed last year have persisted. It also provided an opportunity to examine whether the Program has leveraged effects beyond the direct ones on the participants. The primary findings presented fall into the following categories:

- Perceptions about barriers to implementing EEMs
- Behaviors involving energy efficiency and EEMs
- Suggestions and recommendations.

4.4.1 EEM Barriers

When they were interviewed last year, real estate agents and lenders indicated that the 1999 Program training significantly decreased the perceived magnitude of several potential EEM barriers. Some significant barriers remained, however. To identify changes over time, we asked these same agents and lenders to rate the barriers again this year.

The average ratings across the lenders were remarkably similar this year and last. Although the agents' ratings were generally consistent over time, there were some noteworthy changes. Key findings included the following:

- For both groups, the most significant barrier remained the lack of examples of agents and lenders ("champions") who promoted EEMs actively.
- Lenders and agents continued to believe that lack of buyer interest/demand was a major barrier, but both groups gave it a lower rating than they did last year.
- Lenders and agents continued to rate lack of information on EEMs as a significant barrier.
- Lenders and agents continued to rate "high front-end costs" as a moderate barrier.
- Real estate agents this year rated "lack of assistance to implement EEMs" and "poor fit with how agents do business" as considerably more significant barriers than they did last year. The lenders, on the other hand, continued to rate both as relatively minor barriers.

These results suggested that the participants' perceptions about barriers have not changed much overall since last year. Barriers that declined after the training tended to remain less significant than they were perceived to be before the training. Consequently, the seminars' benefits in reducing perceived barriers appeared to be long lasting.

One additional barrier that affects the Program and implementation of EEMs needs to be pointed out. The TOSER Program manager has indicated that there is a fairly high turnover rate in real estate agents (and possibly lenders as well). This has implications for how the Program is implemented, the longevity of effects, and the leveraging of the impacts. We did not confirm the turnover rate independently, but note that a large proportion of the respondents we interviewed last year were no longer with the same firm this year.

4.4.2 Behaviors and Actions Involving Energy Efficiency and EEMs

We were able to obtain information about the behavior and actions of the real estate agents and lenders interviewed last year. This allowed us to compare the findings with those documented shortly after the training last year.

Discussion of Energy Efficiency with Buyers

Both agents and lenders indicated that they discussed energy efficiency with buyers less often in the past year than initially after the EEM training. Last year both groups said they had discussed energy efficiency with buyers relatively rarely before the training, but discussed it fairly often after the training. Both groups said this year that they had discussed energy efficiency a moderate amount in the past year. Consequently, the effects of the training on the frequency of discussing energy efficiency have declined, but the frequency is still higher than it was before the training.

Discussion of EEMs with Buyers

We asked the interviewees how many times they had discussed or recommended EEMs to buyers. The average number of times per month was about 1.5 for both lenders and real estate agents during the past year. The rate for agents was comparable to the rate shortly after the training last year, but it had declined by about one-third for lenders in the past year.

We also asked both groups what types of information about EEMs they conveyed to buyers. The fact mentioned most often by both groups, without prompting, was that EEMs could reduce utility bills. Nearly two-thirds of the real estate agents mentioned this effect both this year and last. On the other hand, only about half the lenders mentioned this fact this year, down from 90% last year. Unprompted, real estate agents and lenders mentioned considerably less often than last year that they would tell buyers that EEMs were for energy-efficiency retrofits and could increase a home's value. When prompted, however, almost all members of both groups said they would mention these characteristics.

The study last year found that there was considerable uncertainty about the investment amount that could be included in an EEM and the results this year were similar. Half the lenders this year said that they did not know the amount that could be covered and only 30% provided reasonably accurate responses. Nearly 80% of the real estate agents this year either had no idea or had incorrect information about the amount. The remaining agents either knew the correct

amount or that it could be related to the home's value. Incorrect understanding about the financial limits continued to be a problem for these 1999 seminar attendees.

Discussion of EEMs with Other Professionals

Discussing EEMs with other professionals is one way to leverage the effects of the Program training. Last year and this year, both lenders and real estate agents, on the average, said that they discussed EEMs with other professionals only rarely or sometimes.

Implementation of EEMs

As shown earlier in Table 4-3, the proportion of homes that were financed with EEMs changed significantly between the 1999 and 2000 interviews. The real estate agents we reinterviewed in 2000 had sold 12.6% of their homes with EEMs since taking the training, but only 2.5% when we interviewed them originally in 1999. Almost all the homes handled by agents were resales, i.e., not sales of new homes. The significant increase in the penetration of EEMs was due primarily to two agents who had sold a large proportion of their homes with EEMs during the past year. One had sold predominantly REO homes with EEMs during this period.

The lenders we reinterviewed, on the other hand, made a much lower share of their loans with EEMs during the past year than they had when we interviewed them in 1999. The proportion in 1999 was 4.0%, but only 0.4% in 2000. Only 70% of the homes financed by lenders were existing homes; only 12% of the existing homes were REO homes.

When the agents were interviewed in 2000, the average follow-through by buyers after the agents recommended an EEM was about 8%, up from 1.8% when they were interviewed in 1999. As with the EEM quantities, the higher follow-through was attributable to a small number of agents; one reported 90% follow-through and another reported 50%.

The follow-through reported by lenders was comparable for the two interviews. The overall average rate was 4% this year and 5% last year.

When we asked why buyers didn't follow through on getting an EEM, the most common reason given by these real estate agents was related to the costs of making the upgrades. Lenders, on the other hand, mentioned possible delays in and complication of the transaction most often. Both lenders and agents mentioned a lack of buyer understanding about how an EEM would work and benefit them. One agent noted that EEMs were very difficult to obtain on a conventional loan.

4.4.3 Suggestions and Recommendations

Our interviews both this year and last solicited suggestions and recommendations from the participants on how the Program and EEM process could be improved. The agents' suggestions covered a wide spectrum. Those mentioned most frequently included the following:

- Educate and inform buyers more about EEMs
- Decrease the cost to the buyer
- Provide follow-up EEM training and information to the agents and lenders
- Provide simplified materials that agents can use such as a "simple one-page sample of what qualifies that we could access handily, as opposed to a big book"
- Provide an incentive to the real estate agents and lenders.

Other single suggestions that were worthy of mention included the following:

- Provide a database that can be linked to the Multiple Listing Service listings
- Provide a "business card with the ten points I need to know."

These recommendations were similar to those these agents made in 1999; however, they emphasized even more strongly in 1999 the need for advertising and promoting EEMs to buyers.

The lenders this year provided recommendations that were more strongly focused than those from the real estate agents. Major recommendations included the following:

- Provide more education and training to the industry, particularly the real estate agents
- Promote and market EEMs to buyers
- Provide technical support to the lenders and agents and materials that they can provide to buyers.

These recommendations were very consistent with those provided by these same lenders last year.

5 HOME BUYERS

This section provides findings based on our interviews with home buyers who had implemented EEMs. The first subsection describes key characteristics of the buyers we interviewed. The next subsection presents findings about the EEMs that were implemented. The following one discusses findings about energy-efficiency barriers and the role of EEMs. The next subsection presents information about buyer attitudes and perceptions related to EEMs. The final one presents the suggestions that buyers offered for improving the EEM process.

It is important to reiterate that the information in this section is based on interviews with only buyers who had obtained EEMs. Since we did not interview a control group of buyers, it was not possible to make comparisons with a baseline buyer population.

Because the TOSER Program has emphasized educating and informing real estate agents and lenders rather than buyers so far, we did not expect to see major direct market effects on buyers. Nevertheless, some effects might be evident over time (i.e., cumulative effects of the 1998 EAHAP and the 1999 and 2000 TOSER Program) and where possible we have pointed out trends that were suggested by comparing this year's results with those from the 1999 TOSER Market Effects Study.

5.1 CHARACTERISTICS OF BUYER SAMPLE

We had targeted completed interviews with 20 buyers each in the HUD Sacramento and Fresno regions, and 10 in the San Francisco region. We exceeded our target of buyers to interview in the Sacramento region (29 completes), but fell short of the target in the San Francisco (6 completes) and Fresno (10 completes) regions; even after an exhaustive attempt to get valid names and phone numbers and conduct interviews. In all, we completed 45 of the 50 interviews planned.

Unlike last year, we were able to select the buyers randomly from a list of all the FHA EEM recipients, without having to rely primarily on sources provided by HERS facilitators. Consequently, the findings were more representative of the population. We note, however, that the sample size was still relatively small. Therefore, the findings should be fairly indicative of the results for the entire population, but any quantitative estimates necessarily have relatively large confidence intervals around them.

Key characteristics of the households and homes included in our survey are presented in Table 5-1. Compared with the overall population, the average age of these homes, the proportion of first-time buyers, and the proportion of younger buyers were all higher. Nearly all the buyers were between 21 and 50 years old.

Table 5-1
Home and Household Characteristics

Age of home purchased	
Mean, yrs.	33
Minimum, yrs.	<1
Maximum, yrs.	60
% first-time home buyers	78%
Household size, mean number of people	3.3
Household head age distribution	
20 years or less	0%
21-30 years	38%
31-40 years	36%
41-50 years	22%
51-60 years	4%
61-70 years	0%
>70 years	0%

5.2 EEM INFORMATION

Table 5-2 summarizes basic information about the EEMs. The elapsed time since the EEM was obtained and the interview was conducted ranged from 3 to 10 months, with an average of 7 months. The most common efficiency upgrades reported by the buyers were installation of insulation, upgraded windows, new heating or air-conditioning equipment, or a new water heater. Upgrades to either heating or air conditioning system were much more common this year than last, but upgrading both systems occurred about one-third less frequently. Water heating improvements occurred about twice as often. Improvements to reduce infiltration (caulking, weatherstripping, etc.) occurred about half as frequently this year.

Table 5-2
EEM Characteristics

Months Since EEM			% Reporting Installation of Different Efficiency Measures								
Ave.	Min.	Max.	Heat or A/C	Central heat and A/C	Insula-tion	Water heating	Win-dows	Sun-screen	Infiltra-tion	Ducts	Whole house fan
7	3	10	38%	22%	53%	36%	47%	24%	22%	2-6%	27%

The upgrades varied across the HUD regions. Consistent with the results last year, sunscreens, whole house fans, and water heaters were much more common in the Fresno area than in other areas. In the Sacramento area, increased insulation and upgraded windows were the most common measures. New heating and/or air conditioning system upgrades were most common in the San Francisco region (instead of in the Sacramento region as in last year's results) along with

upgraded windows. We note that these were the upgrades reported by the respondents and may not correspond to the actual upgrades.

We also asked the buyers several questions about their awareness of EEMs and how they had implemented theirs. When asked whether they had heard of an EEM before they started looking for their current home, 11% indicated that they had.

When asked where they heard of EEMs for the first time (even if this did not occur before their home purchase), Table 5-3 shows that the most common source was the lender (indicated by almost half the respondents), followed by the real estate agent. These were the two most common sources last year as well. Seven percent said that advertising or the media were their first source. The remaining 20% indicated a variety of sources including home buyer seminars, friends, stickers on the home, home shows, etc.

Table 5-3
First Source of Information about EEMs

Information Source	% of Buyers
Lender	49%
Real estate agent	24%
Media, advertising	7%
Home buyer seminar	4%
Friends/acquaintances	4%
Other	12%

We also asked buyers who first brought up the possibility of getting an EEM during the transaction process. Table 5-4 shows that lenders brought up using an EEM almost half the time and real estate agents did so about one-third of the time. The buyer initiated the idea about 10% of the time. Others who first proposed using an EEM included friends, the previous owner, a home inspector, etc.

Table 5-4
Who First Mentioned
EEM during Transaction

Real estate agent	31%
Lender	47%
Buyer	9%
Other	13%

About 58% of the buyers we interviewed said that they had used a facilitator to assist with the EEM process. This suggests that for the population of buyers about half of those who obtain EEMs use a facilitator. This percentage was lower than last year because the sample of buyers we interviewed then was drawn primarily from information provided by facilitators.

We asked the buyers who their primary source of information was throughout the EEM process. As shown in Table 5-5, over one-third said the lender. Thirty percent said the facilitator, and only 14% said that the real estate agent was their main information source. For those buyers who used a facilitator, about half indicated that the facilitator was their main information source.

Table 5-5
Primary Source of EEM
Information during Process

Real estate agent	14%
Lender	37%
Facilitator	30%
None/other	19%

Finally, we asked buyers about their awareness of the home energy rating process. Fifty-one percent (51%) said that they were familiar with the HERS process (compared to only 33% last year). Of those buyers who said they were familiar with the rating system, the responses to a follow-up question indicated that 82% had at least a basic understanding of the rating's purpose. This agreed with the results from last year.

5.3 ENERGY-EFFICIENCY BARRIERS AND BENEFITS OF EEMS

To determine how useful EEMs were to home buyers, we asked the respondents first about the significance of a wide range of possible barriers to efficiency investments. Table 5-6 shows that the barriers were all rated to be in the moderate range (from 2.1 to 3.2 on a 0 to 5 scale). "Difficulty getting trustworthy information" received the highest rating and "difficulty understanding efficiency upgrades" received the lowest. The ratings were similar to those from last year, except "difficulty of affording or financing the upgrade costs" dropped from first to fifth in the ranking.

Table 5-6
Significance of Energy-Efficiency Upgrade Barriers

Energy Efficiency Barrier	Average Significance Rating
Difficulty finding efficiency information	2.8
Difficulty getting trustworthy information	3.2
Time required to select and make improvements	2.7
Uncertainty about usefulness of efficiency investments	2.9
Difficulty understanding efficiency upgrades	2.1
Difficulty finding someone to provide assistance	3.0
Difficulty affording or financing improvements	2.5
Note: Ratings are based on a scale from 0 to 5 where 0=not at all serious and 5=very serious.	

In addition to those barriers we asked about specifically, buyers mentioned other barriers that they felt were significant. One noted that newer homes were already very energy-efficient and didn't warrant retrofits. Two noted that buyers were just not informed about energy efficiency, and one said that buyers were generally too lazy to look into energy efficiency.

EEMs are intended to help overcome many of these barriers, so we next asked the buyers to rate the usefulness of their EEM in overcoming the major barriers (i.e., each barrier that a buyer gave a significance rating of 4 or 5). As shown in Table 5-7, EEMs received a rating of at least 2.9 on the 5-point scale for addressing all the barriers. They were rated most useful in overcoming the "difficulty understanding efficiency upgrades" barrier. They also received high ratings for reducing the "difficulty affording or financing improvements," "uncertainty about usefulness of efficiency investments," "time to select and make improvements," and "difficulty finding someone to provide assistance." Buyers this year rated the overall usefulness of EEMs in overcoming the barriers about the same as they did last year, but the usefulness ratings varied some by barrier.

Table 5-7
Usefulness of EEMs in Overcoming Upgrade Barriers

Energy Efficiency Barrier	Average EEM Usefulness Rating
Difficulty finding efficiency information	3.4
Difficulty getting trustworthy information	2.9
Time required to select and make improvements	3.7
Uncertainty about usefulness of efficiency investments	3.8
Difficulty understanding efficiency upgrades	4.6
Difficulty finding someone to provide assistance	3.8
Difficulty affording or financing improvements	4.1
Note: Ratings are based on a scale from 0 to 5 where 0=not useful at all and 5=very useful.	

We also wanted to determine what motivated each buyer to obtain an EEM. Table 5-8 shows that, of the seven reasons offered to buyers, "utility bill reductions" and the "opportunity to upgrade the home" received the highest average rating. "Improving the comfort" of the home received the third highest average rating. When asked to identify the *most important* reason, 36% of the respondents said "utility bill reductions" and 31% said "improved home comfort." Although "an opportunity to update the home" and "conserving resources and improving the environment" received a high average rating, only 9% of the respondents rated either as the most important reason. Overall, these results were consistent with those from the 1999 survey.

Table 5-8
Reasons for Obtaining an EEM

Reasons	Average Importance Rating
Utility bill reductions	4.7
Opportunity to update home	4.6
Helps conserve resources/improve environment	4.2
Makes it possible to qualify for a larger loan including efficiency upgrades	3.7
Real estate agent promoted it	2.9
Lender promoted it	3.2
Comfort*	4.5
Notes: Ratings are based on a scale from 0 to 5 where 0=not important at all and 5=very important.	

5.4 ATTITUDES AND PERCEPTIONS ABOUT THE EEM PROCESS

We asked buyers several questions that addressed their perceptions about the EEM process and how satisfied they were with it. Table 5-9 shows that, on the average, buyers rated both the difficulty of understanding and using an EEM to be low, although the difficulty of understanding an EEM was rated slightly higher this year than last.

Last year, we speculated that the high usage of facilitators by buyers in our sample might have been responsible for the low "difficulty of understanding an EEM" ratings. When we calculated the simple correlation coefficient this year, however, it demonstrated no relationship between the use of a facilitator and the buyers' rating of the difficulty of understanding an EEM. Consequently, the results from this survey did not support the hypothesis that using a facilitator significantly improved the buyer's ability to understand an EEM.

On the other hand, the correlation between using a facilitator and the difficulty of the EEM process was statistically significant at the 0.10 level. This result suggested that using a facilitator could reduce the difficulties a buyer encountered going through the EEM process.

Table 5-9
Level of Difficulty Understanding and Using an EEM

Difficulty Level	Understanding an EEM	EEM Process
High (4-5)	13%	2%
Medium (2-3)	29%	24%
Low (0-1)	58%	73%
Average	*1.5*	*1.0*
Note: Scale ranges from 0=not difficult at all to 5=very difficult		

To get information on the details of the EEM process, we asked how difficult specific steps were. Averaged over the respondents, all the individual steps received low difficulty ratings as shown in Table 5-10. These results were very similar to those last year.

Table 5-10
Level of Difficulty with Specific EEM Steps

EEM Steps	Average Difficulty Rating
Obtaining information about how EEM works	1.1
Understanding EEM benefits	1.0
Getting an energy rating	1.0
Finding a lender to process EEM	0.7
Finding a facilitator	1.0
Filling out EEM paperwork	0.7
Choosing measures to install	1.6
Notes: Ratings are based on a scale from 0 to 5 where 0=not difficult at all and 5=very difficult.	

The most common problem was not among the specific ones shown in the table. Almost one-fourth of the respondents said that they had problems working with the contractor who did the work. The problems included not arriving on time, making mistakes, and not finishing the job properly.

Finally, we asked the buyers two questions addressing their overall satisfaction with the EEM process. These provided the following results:

- The average satisfaction rating of the buyers was 4.3 (on a scale from 0=not satisfied at all to 5=very satisfied).
- Consistent with their overall satisfaction rating, 96% of the buyers said that they would recommend an EEM to other buyers.

The high satisfaction level was consistent with the findings last year.

When they were asked what information was most helpful to them, the answers were quite positive and covered a wide range of information types and sources. Nearly one-fourth mentioned a pamphlet, brochure, or other written materials. Almost one-sixth specifically mentioned that the information from the facilitator was the most helpful. Over 10% mentioned that the rating information (utility bill savings for the investment) was the most helpful.

Over 10% of the buyers mentioned that information from the real estate agent or lender was most helpful. Although this was not a large share, it is important to note that these comments coupled with several very positive comments that respondents offered at the end of the interviews illustrated that informing customers about and helping them with the EEM process could be very effective at creating good will for lenders and real estate agents.

Although satisfaction with the EEM program was high, a sizable minority of the respondents reported dissatisfaction with their interaction with the contractor, as noted earlier. There were

fewer specific complaints about working with the facilitator than we observed last year, but the proportion of buyers who used facilitators was lower this year. Thirty-eight percent of the people who used facilitators had complaints about the work performed by the contractor. A few buyers said they would have liked the option of choosing their own contractor to perform the work. Only one of the people who used a facilitator indicated that finding a facilitator was a very difficult process.

5.5 SUGGESTIONS FOR IMPROVING EEMS AND THE PROCESS

The buyers were asked to offer any suggestions for improving EEMs or the process for implementing them. The suggestions this year were relatively consistent with those provided last year.

Thirty-eight percent (38%) said either they had no suggestions to offer or they felt the process worked well enough that they didn't see any way to improve the process. Consistent with the comments on problems that buyers had, almost one-fourth suggested that the process of working with the installation contractor be improved. Suggestions were usually general, but individual buyers recommended the following:

- "Contractors need to be more flexible about when they can come out and then should show up on time."
- "They need to have enough people to come out and do the work. That was the problem."

Most of the remaining suggestions were evenly split among the respondents, with about 7% offering each of the following as a suggestion:

- Information on energy savings and costs should be improved and made easier to understand.
- The program should be advertised and promoted more intensively.
- The process and paperwork should be made more efficient.
- The buyer should be able to choose her own contractor.

Individual interviewees suggested each of the following:

- The dollar amount that can be included in the EEM should be increased.
- Someone should follow through after the work is done to verify it was done properly.

6 EEM ENERGY SAVINGS AND TRAINING EFFECTS

This section presents the results of two analyses. The first is a summary of the energy savings associated with houses that were upgraded with EEMs.

The second is an analysis of the relationship between several factors, including the Program training, and the number of EEMs implemented and the penetration rate of EEMs (number of EEMs implemented divided by the number of FHA loans).

6.1 ENERGY SAVINGS

This subsection presents an analysis of the energy savings associated with EEMs implemented in 2000. The results provide an indication of the energy savings, both kilowatt-hours (kWh) of electricity and therms of natural gas, which resulted from upgrades performed through EEMs.

6.1.1 Data and Approach

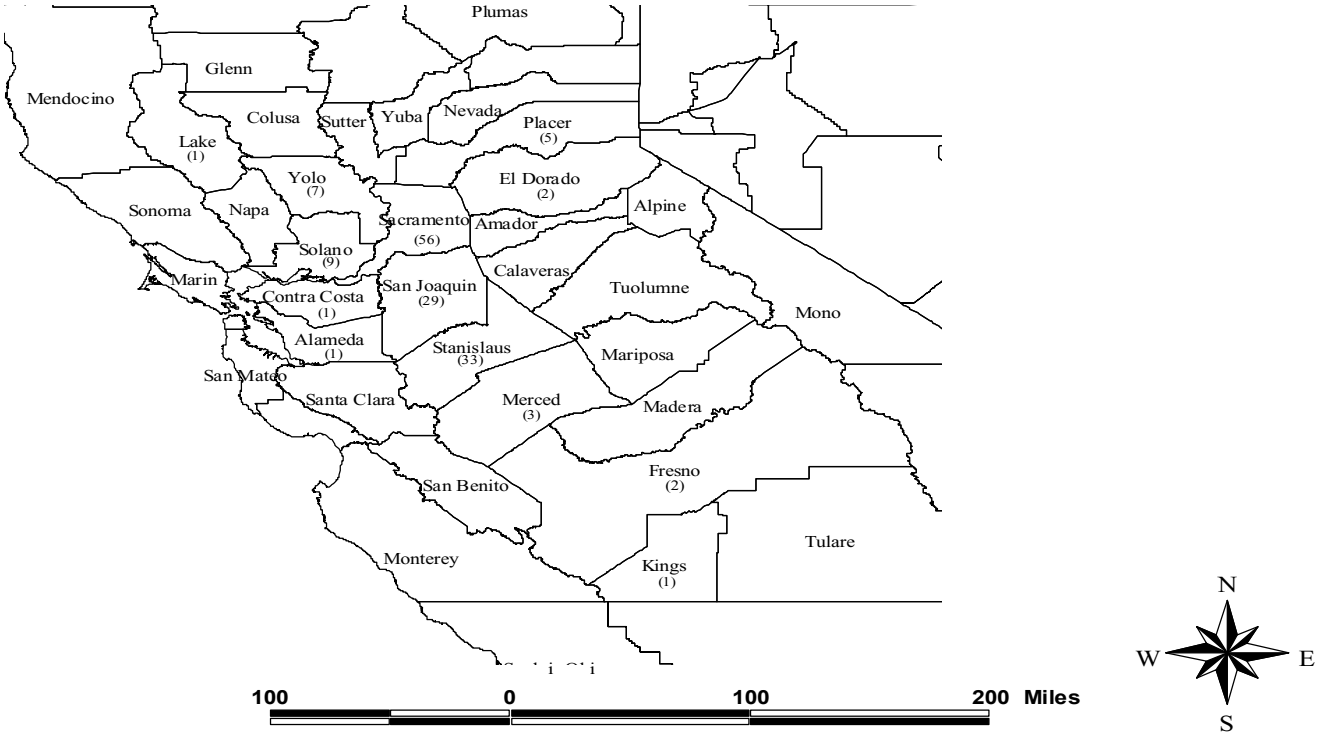
This analysis used the data from HERS ratings conducted on 150 existing houses in the PG&E service area. The rated houses were located across a wide geographic range. The numbers of rated houses in our sample by county are shown in Figure 6-1.

The ratings were for houses for which the buyer implemented an EEM at the time of purchase. The ratings were produced through the accepted standard HERS rating procedures and software used to estimate energy savings of specific energy-efficiency measures. These procedures and software used ASHRAE standards for calculating estimated heat gains and losses.

The ratings were provided by several different rating organizations. The format was almost identical for each rating, but did vary some by the measures included, the measure descriptions, and the organization of the information. In most cases, the following information was available:

- house location
- existing (pre-upgrade) conditions of the house by building component and equipment
- improvements that were analyzed in the rating
- improvements that were installed through the EEM
- estimated cost of each improvement analyzed
- measure life for the improvements
- estimated annual kWh savings
- estimated annual therm savings
- estimated annual utility bill savings.

Figure 6-1
Location of Rated Houses



In some cases, we had to examine two or three documents to obtain all the needed data. For some houses, specific data were unavailable; the data missing most often were the existing conditions for measures that were not upgraded through the EEM.

The complete set of measures that were listed on at least one rating sheet is summarized below. The estimated life for each measure is shown and these numbers were based on the HERS rating reports.[1]

- *Ceiling insulation:* The R-value of existing ceiling insulation was documented. The improvement was usually shown as the additional R-value of insulation proposed as an improvement. In some cases, the final R-value after the improvement was given instead of the R-value added. Measure life was 30 years.
- *Wall insulation:* The R-value of existing wall insulation was documented. The improvement was usually shown as the additional R-value of insulation proposed as an improvement. In some cases, the final R-value after the improvement was given instead of the R-value added. Measure life was 30 years.

[1] The measures life reported here was taken from the HERS ratings and we note that for some measures the different ratings assumed different periods.

- *Floor insulation:* The R-value of existing floor insulation was documented. The improvement was usually shown as the additional R-value of insulation proposed as an improvement. In some cases, the final R-value after the improvement was given instead of the R-value added. Measure life was 30 years.
- *Windows:* Typically, the number of panes in windows was shown for the existing condition and the number of panes proposed as an upgrade. In a few cases, more detailed information, such as a low-e coating, was provided for the improvement. Measure life was 30 years.
- *Sunscreens:* The presence of sunscreens on windows in the existing house and whether they were a recommended upgrade were shown. In some cases, the windows that would have sunscreens installed were indicated. Measure life was 30 years.
- *Infiltration control:* Generally, the measured pre-upgrade natural infiltration rate and the proposed rate after an upgrade were given. The upgrades involved installation of weatherization measures, such as caulking and weatherstripping. In some ratings, the measure was identified as weatherization rather than as infiltration control. We treated this as a binary variable—either infiltration was improved or not—and not as a quantitative measure of infiltration levels. Measure life was 15 to 30 years.
- *Duct loss reduction:* This measure was usually denoted in terms of existing duct losses (cubic feet per minute) and the proposed losses after duct sealing. As with the infiltration control measure, we did not attempt to treat this as a quantitative variable primarily because existing and upgraded infiltration rates were shown as ranges rather than specific values. Measure life was 30 years.
- *Furnace efficiency:* Almost all rated houses had gas furnaces and the existing efficiency was given in terms of the Annual Fuel Utilization Efficiency (AFUE) as a percentage. The upgraded efficiency levels were also shown as an AFUE. Measure life was 30 years.
- *Heat pumps:* Only two of the houses were equipped with heat pumps for heating and cooling. One house had an electric resistance furnace (and central air conditioner) that was replaced with a heat pump and this change affected the heating and cooling efficiency. Measure life was 15 years.
- *Air conditioner (A/C) efficiency:* The existing A/C efficiency was given as the Seasonal Energy Efficiency Ratio (SEER). The SEER of the upgraded A/C was provided if this measure was implemented through the EEM. Measure life was 15 or 30 years.
- *Setback thermostats:* The existing conditions data indicated whether an automatic setback thermostat was present. In houses where one was installed through the EEM, this was included as an implemented measure. Measure life was 30 years.
- *Whole house fan:* The presence of a whole house fan for ventilation was shown in the existing conditions and included in the improvements if one was added through the EEM. Measure life was 15 or 30 years.
- *Water heater:* Typically, the age of the existing water heater was shown in the existing conditions data. Because of new efficiency standards, older water heaters were often replaced by new ones to achieve efficiency improvements. In some cases, existing electric water heaters were replaced with natural gas water heaters. Measure life was 15 or 30 years.

- *Solar water heating:* This was included as a possible measure. In no cases did any of the houses have solar water heaters installed as existing equipment or have them added through the EEM.
- *Lighting efficiency:* The estimated wattage of existing lighting was given. If compact fluorescents (CFLs) were installed to replace incandescent lighting, the wattage of the lighting after the retrofit was provided. Measure life was 7 or 10 years.
- *Low-flow water devices and pipe wrap:* The presence of low-flow plumbing devices (such as showerheads) and pipe insulation was indicated for the existing house. If these measures were installed through the EEM, they were included in the upgraded measures. These measures reduced water heating energy use. Measure life was 15 years.
- *Power Planner:* This device regulates the voltage, current, and phase of electricity supplied to household appliances (such as refrigerators) to closely match power draw to needs and reduce energy consumption.[2] The presence of this device was indicated in the existing and upgraded conditions. Measure life was 15 years.

Because the rating tools used to estimate the energy savings have been approved for this process and it was beyond the scope of our study to conduct an in-depth assessment of the energy savings estimates from the ratings, we generally used the exact numbers reported in the ratings. In a few cases, we corrected obvious data entry or transcription errors. We do note, however, that we were uncertain about the extent to which the tools accounted for interactions among the effects of different efficiency measures. We also note that the way the savings were reported was not consistent across all the ratings.[3]

6.1.2 Estimated Energy Savings

This subsection provides summary information on the upgrades and the energy savings estimates by measure type and for a typical house. Measure data presented include pre-EEM measure frequency in houses, post-EEM measure frequency, and the percentage of houses that upgraded each particular building component or equipment type. Due to the variety of data available across measures, results are presented in slightly different formats for different measures. These formats are explained under each measure heading.

Envelope Upgrades

Envelope insulation upgrades included adding ceiling, wall, or floor insulation to achieve a higher R-value. Table 6-1 shows the percent of houses in the study sample that had at least some insulation in each of these envelope areas prior to the EEM and after, as well as the percent of houses that upgraded each type of insulation. Post-EEM measure frequency is useful in distinguishing the fraction of upgrades that occurred in houses that had existing insulation and the fraction of upgrades that occurred in houses that did not have any insulation. As the table

[2] Personal communication, February 14, 2000. Bill Blair, Energy Efficient Mortgage Services, Stockton, California.

[3] For example, when electric water heaters were replaced with gas water heaters some ratings showed an increase in natural gas energy use, while others showed a decrease. In two cases, no electricity savings credit was included when existing heat pumps were replaced with gas furnaces, but natural gas savings were estimated.

shows, 44% of the buyers chose to upgrade ceiling insulation, mostly in cases where some ceiling insulation already existed. Only 1.3% upgraded floor insulation and a significantly larger percent (24.1%) upgraded their wall insulation. In these cases, insulation was added to houses that had none in the wall or floor.

Table 6-1
Pre-EEM and Post-EEM Measure and Upgrade Frequency for Insulation (% houses)

	Pre-EEM Measure Frequency	Post-EEM Measure Frequency	% Upgrading
Ceiling insulation	92.5%	95.6%	44%
Wall insulation	50.3%	74.4%	24.1%
Floor insulation	1.5%	2.8%	1.3%
Note: % upgrading ceiling insulation includes houses that had some ceiling insulation before upgrading.			

Figure 6-1 displays the minimum, maximum, and mean R-values for ceiling, wall, and floor insulation before upgrades.[4] The values are all based on houses where at least some insulation was present. The average ceiling insulation was R-18, with a range from R-3 to R-38. Houses that had wall insulation had either R-11 or R-13. Only two (2) of the houses in our sample for which we had data on existing conditions had floor insulation, and they both had R-11 insulation.

Figure 6-2
Pre-EEM Insulation R-Values When Insulation Was Present

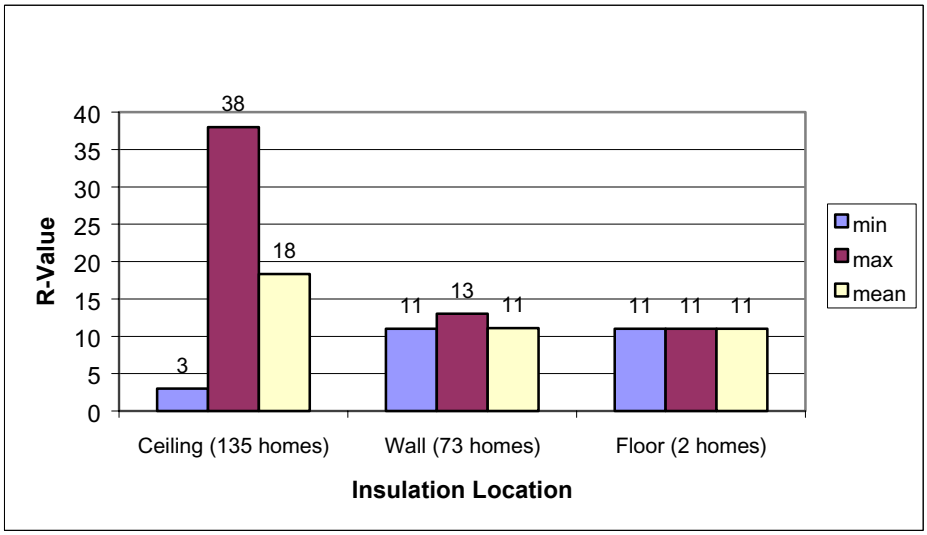


Figure 6-2 shows the R-values that were added to the ceiling, walls, and floor of houses that upgraded through EEMs. As noted earlier, in the case of walls and floors all the houses that upgraded had no insulation in this envelope component to start with so the values shown in the

[4] Note that all percentages exclude houses for which data were missing.

figure are the total insulation R-values. In the case of ceilings, only about 3% of the houses in our sample installed insulation in ceilings that were uninsulated to start with; the remaining 41% of the houses added insulation to ceilings that were already partially insulated.

Another common upgrade was the replacement of single- with double-pane windows. As shown in Table 6-2, 30% of houses upgraded their windows, going from single-pane to double-pane glazing. These upgrades increased the percentage of houses with double-pane windows by nearly a factor of four. None of the houses had sunscreens to start with. After the EEM upgrades, over one-fifth had sunscreens.

Figure 6-3
Insulation Upgrade R-Values Added to Existing Insulation

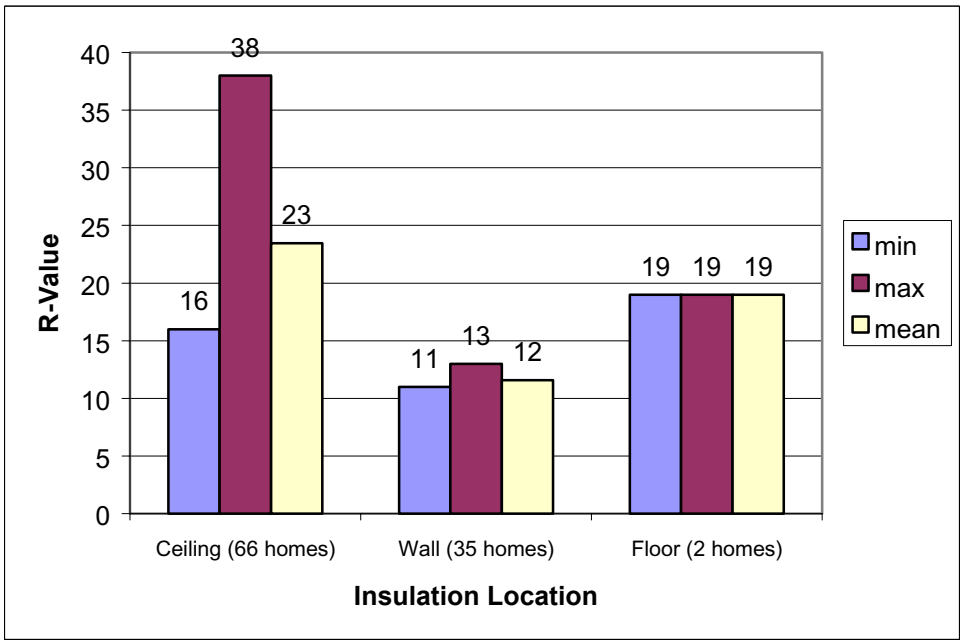


Table 6-2
Measure and Upgrade Frequency for Envelope Measures (% houses)

	Pre-EEM Measure Frequency	Post-EEM Measure Frequency	% Upgrading
Window panes- double	12%	42%	30%*
Sunscreens	0%	21%	21%

Heating, Cooling, and Lighting Upgrades

Table 6-3 summarizes the space heating, space cooling, and lighting upgrades that were done through EEMs.

Table 6-3
Upgrades of Heating, Cooling, and Lighting Measures

Measure	% Upgrading
Setback thermostat [19% had setback thermostats before upgrading]	35%
Duct loss reduction	36%
Gas furnace efficiency	43%
Replacement of electric furnace with heat pump	0.7%
Cooling (A/C) efficiency	41%
Lighting efficiency	39%

Only 19% of houses had setback thermostats before the EEMs. As a result of the EEM upgrades, an additional 35% of the houses installed setback thermostats.

A significant percentage of houses (36%) reduced duct leakage by improved duct sealing. The leakage was usually reduced by about 50%.

Prior to the EEMs, 98% of the homes utilized gas furnaces for heating. Approximately 43% (Table 6-3) of the study sample houses upgraded to a more efficient furnace. Table 6-4 presents the minimum, maximum, and mean gas furnace AFUE for houses before implementing EEMs and after the furnace upgrades. Basically, existing furnaces were replaced with new standard efficiency furnaces with an AFUE of 80%. No new furnaces that would be classified as high efficiency were installed through the EEMs.

Table 6-4
Pre-EEM and Upgraded Furnace Average Fuel Utilization Efficiency (AFUE)

	Minimum	Maximum	Mean	% upgrading
Pre-EEM AFUE	50	80	57	*
Upgraded AFUE	80			43%

Prior to the EEM upgrades, two of the sample houses had heat pumps and one had an electric resistance furnace. As a result of the EEMs, the two houses with heat pumps converted to gas furnaces and the one house that originally had an electric resistance furnace retrofitted with a heat pump, which had a Heating Season Performance Factor (HSPF) of 8.0.

All the houses in our sample for which we had data on the existing conditions had air conditioning before the upgrades. As shown in Table 6-3, over 40% of the sample houses upgraded their air conditioner efficiency through the EEMs. The units were upgraded to a SEER of 10. Again, this is the standard efficiency for new air conditioners, but is a substantial

improvement over the old units. Table 6-5 provides SEER information for the sample before the EEMs and after the upgrades.

Table 6-5
Pre-EEM and Upgrade A/C Seasonal Energy Efficiency Ratio (SEER)

	Minimum	Maximum	Mean	% upgrading
Pre-EEM SEER	5.5	10	7.4	*
Upgraded SEER	9	10	10	41%

Table 6-6 displays the minimum, maximum, and mean lighting total wattages per house before the EEM and the same statistics for the upgrades. The upgrades consisted of replacing incandescent bulbs with CFLs. As shown in Table 6-3, 39% of the houses upgraded their lighting. The mean lighting wattage per house after the upgrades was 234 watts.

Table 6-6
Pre-EEM and Upgrade Lighting Wattage

	Minimum	Maximum	Mean	% upgrading
Pre-EEM Watts	750	2080	879	*
Upgraded Watts	150	520	234	39%

Other Upgrades

Table 6-7 reveals that the overwhelming majority, 93%, of the houses in our sample had gas water heaters. Thirty-seven percent (37%) of all houses (for which we had data on existing conditions) upgraded to new gas water heaters. This included 2 of the 7 houses with electric water heaters that converted to new gas heaters. The age of the replaced units ranged from 8 to 26 years. As before, we note that even though the new water heaters were standard efficiency units they were much more efficient than the units they replaced. These upgrades resulted in 96% of the homes having gas water heaters after the EEMs.

Table 6-7 shows that a large percentage of the houses, 65%, reduced infiltration rates through weatherization measures to decrease air leakage. The leakage was decreased by about 60% in most cases.

Before the EEMs, none of the houses in the study sample had whole house fans, Power Planners, or low-flow plumbing devices or pipe insulation wrap. Through EEMs, 41% installed whole house fans, 7% installed Power Planners, and 12% installed water low-flow devices or pipe insulation.

Table 6-7
Existing and Upgrade Frequency for Selected Measures (% houses)

	Pre-EEM Measure Frequency	Post-EEM Measure Frequency	% Upgrading
Water heater- electric	7%	4%	--
- gas	93%	96%	37%
Infiltration control	--	--	65%
Whole house fan	0%	41%	41%
Power Planner	0%	7%	7%
Low-flow devices	0%	12%	12%
Note: Infiltration control refers to reductions in the existing level of natural air leakage.			

6.1.3 Measure and Total Annual Energy Savings

This subsection provides the annual measure-specific energy savings averaged over all houses in which the measure was installed and the total annual energy savings averaged over all houses upgraded through EEMs. This analysis complements the preceding section, which focused upon the benefits of individual measures. The subsection is divided into three parts. The first shows measure-specific electricity savings per house; the second focuses upon measure-specific natural gas savings per house. Finally, the last part combines the previous two parts to provide the total energy savings per house, expressed in kWh, therms, and source Btus.

Measure-Specific Electricity Savings

Table 6-8 shows the average annual electricity savings for individual upgrades in those houses in which the upgrades took place, and averaged over all the houses in our sample. Water heater conversions to natural gas and electric resistance furnace conversions to a heat pump each produced on the order of 5,000 kWh/year electricity savings. More efficient air conditioners produced annual savings of about 1,500 kWh. The large savings for these three equipment types were because they directly affected the largest electricity end uses. Because only a few houses converted electric space or water heating equipment, the savings from these measures averaged over all the houses were relatively low. Air conditioner efficiency savings, however, were relatively large averaged over all houses because so many implemented this measure.

Table 6-8
Annual Measure-Specific kWh Savings

Upgrade Measure	Energy Savings, kWh	
	Mean for Houses Installing Measure (Standard deviation in parentheses)	Mean Across All Houses
Ceiling insulation	568 (208)	250
Wall insulation	675 (236)	163
Floor insulation	565 (NA)	7
Windows (double-pane)	979 (307)	294
Sunscreens	1091 (226)	229
Infiltration control	661 (192)	430
Duct loss reduction	713 (769)	257
Furnace efficiency	NA	NA
Electric furnace to heat pump conversion	5411 (NA)	38
Cooling (A/C) efficiency	1574 (687)	645
Setback thermostat	424 (68)	148
Whole house fans	967 (253)	396
Water heaters (conversion to gas)	4848 (133)	145
Lighting efficiency	878 (308)	342
Power Planner	624 (34)	44
Low-flow devices/pipe insulation	572 (NA)	3

The measures producing the second largest savings were installation of sunscreens, double-pane windows, or whole house fans—about 1,000 kWh/year for each upgrade. All had a significant effect on the estimated cooling loads. Averaged over all houses, the savings for these measures were relatively large because of the large number of houses in which they were implemented.

Estimated mean savings for improvements in lighting efficiency also were significant—about 900 kWh/year. Reductions in duct leakage and air infiltration into the house produced significant savings in energy used for cooling. The mean savings for each measure were about 700 kWh/year in houses in which they were implemented. Averaged over all the houses in our sample, the savings for these measures were also relatively large.

Improvements in envelope insulation levels also reduced cooling energy use. The mean savings for ceiling, wall, and floor insulation were about 600 kWh/year for each measure. We note that the wall and floor energy savings were for installing insulation in uninsulated space, while most ceiling upgrades were to add to existing insulation. Averaged over all houses, the ceiling insulation electricity savings were high, but the savings for wall and floor insulation were low because these measures were implemented in so few houses.

The group of upgrades with the smallest estimated electricity savings included installing the Power Planner, low-flow devices and pipe insulation, and setback thermostats. Each measure

saved between about 400 and 600 kWh/year. Averaged over all houses in our sample, the savings for these measures were relatively small also.

Measure-Specific Natural Gas Savings

Table 6-9 shows the therm savings for individual upgrades in those houses in which the upgrades took place, and averaged over all the houses in our sample. Most savings were realized through reduced space heating energy consumption.

Upgraded furnaces had the largest single impact on total gas savings with a mean saving of 244 therms/year per house. Duct leakage reductions, which saved 193 therms/year, also contributed significantly to total gas savings. Savings from these upgrades were large when averaged across all the houses in our sample as well.

Table 6-9
Annual Measure-Specific Therm Savings per House

Upgrade Measure	Energy Savings, therms	
	Mean for Houses Installing Measure (Standard deviation in parentheses)	Mean Across All Houses
Ceiling insulation	74 (28)	32.6
Wall insulation	105 (42)	25.3
Floor insulation	101 (46)	1.3
Windows (double-pane)	131 (41)	39.3
Sun screens	N/A	
Infiltration control	90 (20)	58.5
Duct loss reduction	193 (191)	69.4
Furnace efficiency	244 (53)	105
Heat pump conversion	N/A	
Cooling (A/C) efficiency	N/A	
Setback thermostat	42 (17)	14.7
Whole house fans	N/A	
Water heaters	92 (81)	31.3
Lighting efficiency	N/A	
Power Planner	N/A	
Low-flow devices/pipe insulation	29 (17)	3.3

Converting from single-pane to double-pane windows produced the third largest gas savings, 131 therms/year. Savings for window upgrades were relatively large averaged across all the houses in our sample also.

Insulation upgrades saved between 74 (for ceiling insulation) and 105 (for wall insulation) therms/year, on the average. The savings for ceiling and wall insulation averaged across all the

houses were also relatively large. Savings for floor insulation, however, were very low averaged across all houses because so few implemented this measure.

Reduced infiltration saved 90 therms/year in space heating energy use. The use of a setback thermostat produced less savings—approximately 40 therms/year. A similar relationship applied when savings were averaged across all the houses in our sample.

Two other upgrades reduced energy use for water heating. Installing a new gas water heater produced mean savings of about 90 therms/year. This mean value takes into account that negative savings (increased gas consumption) were attributed to two cases where electric water heaters were replaced by gas heaters. Installation of low-flow water devices and pipe insulation was estimated to reduce water heater energy use by about 30 therms/year. Averaged across all houses in our sample, water heater replacement saved a relatively large amount of energy, but low-flow devices and pipe insulation saved very little energy because these measures were implemented in very few houses.

Total Annual Energy Savings Per House

The average total energy savings per house are presented in Table 6-10. These values take into account all houses for which we had data, regardless of which upgrades were performed on them. The estimated electricity and natural gas savings can be used to determine the average energy savings for houses that have been upgraded through an EEM.

The second column shows the mean kWh savings per house averaged across all 150 houses. This number includes the electricity savings for all the measures implemented in each house. The mean electricity savings for the houses in our sample were 3,261 kWh/year.

The third column presents the average therm savings per house. The average natural gas savings were 384 therms/year.

Table 6-10
Total Annual Energy Savings per House

	kWh	Therms	Source MMBtu
Mean Savings	3261	384	71
Standard Deviation	1234	187	23

To provide an estimate of the source energy savings, we combined the kWh and therm savings for each house by converting them to source Btus.[5] That number for all 150 houses was

[5] Therm savings were converted to Btus using a factor of 100,000 Btus/therm. kWh savings were converted to Btus using a conversion factor to obtain source Btus for electricity generation. The conversion we used was the product

averaged to find the mean total energy savings per house resulting from the EEM upgrades. We estimated that the average house reduced its source energy consumption by 71 Million Btu per year by implementing upgrades through an EEM.

As noted in Section 3, the number of EEMs implemented in the PG&E area since the TOSER Program (and preceding EAHAP) began has totaled 4,804 loans. Using the results above, we estimated the annual energy savings from houses financed with EEMs in the PG&E service territory. The estimates are shown in Table 6-11.[6]

Table 6-11
Estimated Energy Savings from EEMs

	Oct 97-Dec 98	1999	2000	Full period
Total Number of EEMs in PG&E Area	1,869	1,706	1,229	4,804
Annual Electricity Savings from EEMs	6.1 GWh	5.6 GWh	4.0 GWh	15.7 GWh
Annual Gas Savings from EEMs	0.72 million therms	0.66 million therms	0.47 million therms	1.84 million therms
Annual Source Energy Savings from EEMs	133 billion Btu	121 billion Btu	87 billion Btu	341 billion Btu
Note: Estimated energy savings are based on averages for the 150 houses analyzed in this study. These were existing houses retrofit through their EEMs, but the total number of EEMs in this table includes new houses, as well as existing houses, that qualified for EEMs.				

The electricity demand savings can be estimated by multiplying annual electricity savings by the ratio of PG&E residential peak to electricity consumption.[7] Based on the estimated electricity savings, demand would be reduced by all EEMs in PG&E's territory over this period by

- 3.73 average megawatts.

6.2 FACTORS AFFECTING THE NUMBER OF EEMS

This subsection presents results from a preliminary quantitative analysis of the relationship between several factors, including Program training, and the rate of EEM implementation. This subsection summarizes our analysis; the details are presented in Appendix B.

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of the reciprocal of the average natural gas plant efficiency and the number 1.1, which reflects average transmission and distribution losses of 10%.

[6] As noted in the table, the total savings are based on the total number of EEMs over each time period. However, we estimate that 20% to 30% of EEMs each period were for new houses for which these savings estimates would not be accurate since they were based on upgrades of existing houses.

[7] According to the California Energy Commission's report *California Energy Demand 2000-2010,* P200-00-002, June 2000, PG&E's residential electricity use in 2000 was 30,454 GWh and peak demand was 7229 MW.

6.2.1 Background

Statistics provided in last year's TOSER Program Market Effects Report and this report have shown that the number of EEMs in the PG&E area have been both higher and lower than the number in the rest of California at different points in time since the TOSER Program (and EAHAP) began. On the other hand, when EEMs are viewed in terms of their penetration rate relative to total FHA loans, the penetration rate in the PG&E area has been consistently higher than in other parts of the state since the Programs began. In the 1999 Market Effects Study we argued that the penetration rate is a better measure of the influence of the Program because the number of EEMs is so dependent on the number of FHA loans.

An obvious hypothesis about the Program's effects is that the number of EEMs in the PG&E area has increased as a result of the training over what it would have been without the training. However, through 1999 no detailed quantitative analysis had been conducted on what factors affect the number of EEMs let alone how much effect the training had. Although the EEM penetration rate has been higher in the PG&E area than elsewhere in California since the Program began, it was uncertain how much of the higher rate was due to the Program training and how much was due to other factors.

To begin to answer the question of the effect of training on the number of EEMs, we conducted a preliminary analysis of factors affecting the origination of EEMs. Our objectives were to identify what factors drive the number of EEMs implemented and how big an effect the Program training has had on those numbers.

6.2.2 Overview of Approach and Data

Because the research scope was rather limited, our approach was a preliminary analysis to test whether clear results of the Program training could be identified with simplified statistical models and, if not, to identify analytic refinements that should be implemented to provide more conclusive results. Since including non-PG&E areas in the analysis would have been very data intensive and complicated, we chose to focus on data for only the PG&E area under the assumption that Program effects were likely to be concentrated in areas where significant numbers of agents and lenders had been trained.[8]

We developed several approaches for analyzing factors affecting the number of EEMs, including Program training effects. In all cases the number of FHA loans was included as a primary explanatory variable of the number of EEMs. In addition to these factors, we examined and tested demographic effects, weather effects, temporal elements, and dynamic effects.

Our first model estimated the number of EEMs by county based on the number of FHA loans and numbers of agents and lenders trained over the full 39-month Program period. One set of more comprehensive equations was based on the cumulative total of EEMs, FHA loans, number

[8] This bounding of the analysis eliminated the need to consider exogenous and difficult to characterize factors such as structural differences in the southern California housing market and efforts of other utilities to promote EEMs.

of lenders trained and number of real estate agents trained at any point in time, and demographics data. We routinely employed three chronological reference points—the end of 1998[9], the end of 1999, and the end of 2000. We also developed a second set of comprehensive equations in terms of temporal data to help identify differences across time periods.

We examined in some detail three functional forms:

- a linear model to estimate the number of EEMs as a linear function of demographics variables, training variables, and the number of FHA loans
- a logistic model to estimate the penetration rate (number of EEMs/number of FHA loans) as a linear function of demographic variables, training variables, and the number of FHA loans
- a nonlinear model to estimate the number of EEMs as the product of the number of FHA loans multiplied by the demographic and training variables.

In addition to these forms, we also explored a model based on a production analysis framework. This model produced promising results, but a detailed application of the model was beyond the scope of the current study.

Our data were compiled at the 5-digit zip code level. We had a very rich database at this level.

One of the serious issues that affected the outcomes of our analyses was the difficulty of defining a geographic area that properly represented the region over which trained agents and lenders would be likely to do business. It became apparent once we analyzed the data at the zip code level that the role of trained agents and lenders extended beyond the 5-digit zip code. This was evident from comparing the training and EEM data for certain zip codes where 1) little or no training had occurred yet an above average number of EEMs was implemented and 2) extensive training had occurred yet few or no EEMs had been implemented. In the cases we examined in detail, the opposite was often true in nearby zip codes, suggesting that homes sold or financed by Program trainees were often in 5-digit zip codes other than where their offices were located.

To address the problem of identifying an appropriate geographic influence area, we conducted analyses at the 5-digit, 4-digit, and 3-digit zip code levels. In addition, we conducted a limited analysis at the county level. The disparities among the results from analyses at these different aggregation levels suggested that this was an important analytic issue. We were not able to resolve the issue completely in this preliminary analysis and recommend that it be pursued further in follow-on research.

[9] It should be noted that, although the program and program data series we had available began in October 1997, we always combined the three observations for 1997 with the 1998 data. Thus, equations focusing on 1998 used 15 monthly observations, rather than just 12.

6.2.3 Results

Our first analysis used a simplified linear model at the county level. We did not have demographic data available at the county level so the only variables used to predict EEMs were the number of FHA loans and the numbers of agents and lenders trained. The regression analysis was conducted with data for the entire 39-month Program period.

Table 6-12 shows the results including elasticity estimates[10] and t-statistics[11] (in parentheses). The lender training regression coefficient was not statistically significant, suggesting that lender training had no measurable effect on the number of EEMs. Agent training, on the contrary, was statistically significant. These results suggested that every agent trained was responsible for one additional EEM over the 39-month period, or training the 1,299 agents through the Program led to about 1,300 of the 4,804 EEMs in the PG&E area during this period.

Table 6-12
EEM Program Training Relationships Based on County Data, No Demographics

Group	Value	Full period
Lenders	Elasticity (t-statistic)	Statistically insignificant
	#EEMs added per 10 trainees during Program	N/A
Agents	Elasticity (t-statistic)	0.26 (3.20)[a]
	#EEMs added per 10 trainees during Program	10

[a] *This value is significant at greater than the 98% level.*

However, this model had one major and one uncertain shortcoming. The lack of demographics data in the model meant that it did not control for the possible influence of other potentially important factors and this could bias the estimates of the training effects. In addition, aggregation to the county level probably did not provide an accurate measure of the geographic area covered by agents and lenders in many locations.

Primarily because of the likely importance of demographic factors, we conducted several analyses with demographic variables aggregated to various zip code levels. After numerous

[10] The elasticity indicates the change predicted in the percentage of EEMs as a result of a given percent change in the variable, all evaluated at the sample mean values.

[11] The standard interpretation of the t-statistic applies to the results reported here. A t-statistic greater than 2.01 in this regression indicates that there is a 95% chance that we have concluded correctly that the variable has an effect on the number of EEMs. The larger the t-statistic is the more confidence we can have that the variable does affect the number of EEMs.

exploratory analyses, we settled on the 3-digit level of analysis using the nonlinear model structure described briefly earlier.

Demographic factors entered the statistical models in a significant fashion. Moreover, the regression results reinforced the importance of controlling for demographic factors in trying to estimate Program training effects on the number of EEMs. Sensitivities with respect to the significant demographic variables are reported in Table 6-13. The elasticities of the quantity of EEMs predicted with respect to each variable are shown. The quantities in parentheses are the t-statistics.[12]

Table 6-13
EEM Elasticities for Demographic Variables,
3-digit Zip Code Level, Full Program Period

Demographic Variable	Elasticity
Hispanic % of population	0.50 (2.8)
Median household income	-1.01 (2.01)
Household formation 1990-2000	0.54 (2.86)
Average household size	-5.8 (2.78)
Median age, head of household	-2.42 (2.3)
Note: t-statistics are shown in parentheses.	

These elasticity estimates were based on the entire 39-month Program period through December 2000. They have the following interpretation:

- A 10% increase in the proportion of Hispanics in a 3-digit zip code area would be associated with a 5% increase in the number of EEM loan originations. The mean Hispanic proportion was 23.3%.
- A 10% decrease in the level of household income would cause a 10% increase in EEM origination. The mean household income was $49,286.
- For every 1 percentage point increase in the annual rate of household growth in a 3-digit zip code, an extra 70 EEMs would have been generated over the 39-month time period. The average growth over the period 1990-2000 was 14.3% and the annual rate ranged from 0.4% to 3.6 % per year, compounded.

[12] Every elasticity, except the one for household income, was associated with a confidence level of 97% or higher. The household income variable was significant at the 90% confidence level.

- Larger households and those with older heads of the household had a lower demand for EEMs. The mean household size was 2.68 persons and the mean head-of-household age was 36.0 years.

The first result indicates that areas with higher Hispanic population shares have a higher demand for EEMs than other areas. The income results suggest that areas with lower average incomes also have a higher demand for EEMs, which probably reflects the fact that lower-income households are more in need of and more likely to benefit from the financing provided by EEMs.

Household formation or growth was also an important source of EEM demand. Growth rates varied by a factor of 10 across the 3-digit zip code areas. With all else equal, larger household size and higher age of head of household reduced EEM demand. Somewhat surprisingly, we did not find climate effects to be a significant factor in EEM demand.

Program training effects that we estimated at this preliminary stage of the research were more varied and less certain. Table 6-14 gives the estimates of Program training effects by trainee group and time period. .

Table 6-14
EEM Program Training Relationships Based on 3-digit Zip Code Areas

Group	Value	1997-98	1999	2000	Full period
Lenders	Elasticity (t-statistic)	Statistically insignificant	Statistically insignificant	0.08 (4.25)[a]	0.11 (1.76)[b]
	#EEMs added per 10 trainees during each period	N/A	N/A	9	13
Agents	Elasticity (t-statistic)	0.19 (2.65)[c]	Statistically insignificant	Statistically insignificant	Statistically insignificant
	#EEMs added per 10 trainees during each period	7	N/A	N/A	N/A

Note: The accuracy of all estimates is limited by the possible lack of correspondence between 3-digit zip codes and the actual geographic area in which trainees operate.

[a] *This value is significant at greater than the 98% level.*

[b] *This value is significant at the 85% confidence level.*

[c] *This value is significant at the 98% confidence level.*

We examined the four chronological periods shown and found that the results varied considerably by period. During three of the four time periods presented, either the lender or real estate agent training variable was statistically significant (at at least the 80% confidence level). However, the effects were not statistically significant for both variables during any of the periods. We believe that these mixed results provide evidence that a relationship between training and the number of EEMs implemented exists, but that the analysis should be expanded to account more accurately for the geographic area in which lenders and agents operate, as noted

earlier. Furthermore, other model specifications that showed initial promise (but that we could not examine in depth within the scope of the current study) should be explored. Consequently, these results should be viewed as indicative of the possible relationship between training and the number of EEMs, but not conclusive.

Using the model for the whole Program period, the elasticity of lender training indicated that a 10% increase in the number of lenders trained would result in a 1.1% increase in EEMs. In absolute terms, this would mean that for every 10 lenders trained over the 39-month period, approximately 13 more EEMs would have been financed over this same period. The results for lender training were not statistically significant in the first two periods, but they were quite strong in 2000. For 2000, the results suggested that each 10 lenders trained led to 9 additional EEMs during the year.

The results for agents did not show a statistically significant relationship between number of agents trained and houses sold with EEMs when we conducted this analysis over the full 39-month period. However, the results for October 1997 through December 1998 were statistically significant for agent training. For this restricted interval, the elasticity for agent training was 0.19, nearly twice the lender training elasticity. In absolute terms, this indicated that 7 additional EEMs would have resulted over the 15-month period for every 10 agents trained during the first 15 months.

Based on these results, we calculated initial estimates of the bounds on the probable effect of training on the number of EEMs implemented. The results for lenders over the whole period provided an initial estimate of an upper bound. The results for real estate agents over the 1997-98 period provided a lower bound estimate assuming that the training only increased the number of EEMs during this period and the effect was averaged over the whole 39-month period. Based on this approach, we estimated the following:

- The probable upper bound on the training effect was about 13 additional EEMs over the 39-month period for each 10 lenders trained.
- The probable lower bound on the training effect was about 2.7 additional EEMs over the 39-month period for each 10 agents trained. [13]

These estimates and the county-level analysis allowed us to estimate preliminary lower and upper bounds on the percent of EEMs during the Program that were attributable to Program training:

- A probable **lower bound** on the percent of EEMs during the Program that was attributable to the training was **3.4%.** This estimate was based on the number of real estate agents trained during the 1997-98 period.

[13] This estimate was based on the effect of real estate agent training during 1997-98 scaled to the full 39-month period (7 * 15 months/39 months).

- A probable **upper bound** on the effect of training was that **27%** of the EEMs during the Program were attributable to the training. This estimate was based on the county-level analysis and the number of agents trained during the entire Program period.

We also examined the role of dynamic effects (inertia and lagged effects). Based on the preliminary analyses conducted, the data revealed that dynamic effects appeared to be of only secondary importance.

6.2.4 Conclusions and Recommendations

These analyses consistently demonstrated the influence of key demographic variables on the number of EEMs implemented and their penetration rate relative to the number of FHA loans. The effects of the demographic variables included in our analyses were generally consistent with expectations. The strength of the role played by the Hispanic population proportion, household formation rate, and income can provide useful insights about targeting Program efforts.

The effects of Program training were less clear, but we believe that the lack of an accurate measure of the geographic area influenced by real estate agents and lenders was a significant limitation in our analysis. The difference between the county-level and 3-digit zip code results suggested that it would be premature to draw definitive conclusions about the Program training effects from these preliminary analyses.

Despite these analytic limitations, we developed initial estimates of the effects of training on the number of EEMs implemented. Preliminary results suggested that between 3.4% and 27% of the EEMs implemented in the PG&E territory over the entire Program period were attributable to the training.

We believe that defensible conclusions about the Program effects can be reached only if the geographic area of influence is defined more accurately. The 5-digit and 4-digit databases are a very rich source of information that merits further analyses. We recommend conducting a systematic and comprehensive aggregation of the appropriate zip codes associated with Program trainees for the next Program Market Effects study to provide more defensible estimates of the effect of Program training. In addition, we recommend further examination of hybrid models based on a production analysis framework because of the promise they showed in initial exploratory applications of these models.

7 CONCLUSIONS AND RECOMMENDATIONS

This section presents our key findings and conclusions about the effects of the TOSER Program and recommendations for ways to improve the Program and facilitate future evaluations and market effects studies of the Program.

7.1 MAJOR FINDINGS AND CONCLUSIONS

The presentation of findings and conclusions begins with a subsection summarizing information on the number of EEMs implemented in the PG&E service area since the Program began and the energy savings associated with EEMs. The next subsection provides insights into the barriers that impede the *implementation of efficiency upgrades* by buyers of existing homes and the perceived effects of EEMs on those barriers. The following subsection addresses barriers to the *implementation of EEMs* and the role of the TOSER Program in alleviating those barriers. This discussion also summarizes preliminary findings about the effect of the Program training on the number of EEMs implemented. The next portion of the conclusions discussion assesses the market effects of the Program using the program theory described in Section 2. In the last subsection, comparisons are presented to the findings and conclusions from the Market Effects Study conducted last year.

7.1.1 Energy Savings Associated with EEMs

Since this Program began, 4,804 EEMs have been implemented in the PG&E service territory.[1] Table 7-1 provides a list of efficiency upgrades and indicates what percent of homes implemented each upgrade through an EEM (based on a sample of 150 recent EEMs). The upgrades are listed from most to least common.

The average total energy savings per house from implementing energy efficiency upgrades through EEMs are presented in Table 7-2. The second column shows the mean kWh savings per house averaged across all 150 houses. This number includes the electricity savings for all the measures implemented in each house. The mean electricity savings for the houses in our sample were 3,261 kWh/year.

[1] This number includes EEMs for both existing and new houses, while the TOSER Program emphasizes only EEMs for upgrades of existing houses. The results throughout this report are focused on existing house EEMs.

Table 7-1
Frequency of EEM Efficiency Upgrades

Upgrade	% of Houses Implementing
Infiltration control (weatherization)	65%
Ceiling insulation	44%
Gas furnace efficiency	43%
Cooling (A/C) efficiency	41%
Whole house fan	41%
Lighting efficiency	39%
New gas water heater	37%
Duct loss reduction	36%
Setback thermostat	35%
Window panes- double	30%
Wall insulation	24%
Sunscreens	21%
Low-flow devices	12%
Power Planner	7%
Floor insulation	1.3%
Replacement of electric furnace with heat pump	0.7%

Table 7-2
Total Annual Energy Savings per House

	kWh	Therms	Source MMBtu
Mean House Savings	3261	384	71
Standard Deviation	1234	187	23

The third column presents the average natural gas (therms) savings per house. The average natural gas savings were 384 therms/year.

We combined the kWh and therm savings to estimate source Btu savings as shown in the fourth column. Based on the electricity and natural gas savings, the average house reduced its source energy consumption by 71 Million Btu per year by implementing upgrades through an EEM.

Applying these estimated savings per house to the total number of EEMs implemented in the PG&E area since the TOSER Program (and preceding EAHAP) began we estimated that the following energy savings per year and electricity peak demand savings have resulted from these EEMs:

- 15.7 million kWh (15.7 GWh) per year
- 1.84 million therms per year

- a total of 341 billion Btu per year
- peak demand reduction of 3.73 average megawatts.

7.1.2 Energy-Efficiency Barriers and the Role of EEMs

The scope of this study did not permit us to assess the direct influences of the Program on home buyers, i.e., the demand side of this market. However, our interviews with home owners who obtained EEMs provided useful information about attitudes and behavior regarding energy efficiency and the role of EEMs in alleviating barriers faced by buyers in making efficiency upgrades. This information will be helpful in implementing this and similar programs in the future and assessing their effects.

Table 7-3 summarizes the interview data from home buyers on energy efficiency in general. Buyers rated most energy-efficiency barriers to be of moderate significance and did not rate any as very significant. Last year, the barrier rated most significant by buyers was the "difficulty affording or financing improvements." This year, however, buyers rated this barrier as only moderately significant. The two most significant barriers this year were "difficulty getting trustworthy information" and " difficulty finding someone to provide assistance." These suggested a common theme—a need for credible information and assistance to make efficiency upgrades. Other barriers were rated about the same this year as last.

EEMs received high or very high ratings for their usefulness in overcoming almost all energy-efficiency barriers. Consistent with last year's results, buyers who obtained EEMs rated their usefulness in addressing affordability and financing issues as very high. Buyers also rated the usefulness of EEMs as very high in reducing "difficulty of understanding efficiency upgrades." For most other categories, however, buyers this year rated the usefulness of EEMs in reducing energy-efficiency barriers slightly lower than they did last year.

Table 7-3
Buyer's Perspective on Energy-Efficiency
Barriers and Usefulness of EEMs in Overcoming Them

Energy Efficiency Barrier	Significance	Usefulness of EEM
Difficulty finding efficiency information	Moderate	High
Difficulty getting trustworthy information	High	Moderate
Time required to select and make improvements	Moderate	High
Uncertainty about usefulness of efficiency investments	Moderate	High
Difficulty understanding efficiency upgrades	Moderate	Very high
Difficulty finding someone to provide assistance	High	High
Difficulty affording or financing improvements	Moderate	Very high

7.1.3 EEM Barriers and the Role of the TOSER Program

Table 7-4 summarizes our conclusions, based on market actor interviews, about EEM market barriers and the effects of the TOSER training on the barriers. We categorized the barriers by the general groups developed in Section 2. The results for buyers were based on the assessments of those who had gone through the process to implement EEMs (presented in Section 5). Results for real estate agents and lenders are presented for nonparticipants, participants prior to training, and participants after the training.

Table 7-4
Significance of EEM Market Barriers and Effects of TOSER Training by Market Actor

Barrier Category	Buyers	Real Estate Agents			Lenders		
		Nonparti-cipants	Participants		Nonparti-cipants	Participants	
			Pre-training	Post-training		Pre-training	Post-training
Unavailability of EEMs, implementation tools, etc.	●	●●●●	●●●●	●●●	●●●●	●●●	●●
Lack of awareness/ information	●●	●●●●	●●●●	●●●	●●●●	●●●●	●●●
Transaction/hassle costs, decision-making problems	●●	●●●	●●●	●●●	●●●●	●●●	●●
Market or performance reliability/uncertainty	●●	●●●	●●●●	●●●	●●●	●●●	●●●
Lack of champions/ communications	●	●●●●	●●●	●●●	●●●●	●●●	●●●
Complexity	●	●●●	●●●●	●●	●●●	●●●	●●

Note: Significance of barrier is designated by number of circles from ●●●●●=major barrier to ●=insignificant barrier.

Overall, buyers rated EEM barriers as minimal and this reflected positively on the effectiveness of the EEM process. The buyers' ratings this year were almost identical to those last year. As noted last year, the buyers were self-selected EEM users so their perceptions might not be consistent with the barriers *expected* by buyers who had not been through the process.

The results shown for real estate agents and lenders summarize the data presented in Section 4. As pointed out in last year's Market Effects Study, the fact that these market actors rated these barriers as more significant than buyers suggested that the Program's emphasis on agents and lenders was well placed.

Comparing the post-training ratings of participants to both the pre-training ratings of participants and the ratings of nonparticipants indicated that the training reduced the perceived magnitude of most barriers. These findings suggested that the training was most effective at reducing concerns about the complexity of EEMs.

Although the findings this year generally agreed with those last year, the lack of EEM champions in the marketplace was less of a barrier this year than last. This was true for participants both before and after training and for nonparticipants. This may be a result of the new Program efforts this year to increase the visibility of agents and lenders who have been active EEM promoters. It is important to note that the significance of this barrier did not decrease after the training, suggesting that the training itself had little effect on participants' perceptions about the presence of marketplace champions.

The results in Table 7-4 also suggest that several moderate barriers remain for real estate agents even after training. Training reduced perceived barriers related to the complexity of the EEM process, but agents still rated the unavailability of needed tools and information, transaction costs, market uncertainty, and lack of champions remained as moderate perceived EEM barriers after the training.

7.1.4 Factors Affecting the Number of EEMs

This study focused on assessing underlying effects of the Program training on characteristics of the EEM market such as market actor EEM awareness, knowledge, and behavior, but the anticipated ultimate benefit of the Program would be an increase in the number of EEMs implemented. Our preliminary econometric analysis of the EEM data showed that several factors, including the Program training, were determinants of the number of EEMs implemented.

The analysis provided the following results regarding non-training factors that affected the number of EEMs implemented in an area:

- The number of EEMs implemented was very dependent on the number of FHA loans issued. This was consistent with the aggregate trends observed in the quantity of EEMs over the 1997-2000 time period and demonstrated the importance of using the ratio of EEMs to FHA loans, or EEM penetration rate, to compare areas and time periods.
- Several demographic factors had statistically significant effects on the number of EEMs implemented. The number of EEMs was higher in areas with larger Hispanic population proportions, lower incomes, higher housing growth rates, smaller households, and older household heads, on the average.

When we estimated the effects of Program training on the number of EEMs implemented, the results were less consistent and varied depending on the type of model estimated and which time period we examined. However, we found a statistically significant effect of either real estate agent or lender training in 4 of 5 cases examined. At this stage, our results have not ruled out the possibility that the training has had no effect on the number of EEMs, but it has provided initial statistical evidence supporting the hypothesis that training has increased the number of EEMs

issued. Based on these preliminary results, it was possible to develop a likely range of values to bound the effect of the training. Our results suggested that between 3.4% and 27% of the EEMs in the PG&E territory during the 39-month Program period resulted from the Program training.

7.1.5 Overall Assessment of Effects on the Market for EEMs

We used the hypotheses shown in Table 2-1 to assess the overall market effects of the TOSER Program. Table 7-5 summarizes our conclusions about the evidence supporting or refuting each of the hypothesized market effects. The table indicates our assessment of the extent of evidence that we were able to gather about each hypothesis and the strength of that evidence. The extent of the evidence depended on the types of data that were available for this study and the quality of that information. In some cases, we did not collect relevant information in this study; in others, it was too early in certain stages of the Program to compile such information. Interviews of nonparticipating agents and lenders this year improved our ability to compile evidence of market effects. The strength of the evidence reflects how strongly the available evidence supported the hypothesis. The degree to which each hypothesis could be confirmed by this study depended on both the extent of evidence and the strength of the evidence.

Overall, the extent of the evidence available to assess each hypothesis increased this year for two reasons. First, this is the third market effects study conducted of the TOSER Program and its preceding third-party program, EAHAP. Because each study addressed similar issues, the body of information available to assess hypotheses related to market effects has grown. Second, we conducted interviews of nonparticipating real estate agents and lenders this year for the first time, and this permitted us to establish baseline information about these populations for comparison with the data for participants. In addition, our reinterviews of participants in the 1999 TOSER Program permitted an assessment of the persistence of effects observed in the 1999 Market Effects Study.

Table 7-5
Assessment of Market Effects Hypotheses

Hypotheses	Extent of Evidence	Strength of Evidence
Supply-Side Actors		
SS1. Real estate (RE) firm promotion of Energy Snapshots leads to increased RE agent awareness/understanding of efficiency and EEMs	Limited	Moderate
SS2. Training of real estate agents leads to increased RE agent awareness/ understanding of energy efficiency and EEMs	Extensive	Strong
SS3. Increased RE agent awareness/understanding leads to RE agent EEM promotion	Moderate	Strong
SS4. Training of lenders leads to increased lender awareness/ understanding of energy efficiency and EEMs	Extensive	Strong
SS5. Increased lender awareness/ understanding leads to increased promotion	Moderate	Strong
SS6. Improved dialog between RE agents/lenders and facilitators leads to increased lender awareness/ understanding of EEMs	None	N/A
SS7. Improved dialog between RE agents/lenders and facilitators leads to increased RE agent awareness/ understanding of EEMs	None	N/A
SS8. Increased buyer requests for EEMs lead to lender/RE agent benefits from EEMs	Extensive	Moderate
SS9. Lender/RE agent benefits from EEMs lead to increased lender/ RE agent positive communications about EEMs	Extensive	Moderate
SS10. Lender/RE agent benefits from EEMs lead to lender/RE agents integrating EEMs into standard practices	Moderate	Moderate
SS11. Increased lender/RE agent positive communications about EEMs lead to lender/RE agents integrating EEMs into standard practices	Moderate	Moderate
Home Buyers		
HB1. Energy Snapshot ratings lead to increased buyer knowledge/awareness of energy efficiency, HERS, EEMs	None	N/A
HB2. Real estate agent EEM promotion leads to increased buyer knowledge/awareness of energy efficiency, HERS, EEMs	Moderate	Moderate
HB3. Increased lender EEM promotion leads to increased buyer knowledge/awareness of energy efficiency, HERS, EEMs	Moderate	Strong
HB4. Home loan consultant training and materials lead to increased buyer knowledge/awareness of energy efficiency, HERS, EEMs	Moderate	Moderate
HB5. Home buyer education leads to increased buyer knowledge/awareness of energy efficiency, HERS, EEMs	Limited	Weak
HB6. Increased buyer knowledge/awareness of energy efficiency, HERS, EEMs leads to near-term buyer requests for EEMs	Moderate	Moderate
HB7. Buyer requests for EEMs lead to buyer EEM benefits	Moderate	Strong
HB8. Buyer EEM benefits lead to positive buyer communications about EEMs	Moderate	Strong
HB9. Positive communications from buyers and others about EEMs lead to general increase in consumer demand for EEMs	Moderate	Moderate

Real Estate Agent and Lender Hypotheses

The supply-side actor hypotheses are discussed in the following paragraphs:

Hypothesis SS1: Because it was revised during the past year, there was some uncertainty about comments provided on the Energy Snapshot in the market actor interviews. Nevertheless, over half the lenders and agents said this year that they were aware of the Energy Snapshot, more than double the shares last year. The comments provided by the respondents suggested that they had a reasonable understanding of the Snapshot.

Hypothesis SS2: As they did last year, the interview results for real estate agents showed that awareness of and understanding about EEMs were very good after the training. The perceived barriers to implementing EEMs also decreased substantially after the training, and the significance ratings for almost all barriers were lower for participants than nonparticipants.

Hypothesis SS3: The real estate agents indicated a strong commitment to promoting EEMs after the training, but, even so, nearly one-third had not discussed EEMs with a single buyer since the training. Participating agents reported closing a much larger share of homes with EEMs than the nonparticipants. It is important to note that agents participating in the 1999 Program reported this year that they had continued to discuss and recommend EEMs at the same rate they reported last year shortly after the training.

Hypothesis SS4: See comments for Hypothesis SS2.

Hypothesis SS5: Contrary to the findings last year, participating lenders indicated a slightly stronger commitment to discuss EEMs with and recommend them to buyers than the real estate agents. Over 90% of the lenders reported that they had discussed an EEM with at least one buyer since taking the training. It is important to recognize that many federal programs require borrowers to be informed about EEMs so the high frequency is probably not due completely to the EEM training.

Hypotheses SS6 and SS7: We collected no data about this aspect of the Program.

Hypothesis SS8: Participating lenders' and real estate agents' responses indicated that buyer interest in EEMs was much more important this year as a reason to promote EEMs than their responses last year indicated. Nonparticipants also stated that buyer interest was considerably more important this year than the participants noted last year. This evidence suggested that a significant increase in buyer interest in and demand for EEMs has occurred in the past year and lenders and agents have started to benefit from this increase. This increase in buyer interest and demand may be related to the energy supply uncertainties and price increases that occurred in 2000, although our data collection took place before the major changes occurred. Overall, real estate agents and lenders expressed generally positive views, as they did last year,

about the benefits of EEMs to their business. Many saw EEMs as a component of improved customer service and a useful sales tool.

Hypothesis SS9: About 73% of the lenders and 50% of the real estate agents said that since the seminar they told other professionals about EEMs at least sometimes. Both represented an increase over the rates last year. EEM awareness of participants prior to training and of nonparticipants was also considerably higher this year than last. Although it was not possible to ascertain how much of this was due to information dissemination and communications among these professionals, particularly communications between prior participants and nonparticipants, the relatively high levels of awareness were consistent with the Program having a positive effect on communications about EEMs.

Hypotheses SS10 and SS11: Neither real estate agents nor lenders expressed serious concerns about being able to integrate EEMs into their standard business practices. Both this year and last, real estate agents and lenders who took the TOSER training were substantially more likely to discuss and recommend EEMs to buyers after the training. The share of homes closed with EEMs by participating agents this year was considerably higher than last year. The follow-up interviews of 1999 Program participants generally indicated that the training had lasting effects on their behavior, but the changes were less than they were shortly after the training—agents and lenders continued to discuss both energy efficiency and EEMs with buyers more often than they did before the training; agents continued to tell buyers that EEMs could reduce their utility bills; and agents closed a much larger share of homes with EEMs during the past year than shortly after the training. Responses from lender reinterviews, however, suggested that they were less active in promoting EEMs during the past year.[2] The EEM quantitative analysis provided some evidence that the training had increased the number of EEMs implemented. We were not able to distinguish between the effects of benefits derived from EEMs and positive communications from others. However, it is important to note that both agents and lenders continued to state that lack of visible examples of others in their industry who strongly advocated EEMs was a barrier to further implementation.

Buyer Hypotheses

The buyer hypotheses are discussed in the following paragraphs:

Hypothesis HB1: We collected no information about Energy Snapshots from buyers because so few were likely to be aware of them at this point in the Program.

Hypotheses HB2 and HB3: As was the case last year, buyers most often learned about EEMs from their lender or real estate agent. Almost half reported that their lender was their first source of EEM information and about one-fourth said that their agent was their first source. Buyers (78%) also reported that the lender or agent was the first to bring up EEMs during the purchase process; only 9% of buyers were the first to mention using an EEM. For the buyers

[2] The sample sizes for the follow-up interviews were so small (14 agents and 10 lenders), however, that these findings were not statistically significant.

interviewed this year, lenders were the primary source of information throughout the EEM process. This was contrary to last year when three-fourths said that the facilitator was the primary information source; this difference was probably due to the fact that last year's interviewees were selected almost totally from lists of those who had used a facilitator.

Hypothesis HB4: A much smaller proportion of the buyers interviewed this year than last year mentioned home loan consultants or home buyer seminars as information sources. Consequently, we could not access the effectiveness of these information channels. The results last year, however, did suggest that they were often effective, especially with first-time buyers.

Hypothesis HB5: Only 7% of the buyers said they learned about EEMs and energy efficiency through the media or advertising. Consequently, these channels continued to have little influence on buyer awareness. We note that we conducted our interviews prior to the buyer education campaign, which occurred later in the year, so these results did not reflect possible effects of this effort.

Hypotheses HB2-HB5: In combination, these information channels were quite effective at informing and educating buyers about energy efficiency and EEMs. Over half the buyers this year (compared to one-third last year) said that they were familiar with the home energy rating process. Buyers indicated that most barriers to energy-efficiency upgrades were moderately significant, with "difficulty getting trustworthy information" and "difficulty finding someone to provide assistance" being the most significant; EEMs are largely intended to overcome these barriers.

Hypothesis HB6: Only about 10% of the buyers who obtained an EEM had been the party to initiate the discussion with the lender or agent. When the agents or lenders discussed EEMs with buyers, about 20% of the buyers followed through and obtained one. Consequently, there appeared to be some buyer response to increased awareness and knowledge about EEMs, but it was fairly limited.

Hypothesis HB7: The buyers almost universally were pleased with the outcome of their EEM and believed that they had benefited from it. Buyers rated EEMs to be quite useful in overcoming almost all energy-efficiency barriers. The lowest rating for the usefulness of EEMs was in overcoming the "difficulty of getting trustworthy information." On the average, buyers rated EEMs to be easy to understand and rated all the steps in the process as being easy to implement. Almost one-fourth, however, noted that they had problems with the contractor that did the work.

Hypothesis HB8: Ninety-six percent (96%) of the buyers said they would recommend EEMs to other buyers.

Hypothesis HB9: We had little information from the interviews to assess overall market impacts of the Program or the mechanisms hypothesized for increasing the use of EEMs. However, the EEM statistics compiled by HUD were consistent with a substantial effect on the

overall rate of EEM implementation. The 1998 and 1999 Market Effects Studies showed a significant increase in the percentage of EEMs implemented in the PG&E area after the EAHAP and TOSER Program went into effect. That increase continued into 2000. In addition, the penetration rate of EEMs in the TOSER Program area continued to be higher than in the remainder of California. Our quantitative analysis showed that the number of EEMs implemented was highly dependent on the number of FHA loans issued and specific demographic factors; it also provided preliminary evidence that the training had increased the number of EEMs beyond what it would have been without the training when these other factors were taken into account.

Overall Effects

We used the Program theory (or model) to provide a framework for assessing the market effects of this Program. This framework permitted us to assess individual links in the chain from Program activities to market changes that would be expected to occur in conjunction with market transformation.

Although the number of Program participants interviewed in this year's study, as well as in the preceding market effects studies, was relatively small, the cumulative number of participants interviewed has grown—totals of 65 lenders and 119 real estate agents have been interviewed over the course of the three studies. Consequently, even though the number of interviewees in any one year has not been large, the cumulative number of participants interviewed has begun to approach a sample size that would be sufficient for typical statistical analyses.

By and large, the key findings from the interviews have been relatively consistent over the three years. This has increased the confidence that can be placed in the reliability of specific findings.

The overall assessment of Program effects depends on both the extent of the evidence available and the strength of the evidence supporting the hypothesized market effects. The accumulation of evidence over three market effects studies has increased the extent of evidence related to most hypotheses. Consistency across the findings from all three studies and the observability of clear, significant effects add to the strength of evidence supporting several of the hypotheses shown in Table 7-5.

The clearest and most extensive evidence of Program market effects involved the direct effects of the training on participants' awareness, understanding, and promotion of energy efficiency and EEMs (SS2, SS3, SS4, and SS5). The Program has focused primarily on these objectives and it appeared to be quite successful at achieving them. Training of lenders and agents appeared to have notable effects on the demand side as well: buyers have increased their knowledge and awareness as a result of working with agents and lenders who were educated about energy efficiency and EEMs (HB2 and HB3). The expected outcomes from buyers using EEMs also appeared to be realized through their benefiting from EEMs, communicating positively to others about EEMs, and increasing general buyer demand for EEMs (HB7, HB8, and HB9).

The more tenuous and less clear market effects occurred in two general areas—institutionalized changes in the practices of lenders and agents in implementing EEMs (SS8, SS9, SS10, and SS11) and follow-through of buyers to obtain EEMs (HB6). Both types of market effects are essential for market transformation to occur. On the supply side, lenders and agents noted in interviews for the 1999 and 2000 Market Effects Studies that the lack of EEM "champions" in their industry was a significant impediment to their embracing EEMs; this impediment could be related to the observed gaps in the supply-side market effects. On the buyer side, buyers, lenders, and real estate agents all mentioned that more third-party education of buyers about EEMs was needed, and this could be related to the lack of buyer follow-through to obtain EEMs, even after being informed by a lender or agent about EEMs.

Our preliminary analysis of EEM penetration rates provided limited evidence that the Program training has increased the number of EEMs implemented. This analysis was limited by the analytic complexity involved and scope limitations; however, it provided initial indications that Program training has generated additional EEMs.

7.1.6 Comparison with 1999 Market Effects Study Conclusions

Table 7-6 compares the effect of the TOSER training on attendees' perceptions of EEM barriers in 2000 and 1999. The number of circles indicates how much the training reduced the magnitude of each type of EEM barrier. The results for real estate agents suggested that the seminars in

Table 7-6
TOSER Training Reduction of EEM Barriers, 2000 Compared to 1999

Barrier Category	Real Estate Agents		Lenders	
	1999	2000	1999	2000
Unavailability of EEMs, implementation tools, etc.	●●●●●	●●●	●●	●●●
Lack of awareness/information	●●●●●	●●●	●●●	●●●●
Transaction/hassle costs, decision-making problems	●●●●●	●●	●●●	●●
Market or performance reliability/ uncertainty	●●●	●●	●	●
Lack of champions/communications	●●	●	●	●
Complexity	●●●●●	●●●●●	●●●	●●●●●
Note: Reduction in barrier is designated by the number of circles: ● = 0-10%, ●● = 11-20%, ●●● = 21-30%, ●●●● = 31-40%, ●●●●● > 40% .				

1999 generally reduced their perceived barriers more than the 2000 seminars did. Although this was true, the main reason was that in 1999 agents came into the seminars with a much lower level of understanding of EEMs than in 2000. As noted throughout this report, the general level of EEM awareness and understanding among real estate agents appeared to increase notably in

2000 from the levels in 1999. Although the amount attributable to the Program was uncertain, part of this increase was probably due to the cumulative effects of the Program and a resulting general increase in understanding and awareness.

For both agents and lenders, the largest impact of the training was on diminishing the magnitude of the EEM complexity barrier. This was the case for both the 1999 and 2000 seminars. This result indicated that the seminars were, and have continued to be, quite effective at informing the attendees about the EEM process and reducing their concerns about its complexity.

Table 7-7 shows changes in our assessments of the market effects hypotheses from 1999 to 2000. In most cases, the extent of the evidence available on the hypotheses increased this year. This was due to three major factors: 1) the growing body of data accumulated through three market effects studies, 2) larger sample sizes this year, and 3) interview data from additional groups this year including nonparticipating lenders and real estate agents and training participants who were interviewed initially last year. Although this study provided additional evidence regarding hypotheses SS3 and SS5 (Increased real estate agent and lender, respectively, awareness/ understanding leads to increased EEM promotion), we judged that the extent of the evidence was still not significantly greater than it was last year. This was because of the relatively small numbers of agents and lenders interviewed this year and the lack of a clear link between increased awareness/understanding and EEM promotion. We also assessed the extent of evidence regarding SS6 (Improved dialog between agents/lenders and facilitators increases lender EEM awareness/understanding), SS7 (Improved dialog between agents/lenders and facilitators increases agent EEM awareness/understanding), and HB1 (Energy Snapshot increases buyer knowledge/awareness) to be unchanged this year because these activities were not major activities in the Program and we had little information on their effectiveness. We also considered the extent of evidence on HB5 (Home buyer education increases knowledge/ awareness) to be limited because little Program activity was directed to educating buyers directly.

For all but two hypotheses, we judged the strength of the evidence supporting the hypotheses to be the same this year as last. This should not be interpreted to mean that evidence of the postulated Program cause-effect relationships has not continued to remain significant. Referring to Table 7-5, it is clear that, in our judgment, there appeared to be moderate or strong evidence supporting most of the hypothesized relationships; this was also the case in the 1999 Market Effects Study.

The key difference between the results for 1999 and 2000 was that the extent of the evidence supporting most of the hypothesized relationships has continued to grow as more data have been accumulated. Consequently, the results this year suggested that the market effects observed last year were supported more strongly by the larger body of evidence acquired through this study.

Table 7-7
Support for Market Effects Hypotheses, 2000 Compared to 1999

Hypotheses	Extent of Evidence	Strength of Evidence
Supply-Side Actors		
SS1.Real estate (RE) firm promotion of Energy Snapshots leads to increased RE agent awareness/understanding of efficiency and EEMs	Increased	Same
SS2. Training of real estate agents leads to increased RE agent awareness/ understanding of energy efficiency and EEMs	Increased	Same
SS3. Increased RE agent awareness/understanding leads to RE agent EEM promotion	Same	Increased
SS4. Training of lenders leads to increased lender awareness/ understanding of energy efficiency and EEMs	Increased	Same
SS5. Increased lender awareness/ understanding leads to increased promotion	Same	Same
SS6. Improved dialog between RE agents/lenders and facilitators leads to increased lender awareness/ understanding of EEMs	Same	Same
SS7. Improved dialog between RE agents/lenders and facilitators leads to increased RE agent awareness/ understanding of EEMs	Same	Same
SS8. Increased buyer requests for EEMs lead to lender/RE agent benefits from EEMs	Increased	Same
SS9. Lender/RE agent benefits from EEMs lead to increased lender/ RE agent positive communications about EEMs	Increased	Same
SS10. Lender/RE agent benefits from EEMs lead to lender/RE agents integrating EEMs into standard practices	Increased	Same
SS11. Increased lender/RE agent positive communications about EEMs lead to lender/RE agents integrating EEMs into standard practices	Increased	Same
Home Buyers		
HB1.Energy Snapshot ratings lead to increased buyer knowledge/awareness of energy efficiency, HERS, EEMs	Same	Same
HB2.Real estate agent EEM promotion leads to increased buyer knowledge/awareness of energy efficiency, HERS, EEMs	Increased	Same
HB3.Increased lender EEM promotion leads to increased buyer knowledge/awareness of energy efficiency, HERS, EEMs	Increased	Same
HB4.Home loan consultant training and materials lead to increased buyer knowledge/awareness of energy efficiency, HERS, EEMs	Increased	Decreased
HB5.Home buyer education leads to increased buyer knowledge/awareness of energy efficiency, HERS, EEMs	Same	Same
HB6.Increased buyer knowledge/awareness of energy efficiency, HERS, EEMs leads to near-term buyer requests for EEMs	Increased	Same
HB7.Buyer requests for EEMs lead to buyer EEM benefits	Increased	Same
HB8.Buyer EEM benefits lead to positive buyer communications about EEMs	Increased	Same
HB9.Positive communications from buyers and others about EEMs lead to general increase in consumer demand for EEMs	Increased	Same

7.2 RECOMMENDATIONS

We present our recommendations for improvements to the EEM process and the TOSER Program first. The final subsection presents recommendations to facilitate future evaluations and market effects studies for the Program.

7.2.1 Program Recommendations

Most Program recommendations build on those provided in the 1999 Market Effects Study. We note that recent substantial energy price increases and uncertainties about energy supplies increase the importance of energy savings achieved through utility efforts such as the TOSER Program. Increased consumer and market actor awareness of energy issues also should increase interest in TOSER and other efficiency programs and a concerted effort to promote this Program could have larger payoffs this year than in the past. Major recommendations for improving the EEM process and the TOSER Program are the following:

- *Continue to increase marketing to potential buyers:* Both supply-side actors and buyers mentioned the need for more promotion of EEMs to buyers. High energy prices should make buyers, in particular, more responsive to the energy-efficiency benefits of the Program. This year offers an excellent opportunity for stressing the utility bill benefits possible through implementing EEMs. The effects of increased efforts that have been undertaken already to reach buyers this year would be expected to show up in next year's Market Effects Study.
- *Target EEM promotion:* Our EEM quantitative analysis identified several demographic factors that were related to higher rates of EEM use. To maximize effectiveness, the Program should emphasize promotion in areas with higher than average Hispanic population proportions, lower than average income levels, and higher than average housing growth rates.
- *Continue recent efforts to increase the visibility of industry leaders who have successfully promoted EEMs actively:* A major need in the industry is for champions who show that promoting EEMs can be a successful business strategy. There was some evidence this year that the lack of champions had declined as a barrier, but it still remained as one of the most significant reasons for lenders and agents to not embrace and promote EEMs.
- *Implement follow-up with the training attendees:* Many agents and lenders this year, as well as last, felt that EEMs could get lost among all the other activities in their business, but most were very committed to pursuing EEMs. Many suggested the need for reminders, refresher courses, and materials that would help them give EEMs their continued attention. Agents and lenders this year mentioned specific types of information that they would find useful to remind them of the benefits of EEMs and to communicate these benefits to buyers.

- *Develop and make available additional EEM cost and benefit information:* All three groups interviewed mentioned this need in both 1999 and 2000. This report presents estimated energy savings for houses upgraded through EEMs. These data should be supplemented with upgrade cost estimates and used to develop cost-effectiveness information for buyers, real estate agents, and lenders. Estimates of utility bill savings should reflect recent and probable future prices increases. For the agents and lenders, this information would help sell EEMs to buyers. For buyers, this information would help them understand the benefits of an EEM and what level of cost to expect. Information about potential comfort, health, safety, and environmental benefits of efficiency upgrades also should be included.
- *Investigate ways to address buyer concerns about facilitators and contractors:* A vocal minority of buyers this year and last expressed reservations about the service provided by facilitators and contractors, the upgrade costs, and possible conflicts of interest. The facilitators and contractors can be extremely useful in making the process work, but buyer concerns need to be alleviated.
- *Clarify the dollar limits for EEMs in the training course and materials:* Lenders and real estate agents continued to be uncertain about the dollar limits that applied to EEMs. This was one of the few areas where a significant number of supply-side actors were unsure about the criteria for an EEM.
- *Improve the training components that address home energy ratings:* The proportion of agents and lenders who said they told buyers about the HERS process declined this year. The ratings are critical as a way to communicate to buyers the economic benefits of an EEM, especially at a time when utility rates have risen substantially and the economics of energy efficiency have become considerably more important.
- *Tailor training to the different market actors:* There was increasing evidence this year that real estate agents were less knowledgeable about EEMs and less active in promoting them than lenders after the training. Real estate agents still rated the unavailability of needed tools and information, transaction costs, market uncertainty as relatively significant EEM barriers after the training. It may be desirable to train each group separately or devise ways to provide additional information to agents through longer sessions or more follow ups.
- *Expand the training to increase the emphasis on EEMs with conventional loans:* Recent programs by Fannie Mae and Freddie Mac have increased the opportunities for EEMs with non-FHA loans. Next year should provide excellent conditions for expanding the impact of EEMs beyond FHA loans.

7.2.2 Assessment and Evaluation Recommendations

We make the following recommendations related to future analyses of this program:

- *Further quantitative analyses of factors affecting the number of EEMs implemented should be conducted:* Our initial analyses this year identified several key factors

affecting the number of EEMs implemented and provided initial evidence of the relationship between training and the number of EEMs implemented. However, data and scope limitations did not permit a conclusive analysis of the training effect. We recommend further development of models to analyze the effects of training on the number of EEMs implemented, as well as providing the flexibility to take into account the effects of other current and possible future Program components.

- *EEMs implemented through conventional loans should be analyzed:* Efforts should be made to work with the secondary lenders that have instituted EEM programs (primarily Fannie Mae and Freddie Mac) to obtain and analyze data on non-FHA loans and EEMs.
- *The analysis should differentiate between EEMs for existing and new homes:* To date, the statistical analyses generally have considered all EEMs together. However, the Program targets EEMs in the existing home market, but not in the new home market. Future studies should make use of HUD data that identify whether an EEM is for a new or existing home.
- *Processes should be established for providing more complete information on buyers with EEMs and agents, lenders, and others participating in the Program:* Although more comprehensive information was collected from the training sessions this year, further efforts should be made to collect at least the minimum set of information required to conduct a market effects study efficiently. Protocols should be established with lenders, agents, facilitators, and others that will provide the best possible contact information. More detailed and complete information should be obtained on seminar attendees (e.g., whether they are a lender or agent, county they do business in, etc.).
- *The other Program components should be analyzed:* The Program was modified this year in several areas including the Energy Snapshot and consumer outreach. Analysis should be expanded in the future to examine the effects of these and other Program components. An effort should be made to distinguish the effects of the different components so that each can be assessed for its effectiveness.
- *Buyers who did not obtain EEMs should be included in the next Market Effects Study:* Buyers who did not obtain EEMs have not been included in any of the three Market Effects Studies conducted so far. Consequently, there is no baseline information available on the demand side of this market. This information is needed to better characterize the market and provide a fuller understanding of general knowledge and awareness. This information also would be useful to assess the effects of recent consumer communication efforts in the TOSER Program.
- *Data collection should capture effects of higher energy prices.* Interview instruments should be modified to ensure that key information is obtained about how higher energy prices have affected awareness, knowledge, and behavior related to energy-efficiency practices and the use of EEMs.
- *Analysis of the long-term effects of the Program should continue*: This year we conducted the first follow-up interviews of Program participants who had been trained in

prior years. Such follow up interviews with supply-side actors should be continued in the future to document whether Program effects continue.

A

INTERVIEW INSTRUMENTS

This appendix presents the interview instruments that we used to conduct telephone interviews. They are presented in the following order: 2000 participating real estate agents, 2000 nonparticipating real estate agents, 1999 participating real estate agents reinterviews, 2000 participating lenders, 2000 nonparticipating lenders, 1999 participating lenders reinterviews, and home buyers.

A.1 2000 PARTICIPATING REAL ESTATE AGENTS

Record from list:

- **AGENT NAME**
- **COMPANY**
- **HUD REGION**
- **COUNTY** ***we have city, not county on the list***
- **ZIP CODE**
- **DATE ATTENDED TRAINING (Note: this needs to be used in Q1 and Q19a)**

Hello, this is _____. I am trying to reach _____ _____.

(ONCE TARGETED PERSON IS ON THE LINE) I am calling on behalf of XENERGY, an energy research and consulting company. We are conducting a study for Pacific Gas and Electric on the use of Energy Efficient Mortgages, also called EEM's, by homebuyers in your area. We are speaking with real estate agents who may be familiar with EEM's, and we are not selling anything – this is strictly a research study. The interview will take approximately 15 minutes. Is now a good time to conduct this interview? **(IF NOT, ASK)** When would be a good time to call back?

1 Schedule callback_____

2 Don't know, just try back_____

8 Refused → **Thank and terminate**

Interviewer note: OPTIONAL INFORMATION TO PROVIDE RESPONDENTS, IF NEEDED.

- The information you provide is completely confidential.
- The information we gather will be used to evaluate the effectiveness of Energy Efficiency Mortgage promotion programs currently active in your area.

→ ASK FOR ANY MISSING INFORMATION IN THE DEMOGRAPHIC SECTION (TOP OF PAGE) FIRST

A. What is your primary occupation: real estate agent, mortgage lender, or other real estate industry professional?

1 Real estate agent → **Skip to Q1**
2 Mortgage lender → **Go to Lender survey, Q1**
3 Other real estate industry professional → **Ask Screener B**

B. **If Screener A = 3, "Other," ask:** Please explain…

99 **Specify:** _____

C. In your capacity as **(insert answer from B),** do you have the opportunity to discuss mortgage options, such as Energy-Efficient Mortgages (EEM's), with your clients?

1 Yes
2 No → **Thank and terminate**

TRAINING CLASS

Q1 Based on class sign-up sheets, you attended a training class for real estate agents on EEM's on <**enter date**>. Do you recall that training class?

1 Yes
2 No → **Probe: "Any classes on EEM's?" If yes, correct date with on-line correction. If no class on EEM's, then thank and terminate**

Q2 **DELETED**

Q3 Did you know what EEM's were before you heard about this class?

1 Yes
2 No

Q4 Based on what you now know about EEM's, how would you describe an EEM and its benefits to a buyer? **(MULTIPLE MENTION)**

Interviewer notes:

- **Do not read list.**
- **Check all mentioned. If they don't mention one or more of the first THREE (A, B, or C) or E, ask about them as a PROBE (see below). If their answer indicates they understand this aspect of an EEM then check prompted response.**

Unprompted	Prompted	DK	
1	2	7	A. FOR ENERGY-EFFICIENCY RETROFITS – includes things like adding insulation, improving windows. **PROBE: "What about retrofits? What types of retrofits might be included?"**
1	2	7	B. CAN INCREASE HOME VALUE BY MAKING IT MORE ENERGY EFFICIENT – efficiency improvements can increase home's value and improve a less desirable home **PROBE: "What about increasing home value? Any benefits in this regard from an EEM?"**
1	2	7	C. SAVES ON UTILITY BILLS – retrofits will reduce owner's heating/cooling bills **PROBE: "What about utility bills? Any effect in this regard from an EEM?"**
1		7	D. STRETCHES QUALIFYING RATIO – cost of retrofits is added into mortgage without affecting buyer eligibility
			E. AMOUNT AVAILABLE – amount that can be financed through EEM **PROBE: "How much can be added to a loan amount with an EEM?"**
1	2	7	E1 Greater of 5% of property value (not to exceed $8000) or $4000
1	2	7	E2 Other amount **Specify:** _____
1	2	7	E3 Don't know
1		7	F. INCREASES PAYMENTS – INCREASES MONTHLY MORTGAGE PAYMENTS INCREMENTALLY, WHICH ARE OFFSET BY ENERGY BILL REDUCTIONS
1		7	G. CLOSING COSTS – closing costs can be financed
1		7	H. ELIGIBLE HOMES – eligible properties are 1-2 unit existing and new construction
1	2	7	I. OTHER **Specify:** _____

→ **READ:** In the following questions, we are interested primarily in EEM's that are used with existing homes, not new homes. Please keep that in mind when you answer each question. How would you describe how a buyer obtains an EEM?

Interviewer note: Check all mentioned. If they don't mention the first one, ask them the probe below. If their answer indicates they understand it then check prompted response.

Unprompted	Prompted	DK	
1	2	7	K. HERS – obtains a home energy rating system (HERS) rating to get recommendations for qualifying retrofits **PROBE: "How would the buyer determine which retrofits would be covered by the EEM?"**
1		7	L. LENDER – finds lender who will process loan as an EEM
1		7	M. FACILITATOR – can work with a facilitator to do retrofits
1		7	N. EFFICIENCY IMPROVEMENTS – installs energy-efficiency retrofits
1		7	O. REAL ESTATE AGENT – informs buyer/recommends EEM
1		7	P. OTHER **Specify:** _____

Q5A Thinking back to the training class, what information from the class was most helpful in increasing your understanding of EEM's? **(Probe and clarify)**

99 **Specify:** _____ **(97 = Don't know)**

Q5B Why? **(Probe and clarify)**

99 **Specify:** _____ **(97 = Don't know)**

Q5C Since taking the class, how often have you told other real estate agents or lenders about EEM's?

4 Very often
3 Often
2 Sometimes
1 Rarely
0 Never
7 Don't know

Q6 Do you feel the training provided you with all the information, resources, and contacts necessary to discuss an EEM with a buyer who asks about one?

1 Yes
2 No
7 Don't know

Q7 What types of additional information would be useful? **(Probe and clarify)**

99 **Specify:** _____ **(97 = Don't know)**

Q8 **DELETED**

EEM KNOWLEDGE

(IN Q9 AND SEVERAL FOLLOWING QUESTIONS, RESPONDENT IS ASKED TO PROVIDE THEIR CURRENT RATING AND THE RATING THEY THINK WOULD HAVE APPLIED BEFORE THE TRAINING. ALWAYS ASK FOR CURRENT RATING FIRST. IT MAY BE USEFUL TO EXPLAIN THIS TO RESPONDENT BEFORE ASKING Q9. IF THEY WERE NOT AWARE OF EEM'S BEFORE THE TRAINING [I.E., RESPONSE TO Q3 IS "NO"], DO NOT ASK FOR RATINGS BEFORE TRAINING IN Q9)

Q9 How would you rate your understanding of EEM's now using a scale from 0 to 5, with 0 being *no understanding* and 5 being *a complete understanding*?

Understanding Scale

5	Complete understanding
4	
3	
2	
1	
0	No understanding
7	Don't know

Q9A CURRENT UNDERSTANDING **RECORD:** _____

Q9B UNDERSTANDING BEFORE TRAINING **RECORD:** _____

(DO NOT ASK IF Q3 = 2, "NO")

READ→ A HERS, or Home Energy Rating System, is used to evaluate energy usage in a home and provide recommendations on retrofits that can reduce energy costs and be included in an EEM.

Q10 How would you rate your understanding of a HERS now using the same scale from 0 to 5 where 0 means no understanding and 5 means you have a complete understanding?

Q10A CURRENT UNDERSTANDING **RECORD:** _____

Q10B UNDERSTANDING BEFORE TRAINING **RECORD:** _____

Q11A DO YOU KNOW WHAT AN ENERGY SNAPSHOT IS?

1 YES

2 NO → **GO TO Q12**

Q11B HOW WOULD YOU RATE YOUR UNDERSTANDING OF AN ENERGY SNAPSHOT ON A SCALE FROM 0 (NO UNDERSTANDING) TO 5 (UNDERSTAND COMPLETELY)?

RECORD: _____

Q11C Did you receive training on the Energy Snapshot?

1 Yes
2 No → **Go to Q12**

Q11D PLEASE TELL ME YOUR UNDERSTANDING OF HOW AN ENERGY SNAPSHOT WORKS AND ITS RELATION TO A HOME ENERGY

Rating and EEM. **(Probe and clarify)**

99 **Specify: _____ (97 = Don't know)**

Q11E What do you see as the advantages of an Energy Snapshot? **(Probe and clarify)**

99 **Specify: _____ (97 = Don't know)**

Q11F What disadvantages or problems do you think there are with implementing an Energy Snapshot? **(Probe and clarify)**

99 **Specify: _____ (97 = Don't know)**

Q11G Are you familiar with any cases so far where an Energy Snapshot has motivated a home buyer to have a complete HERS rating?

1 Yes
2 No

Q11H Please describe how home buyers have responded or you think they'll respond to the Energy Snapshot. **(Probe and clarify)**

99 **Specify: _____ (97 = Don't know)**

Q12 Please rate your understanding of the value of using energy efficiency retrofits to reduce utility bills now (such as through adding insulation, upgrading appliances, or replacing windows) using a scale from 0 to 5 with 0 being no understanding and 5 being a complete understanding.

Q12A CURRENT UNDERSTANDING **RECORD: _____**

Q12B UNDERSTANDING BEFORE TRAINING **RECORD: _____**

Q13 Please indicate how often you discuss energy efficiency with potential buyers now on a scale of 0 to 5, where 0 means never and 5 means very often with most potential buyers.

Frequency

5 Very Often
4
3
2
1
0 Never
7 Don't know

Q13A CURRENT FREQUENCY **RECORD: _____**

Q13B FREQUENCY BEFORE TRAINING **RECORD: _____**

DISCUSSION OF EEM'S WITH BUYERS

(IF RESPONDENT WAS NOT AWARE OF EEM'S BEFORE THE TRAINING [I.E., RESPONSE TO Q3 IS "NO"], DO NOT ASK FOR RATINGS BEFORE TRAINING IN Q14 AND Q15)

Q14 PLEASE INDICATE HOW LIKELY YOU ARE TO DISCUSS EEM'S WITH POTENTIAL BUYERS NOW ON A SCALE FROM 0 TO 5 WHERE 0 MEANS NOT AT ALL LIKELY AND 5 MEANS VERY LIKELY TO DISCUSS WITH ALL POTENTIAL BUYERS.

Likelihood Scale

5 Very likely
4
3
2
1
0 Not at all likely

7 Don't know

Q14A CURRENT LIKELIHOOD **RECORD: _____**

Q14B LIKELIHOOD BEFORE TRAINING **RECORD: _____ (DO NOT ASK IF Q3 = 2, "NO")**

Q14C IS THERE ANY DIFFERENCE IN HOW LIKELY YOU ARE TO DISCUSS EEM'S WITH POTENTIAL BUYERS DEPENDING ON WHETHER THEY ARE BUYING A NEW VS. A PRE-EXISTING HOUSE? PLEASE EXPLAIN…

99 **SPECIFY:** _____

Q15 HOW LIKELY ARE YOU TO RECOMMEND AN EEM TO A POTENTIAL BUYER NOW USING THE SAME SCALE FROM 0 TO 5?

Q15A CURRENT LIKELIHOOD **RECORD: _____**

Q15B LIKELIHOOD BEFORE TRAINING **RECORD: _____ (DO NOT ASK IF Q3 = 2, "NO")**

Q15C IS THERE ANY DIFFERENCE IN HOW LIKELY YOU ARE TO RECOMMEND EEM'S WITH POTENTIAL BUYERS DEPENDING ON WHETHER THEY ARE BUYING A NEW VS. A PRE-EXISTING HOUSE? PLEASE EXPLAIN…

99 **SPECIFY:** _____

Q16 THERE ARE SEVERAL REASONS WHY REAL ESTATE AGENTS MIGHT WANT TO BE PREPARED TO DISCUSS EEM'S WITH

BUYERS AND PROMOTE THEM. WHAT DO YOU SEE AS THE MOST IMPORTANT REASONS? **(CHECK "2" FOR ALL MENTIONED UNPROMPTED)**

FOR THOSE NOT MENTIONED, ASK WHETHER THEY CONSIDER THEM TO BE VERY IMPORTANT (2), SOMEWHAT IMPORTANT (1), OR NOT IMPORTANT AT ALL (0).

UNPROMPTED/ VERY IMP.	SOMEWHAT IMP	NOT IMP	DK

2	1	0	7A. THEY'RE OFTEN A USEFUL SALES TOOL/HELP CLOSE MORE MORTGAGES/INCREASE COMMISSION
2	1	0	7B. THEY'RE PART OF BETTER CUSTOMER SERVICE
2	1	0	7C. THEY ALLOW BUYERS TO INCREASE THE HOME'S EFFICIENCY AND STILL QUALIFY FOR A MORTGAGE/INCREASE HOMEOWNER BUYING POWER
2	1	0	7D. MORE BUYERS ARE ASKING ABOUT THEM
2	1	0	7E. MORE LENDERS ARE PROMOTING THEM
2	1	0	7F. THEY HELP CONSERVE RESOURCES/IMPROVE THE ENVIRONMENT
2	1	0	7G. OTHER **SPECIFY:** _____
2	1	0	7H. OTHER **SPECIFY:** _____

16I. **IF TWO OR MORE ARE VERY IMPORTANT IN Q16, ASK:** WHICH OF THESE IS THE MOST IMPORTANT FACTOR?

ENTER LETTER FROM ABOVE: _____(97 = DON'T KNOW)

16J. SINCE TAKING THE TRAINING, APPROXIMATELY HOW MANY TIMES HAVE YOU DISCUSSED OR RECOMMENDED

AN EEM TO A BUYER?

RECORD____ (997 = DON'T KNOW) (IF NONE, GO TO Q17)

16K. HOW OFTEN HAVE BUYERS FOLLOWED THROUGH AND OBTAINED AN EEM AFTER YOU DISCUSSED OR

RECOMMENDED ONE?

RECORD % OF THE TIME___% (997 = DON'T KNOW)

16L. WHEN BUYERS DIDN'T FOLLOW THROUGH AND GET AN EEM, WHAT WERE THE USUAL REASONS? **(PROBE AND CLARIFY)**

99 **Specify: _____ (997 = Don't know)**

BARRIERS

Interviewer note: IF THEY WERE NOT AWARE OF EEM's BEFORE THE TRAINING (I.E., RESPONSE TO Q3 IS NO) DO NOT ASK FOR RATINGS BEFORE TRAINING.

Q17 THERE ARE SEVERAL REASONS THAT HAVE BEEN MENTIONED FOR WHY REAL ESTATE AGENTS MIGHT NOT PROMOTE EEM'S ACTIVELY. WE'D LIKE TO GET AN IDEA OF HOW IMPORTANT YOU FEEL THESE REASONS ARE NOW. PLEASE RATE HOW BIG A BARRIER YOU FEEL EACH OF THE FOLLOWING REASONS IS NOW TO PROMOTING EEM'S AND HOW BIG A BARRIER YOU THOUGHT IT WAS BEFORE YOU TOOK THE TRAINING ON A SCALE OF 0 TO 5, WHERE 0 MEANS NO BARRIER AND 5 MEANS A MAJOR BARRIER. **(BE SURE TO ASCERTAIN HOW MUCH RESPONDENT BELIEVES EACH IS A BARRIER, NOT WHETHER OR NOT THEY AGREE WITH THE STATEMENT. RESPONDENT COULD AGREE, BUT NOT THINK IT IS A BARRIER, OR VICE VERSA) (ROTATE)**

NOW	DK	BEFORE	DK	**(DO NOT ASK "BEFORE" RATINGS IF Q3 = 2, "NO")**
5 4 3 2 1 0	7	5 4 3 2 1 0	7	A. COMPLICATING OR DELAYING THE SALES TRANSACTION
5 4 3 2 1 0	7	5 4 3 2 1 0	7	B. DIFFICULTY OF UNDERSTANDING AND EXPLAINING EEM'S
5 4 3 2 1 0	7	5 4 3 2 1 0	7	C. LACK OF BUYER INTEREST IN OR UNDERSTANDING OF EEM'S
5 4 3 2 1 0	7	5 4 3 2 1 0	7	D. LACK OF BENEFITS FOR BUYERS
5 4 3 2 1 0	7	5 4 3 2 1 0	7	E. LACK OF INFORMATION ON EEM'S

5 4 3 2 1 0 7	5 4 3 2 1 0 7	F. LACK OF ASSISTANCE AVAILABLE TO IMPLEMENT EEM'S
5 4 3 2 1 0 7	5 4 3 2 1 0 7	G. POOR FIT WITH THE WAY REAL ESTATE AGENTS DO BUSINESS (E.G., AGENT SELLS MOSTLY NEW HOMES
5 4 3 2 1 0 7	5 4 3 2 1 0 7	H. LENDER RESISTANCE TO USING EEM'S
5 4 3 2 1 0 7	5 4 3 2 1 0 7	I. DIFFICULTY FINDING LENDERS TO PROCESS EEM'S
5 4 3 2 1 0 7	5 4 3 2 1 0 7	J. LACK OF EXAMPLES OF REAL ESTATE AGENTS OR LENDERS WHO ACTIVELY PROMOTE EEM'S
5 4 3 2 1 0 7	5 4 3 2 1 0 7	K. LACK OF EEM FACILITATORS TO RECOMMEND TO BUYERS
5 4 3 2 1 0 7	5 4 3 2 1 0 7	L. LOAN PRE-QUALIFICATION DOESN'T INCLUDE EEM'S
5 4 3 2 1 0 7	5 4 3 2 1 0 7	M. TIME REQUIRED TO PROCESS EEM'S
5 4 3 2 1 0 7	5 4 3 2 1 0 7	N. FRONT-END COST IS TOO HIGH

WHAT OTHER OBSTACLES ARE THERE THAT REDUCE THE CHANCES THAT REAL ESTATE AGENTS WOULD PROMOTE EEM'S?

HOW WOULD YOU RATE HOW SIGNIFICANTLY THEY ARE NOW (AND BEFORE YOU TOOK THE TRAINING)?

5 4 3 2 1 0 7 5 4 3 2 1 0 7 O. OTHER_____

Q18 WHAT SUGGESTIONS DO YOU HAVE FOR REDUCING THESE BARRIERS? **(PROBE AND CLARIFY)**

99 **Specify: _____ (97 = Don't know)**

SALES ACTIVITY

Q19A APPROXIMATELY HOW MANY HOMES HAVE YOU CLOSED SINCE YOU TOOK THE TRAINING ON <**ENTER DATE>**?

RECORD_____(9997 = DON'T KNOW)

Q19B HOW MANY WERE RESALE'S OF EXISTING HOMES?

RECORD_____(9997 = DON'T KNOW)

Q20 APPROXIMATELY HOW MANY OF THESE WERE HUD/REAL ESTATE OWNED (REO) HOMES?

RECORD_____(9997 = DON'T KNOW)

Q21 HOW MANY EXISTING HOMES HAVE YOU CLOSED WITH EEM'S SINCE THE TRAINING?

RECORD_____(9997 = DON'T KNOW)

Q22 →**IF ANY ARE REO HOMES, ASK:** HOW MANY OF THE EEM'S WERE FOR HUD/REO HOMES?

RECORD_____(9997 = DON'T KNOW)

Q23 WHAT OTHER GENERAL COMMENTS OR SUGGESTIONS DO YOU HAVE ABOUT IMPROVING EEM'S OR THE PROCESS USED TO IMPLEMENT THEM? **(PROBE AND CLARIFY)**

99 **Specify: _____(97 = Don't know)**

THANK AND END SURVEY

A.2 2000 NONPARTICIPATING REAL ESTATE AGENTS

TOSER Questionnaire: Non-Participating Real Estate Agents

Date: _____Telephone:_____

Company: _____

Hello this is _____, I would like to speak with one of your real estate agents.

[Once targeted person is on the line] I am calling from XENERGY. We are conducting a study for Pacific Gas and Electric on the use of Energy Efficient Mortgages, also called EEMs, by homebuyers in your area. The interview will take approximately 7 to10 minutes. Is now a good time to conduct this interview?

[If not, ask] When would be a good time to call back?

- ◊ Scheduled callback_____
- ◊ Don't know, just try back_____
- ◊ Refused

[Optional information to provide interviewees if needed]

- (The information you provide is completely confidential)
- (The information we gather will be used to evaluate the effectiveness of Energy Efficient Mortgage promotion programs currently active in your area.)

[Begin Interview]

Screening

A. Are you a real estate agent engaged in selling existing homes?

___Yes, continue ___No, thank and terminate

B. During the past 3 years have you taken a training class sponsored by PG&E on Energy Efficient Mortgages or EEMs.

___Yes [Explain that we are now interviewing only people who have NOT taken the training and ask whether there is someone else in their office who has NOT participated in the training. If so, thank and ask to be connected with that person and begin the interview with them. Otherwise, thank them and terminate.]

___No [Continue]

Descriptive Information

C. What county is your office located in?_____

D. What is the zip code of your office?_____

E. How many years have you been a real estate agent?_____

F. Approximately how many homes have you closed in the past 6 months?_____

G. Approximately how many closings in the past 6 months were resales of existing homes?_____

H. Approximately how many of these were HUD/real estate owned (REO) homes? ___

Knowledge of EEMs

1. Before this interview, were you aware of Energy Efficient Mortgages, or EEMs?

[Circle] 1=Yes 0=No

[If "No", go to Q4]

2. How would you rate your understanding of EEMs on a scale from 0 to 5, with 0 being no understanding and 5 being a complete understanding?____

3. Based on what you know about EEMs, how would you describe an EEM and its benefits to a buyer?

[Check all mentioned. If they don't mention one or more of the first THREE, ask about them as a follow on question, e.g., if they mention retrofits but don't specify they're for energy efficiency ask "What types of retrofits are included?" If their answer indicates they understand this aspect of an EEM then check prompted response.]

[Note: If respondent does not voluntarily mention e ask him/her how much can be added to loan amount with an EEM and record the amount]

- ◊ a. FOR ENERGY-EFFICIENCY RETROFITS—includes things like adding insulation, improving windows
  a1 unprompted a2 prompted
- ◊ b. CAN INCREASE HOME VALUE BY MAKING IT MORE ENERGY EFFICIENT—efficiency improvements can increase home's value and improve a less desirable home
  b1 unprompted b2 prompted
- ◊ c. SAVES ON UTILITY BILLS—retrofits will reduce owner's heating/cooling bills
  c1 unprompted c2 prompted
- ◊ d. STRETCHES QUALIFYING RATIO—cost of retrofits is added into mortgage without affecting buyer eligibility
- ◊ e. AMOUNT AVAILABLE—amount that can be financed through EEM
  - e1. Greater of 5% of property value (not to exceed $8,000) OR $4,000
  - e2. (Other amount)_____
  - e3. Don't know
- ◊ f. INCREASES PAYMENTS—increases monthly mortgage payments incrementally, which are offset by energy bill reductions
- ◊ g. CLOSING COSTS—closing costs can be financed
- ◊ h. ELIGIBLE HOMES—eligible properties are 1 to 4 unit existing and new construction
- ◊ i. OTHER_____

In the remaining questions, we are interested primarily in EEMs that are used to purchases existing homes, not new homes. Please keep that in mind when you answer each question.

How would you describe how a buyer obtains an EEM?

[Check all mentioned. If they don't mention the first one, ask them "How would the buyer determine which retrofits would be covered by the EEM?" If their answer indicates they understand it then check prompted response.]

- ◊ k. HERS—obtains a home energy rating system (HERS) rating to get recommendations for qualifying retrofits
  k 1 unprompted k 2 prompted
- ◊ l. LENDER—finds lender who will process loan as an EEM
- ◊ m. FACILITATOR—can work with a facilitator to do retrofits
- ◊ n. EFFICIENCY IMPROVEMENTS—installs energy-efficiency retrofits
- ◊ o. REAL ESTATE AGENT—informs buyer/recommends EEM
- ◊ p. OTHER_____

General Energy Efficiency Knowledge

4. Please rate your understanding of the effect of using energy efficiency retrofits in an existing home to reduce utility bills (such as through insulation, upgrading appliances, or replacing windows) using a scale from 0 to 5, with 0 being no understanding and 5 being a complete understanding? _____ (0-5)

5. Please indicate how often you discuss energy efficiency (generally) with potential buyers on a scale from 0 to 5 where 0 means never and 5 means very often with most potential buyers. _____ (0-5)

Definition of EEMs

I would now like to ask you a few questions about Energy Efficient Mortgages. For consistency, I'd like to define EEMs for the purchase of existing homes as follows:

For an existing home, an EEM is a mortgage for which the underwriting guidelines have been adapted specifically to include energy-efficiency improvements that the buyer chooses to add to the home. Currently, most EEMs occur through FHA loans. FHA policies require the energy-efficiency improvements to reduce monthly utility bills more than they add to the monthly loan amount. FHA places limits on the amount that can be financed with an EEM—the maximum amount is the greater of $4,000 OR 5% of the home's value up to $8,000. The costs and benefits of the energy-efficiency improvements must be determined using a Home Energy Rating System or HERS. The rating usually costs a few hundred dollars, but at least $200 of the cost can be included in the loan. EEMs can be applied to residential buildings that have 1 to 4 units.

Discussion of EEMs with Buyers

[Skip to Q8 if they were not aware of EEMs before this call, i.e., answer to Q1 was "No".]

6. Please indicate how likely you are to discuss EEMs with potential buyers on a scale from 0 to 5 where 0 means not at all likely and 5 means very likely to discuss with all potential buyers. _____ (0-5)

7. a. How likely are you to recommend an EEM to a potential buyer, using the same scale from 0 to 5. ____(0-5)
   b. Approximately how many of the existing homes you closed in the last 6 months were financed with EEMs? ___

8. There are several reasons why real estate agents might want to be prepared to discuss EEMs with buyers and promote them. What do you see as the most important reasons?

   [Put a 2 for all they mention unprompted. For ones they don't mention ask whether they consider them to be very important (put a 2), somewhat important (1), or not important at all (0)]

   ◊ a. (They are or could be a useful sales tool) __
   ◊ b. (They are or could be part of better customer service) __
   ◊ c. (They could allow buyers to increase the home's efficiency and still qualify for a mortgage) __
   ◊ d. (More buyers are asking about them) __
   ◊ e. (More lenders are promoting them) __
   ◊ f. (They help conserve resources/improve the environment) __
   ◊ g. (Other)_____ __
   ◊ h. (Other) _____ __
   ◊ i. [If 2 or more are very important, ask] Which of these is the most important factor?_____[enter letter from above]

[Skip to Q9 if they were not aware of EEMs before this call, i.e., answer to Q1 was "No".]

j. In the past 6 months, approximately how many times have you discussed or recommended an EEM to a buyer? _____ [If 0, skip to Q9]

k. How often have buyers followed through and obtained an EEM after you discussed or recommended one? _____% of the time

l. When buyers didn't follow through and get an EEM what were the usual reasons?

_____

_____

Barriers

9. There are several reasons that have been mentioned for why real estate agents might not promote EEMs actively. We'd like to get an idea of how important you feel these reasons are. Please rate how big a barrier each of the following reasons is to promoting EEMs, on a scale from 0 to 5, where 0 means no barrier and 5 means a major barrier: [Be sure to ascertain how much a respondent believes each is a barrier, not whether or not they agree with the statement. A respondent could agree, but not think it is a barrier or vice versa.]

   a. Complicating or delaying the sales transaction..... ___
   b. Difficulty of understanding and explaining EEMs..... ___
   c. Lack of buyer interest in or understanding of EEMs..... ___
   d. Lack of benefits for buyers..... ___
   e. Lack of information on EEMs..... ___
   f. Lack of assistance available to implement EEMs……..... ___
   g. Poor fit with the way real estate agents do business (e.g., agent sells

mostly new homes).....……... ___
h. Lender resistance to using EEMs..... ___
i. Difficulty finding lenders to process EEMs..... ___
j. Lack of examples of real estate agents or lenders who actively promote EEMs ..... ___
k. Loan prequalification doesn't include EEMs..... ___
l. Time required to process EEMs..... ___
m. Front-end cost is too high..... ___

What other obstacles do you think there are that reduce the chances that real estate agents would promote EEMs? How would you rate how significant they are?

n/o/p. Other (specify)_____ .... rating: na/oa/pa___

10. What suggestions do you have for ways to reduce the most significant barriers that keep real estate agents from promoting EEMs?

_____
_____
_____

11. How much interest do you have in attending a training seminar to learn more about EEMs?

0=None 1=A little 2=A moderate amount 3=Very much

12. What general comments or suggestions do you have about improving EEMs or the process used to implement them?

_____
_____
_____

THANK AND END INTERVIEW

LEGEND
( ) = optional statements to say as prompts for interviewee
[ ] = instructions/notes to interviewer

A.3 1999 REAL ESTATE AGENT REINTERVIEWS

TOSER Questionnaire: Participating Real Estate Agents Follow-up

Demographics
Date: _____Telephone:_____

Agent Name:_____

Company: _____

HUD Region:_____County: _____Zip Code:_____

Date Attended Training:_____ [Note: this needs to be used in Q19a.]

Hello this is _____, I am trying to reach _____.

[Once targeted person is on the line] I am calling from XENERGY. We spoke with you last year as part of a study for Pacific Gas and Electric on the use of Energy Efficient Mortgages, also called EEMs, by homebuyers in your area. I would like to ask you a few questions now that a year has passed about your experience with EEMs. The interview will take approximately 10 minutes. Is now a good time to conduct this interview?
[If not, ask] When would be a good time to call back?

- ◊ Scheduled callback_____
- ◊ Don't know, just try back_____
- ◊ Refused

[Optional information to provide interviewees if needed]

- (The information you provide is completely confidential)
- (The information we gather will be used to evaluate the effectiveness of Energy Efficiency Mortgage promotion programs currently active in your area.)

Knowledge of EEMs

4. Based on what you now know about EEMs, how would you describe an EEM and its benefits to a buyer?
   [Check all mentioned. If they don't mention one or more of the first THREE, ask about them as a follow on question, e.g., if they mention retrofits but don't specify they're for energy efficiency ask "What types of retrofits are included?" If their answer indicates they understand this aspect of an EEM then check prompted response.]
   [Note: If respondent does not voluntarily mention e ask him/her how much can be added to loan amount with an EEM and record the amount]
   - ◊ a. FOR ENERGY-EFFICIENCY RETROFITS—includes things like adding insulation, improving windows
     a1 unprompted a2 prompted
   - ◊ b. CAN INCREASE HOME VALUE BY MAKING IT MORE ENERGY EFFICIENT—efficiency improvements can increase home's value and improve a less desirable home
     b1 unprompted b2 prompted
   - ◊ c. SAVES ON UTILITY BILLS—retrofits will reduce owner's heating/cooling bills

c1 unprompted c2 prompted

◊ d. STRETCHES QUALIFYING RATIO—cost of retrofits is added into mortgage without affecting buyer eligibility

◊ e. AMOUNT AVAILABLE—amount that can be financed through EEM

e1. Greater of 5% of property value (not to exceed $8,000) OR $4,000

e2. (Other amount)_____

e3. Don't know

◊ f. INCREASES PAYMENTS—increases monthly mortgage payments incrementally, which are offset by energy bill reductions

◊ g. CLOSING COSTS-closing costs can be financed

◊ h. ELIGIBLE HOMES—eligible properties are 1-2 unit existing and new construction

◊ i. OTHER_____

◊ j. OTHER_____

In the following questions, we are interested primarily in EEMs that are used with existing homes, not new homes. Please keep that in mind when you answer each question.

How would you describe how a buyer obtains an EEM?

[Check all mentioned. If they don't mention the first one, ask them "How would the buyer determine which retrofits would be covered by the EEM?" If their answer indicates they understand it then check prompted response.]

◊ m. HERS—obtains a home energy rating system (HERS) rating to get recommendations for qualifying retrofits

m1 unprompted m2 prompted

◊ n. LENDER—finds lender who will process loan as an EEM

◊ o. FACILITATOR—can work with a facilitator to do retrofits

◊ p. EFFICIENCY IMPROVEMENTS—installs energy-efficiency retrofits

◊ q. OTHER_____

◊ r. OTHER_____

◊ s. REAL ESTATE AGENT—informs buyer/recommends EEM

5. c. In the past year, how often have you told other real estate agents or lenders about EEMs? (Never, Rarely, Sometimes, Often, or Very often?)

[Circle] 0=Never 1=Rarely 2=Sometimes 3=Often 4=Very often

11. a. Do you know what an Energy Snapshot is? [Circle] 1=Yes 0=No

[If no skip to 12; if yes, ask]

b. How would your rate your understanding of an Energy Snapshot on a scale from 0 (no understanding) to 5 (understand completely) _____

c. Did you receive training on the Energy Snapshot? [Circle] 1=Yes 0=No

[If no skip to 12; if yes, ask]

d. Please tell me your understanding of how an Energy Snapshot works and its relation to a Home Energy Rating and EEM.

_____

e. What do you see as the advantages of an Energy Snapshot?

f. What disadvantages or problems do you think there are with implementing an Energy Snapshot?

g. Are you familiar with any cases so far where an Energy Snapshot has motivated a home buyer to have a complete HERS ratings? [Circle] 1=Yes 0=No

h. Please describe how home buyers have responded or you think they'll respond to the Energy Snapshot.

General Energy Efficiency

13. Please indicate how often you have discussed energy efficiency (generally) with potential buyers during the past year on a scale from 0 to 5 where 0 means never and 5 means very often with most potential buyers.

a. Current frequency _____ (0-5)

Discussion of EEMs with Buyers

16. j. Since taking the training, approximately how many times have you discussed or recommended an EEM to a buyer? _____ [If 0, skip to Q #17]

k. How often have buyers followed through and obtained an EEM after you discussed or recommended one?
_____% of the time

l. When buyers didn't follow through and get an EEM what were the usual reasons?

Barriers

17. Based on your experiences during the past year, we'd like to find out how important you feel several reasons are why real estate agents might not promote EEMs. Please rate how big a barrier you feel each of the following reasons is to promoting EEMs on a scale from 0 to 5, where 0 means no barrier and 5 means a major barrier: [Be sure to ascertain how much a respondent believes each is a barrier, not whether or not they agree with the statement. A respondent could agree, but not think it is a barrier or vice versa.]

Barrier	Rating
Complicating or delaying the sales transaction.....	a.
Difficulty of understanding and explaining EEMs.....	c.
Lack of buyer interest in or understanding of EEMs.....	e.
Lack of benefits for buyers.....	g.
Lack of information on EEMs.....	i.
Lack of assistance available to implement EEMs…….....	k.
Poor fit with the way real estate agents do business (e.g., agent sells mostly new homes).....……..	m.
Lender resistance to using EEMs.....	o.
Difficulty finding lenders to process EEMs.....	q.
Lack of examples of real estate agents or lenders who actively promote EEMs	s.
Lack of EEM facilitators to recommend to buyers.....	u.
Loan prequalification doesn't include EEMs.....	v.1.
Time required to process EEMs.....	v.3.
Front-end cost is too high.....	v.5.

What other obstacles are there that reduce the chances that real estate agents would promote EEMs? How would you rate how significant they are?

Barrier	Rating
Other #1 w._____.....	x.
Other #2 z._____.....	aa.

18. What suggestions do you have for reducing these barriers?

_____

_____

_____

Sales Activity

19. a. Approximately how many homes have you closed since you took the training in _____[enter date]?

_____

b. How many were resales of existing homes?_____

20. Approximately how many of these were HUD/real estate owned (REO) homes?

_____

21. How many existing homes have you closed with EEMs since the training? _____

22. [If any are REO homes] How many of the EEMs were for HUD/REO homes? _____

23. What other general comments or suggestions do you have about improving EEMs or the process used to implement them?

_____

_____

_____

THANK AND END INTERVIEW

LEGEND

( ) = optional statements to say as prompts for interviewee

[ ] = instructions/notes to interviewer

A.4 2000 PARTICIPATING LENDERS

Record from list:

- **AGENT NAME**
- **COMPANY**
- **HUD REGION**
- **COUNTY** ***we have city, not county on the list***
- **ZIP CODE**
- **DATE ATTENDED TRAINING (Note: this needs to be used in Q1 and Q19a)**

Hello, this is _____. I am trying to reach _____.

(ONCE TARGETED PERSON IS ON THE LINE) I am calling on behalf of XENERGY, an energy research and consulting company. We are conducting a study for Pacific Gas and Electric on the use of Energy Efficient Mortgages, also called EEM's, by homebuyers in your area. We are speaking with lenders who many be familiar with EEM's, and we are not selling anything – this is strictly a research study. The interview will take approximately 15 minutes. Is now a good time to conduct this interview? **(IF NOT, ASK)** When would be a good time to call back?

1 Schedule callback_____
2 Don't know, just try back_____
8 Refused → **Thank and terminate**

Interviewer note: OPTIONAL INFORMATION TO PROVIDE RESPONDENTS, IF NEEDED.

- The information you provide is completely confidential.
- The information we gather will be used to evaluate the effectiveness of Energy Efficiency Mortgage promotion programs currently active in your area.

→ ASK FOR ANY MISSING INFORMATION IN THE DEMOGRAPHIC SECTION (TOP OF PAGE) FIRST

A. WHAT IS YOUR PRIMARY OCCUPATION: MORTGAGE LENDER, REAL ESTATE AGENT, OR OTHER REAL ESTATE INDUSTRY

professional?

1 Real estate agent → **Skip to Q1 on agent survey**
2 Mortgage lender → **Go to Q1**

3 Other real estate industry professional → **Ask Screener B**

B. **If Screener A = 3, "Other," ask:** Please explain…

99 **Specify:** _____

C. In your capacity as **(insert answer from B),** do you have the opportunity to discuss mortgage options, such as Energy-Efficient Mortgages (EEM's), with your clients?

1 YES

2 No → **Thank and terminate**

TRAINING CLASS

Q1 Based on class sign-up sheets, you attended a training class for real estate agents on EEM's on <**enter date**>. Do you recall that training class?

1 Yes
2 No → **Probe: "Any classes on EEM's?" If yes, correct date with on-line correction. If no class on EEM's, then thank and terminate**

Q2 **DELETED**

Q3 Did you know what EEM's were before you heard about this class?

1 Yes
2 No

Q4 Based on what you now know about EEM's, how would you describe an EEM and its benefits to a buyer? **(MULTIPLE MENTION)**

Interviewer notes:

- **Do not read list.**
- **Check all mentioned. If they don't mention one or more of the first THREE (A, B, or C) or E, ask about them as a PROBE (see below). If their answer indicates they understand this aspect of an EEM then check prompted response.**

Unprompted	Prompted	DK	
1	2	7	A(11). FOR ENERGY-EFFICIENCY RETROFITS – includes things like adding insulation, improving windows. **PROBE: "What about retrofits? What types of retrofits might be included?"**

1	2	7	B(12). CAN INCREASE HOME VALUE BY MAKING IT MORE ENERGY EFFICIENT – efficiency improvements can increase home's value and improve a less desirable home **PROBE: "What about increasing home value? Any benefits in this regard from an EEM?"**
1	2	7	C(13). STRETCHES QUALIFYING RATIO – cost of retrofits is added into mortgage without affecting buyer eligibility **PROBE: "What about the buyer's qualifying ratio? Any effect in this regard from an EEM?"**
1		7	D(14). SAVES ON UTILITY BILLS – retrofits will reduce owner's heating/cooling bills
			E(15). AMOUNT AVAILABLE – amount that can be financed through EEM **PROBE: "How much can be added to a loan amount with an EEM?"**
1	2	7	E1(1) Greater of 5% of property value (not to exceed $8000) or $4000
1	2	7	E2(2) Other amount **Specify:** _____
1	2	7	E3(7) Don't know
1		7	F(16). INCREASES PAYMENTS – INCREASES MONTHLY MORTGAGE PAYMENTS INCREMENTALLY, WHICH ARE OFFSET BY ENERGY BILL REDUCTIONS
1		7	G(17). CLOSING COSTS – closing costs can be financed
1		7	H(18). ELIGIBLE HOMES – eligible properties are 1-2 unit existing and new construction
1	2	7	I (19). OTHER **Specify:** _____

Q4_1 → **READ:** In the following questions, we are interested primarily in EEM's that are used with existing homes, not new homes. Please keep that in mind when you answer each question. How would you describe how a buyer obtains an EEM?

Interviewer note: Check all mentioned. If they don't mention the first one, ask them the probe below. If their answer indicates they understand it then check prompted response.

Unprompted	Prompted	DK	
1	2	7	K(21). HERS – obtains a home energy rating system (HERS) rating to get recommendations for qualifying retrofits **PROBE: "How would the buyer determine which retrofits would be covered by the EEM?"**
1		7	L(22). LENDER – finds lender who will process loan as an EEM

1	7	M(23). FACILITATOR – can work with a facilitator to do retrofits
1	7	N(24). EFFICIENCY IMPROVEMENTS – installs energy-efficiency retrofits
1	7	O(25). REAL ESTATE AGENT – informs buyer/recommends EEM
1	7	P(27). OTHER **Specify:** _____

Q5A Thinking back to the training class, what information from the class was most helpful in increasing your understanding of EEM's? **(Probe and clarify)**

99 **Specify:** _____

Q5B Why? **(Probe and clarify)**

99 **Specify:** _____

Q5C Since taking the class, how often have you told other lenders or real estate agents about EEM's?

4 Very often
3 Often
2 Sometimes
1 Rarely
0 Never
7 Don't know

Q6 Do you feel the training provided you with all the information, resources, and contacts necessary to discuss an EEM with a buyer who asks about one?

1 Yes
2 No
7 Don't know

Q7 What types of additional information would be useful? **(Probe and clarify)**

99 **Specify:** _____

Q8 **DELETED**

(IN Q9 AND SEVERAL FOLLOWING QUESTIONS, RESPONDENT IS ASKED TO PROVIDE THEIR CURRENT RATING AND THE RATING THEY THINK WOULD HAVE APPLIED BEFORE THE TRAINING. ALWAYS ASK FOR CURRENT RATING FIRST. IT MAY BE USEFUL TO EXPLAIN THIS TO RESPONDENT BEFORE ASKING Q9. IF THEY WERE NOT AWARE OF EEM'S BEFORE THE TRAINING [I.E., RESPONSE TO Q3 IS "NO"], DO NOT ASK FOR RATINGS BEFORE TRAINING IN Q9)

Q9 How would you rate your understanding of EEM's now using a scale from 0 to 5, with 0 being *no understanding* and 5 being *a complete understanding*?

Understanding Scale

5	Complete understanding
4	
3	
2	
1	
0	No understanding
7	Don't know

Q9A CURRENT UNDERSTANDING **RECORD:** _____

Q9B UNDERSTANDING BEFORE TRAINING **RECORD:** _____ **(DO NOT ASK IF Q3 = 2, "NO")**

READ→ A HERS, or Home Energy Rating System, is used to evaluate energy usage in a home and provide recommendations on retrofits that can reduce energy costs and be included in an EEM.

Q10 How would you rate your understanding of a HERS now using the same scale from 0 to 5 where 0 means no understanding and 5 means you have a complete understanding?

Q10A CURRENT UNDERSTANDING **RECORD:** _____

Q10B UNDERSTANDING BEFORE TRAINING **RECORD:** _____

Q11A DO YOU KNOW WHAT AN ENERGY SNAPSHOT IS?

1 YES

2 NO → **GO TO Q12**

Q11BHOW WOULD YOU RATE YOUR UNDERSTANDING OF AN ENERGY SNAPSHOT ON A SCALE FROM 0 (NO UNDERSTANDING) TO 5 (UNDERSTAND COMPLETELY)?

RECORD: _____

Q11C Did you receive training on the Energy Snapshot?

1 Yes
2 No → **Go to Q12**

Q11D PLEASE TELL ME YOUR UNDERSTANDING OF HOW AN ENERGY SNAPSHOT WORKS AND ITS RELATION TO A HOME ENERGY

Rating and EEM. **(Probe and clarify)**

99 **Specify:** _____

Q11E What do you see as the advantages of an Energy Snapshot? **(Probe and clarify)**

99 **Specify:** _____

Q11F What disadvantages or problems do you think there are with implementing an Energy Snapshot? **(Probe and clarify)**

99 **Specify:** _____

Q11G Are you familiar with any cases so far where an Energy Snapshot has motivated a home buyer to have a complete HERS rating?

1 Yes
2 No

Q11H Please describe how home buyers have responded or you think they'll respond to the Energy Snapshot. **(Probe and clarify)**

99 **Specify:** _____

Q12 Please rate your <u>understanding</u> of the value of using energy efficiency retrofits to reduce utility bills now (such as through adding insulation, upgrading appliances, or replacing windows) using a scale from 0 to 5 with 0 being no understanding and 5 being a complete understanding.

Q12A CURRENT UNDERSTANDING **RECORD:** _____

Q12B UNDERSTANDING BEFORE TRAINING **RECORD:** _____

Q13 Please indicate how often you discuss energy efficiency with potential buyers now on a scale of 0 to 5, where 0 means never and 5 means very often with most potential buyers.

Frequency

5 Very Often
4
3
2
1
0 Never
7 Don't know

Q13A CURRENT FREQUENCY **RECORD: _____**

Q13B FREQUENCY BEFORE TRAINING **RECORD: _____**

DISCUSSION OF EEM'S WITH BUYERS

(IF RESPONDENT WAS NOT AWARE OF EEM'S BEFORE THE TRAINING [I.E., RESPONSE TO Q3 IS "NO"], DO NOT ASK FOR RATINGS BEFORE TRAINING IN Q14 AND Q15)

Q14 PLEASE INDICATE HOW LIKELY YOU ARE TO DISCUSS EEM'S WITH POTENTIAL BUYERS NOW ON A SCALE FROM 0 TO 5 WHERE 0 MEANS NOT AT ALL LIKELY AND 5 MEANS VERY LIKELY TO DISCUSS WITH ALL POTENTIAL BUYERS.

Likelihood Scale

5 Very likely
4
3
2
1
0 Not at all likely
7 Don't know

Q14A CURRENT LIKELIHOOD **RECORD: _____**

Q14B LIKELIHOOD BEFORE TRAINING **RECORD: _____ (DO NOT ASK IF Q3 = 2, "NO")**

Q14C IS THERE ANY DIFFERENCE IN HOW LIKELY YOU ARE TO DISCUSS EEM'S WITH POTENTIAL BUYERS DEPENDING ON WHETHER THEY ARE BUYING A NEW VS. A PRE-EXISTING HOUSE? PLEASE EXPLAIN…

99 **SPECIFY:** _____

Q15 HOW LIKELY ARE YOU TO RECOMMEND AN EEM TO A POTENTIAL BUYER NOW USING THE SAME SCALE FROM 0 TO 5?

Q15A CURRENT LIKELIHOOD **RECORD:** _____

Q15B LIKELIHOOD BEFORE TRAINING **RECORD:** _____ **(DO NOT ASK IF Q3 = 2, "NO")**

Q15C IS THERE ANY DIFFERENCE IN HOW LIKELY YOU ARE TO RECOMMEND EEM'S WITH POTENTIAL BUYERS DEPENDING ON WHETHER THEY ARE BUYING A NEW VS. A PRE-EXISTING HOUSE? PLEASE EXPLAIN…

99 **SPECIFY:** _____

LQ16 THERE ARE SEVERAL REASONS WHY LENDERS MIGHT WANT TO BE PREPARED TO DISCUSS EEM'S WITH

BUYERS AND PROMOTE THEM. WHAT DO YOU SEE AS THE MOST IMPORTANT REASONS? **(CHECK "2" FOR ALL**

MENTIONED UNPROMPTED)

FOR THOSE NOT MENTIONED, ASK WHETHER THEY CONSIDER THEM TO BE VERY

IMPORTANT (2), SOMEWHAT IMPORTANT (1), OR NOT IMPORTANT AT ALL (0).

UNPROMPTED/ VERY IMP.	SOMEWHAT IMP	NOT IMP	DK	
2	1	0		7A(11). THEY'RE OFTEN A USEFUL SALES TOOL/HELP CLOSE MORE MORTGAGES/INCREASE COMMISSION

2	1	0	7B(12). THEY'RE PART OF BETTER CUSTOMER SERVICE
2	1	0	7C(13). THEY ALLOW BUYERS TO INCREASE THE HOME'S EFFICIENCY AND STILL QUALIFY FOR A MORTGAGE/INCREASE HOMEOWNER BUYING POWER
2	1	0	7C1(14). THEY CAN REDUCE LOAN DEFAULT RATE BY LOWERING UTILITY BILLS
2	1	0	7D(15). MORE BUYERS ARE ASKING ABOUT THEM
2	1	0	7E(16). MORE REAL ESTATE AGENTS ARE PROMOTING THEM
2	1	0	7F(17). THEY HELP CONSERVE RESOURCES/IMPROVE THE ENVIRONMENT
2	1	0	7G(99). OTHER **SPECIFY:** _____

16I. **IF TWO OR MORE ARE VERY IMPORTANT IN LQ16, ASK:** WHICH OF THESE IS THE MOST IMPORTANT FACTOR?

ENTER LETTER FROM ABOVE:

16J. SINCE TAKING THE TRAINING, APPROXIMATELY HOW MANY TIMES HAVE YOU DISCUSSED OR RECOMMENDED

AN EEM TO A BUYER?

RECORD_____ (IF NONE, GO TO Q17)

16K. HOW OFTEN HAVE BUYERS FOLLOWED THROUGH AND OBTAINED AN EEM AFTER YOU DISCUSSED OR RECOMMENDED ONE?

RECORD % OF THE TIME_____%

16L. WHEN BUYERS DIDN'T FOLLOW THROUGH AND GET AN EEM, WHAT WERE THE USUAL REASONS? **(PROBE AND CLARIFY)**

99 **Specify:** _____

BARRIERS

Interviewer note: **IF THEY WERE NOT AWARE OF EEM's BEFORE THE TRAINING (I.E., RESPONSE TO Q3 IS NO) DO NOT ASK FOR RATINGS BEFORE TRAINING.**

LQ17 THERE ARE SEVERAL REASONS THAT HAVE BEEN MENTIONED FOR WHY LENDERS MIGHT NOT PROMOTE EEM'S ACTIVELY. WE'D LIKE TO GET AN IDEA OF HOW IMPORTANT YOU FEEL THESE REASONS ARE NOW. PLEASE RATE HOW BIG A BARRIER YOU FEEL EACH OF THE FOLLOWING REASONS IS NOW TO PROMOTING EEM'S AND HOW BIG A BARRIER YOU THOUGHT IT WAS BEFORE YOU TOOK THE TRAINING ON A SCALE OF 0 TO 5, WHERE 0 MEANS NO BARRIER AND 5 MEANS A MAJOR BARRIER. **(BE SURE TO ASCERTAIN HOW MUCH RESPONDENT BELIEVES EACH IS A BARRIER, NOT WHETHER OR NOT THEY AGREE WITH THE STATEMENT. RESPONDENT COULD AGREE, BUT NOT THINK IT IS A BARRIER, OR VICE VERSA) (ROTATE)**

NOW **N**	DK	BEFORE **B**	DK	**(DO NOT ASK "BEFORE" RATINGS IF Q3 = 2, "NO")**
5 4 3 2 1 0	7	5 4 3 2 1 0	7	A. COMPLICATING OR DELAYING THE LENDING TRANSACTION
5 4 3 2 1 0	7	5 4 3 2 1 0	7	B. DIFFICULTY OF UNDERSTANDING AND EXPLAINING EEM'S
5 4 3 2 1 0	7	5 4 3 2 1 0	7	C. LACK OF BUYER INTEREST IN OR UNDERSTANDING OF EEM'S
5 4 3 2 1 0	7	5 4 3 2 1 0	7	D. LACK OF BENEFITS FOR BUYERS
5 4 3 2 1 0	7	5 4 3 2 1 0	7	E. LACK OF INFORMATION ON EEM'S
5 4 3 2 1 0	7	5 4 3 2 1 0	7	F. LACK OF ASSISTANCE AVAILABLE TO IMPLEMENT EEM'S

5 4 3 2 1 0 7	5 4 3 2 1 0 7	G. INCOMPATIBILITY WITH LENDING PRACTICES
5 4 3 2 1 0 7	5 4 3 2 1 0 7	H. LITTLE SUPPORT FOR EEM'S IN THE REFINANCING MARKET
5 4 3 2 1 0 7	5 4 3 2 1 0 7	I. IT'S THE AGENT OR BUYER'S RESPONSIBILITY TO MENTION
5 4 3 2 1 0 7	5 4 3 2 1 0 7	J. LACK OF EXAMPLES OF LENDERS OR REAL ESTATE AGENTS WHO ACTIVELY PROMOTE EEM'S
5 4 3 2 1 0 7	5 4 3 2 1 0 7	K. LACK OF EEM FACILITATORS TO RECOMMEND TO BUYERS
5 4 3 2 1 0 7	5 4 3 2 1 0 7	L. LOAN PRE-QUALIFICATION DOESN'T INCLUDE EEM'S
5 4 3 2 1 0 7	5 4 3 2 1 0 7	M. TIME REQUIRED TO PROCESS EEM'S
5 4 3 2 1 0 7	5 4 3 2 1 0 7	N. FRONT-END COST IS TOO HIGH

Q17O WHAT OTHER OBSTACLES ARE THERE THAT REDUCE THE CHANCES THAT LENDERS WOULD PROMOTE EEM'S?

Q17ON/B HOW WOULD YOU RATE HOW SIGNIFICANTLY THEY ARE NOW?

5 4 3 2 1 0 7	5 4 3 2 1 0 7	O. OTHER_____
5 4 3 2 1 0 7	5 4 3 2 1 0 7	P. OTHER_____

Q18 WHAT SUGGESTIONS DO YOU HAVE FOR REDUCING THESE BARRIERS? **(PROBE AND CLARIFY)**

99 **Specify:** _____

SALES ACTIVITY

Q19A APPROXIMATELY HOW MANY HOMES HAVE YOU CLOSED SINCE YOU TOOK THE TRAINING ON <**ENTER DATE**>?

RECORD _____

Q19B HOW MANY WERE RESALE'S OF EXISTING HOMES?

RECORD _____

Q20 APPROXIMATELY HOW MANY OF THESE WERE HUD/REAL ESTATE OWNED (REO) HOMES?

RECORD _____

Q21A HOW MANY EXISTING HOMES HAVE YOU CLOSED WITH EEM'S SINCE THE TRAINING?

RECORD _____

Q21B WHAT PERCENTAGE OF THE EEM'S WERE FOR FHA LOANS?

RECORD _____ **%**

Q22 →**IF ANY ARE REO HOMES, ASK:** HOW MANY OF THE EEM'S WERE FOR HUD/REO HOMES?

RECORD _____

Q23 WHAT OTHER GENERAL COMMENTS OR SUGGESTIONS DO YOU HAVE ABOUT IMPROVING EEM'S OR THE PROCESS USED TO IMPLEMENT THEM? **(PROBE AND CLARIFY)**

99 **Specify:** _____

THANK AND END SURVEY

A.5 2000 NONPARTICIPATING LENDERS

TOSER Questionnaire: Non-Participating Lenders

Date: _____Telephone:_____

Company: _____

Hello this is _____, I would like to speak with one of your loan officers who handles mortgages for the purchase of existing homes.

[Once targeted person is on the line] I am calling from XENERGY. We are conducting a study for Pacific Gas and Electric on the use of Energy Efficient Mortgages, also called EEMs, by homebuyers in your area. The interview will take approximately 7 to 10 minutes. Is now a good time to conduct this interview?
[If not, ask] When would be a good time to call back?

- ◊ Scheduled callback_____
- ◊ Don't know, just try back_____
- ◊ Refused

[Optional information to provide interviewees if needed]

- (The information you provide is completely confidential)
- (The information we gather will be used to evaluate the effectiveness of Energy Efficient Mortgage promotion programs currently active in your area.)

[Begin Interview]

Screening

A. Do you provide mortgages for the purchase of existing homes?
___Yes, continue ___No, thank and terminate

B. During the past 3 years have you taken a training class sponsored by PG&E on Energy Efficient Mortgages or EEMs.
___Yes [Explain that we are now interviewing only people who have NOT taken the training and ask whether there is someone else in their office who has NOT participated in the training. If so, thank and ask to be connected with that person and begin the interview with them. Otherwise, thank them and terminate.]
___No [Continue]

Descriptive Information

C. What county is your office located in?_____
D. What is the zip code of your office?_____
E. How many years have you been making home loans or mortgages?_____
F. Approximately how many home purchases have you financed in the past 6 months?_____
G. Approximately how many homes have you financed in the past 6 months that were resales of existing homes?_____
H. Approximately how many of these were HUD/real estate owned (REO) homes? ___

Knowledge of EEMs

1. Before this interview, were you aware of Energy Efficient Mortgages, or EEMs?

[Circle] 1=Yes 0=No

[If "No", go to Q4]

2. How would you rate your understanding of EEMs on a scale from 0 to 5, with 0 being no understanding and 5 being a complete understanding?____

3. Based on what you know about EEMs, how would you describe an EEM and its benefits to a buyer?

[Check all mentioned. If they don't mention one or more of the first THREE, ask about them as a follow on question, e.g., if they mention retrofits but don't specify they're for energy efficiency ask "What types of retrofits are included?" If their answer indicates they understand this aspect of an EEM then check prompted response.]

[Note: If respondent does not voluntarily mention e ask him/her how much can be added to loan amount with an EEM and record the amount]

- ◊ a. FOR ENERGY-EFFICIENCY RETROFITS—includes things like adding insulation, improving windows
  a1 unprompted a2 prompted
- ◊ b. CAN INCREASE HOME VALUE BY MAKING IT MORE ENERGY EFFICIENT—efficiency improvements can increase home's value and improve a less desirable home
  b1 unprompted b2 prompted
- ◊ c. STRETCHES QUALIFYING RATIO—cost of retrofits is added into mortgage without affecting buyer eligibility
  c1 unprompted c2 prompted
- ◊ d. SAVES ON UTILITY BILLS—retrofits will reduce owner's heating/cooling bills
- ◊ e. AMOUNT AVAILABLE—amount that can be financed through EEM
  e1. Greater of 5% of property value (not to exceed $8,000) OR $4,000
  e2. (Other amount)_____
  e3. Don't know
- ◊ f. INCREASES PAYMENTS—increases monthly mortgage payments incrementally, which are offset by energy bill reductions
- ◊ g. CLOSING COSTS—closing costs can be financed
- ◊ h. ELIGIBLE HOMES—eligible properties are 1 to 4 unit existing and new construction
- ◊ i. OTHER_____

In the remaining questions, we are interested primarily in EEMs that are used to purchase existing homes, not new homes. Please keep that in mind when you answer each question.

How would you describe how a buyer obtains an EEM?

[Check all mentioned. If they don't mention the first one, ask them "How would the buyer determine which retrofits would be covered by the EEM?" If their answer indicates they understand it then check as prompted response.]

- ◊ k. HERS—obtains a home energy rating system (HERS) rating to get recommendations for qualifying retrofits

k 1 unprompted k 2 prompted

◊ l. LENDER—finds lender who will process loan as an EEM
◊ m. FACILITATOR—can work with a facilitator to do retrofits
◊ n. EFFICIENCY IMPROVEMENTS—installs energy-efficiency retrofits
◊ o. REAL ESTATE AGENT—informs buyer/recommends EEM
◊ q. OTHER_____

General Energy Efficiency Knowledge

4. Please rate your understanding of the effect of using energy efficiency retrofits in an existing home to reduce utility bills (such as through insulation, upgrading appliances, or replacing windows) using a scale from 0 to 5, with 0 being no understanding and 5 being a complete understanding? _____ (0-5)

5. Please indicate how often you discuss energy efficiency (generally) with potential buyers on a scale from 0 to 5 where 0 means never and 5 means very often with most potential buyers. _____ (0-5)

Definition of EEMs

I would now like to ask you a few questions about Energy Efficient Mortgages. For consistency, I'd like to define EEMs for the purchase of existing homes as follows:

For an existing home, an EEM is a mortgage for which the underwriting guidelines have been adapted specifically to include energy-efficiency improvements that the buyer chooses to add to the home. Currently, most EEMs occur through FHA loans. FHA policies require the energy-efficiency improvements to reduce monthly utility bills more than they add to the monthly loan amount. FHA places limits on the amount that can be financed with an EEM—the maximum amount is the greater of $4,000 OR 5% of the home's value up to $8,000. The costs and benefits of the energy-efficiency improvements must be determined using a Home Energy Rating System or HERS. The rating usually costs a few hundred dollars, but at least $200 of the cost can be included in the loan. EEMs can be applied to residential buildings that have 1 to 4 units.

Discussion of EEMs with Buyers

[Skip to Q8 if they were not aware of EEMs before this call, i.e., answer to Q1 was "No".]

6. Please indicate how likely you are to discuss EEMs with potential buyers on a scale from 0 to 5 where 0 means not at all likely and 5 means very likely to discuss with all potential buyers. _____ (0-5)

7. a. How likely are you to recommend an EEM to a potential buyer, using the same scale from 0 to 5. ____(0-5)
   b. Approximately how many of the existing home purchases you financed in the last 6 months were EEMs? ___

8. There are several reasons why lenders might want to be prepared to discuss EEMs with buyers and promote them. What do you see as the most important reasons?

[Put a 2 for all they mention unprompted. For ones they don't mention ask whether they consider them to be very important (put a 2), somewhat important (1), or not important at all (0)]

- ◊ a. (They are or could be a useful sales tool/Help close more mortgages/ Increase commission) __
- ◊ b. (They are or could be part of better customer service) __
- ◊ c. (They could allow buyers to increase the home's efficiency and still qualify for a mortgage/Increase homeowner buying power) __
- ◊ c1. (They could reduce loan default rates by lowering utility bills) __
- ◊ d. (More buyers are asking about them) __
- ◊ e. (More real estate agents are promoting them) __
- ◊ f. (They help conserve resources/improve the environment) __
- ◊ g. (Other)_____ __

- ◊ i. [If 2 or more are very important, ask] Which of these is the most important factor?_____[enter letter from above]

[Skip to Q9 if they were not aware of EEMs before this call, i.e., answer to Q1 was "No".]

j. In the past 6 months, approximately how many times have you discussed or recommended an EEM to a buyer? _____ [If 0, skip to Q9]

k. How often have buyers followed through and obtained an EEM after you discussed or recommend one? _____% of the time

l. When buyers didn't follow through and get an EEM what were the usual reasons?

_____

_____

Barriers

9. There are several reasons that have been mentioned for why lenders might not promote EEMs actively. We'd like to get an idea of how important you feel these reasons are. Please rate how big a barrier each of the following reasons is to promoting EEMs, on a scale from 0 to 5, where 0 means no barrier and 5 means a major barrier: [Be sure to ascertain how much a respondent believes each is a barrier, not whether or not they agree with the statement. A respondent could agree, but not think it is a barrier or vice versa.]

a. Complicating or delaying the lending transaction..... ___
b. Difficulty of understanding and explaining EEMs..... ___
c. Lack of buyer interest in or understanding of EEMs..... ___
d. Lack of benefits for buyers..... ___
e. Lack of information on EEMs..... ___
f. Lack of assistance available to implement EEMs……..... ___
g. Incompatibility with lending practices..... ___
h. Little support for EEMs in the refinancing market..... ___

i. It's the agent's or buyer's responsibility to mention..... ___
j. Lack of examples of lenders or real estate agents who actively promote EEMs ..... ___
k. Loan prequalification doesn't include EEMs..... ___
l. Time required to process EEMs..... ___
m. Front-end cost is too high..... ___

What other obstacles do you think there are that reduce the chances lenders would promote EEMs? How would you rate how significant they are?

n/o/p. Other (specify)_____ .... rating: na/oa/pa___

10. What suggestions do you have for ways to reduce the most significant barriers that keep lenders from promoting EEMs?

_____
_____
_____

11. How much interest do you have in attending a training seminar to learn more about EEMs?

0=None 1=A little 2=A moderate amount 3=Very much

12. What general comments or suggestions do you have about improving EEMs or the process used to implement them?

_____
_____
_____

THANK AND END INTERVIEW

LEGEND
( ) = optional statements to say as prompts for interviewee
[ ] = instructions/notes to interviewer

A.6 1999 LENDERS REINTERVIEWS

Record from list (at end of survey):

- **AGENT NAME**
- **COMPANY**
- **HUD REGION**
- **COUNTY**
- **ZIP CODE**
- **DATE ATTENDED TRAINING (Note: this needs to be used in Q19a)**

Hello, this is _____. I am trying to reach _____ _____.

(ONCE TARGETED PERSON IS ON THE LINE) I am calling on behalf of XENERGY, an energy research and consulting company. We spoke with you last year as part of a study for Pacific Gas and Electric on the use of Energy Efficient Mortgages, also called EEMs, by homebuyers in your area. I would like to ask you a few questions now that a year has passed about your experience with EEMs. The interview will take approximately 10 minutes. Is now a good time to conduct this interview? **(IF NOT, ASK)** When would be a good time to call back?

1 Schedule callback_____
2 Don't know, just try back_____
8 Refused → **Thank and terminate**

Interviewer note: OPTIONAL INFORMATION TO PROVIDE RESPONDENTS, IF NEEDED.

- The information you provide is completely confidential.
- The information we gather will be used to evaluate the effectiveness of Energy Efficiency Mortgage promotion programs currently active in your area.

→ ASK FOR ANY MISSING INFORMATION IN THE DEMOGRAPHIC SECTION (TOP OF PAGE) FIRST

Q4 Based on what you now know about EEM's, how would you describe an EEM and its benefits to a buyer? **(MULTIPLE MENTION)**

Interviewer notes:

- **Do not read list.**
- **Check all mentioned. If they don't mention one or more of the first THREE (A, B, or C) or E, ask about them as a PROBE (see below). If their answer indicates they understand this aspect of an EEM then check prompted response.**

Unprompted	Prompted	DK	
1	2	7	A. FOR ENERGY-EFFICIENCY RETROFITS – includes things like adding insulation, improving windows. **PROBE: "What about retrofits? What types of retrofits might be included?"**
1	2	7	B. CAN INCREASE HOME VALUE BY MAKING IT MORE ENERGY EFFICIENT – efficiency improvements can increase home's value and improve a less desirable home **PROBE: "What about increasing home value? Any benefits in this regard from an EEM?"**
1	2	7	D. STRETCHES QUALIFYING RATIO – cost of retrofits is added into mortgage without affecting buyer eligibility **PROBE: "What about the buyer's qualifying ratio? Any effect in this regard from an EEM?"**
1	~~2~~	7	C. SAVES ON UTILITY BILLS – retrofits will reduce owner's heating/cooling bills
			E. AMOUNT AVAILABLE – amount that can be financed through EEM **PROBE: "How much can be added to a loan amount with an EEM?"**
1	2	7	E1 Greater of 5% of property value (not to exceed $8000) or $4000
1	2	7	E2 Other amount **Specify:** _____
1	2	7	E3 Don't know
1		7	F. INCREASES PAYMENTS – INCREASES MONTHLY MORTGAGE PAYMENTS INCREMENTALLY, WHICH ARE OFFSET BY ENERGY BILL REDUCTIONS
1		7	G. CLOSING COSTS – closing costs can be financed
1		7	H. ELIGIBLE HOMES – eligible properties are 1-2 unit existing and new construction
1	2	7	I. OTHER **Specify:** _____

→ **READ:** In the following questions, we are interested primarily in EEM's that are used with existing homes, not new homes. Please keep that in mind when you answer each question. How would you describe how a buyer obtains an EEM?

Interviewer note: Check all mentioned. If they don't mention the first one, ask them the probe below. If their answer indicates they understand it then check prompted response.

Unprompted	Prompted	DK	
1	2	7	K. HERS – obtains a home energy rating system (HERS) rating to get recommendations for qualifying retrofits **PROBE: "How would the buyer determine which retrofits would be covered by the EEM?"**
1		7	L. LENDER – finds lender who will process loan as an EEM
1		7	M. FACILITATOR – can work with a facilitator to do retrofits
1		7	N. EFFICIENCY IMPROVEMENTS – installs energy-efficiency retrofits
1		7	O. REAL ESTATE AGENT – informs buyer/recommends EEM
1		7	P. OTHER **Specify:** _____

Q5C In the past year, how often have you told other lenders or real estate agents lenders about EEM's?

4 Very often
3 Often
2 Sometimes
1 Rarely
0 Never
7 Don't know

Q11A DO YOU KNOW WHAT AN ENERGY SNAPSHOT IS?

1 YES

2 NO → **GO TO Q13**

Q11BHOW WOULD YOU RATE YOUR UNDERSTANDING OF AN ENERGY SNAPSHOT ON A SCALE FROM 0 (NO UNDERSTANDING) TO 5 (UNDERSTAND COMPLETELY)?

RECORD: _____

Q11C Did you receive training on the Energy Snapshot?

1 Yes
2 No → **Go to Q13**

Q11D PLEASE TELL ME YOUR UNDERSTANDING OF HOW AN ENERGY SNAPSHOT WORKS AND ITS RELATION TO A HOME ENERGY

Rating and EEM. **(Probe and clarify)**

99 **Specify: _____ (97 = Don't know)**

Q11E What do you see as the advantages of an Energy Snapshot? **(Probe and clarify)**

99 **Specify: _____ (97 = Don't know)**

Q11F What disadvantages or problems do you think there are with implementing an Energy Snapshot? **(Probe and clarify)**

99 **Specify: _____ (97 = Don't know)**

Q11G Are you familiar with any cases so far where an Energy Snapshot has motivated a home buyer to have a complete HERS rating?

1 Yes
2 No

Q11H Please describe how home buyers have responded or you think they'll respond to the Energy Snapshot. **(Probe and clarify)**

99 **Specify: _____ (97 = Don't know)**

Q13 Please indicate how often you discussed energy efficiency (generally) with potential buyers in the past year on a scale of 0 to 5, where 0 means never and 5 means very often with most potential buyers.

Frequency

5 Very Often
4
3
2
1
0 Never
7 Don't know

Q13A CURRENT FREQUENCY **RECORD: _____**

16J. SINCE TAKING THE TRAINING, APPROXIMATELY HOW MANY TIMES HAVE YOU DISCUSSED OR RECOMMENDED AN EEM TO A BUYER?

RECORD____ (997 = DON'T KNOW) (IF NONE, GO TO Q17)

16K. HOW OFTEN HAVE BUYERS FOLLOWED THROUGH AND OBTAINED AN EEM AFTER YOU DISCUSSED OR RECOMMENDED ONE?

RECORD % OF THE TIME____% (997 = DON'T KNOW)

16L. WHEN BUYERS DIDN'T FOLLOW THROUGH AND GET AN EEM, WHAT WERE THE USUAL REASONS? **(PROBE AND CLARIFY)**

99 **Specify: _____ (997 = Don't know)**

BARRIERS

Q17 BASED ON YOUR EXPERIENCES DURING THE PAST YEAR, WE'D LIKE TO FIND OUT HOW IMPORTANT YOU FEEL SEVERAL REASONS ARE WHY LENDERS MIGHT NOT PROMOTE EEMS. PLEASE RATE HOW BIG A BARRIER YOU FEEL EACH OF THE FOLLOWING REASONS IS TO PROMOTING EEMS ON A SCALE FROM 0 TO 5, WHERE 0 MEANS NO BARRIER AND 5 MEANS A MAJOR BARRIER: **[BE SURE TO ASCERTAIN HOW MUCH A RESPONDENT BELIEVES EACH IS A BARRIER, NOT WHETHER OR NOT THEY AGREE WITH THE STATEMENT. A RESPONDENT COULD AGREE, BUT NOT THINK IT IS A BARRIER OR VICE VERSA.]** **(ROTATE)**

NOW						DK	
5	4	3	2	1	0	7	A. COMPLICATING OR DELAYING THE LENDING TRANSACTION
5	4	3	2	1	0	7	B. DIFFICULTY OF UNDERSTANDING AND EXPLAINING EEM'S
5	4	3	2	1	0	7	C. LACK OF BUYER INTEREST IN OR UNDERSTANDING OF EEM'S
5	4	3	2	1	0	7	D. LACK OF BENEFITS FOR BUYERS
5	4	3	2	1	0	7	E. LACK OF INFORMATION ON EEM'S

5 4 3 2 1 0 7 F. LACK OF ASSISTANCE AVAILABLE TO IMPLEMENT EEM'S

5 4 3 2 1 0 7 G. INCOMPATIBILITY WITH LENDING PRACTICES

5 4 3 2 1 0 7 H. LITTLE SUPPORT FOR EEM'S IN THE REFINANCING MARKET

5 4 3 2 1 0 7 I. IT'S THE AGENT OR BUYER'S RESPONSIBILITY TO MENTION

5 4 3 2 1 0 7 J. LACK OF EXAMPLES OF LENDERS OR REAL ESTATE AGENTS WHO ACTIVELY PROMOTE EEM'S

5 4 3 2 1 0 7 K. LACK OF EEM FACILITATORS TO RECOMMEND TO BUYERS

5 4 3 2 1 0 7 L. LOAN PRE-QUALIFICATION DOESN'T INCLUDE EEM'S

5 4 3 2 1 0 7 M. TIME REQUIRED TO PROCESS EEM'S

5 4 3 2 1 0 7 N. FRONT-END COST IS TOO HIGH

WHAT OTHER OBSTACLES ARE THERE THAT REDUCE THE CHANCES THAT REAL ESTATE AGENTS WOULD PROMOTE EEM'S?

HOW WOULD YOU RATE HOW SIGNIFICANTLY THEY ARE NOW (AND BEFORE YOU TOOK THE TRAINING)?

5 4 3 2 1 0 7 O. OTHER**(SPECIFY)** _____

Q18 WHAT SUGGESTIONS DO YOU HAVE FOR REDUCING THESE BARRIERS? **(PROBE AND CLARIFY)**

99 **Specify:** _____ **(97 = Don't know)**

SALES ACTIVITY

Q19A APPROXIMATELY HOW MANY HOMES HAVE YOU CLOSED SINCE YOU TOOK THE TRAINING ON <**ENTER DATE>**?

RECORD_____(9997 = DON'T KNOW)

Q19B HOW MANY WERE RESALE'S OF EXISTING HOMES?

RECORD_____(9997 = DON'T KNOW)

Q20 APPROXIMATELY HOW MANY OF THESE WERE HUD/REAL ESTATE OWNED (REO) HOMES?

RECORD_____(9997 = DON'T KNOW)

Q21A HOW MANY EXISTING HOMES HAVE YOU CLOSED WITH EEM'S SINCE THE TRAINING?

RECORD_____

Q21B WHAT PERCENTAGE OF THE EEM'S WERE FOR FHA LOANS?

RECORD_____%

Q22 →**IF ANY ARE REO HOMES, ASK:** HOW MANY OF THE EEM'S WERE FOR HUD/REO HOMES?

RECORD_____(9997 = DON'T KNOW)

Q23 WHAT OTHER GENERAL COMMENTS OR SUGGESTIONS DO YOU HAVE ABOUT IMPROVING EEM'S OR THE PROCESS USED TO IMPLEMENT THEM? **(PROBE AND CLARIFY)**

99 **Specify: _____(97 = Don't know)**

THANK AND END SURVEY

A.7 HOME BUYERS

Demographics
Date: _____
Telephone:_____
Homeowner Name:_____
Home Address: _____
HUD Region:_____
County: _____
Zip Code:_____

QUOTAS:

HUD Region	Quota
Fresno	20
Sacramento	20
San Francisco	10
TOTAL	**50**

I am calling from Market Decisions, an independent market research firm. We are conducting a study for Pacific Gas and Electric on the use of Energy Efficient Mortgages, also called EEM's, by homebuyers in your area. We are not selling anything in any form. May I please speak to: _____.

[Once targeted person is on the line] I am calling from Market Decisions, an independent market research firm.. We are conducting a study for Pacific Gas and Electric on the use of Energy Efficient Mortgages, also called EEM's, by homebuyers in your area. We are speaking with homeowners who have obtained EEM's. The interview will take approximately 10 minutes, is now a good time?

[If not, ask] When would be a good time to call back? **[It is ok to talk to another household member if they are better able to answer the questions]**

[Optional information to provide interviewees if needed:]

- The information you provide is completely confidential
- The information we gather will be used to evaluate the effectiveness of Energy Efficiency Mortgage promotion programs currently active in your area.

[Ask for any missing information in the demographics section first]

Screening

QS1. Are you familiar with Energy Efficient Mortgages, or EEM's?

1 Yes
2 No → **read explanation:** "An EEM, or energy efficient mortgage, allows a home buyer to include the costs of energy-efficiency improvements in their mortgage. The improvements are made as part of the purchase process. There are specific requirements for the improvements and the costs that can be included in the mortgage."

QS2. Do you recall obtaining an Energy Efficient Mortgages, or EEM, when you purchased your home?

1 Yes
2 No → **thank and terminate**

QS3. When did you purchase your home?

S3._____ (month/year)
S3A_____[Enter date from database]

QS4. Was your home new when you purchased it?

1 Yes → **thank and terminate**
2 No

Discussing EEM's

Q1. How did you FIRST hear of EEM's? **(single mention)**

11 display at a home
12 through a facilitator
13 book, article, home buying advice column
14 media advertising
15 home show
16 friend/acquaintance
17 real estate agent
18 lender
19 home buyer seminar
20 internet
99 Other **(specify)**

Q2. Had you heard of EEM's before you started looking for your current home?

1 Yes
2 No

Q3. When you were considering purchasing your home, who originally mentioned the possibility of using an EEM? **(single mention)**

11 I did (respondent)
12 real estate agent
13 mortgage broker
99 Other **(specify)**

Q4. Did you use an EEM facilitator?

1 Yes
2 No

Q5. Who was your primary source of information about EEM's throughout the buying and lending process?

11 mortgage broker/lender
12 real estate agent
13 facilitator
99 Other **(specify)**

Q6. Do you recall what energy efficiency measures were installed through the EEM ? (**Probe with: Anything else?) (Probe and clarify)**

11 Furnace
12 Air conditioner
13 Furnace and air conditioner
14 Insulation in walls, floors, ceilings
15 Water heater
16 Windows
17 Sun screens
18 Infiltration (air leaking into house)
19 Ducts
20 Whole house fan
21 Insulating pipes and ducts
99 Other **(specify)**

Q7. Are you familiar with a home energy rating, sometimes referred to as a HERS rating?

1 Yes → **ask Q8**
2 No → **Skip to Q9**

Q8. In your own words, how would you describe a home energy rating and what it's used for? **(Probe and clarify)**

99 Other **(specify)**

Benefits of EEM's

Q9. Please rate how satisfied you are overall with the process of using an EEM on a scale of 0 to 5, with 0 not at all satisfied and 5 being very satisfied?

Record rating: _____

7 Don't know

I am going to suggest some reasons why homeowners who do not know about EEM's might NOT make energy efficiency improvements to their homes. Please rate how serious you believe each of these reasons is using a scale of 0 to 5 where 0 means not at all serious, and 5 means very serious. **(rotate)**

A It's difficult to find enough information about how to improve a home's efficiency
B It's hard to find information from someone you can trust
C It takes too much time to figure out what energy efficiency improvements to make and then do them
D It's hard to know whether the efficiency improvements are really worth doing
E The energy efficiency improvements are too complicated to understand
F It's hard to find someone who can help select and install the right improvements
G It's hard to pay for the improvements or qualify for a loan to do them
H Other **(specify)**

Q11. EEM's are intended to help overcome several of these problems. How well, from your experience, do you think the EEM process handles the more serious problems? Please rate how well EEM's handle the more serious problems using a scale of 0 to 5 where 0 means not at all well, and 5 means very well. **[Ask only about those items that were rated 4 or 5 on Q10]**

A It's difficult to find enough information about how to improve a home's efficiency
B It's hard to find information from someone you can trust
C It takes too much time to figure out what energy efficiency improvements to make and then do them
D It's hard to know whether the efficiency improvements are really worth doing
E The energy efficiency improvements are too complicated to understand
F It's hard to find someone who can help select and install the right improvements
G It's hard to pay for the improvements or qualify for a loan to do them
H Other **(specify)**

Q12. There are several reasons why homeowners might decide to use an EEM. How important were each of the following in your decision to use an EEM? Use a scale from 0 to 5 where 0 means the EEM was not at all important to you and 5 means it was very important. **(rotate)**

A My home will have lower utility bills
B It's an opportunity to update the home
C It helps conserve resources/improve the environment
D Makes it possible to qualify for a larger loan that includes energy efficiency improvements

E Real estate agent promoted it
F Lender promoted it
G Home comfort is improved
H Other (**specify**)

Q13. **[If 2 or more are very important in Q11, ask:]** Which of these was the most important factor to you? **(IP note: only show items rated 2 or higher in Q12)**

A My home will have lower utility bills
B It's an opportunity to update the home
C It helps conserve resources/improve the environment
D Makes it possible to qualify for a larger loan that includes energy efficiency improvements
E Real estate agent promoted it
F Lender promoted it
G Home comfort is improved
H Other (**specify**)

Q14. Would you recommend an EEM to other homebuyers?

1 Yes
2 No

Barriers

Q15. Please rate how difficult it is to understand what an EEM is and how it works on a scale of 0 to 5 with 0 being not difficult at all and 5 being very difficult?

Record rating: _____
7 Don't know

Q16. What types of information **were or** would have been most useful to help you understand what an EEM is and how it works? **(probe and clarify)**

99 Other **(specify)**

Q17. Please rate how difficult the process of obtaining an EEM was overall on a scale of 0 to 5 with 0 being not at all difficult and 5 being very difficult?

Record rating: _____
7 Don't know

Q18. Please rate how difficult each of the following steps in the EEM process was on a scale from 0 to 5, with 0 being not at all difficult and 5 being very difficult. **(rotate)**

A Obtaining information about how an EEM works
B Understanding the benefits of an EEM
C Getting a home energy rating or inspection
D Finding a lender who would process the EEM

E Finding a facilitator who would coordinate the EEM process
F Filling out the EEM paperwork
G Choosing which efficiency measures to install
H Other **(specify)**

Q19 What comments or suggestions do you have about improving EEM's or the process used to implement them? **(Probe and specify)**

99 Other **(specify)**

DEMOGRAPHICS

READ → Finally, we'd like to get a little information about your household to make sure we are talking to a good cross-section of home owners.

D1. Approximately how old is your house?

Record number of years: _____
997 Don't know

D2. Is this the first home that you've purchased?

1 Yes
2 No

D3. How many people are in your household?

Record number of people: _____
98 Refused

D4. Which of the following age groups are you in? **(read list)**

11 20 years old or younger
12 21 - 30 years old
13 31 - 40 years old
14 41 - 50 years old
15 51 - 60 years old
16 61 - 70 years old
17 71 years old or older
98 Refused

THANK YOU. THOSE ARE ALL THE QUESTIONS I HAVE FOR YOU.

B ESTIMATING EEM ORIGINATIONS

This appendix presents details of statistical analyses that we conducted to determine the relationships between various factors, including Program training, and the number and penetration of EEMs in the PG&E service territory.

B.1 INTRODUCTION

We developed a number of statistical formulations to estimate and test for the effects of training on EEM loan origination over the period October 1997 through December 2000. Along with Program training effects, there are a number of other factors that could affect the number and penetration rate of EEMs in PG&E's service territory.

Given the aggregate statistical relationship between EEMs and FHA loans identified in this report, we concluded that a major determinant of the number of EEMs was likely to be the number of FHA loans issued in an area. Consequently, we included this variable in all our statistical analyses.

Because demographics are a primary factor in housing demand and in mortgage financing, we anticipated that certain demographic variables would be significant determinants of EEM originations. If this were the case, estimating Program training effects without including appropriate demographic variables could cause biases in estimating Program training effects. Therefore, we compiled a number of demographic factors to test and include in this analysis. These included median household age, average household size, ethnic composition of the population (Hispanic, Afro-American and All Other), median household income, household disposable income, median house price, and household formation (or "growth") on average during the 1990-2000 period.

Another factor that could affect the number of EEM loans would be climate. It is reasonable to expect that a home buyer would have more of an incentive to upgrade the efficiency of her purchased home, and apply for an EEM loan, if the qualified house were located in an area with greater space conditioning needs, either heating or cooling.

The TOSER Program (and EAHAP) training has spanned a considerable interval of time—October 1997 through December 2000. Over this period, there may be temporal effects that cause variations in the share of EEM loans and understanding these may be important for future Program efforts. Thus, we examined annual sub-periods as well as the entire period. Another element of a temporal nature is the rebate payment program that occurred during the period May 1997 through February 1999. The rebate was given to lenders and real estate agents in two HUD regions (San Francisco and Fresno). We performed a statistical test on the significance of these rebates using the data over this sub-period. We also examined the effects of a change in HUD reporting requirements that occurred part way through the Program.

A final thrust of this research on EEM activity is the question of dynamic effects. Essentially, dynamic effects include inertia for some effects and other lags that may account for there not being instantaneous impacts but, instead, impacts that are distributed over months or years.

B.2 APPROACH

We developed several approaches for explaining the number of EEMs, including the role of Program training effects. Within each of these, we examined and tested demographic effects, weather effects, temporal elements, and dynamic effects. In the case of the first three, when no significant relationship was encountered, we deleted the factor from consideration in obtaining a final set of estimates. As noted earlier, in all cases the number of FHA loans was included as a primary explanatory variable of the number of EEMs.

One set of equations was based on the cumulative total of EEMs, FHA loans, number of lenders trained, and number of real estate agents trained at any point in time. We routinely employed three reference points—the end of 1998[1], the end of 1999, and the end of 2000.

The second set of equations we examined was developed in terms of temporal data. Specifically, we used in these equations the number of EEMs and FHA loans for a given time period in conjunction with the cumulative number of agents and lenders trained from the beginning of the Program through the period of interest. These equations helped identify differences across time periods and allowed inclusion of the rebate mentioned earlier.

Most of our analyses focused on the cumulative models and these are discussed in the most detail. We discuss briefly the significant findings from the temporal models later.

There is little to guide one in deciding what functional form to use for estimation and for testing hypotheses about the factors affecting EEM loan origination. We examined three functional forms to cover a range of likely forms. Additive or simple linear equations were specified and estimated using ordinary least square techniques. Logistic specifications were also estimated. Finally, nonlinear models were formulated as a better representation for interplay of variables that could explain the number of EEMs.

The typical additive model was of the form

$$EEM_{ij} = \acute{a}_0 + \ddot{a}_1\ HISPN\%_i + \ddot{a}_2\ GROWTH_i + \ddot{a}_3\ INCOME_i + \ddot{a}_4\ SIZE_i$$

$$+ \ddot{a}_5\ AGEi + \hat{a}_1\ LENDERS_i + \hat{a}_2\ AGENTS_i + \tilde{n}_1\ FHA_{ij} + \mathring{a}_t$$

where

[1] It should be noted that, although the program and program data series we had available began in October 1997, we always combined the three observations for 1997 with the 1998 data. Thus, equations focusing on 1998 used 15 monthly observations, rather than just 12.

EEM_{ij} = the number of EEMs in zip code i, for the j-th time span
FHA_{ij} = the number of FHA loans in zip code i, for the j-th time span
$HISPN\%_i$ = the percentage of the population that is indicated to be Hispanic
$GROWTH_i$ = the percentage growth in households over the 1990 to 2000 period
$INCOME_i$ = median household income
$SIZE_i$ = average household size
AGE_i = median age of head of household
LENDERS = number of lenders trained through the Program
AGENTS = number of real estate agents trained through the Program
å = a random disturbance term

Employing the same definitions, the logistic model is of the form

$$\text{Log((EEM Penetration Rate)/(1-EEM Penetration Rate))} = á_0 + ä_1 HISPN\%_i + ä_2 GROWTH_i + ä_3 INCOME_i + ä_4 SIZE_i + ä_5 AGEi + â_1 LENDERS_i + â_2 AGENTS_i + ñ_1 FHA_{ij} + åi$$

Finally, the nonlinear specification is

$$EEMij = [á_0 + ä_1 HISPN\%_i + ä_2 GROWTH_i + ä_3 INCOME_i + ä_4 SIZE_i + ä_5 AGEi + â_1 LENDERS_i + â_2 AGENTS_i]*FHAij + õi$$

B.3 DATA

Coupled with the demographic variables enumerated above, we created an estimation database that included observations on heating and cooling degree-days that we compiled by California climate zone and by zip code in the PG&E area. Observations on the existence of EEM rebate payments by zip code were included, as well. A variable tracking the change in HUD reporting requirements also was included. The database provided month-by-month observations on the cumulative number of EEMs and the cumulative number of FHA loans by zip code. Thus, these were interpreted as a running total or "stock" of loans issued. The difference between the numbers of loans at any two points in time could be interpreted as a "flow" or change in EEMs per unit time. This is a useful construct for estimating various effects, especially in the context of temporal behavior and dynamics. Lender training and real estate training were measured as the number of lenders and agents trained for each month of the period. These were then accumulated to running totals as needed for analysis.

At the 5-digit level, there were 796 usable zip code observations on loans, training, and demographics variables. Unfortunately, our first-pass analysis revealed a major shortcoming at

this level of detail. We determined that an unusually (and unacceptably) large number of zip codes had no EEM activity, but large training numbers; other zip codes had substantial EEM activity, but no training associated with them. In both cases, adjacent zip codes often reflected the opposite. This suggested a lack of association between a trainee's zip code location and the location of houses sold and financed. The first-pass analysis was not very revealing as a result.

We consolidated the 5-digit zip code data to the 4-digit level in an attempt to ameliorate the foregoing problem. This resulted in 176 usable observations. However, the lack of association between trainees' zips and loan and EEM zips continued to plague the regression results. Consequently, we consolidated the data further. There were 29 usable observations at the 3-digit level used in this stage of the analysis.

Even at the 3-digit level, however, we observed that this problem was not completely remedied. This is discussed later along with a brief discussion of our exploratory findings from a county-based analysis. As a result of this analytic problem, we caution the reader that the results for the effects of Program training must be considered to be preliminary and incomplete pending an analysis that more accurately defines the geographic area of influence for Program trainees.

B.4 FINDINGS AND INFERENCES

After investigating the three model structures described earlier, we selected the nonlinear least squares estimates as the preferred approach, and the results discussed below relate exclusively to these.[2] The nonlinear models generally produced levels of explanatory power for EEMs on the order of 90 to 95 percent, which is quite high for cross-sectional analysis.

B.4.1 Demographics

Demographic factors entered the statistical models in a significant fashion. Results were very robust with respect to the following factors:

- Hispanic composition of the population
- Median household income levels
- Net household formation over the 1990-2000 period
- Average household size
- Median age of head of household

Moreover, the regression results reinforced the importance of controlling for demographic factors in trying to estimate Program training effects on the number of EEMs. In roughly one-third of the regressions, a comparison of the results with and without the demographic variables included in the model showed that the estimates of Program training effects were biased,

[2] We note that we also estimated exploratory hybrid models based on a production or activity analysis framework and they produced very encouraging results for Program training effects. Further development of these models was beyond the scope of the current study, but we believe that they should be explored in more depth in the future.

suggesting that not including the demographic variables could lead one to arrive at erroneous conclusions about the extent of the effects of the training.

Sensitivities with respect to the significant demographic variables are reported in Table B-1. The elasticities of the quantity of EEMs predicted with respect to each variable are shown.[3] The quantities in parentheses are the t-statistics.[4]

Table B-1
EEM Elasticities for Demographic Variables

Demographic Variable	Elasticity
Hispanic % of population	0.50 (2.8)
Median household income	-1.01 (2.01)
Household formation 1990-2000	0.54 (2.86)
Average household size	-5.8 (2.78)
Median age, head of household	-2.42 (2.3)
Note: t-statistics are shown in parentheses	

These elasticity estimates were based on the entire 39-month Program period through December 2000. They have the following interpretation:

- A 10% increase in the proportion of Hispanics in a 3-digit zip code area would be associated with a 5% increase in the number of EEM loan originations.
- A 10% decrease in the level of household income would cause a 10% increase in EEM originations.
- For every 1 percentage point increase in the annual rate of household growth in a 3-digit zip code, an extra 70 EEMs would have been generated over the 39-month time period.
- Larger households and those with older heads of the household had a lower demand for EEMs.

The first result indicates that areas with higher Hispanic population shares have a higher demand for EEMs than other areas. The median Hispanic population proportion was 23.3%.

[3] The elasticity indicates the change predicted in the percentage of EEMs as a result of a given percent change in the variable, all evaluated at the sample mean values.
[4] The standard interpretation of the t-statistic applies to the results reported here. A t-statistic greater than 2.045 indicates that there is a 95% chance that we have concluded correctly that the variable has an effect on the number of EEMs. The larger the t-statistic is the more confidence we can have that the variable does affect the number of EEMs. Every elasticity was associated with a confidence level of 97% or higher except the one for household income, which was significant at a confidence level of about 90%.

The second result suggests that areas with lower average incomes have a higher demand for EEMs. The mean household income was $49,286 so a decrease of $5,000 from the mean would result in a 10% increase in the number EEMs. This probably reflects the fact that lower-income households are more in need of and more likely to benefit from the financing provided by EEMs.

Household formation or growth was also an important source of EEM demand. Growth rates by 3-digit zip code varied from 4.4 % to 43 % over the 10-year span. On an annual basis, these translated to rates on the order of 0.4% to 3.6 % per year, compounded.

With all else equal, the empirical results indicated that larger household size and higher age of head of household reduced EEM demand. Mean household size was 2.68 persons and the mean age of household heads was 36.0 years.

Somewhat surprisingly, we did not find climate effects to be a significant factor in EEM demand. Part of this may be due to the fact that heating and cooling loads are negatively correlated with each other in many areas of the PG&E territory. Also, it is possible that climate variables are correlated with other variables or that the impact of climate on energy bills has not been communicated effectively in some of the locations where the effects could be the largest.

B.4.2 Program Training

At this preliminary stage of the research, the results for Program training effects were somewhat more varied and problematic. Table B-2 gives the estimates of Program training effects by trainee group (lenders and real estate agents or "agents") and time period. As for the demographic results reported earlier, these results are based on a model defined in terms of the 3-digit zip codes in which the trainees were located.

Table B-2
EEM Program Training Relationships Based on 3-digit Zip Code Areas

Group	Value	1997-98	1999	2000	Full period
Lenders	Elasticity (t-statistic)	Statistically insignificant	Statistically insignificant	0.08 (4.25)[a]	0.11 (1.76)[b]
	#EEMs added per 10 trainees during each period	N/A	N/A	9	13
Agents	Elasticity (t-statistic)	0.19 (2.65)[c]	Statistically insignificant	Statistically insignificant	Statistically insignificant
	#EEMs added per 10 trainees during each period	7	N/A	N/A	N/A

Note: The accuracy of all estimates is limited by the possible lack of correspondence between 3-digit zip codes and the actual geographic area in which trainees operate.

[a] *This value is significant at greater than the 98% level.*

[b] *This value is significant at the 85% confidence level.*

[c] *This value is significant at the 98% confidence level.*

We examined the four chronological periods shown and found that the results varied considerably across the different periods. In most cases, the relationship between the number of trainees and the number of EEMs was not statistically significant (at the 80% confidence level). However, for certain intervals, the analysis produced statistically significant results. These are discussed below, but we caution the reader that we believe this analysis is only preliminary and should be expanded to account more accurately for the geographic area in which lenders and agents operate, as noted earlier. Consequently, these results should be viewed as indicative of the possible relationship between training and the number of EEMs, but not conclusive.

Based on the elasticity of lender training over the full 39-month Program period, a 10% increase in the number of lenders trained would have resulted in a 1.1% increase in EEMs. In absolute terms, this would mean that for every 10 lenders trained over the 39-month period, approximately 13 more EEMs would have been financed over this same period. The results for lender training were not statistically significant in the first two periods, but they were quite strong in the year 2000. For this year, the results suggested that each 10 lenders trained increased the number of EEMs implemented by 9 during 2000.

The results for agents did not show a statistically significant relationship between number of agents trained and houses sold with EEMs when we conducted this analysis over the full 39-month period. However, when we investigated temporal effects these results were more indicative of agent training effects, at least during one period. When we repeated this analysis for the initial Program period, October 1997 through December 1998, we found statistically significant results for agent training as shown in the table. For this restricted interval, the elasticity for agent training was 0.19, nearly twice the lender training elasticity. In absolute terms, this indicated that 7 additional EEMs would have resulted over the 15-month period for every 10 agents trained during the first 15 months. If this relationship held up over the full 39-month period the training of 10 agents over this period would have led to 16 additional EEMs over the full Program length. As noted above, however, the analysis for agent training over the full period did not provide statistically significant evidence for this effect. This issue is discussed further below.

Based on these results, we calculated initial estimates of the bounds on the probable effect of training on the number of EEMs implemented. The results for lenders over the whole period provided an initial estimate of an upper bound. The results for real estate agents over the 1997-98 period provided a lower bound estimate assuming that the training only increased the number of EEMs during this period and the effect was averaged over the whole 39-month period. Based on this approach, we estimated the following:

- The probable upper bound on the training effect was about 13 additional EEMs over the 39-month period for each 10 lenders trained.

- The probable lower bound on the training effect was about 2.7 additional EEMs over the 39-month period for each 10 agents trained. [5]

These estimates and the county-level analysis allowed us to estimate preliminary lower and upper bounds on the percent of EEMs during the Program that were attributable to Program training:

- A probable **lower bound** on the percent of EEMs during the Program that was attributable to the training was **3.4%.** This estimate was based on the number of real estate agents trained during the 1997-98 period.
- A probable **upper bound** on the effect of training was that **27%** of the EEMs during the Program were attributable to the training. This estimate was based on the county-level analysis and the number of agents trained during the entire Program period.

B.4.3 Temporal and Dynamic Effects

Examination of the data for temporal effects proved illuminating. Some of the salient findings here include the following:

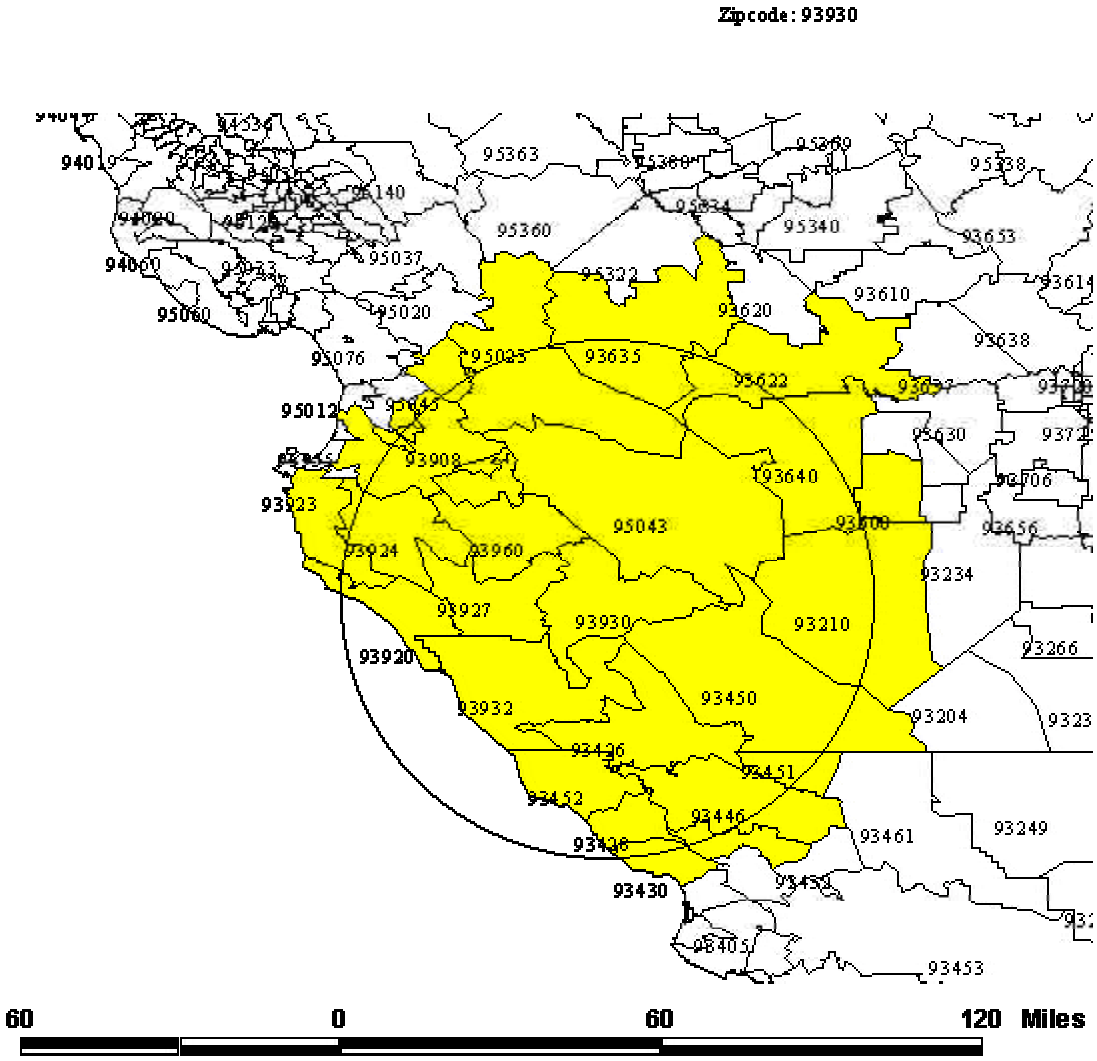
- 1998 revealed the strongest and most significant effect of agent training on EEM origination, as discussed above. Overall, however, the results suggested that the agent training effects have diminished over time and become somewhat muted by the year 2000.
- The results for lenders showed strong effects in 2000 and these were significant enough that they suggested an effect of lender training over the full Program period.
- In 1999, demographic factors seemed to explain the dominant portion of EEM originations, with training effects being muted.
- The rebate payment program over the period October 1997 through February 1999 did not appear to be a significant factor in EEM penetration during that time frame.
- The change in HUD reporting requirements also did not demonstrate a statistically significant effect on the number of EEMs implemented.

We also examined the role of dynamic effects (inertia and lagged effects). Based on the preliminary analyses conducted to date, the data revealed that dynamic effects appeared to be of only secondary importance.

B.5 GEOGRAPHIC PROXIMITY AND COUNTY ANALYSIS

Even with the analysis aggregated to the 3-digit zip code level, the lack of a clear correspondence between zip codes and geographic proximity confounded our analysis. The map shown below illustrates the problem.

[5] This estimate was based on the effect of real estate agent training during 1997-98 scaled to the full 39-month period (7 * 15 months/39 months).



Much of Monterey County in California is in the 3-digit, 939, zip code area. The data for the 939 zip code showed that the EEM penetration rate was considerably higher than the average for the PG&E territory as a whole. However, no Program EEM training was conducted in this 3-digit zip code area. When we looked at the data by 5-digit zip codes, it was apparent that the EEMs in the 939 zip code area were concentrated inland from the City of Monterey in areas such as Gonzales (93926) and Soledad (93960) and, in fact, there was only one EEM issued over the entire period in the wealthier areas of Monterey and Carmel.

As shown by the circle centered in the 93930 zip code, there were several 5-digit zip codes within a radius of 50 miles of 939 zip codes that did not start with 939; these 3-digit zip codes included 932, 934, 936, and 950. In two of these areas, large numbers of agents and lenders were trained. Consequently, it appeared to be very likely that some of the EEMs in the 939 zip code area could have been attributable to Program-trained agents and lenders from one of these

other 3-digit zip code areas who sold and financed homes in various areas within the 939 zip code.

To further explore the issue of using similar zip codes to identify the proximity influenced by trained agents and lenders, we conducted one additional analysis. This was a simplified regression analysis at the county level. Because we did not have county-based demographics data, we were unable to include demographic variables in this analysis. As noted earlier, we believe that demographics are important determinants of the number of EEMs implemented so the county-level analysis presented here must be considered to be only exploratory and a guide to future research directions.

The county-level analysis used the simple linear form presented earlier, with the number of lenders and real estate agents trained and the number of FHA loans as the independent variables. The values were aggregated at the county level across the PG&E service territory and the numbers of loans, EEMs, and trainees were aggregated over the whole Program time period. This analysis indicated that for every 10 agents trained over the full Program period about 11 additional houses were sold with EEMs and the regression coefficient was statistically significant. The coefficient for lenders, however, was not statistically significant.

These results differed markedly from the results based on the 3-digit zip code analysis in two respects:

- the effect of real estate agent training was statistically significant
- the effect of lender training was not statistically significant.

Two major factors have been identified already that could contribute to these differences. First, the county-level analysis did not take into account the influence of demographics. As noted earlier, demographic variables should be included in a cross-sectional analysis of Program training effects because of the significant influence some demographic variables appeared to have on the number of EEMs implemented.

Second, the county-level aggregation probably mitigates some of the problems of using zip codes to identify the geographic areas over which agents and lenders influence the housing market. This is an advantage of the county-level aggregation. On the other hand, aggregating at the county level probably overstates the geographic area influenced by trainees and this could bias the results.

B.6 CONCLUSIONS

These analyses consistently demonstrated the influence of key demographic variables on the number of EEMs implemented and their penetration rate relative to the number of FHA loans. The effects of the demographic variables included in our analyses were generally consistent with expectations. The strength of the role played by the Hispanic population proportion, household formation rate, and income can provide useful insights about targeting Program efforts.

The effects of Program training were less clear, but we were able to estimate preliminary lower and upper bounds of the effect of Program training on the number of EEMs implemented during the Program. In the PG&E area, we estimated that between 3.4% and 27% of the EEMs were associated with Program training.

We believe that the lack of an accurate measure of the geographic area influenced by real estate agents and lenders was a significant limitation in our analysis. We tried several different levels of geographic aggregation based on zip codes to ameliorate this problem. The results were inconclusive, but even at the most aggregated zip code level (the 3-digit level) it was clear that this problem persisted. The difference between the county-level and 3-digit zip code results suggested that it would be premature to draw definitive conclusions about the Program training effects from these preliminary analyses conducted to date.

Defensible conclusions and accurate estimates of Program effects can be reached only if the geographic area of influence is defined more accurately. The 5-digit and 4-digit databases are a very rich source of information that merits further consideration. We recommend conducting a systematic and comprehensive aggregation of the appropriate zip codes associated with Program trainees for the next Program Market Effects study to provide more defensible estimates of the effect of Program training. In addition, we recommend further examination of hybrid models based on a production analysis framework because of the promise they showed in initial exploratory applications of these models.