

**CBEE BASELINE STUDY ON PUBLIC
AWARENESS AND ATTITUDES TOWARD
ENERGY EFFICIENCY**

Final Report

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EXECUTIVE SUMMARY

STUDY BACKGROUND

The purpose of this study was to conduct a comprehensive, statewide survey of residential customers in order to provide a foundation for achieving two fundamental objectives:

- ◆ Help lay the groundwork for analyzing and tracking awareness and attitudes toward residential energy efficiency products and services promoted through California programs, and
- ◆ Provide input for program design and selection decisions.

This first objective involved the implementation of baseline data collection tasks, the results of which were intended to be used as the foundation for tracking changes over time in key measures of customer energy efficiency awareness, attitudes, perceptions, and actions/purchases. The second objective of providing creative input to the program design and selection process was a bit more challenging but also valuable and necessary as individual program managers contemplate modifications to program designs.

Within this context, this study may be of benefit to a broad range of organizations and entities with interests in promoting further development of the residential energy efficiency products and services industry. This might include the following types of individuals and organizations:

- ◆ Program managers and program implementation contractors (including program-specific M&V consultants, if any)
- ◆ Marketing and communications professionals, especially those designing mass-market media and point-of-sale campaigns for energy efficiency programs
- ◆ Policy makers, including the California Board for Energy Efficiency (CBEE) and other interveners
- ◆ Regional/National stakeholders, including Consortium for Energy Efficiency (CEE), Northwest Energy Efficiency Alliance (NEEA), Northeast Energy Efficiency Partnership, (NEEP), etc.
- ◆ Market Assessment and Evaluation (MA&E) program managers and MA&E consultants

RESEARCH OBJECTIVES AND APPROACH

The primary objectives of this study were to provide answers to the following specific research questions:

- ♦ What is the baseline level of energy efficiency awareness in general as well as for key areas of knowledge? Is it correlated with specific market events?
- ♦ What are the baseline customer attitudes toward energy efficiency? What are the baseline behaviors?
- ♦ What specific barriers to action still exist and what is the remaining potential for developing new energy efficient programs?
- ♦ How strong of a correlation, if any, is there between awareness, attitudes and behavior?
- ♦ What recommendations can be offered for increasing customer awareness of energy efficiency, influencing energy efficiency decisions, developing new energy efficiency programs?

In addition to addressing these research questions, we have developed recommendations for carrying out future tracking and performance measurement research. These recommendations address some key issues involved in tracking changes in dimensions of customer energy efficiency awareness, attitudes, perceptions, and actions/purchases over time.

Four elements of primary data collection formed the foundation for this research:

- ♦ Four focus groups were held in California to assist in the telephone survey design, and to gather insights for future program design.
- ♦ A statewide telephone survey was conducted with a representative sample of California residential customers to measure current awareness and attitudes related to energy efficiency issues and how these issues are linked to energy efficiency behaviors.
- ♦ A similar baseline survey was implemented on a nationwide basis to help assess whether any observed pre-post trends in California are due to the effects of California's PGC programs.
- ♦ On-site visits were conducted with a representative sample of California households answering the statewide telephone survey to verify self-reported data obtained from telephone survey respondents, and to assess the remaining potential for energy efficiency improvements.

KEY FINDINGS

- ♦ **Awareness is low** – Few consumers have adequate awareness/knowledge of the range of specific actions they can take to save energy at home. Moreover, consumers often do not have awareness/knowledge of what distinguishes one product from another in terms of energy efficiency. They lack awareness of the likely cost of energy efficient products (relative to standard efficiency alternatives) as well as the energy savings potential. They also lack awareness of how to take action – where to go, where to look, etc.
- ♦ **Attitudes are favorable** – While energy efficiency is not a top-of-mind purchase consideration for most consumers, the general public does exhibit relatively positive attitudes toward the general idea of saving energy and making energy efficient purchase decisions. However, lack of awareness/knowledge of how to go about saving energy or making an energy efficient purchase decision limits the extent to which favorable attitudes alone can influence behavior.
- ♦ **Attitudes are diverse** – Consumers have many views of the energy situation, its role in decisions, and reasons for either attending to energy efficiency or ignoring it when they make decisions. Communications designed to change these general beliefs will face a patchwork market in which many different philosophies about energy efficiency exist and the fact that there are many reasons for both attending to energy efficiency and ignoring it.
- ♦ **Behavior is not necessarily predictable** – Favorable attitudes toward energy efficiency in general does not necessarily correlate with intentions to purchase specific energy efficient products or take particular energy efficient actions. As a result, changing behavior will be problematic due to the many different potential influences on behavior (preferences for other product attributes like brand or features, financial concerns such as price, service delivery issues such as when the product can be delivered, and the influence of other decision-makers like other members of the household).

RECOMMENDED ACTIONS

This study was initiated with two broad goals in mind. First, to collect baseline data on awareness, attitudes, intentions, and behavior with regard to key energy efficiency actions that would be the focus of market transformation program efforts. Second, to provide recommendations to inform future program design. With the results in, it is possible to evaluate the success of these efforts and make recommendations for future program monitoring and design.

FUTURE PROGRAM MEASUREMENT

This study has demonstrated the difficulty of tracking what is a very complex set of actions related to energy efficiency. On the one hand, it is easy to identify a list of attitudes and measures or actions that could be important for efficiency, but the process of counting up these actions and correctly linking them to decision-makers defies simple tracking systems. How successful, therefore, was this effort to measure baseline conditions and what is the value of continuing this study in its current form in the future? The results suggest the following:

- ♦ There is no reason to believe people were not accurate in representing their general attitudes, so this worked well.
- ♦ The awareness measures are also likely fairly accurate and serve the purpose of characterizing some dimensions of awareness.
- ♦ The follow-up survey confirmed that energy efficiency is not a “top of mind” concern that is likely to be considered in product selection decisions, but it does hold considerable importance for most consumers as an individual or societal goal to be pursued.
- ♦ The behavioral intention measures are problematic – they overstate consumers’ actual willingness to buy high efficiency and their comprehension of what high efficiency really means for specific products.
- ♦ The self-reports of behavior are useful for exploring the structure of attitude dimensions, but do not provide the level of accuracy required to estimate measure penetration.

In terms of future measurement strategies, these results point toward several recommendations. First, there is probably very limited value in repeating this study as conducted as part of an overall performance measurement program. Rather this study needs to be more tightly coordinated with the various program efforts. Several options are possible:

- ♦ If a broad attitude measurement program is to continue, it should be done in the context of whatever broad communication goals are established as part of the programs. If the programs will include either a coordinated effort to reinforce certain key themes or a separate umbrella campaign to emphasize the importance of energy efficiency, then a broad attitude survey tracking awareness and comprehension of the key communication goals would be valuable.
- ♦ If a coordinated effort across the various programs is needed to collect the data on awareness of specific technologies or measures, then a master awareness study would be valuable and is feasible.

In terms of tracking behavior and even behavioral intentions, this study points to the difficulty of doing this type of tracking for a broad number of measures in a single study using primarily a

telephone survey methodology. A more effective strategy may be to imbed the detailed questions needed to measure decision-making and intentions to take specific efficiency actions in the evaluation efforts for individual programs that focus on those actions. Perhaps question guidelines could be developed to maximize comparability across studies. A more coordinated study (combining global market share data with in-field validation) should be completed to track actual measure penetration.

There exists, however, at least the potential to use the results of this study to monitor change in awareness and comprehension of key messages as they are introduced through broad, sector-wide information and promotional campaigns. Also, there may also be value in repeating parts of this study to measure changes in attitudes and awareness of specific measures and intervention strategies (e.g., labeling programs, appliance turn-in programs, etc.). It may also be useful to revisit awareness issues for specific products that are only recently being introduced to the market (e.g., high efficiency windows, clothes washers, and improved fluorescent lighting). As program designs are finalized for PY99, it will be important to re-visit the usefulness of this baseline research for tracking changes due to any type of broad-based or measure-specific set of market intervention strategies.

FUTURE PROGRAM DESIGN

Developing program design and marketing recommendations was one of several important research objectives to be addressed through this study. This study was designed to provide broad-based program design and marketing insight, in addition to providing the baseline measurements discussed above. As a result of the multiple objectives of this study, it was not possible to probe deeply to assess the effectiveness of specific program design elements or marketing strategies. Therefore, the recommendations provided through this study are somewhat limited in their usefulness for designing actionable strategies for specific residential program elements. However, the recommendations are likely to have some broad-based appeal and serve to confirm general design and marketing concepts currently being formulated by program planning and design staff.

- ♦ **Marketing & Communication** – This research has shown that consumers look to a diverse set of information sources when faced with energy efficient product selection decisions. These include sales people and contractors, utilities, consumer reports, product labels, and the internet. Some recommendations for supporting existing and developing new information channels include:
 - Develop contractor and retailer training programs (e.g., certification programs, sales training courses, etc.), and prepare “Consumers Guide” type materials emphasizing what consumers should be asking and what contractors, retailers, etc. should be saying.

- Develop consumer information (and perhaps incentives) that is readily available at the point-of-purchase (including product tags, labels).
 - Explore options for utility co-sponsorship, co-branding, co-operative advertising, etc. to maximize credibility for new programs/initiatives in a way that is consistent with goals of market transformation.
 - Explore options available at Consumer Reports (if none, consider developing comparable yet targeted information resources for energy efficient products).
 - Explore options for using the internet as a means of storing and updating energy efficiency information, as well as actively marketing and selling energy efficient products and services.
- ♦ **Product Information** – In addition, consumers are likely to respond to a range of different information when making a decision to purchase an energy efficient product. Some of the more commonly reported suggestions for information content included:
- Energy, cost savings benefits – how much energy/dollar savings should be expected?
 - Pricing information – how much does the high efficiency product in comparison to the standard efficiency option?
 - Features, technical data, equipment comparisons – will the high efficiency product perform as well as and look the same as (or better than) the standard efficiency product?
 - Contacts for retailers, suppliers and repair services – where can the products be obtained and who will service/maintain them?
 - Other benefits – what are the other, non-energy/non-monetary benefits from these products (e.g., environmental improvement, increased comfort, noise reduction, etc.)?
 - Testimonials, case studies – how has this product worked in “the real world” and how does it work for households like mine?

Finally, given the complexity of the relationships between awareness, attitudes and behavior, program developers and policy makers should be open to pursuing strategies that complement broad-based and targeted consumer information and marketing initiatives. The broad general attitudes in favor of energy efficiency suggest that complementary approaches (such as improved equipment standards and building codes, as appropriate) would be generally supported by the public.

CHAPTER 1

INTRODUCTION

This document represents Hagler Bailly's final report on the CBEE Baseline Study of Public Awareness and Attitudes Toward Energy Efficiency. This chapter provides an overview of the study background and project objectives, a brief discussion of the key issues in the research design, and a summary of the data collection tasks.

1.1 STUDY BACKGROUND

The allocation of funds through a Public Goods Charge (PGC) to support energy efficiency programs in California represents an important public policy experiment. Research providing an assessment of current residential customer awareness and attitudes regarding energy efficiency issues is needed because of the importance of this experimental approach. In particular,

- ◆ The PGC programs are a key element of California's strategy for *market transformation* and the development of a self-sustaining, competitive energy efficiency services market.
- ◆ The level of PGC funds expected to support energy efficiency *information and education efforts* in the next few years is significant, heightening the importance of valid and reliable baseline indicators of customer awareness and attitudes in order to track progress longitudinally.
- ◆ The baseline research must inform the program design and selection process by providing a method for linking customer-reported awareness and attitudes to energy efficiency behavior *and to the program efforts likely to be implemented through the PGC*.

The purpose of this study was to conduct a comprehensive, statewide survey of residential customers in order to provide a foundation for achieving two fundamental objectives:

- ◆ Help lay the groundwork for analyzing and tracking awareness and attitudes toward residential energy efficiency products and services promoted through California programs, and
- ◆ Provide input for program design and selection decisions.

This first objective involved the implementation of baseline data collection tasks, the results of which were intended to be used as the foundation for tracking changes over time in key measures of customer energy efficiency awareness, attitudes, perceptions, and actions/purchases. The second objective of providing creative input to the program design and selection process was a

bit more challenging but also valuable and necessary as individual program managers contemplate modifications to program designs.

1.2 RESEARCH OBJECTIVES

The primary objectives of this Phase 1 baseline study are to answer the following specific research questions:

- ♦ What is the baseline level of energy efficiency awareness in general as well as for key areas of knowledge? Is it correlated with specific market events?
- ♦ What are the baseline customer attitudes toward energy efficiency? What are the baseline behaviors?
- ♦ What specific barriers to action still exist and what is the remaining potential for developing new energy efficient programs?
- ♦ How strong a correlation, if any, is there between awareness, attitudes and behavior?
- ♦ What recommendations can be offered for increasing customer awareness of energy efficiency, influencing energy efficiency decisions, developing new energy efficiency programs?

In addition to addressing these research questions, we have developed recommendations for carrying out future tracking and performance measurement research. These recommendations address some key issues involved in tracking changes in dimensions of customer energy efficiency awareness, attitudes, perceptions, and actions/purchases over time.

1.3 OVERVIEW OF APPROACH

This phase of the study consisted of multiple qualitative and quantitative data collection procedures. An overview is provided below along with additional detail in Chapter 2.

- ♦ Four focus groups were held in California to assist in the telephone survey design, and to gather insights for future program design.
- ♦ A statewide telephone survey was conducted with a representative sample of California residential customers to measure current awareness and attitudes related to energy efficiency issues and how these issues are linked to energy efficiency behaviors.
- ♦ A similar baseline survey was implemented on a nationwide basis to help assess whether any observed pre-post trends in California are due to the effects of California's PGC programs.

- ♦ On-site visits were conducted with a representative sample of California households answering the statewide telephone survey to verify self-reported data obtained from telephone survey respondents, and to assess the remaining potential for energy efficiency improvements.

1.4 ORGANIZATION OF REPORT

The preceding chapter presented an Executive Summary, emphasizing the major findings and the most significant recommendations resulting from this study. This chapter has provided an overview of the context for this study, its objectives and general approach. Subsequent chapters of this report are organized as follows:

- ♦ Chapter 2 provides a discussion of key issues in the research design and a description of the study methodology
- ♦ Chapter 3 presents a discussion of the results of the baseline measurements of awareness, attitudes and behaviors
- ♦ Chapter 4 includes the results of various analytic procedures employed to examine the underlying structure of and linkages between awareness, attitudes and behaviors
- ♦ Chapter 5 contains recommendations pertaining to program design and marketing strategies, and future research strategies

Included in the Appendices are copies of the research instruments, detailed frequencies of telephone survey results, and a study bibliography.

CHAPTER 2

METHODOLOGY

This chapter presents a description of the study methodology. The first section discusses some of the key issues addressed through our research design. Subsequent sections provide detail on the data collection and analysis tasks.

2.1 KEY ISSUES IN RESEARCH DESIGN

There were a number of important issues that presented certain challenges in developing this research design:

- ◆ The scope of the planned PY99 programs covers over 30 possible scenarios for energy efficiency actions,
- ◆ There are vast dimensions of baseline awareness, attitudes and behaviors, and
- ◆ There are many challenges in measuring and attributing change in these dimensions over time.¹

The following sections present these issues, a discussion of the challenges presented by each, and our approach for addressing these challenges through this research design.

2.1.1 Scope of PY99 Residential Energy Efficiency Programs

The scope of the residential energy efficiency programs contemplated for 1999 addresses a variety of energy efficiency actions, ranging from the installation of central cooling and heating systems to replacement of screw-in lamps. During the early stages of study design, there were about 20 different measure categories being considered for these programs.

In addition, each program was also being designed to include a diverse set of interventions targeting three distinct categories of “market events”: emergency behavior, planned behavior,

¹ Another issue involved the potential for Proposition 9 media coverage to influence the measured baseline levels of awareness and attitudes. However, based on limited public awareness of the Proposition among customers interviewed during the focus groups and telephone survey pretest, we determined that this issue was not likely to influence the baseline results in any significant manner.

and ongoing, maintenance behavior. We expanded these categories further to provide even greater distinction:

- ♦ **Emergency Behavior** – This category implies that, because of their need to replace certain equipment in an “emergency,” customers will not have time to shop around for optional features or even the best price.
- ♦ **Planned Behavior** – This category includes three different behaviors that can result from decisions that are planned:
 - *Planned replacement of equipment nearing the end of its useful life.* Often, customers are aware of the need to replace certain equipment – either because it is failing or getting old, or because it is not operating as expected or delivering as desired (i.e., the old furnace that no longer provides enough heat). Customers who know this equipment needs replacement may begin the process of shopping around or doing research to better understand their options *before* the actual equipment fails – although they may not actually purchase the equipment until it fails.
 - *Planned changes to the home as part of a renovation and/or remodeling project.* Customers who plan to renovate or remodel their homes may be considering changes that will affect their home’s energy use. However, customers typically renovate or remodel their homes for a variety of reasons and energy efficiency may or may not be a consideration in their decisionmaking process.
 - *Planned improvements to achieve certain energy efficiency benefits.* Customers may set out to make certain changes to their home to achieve certain energy efficiency benefits. Examples of this type of behavior include weatherstripping and caulking, installing programmable thermostats, adding more insulation in the attic, etc. These actions are typically planned with energy efficiency as the primary driver for taking the actions.
- ♦ **Ongoing/Maintenance Behavior** – This category includes ongoing behavioral changes and/or routine equipment maintenance and servicing (e.g., cleaning refrigerator coils, HVAC system maintenance, etc.).

Because the same measure could be implemented as part of more than one type of market event, a matrix of energy efficiency actions mapped to applicable market events would represent over 30 different behavior scenarios. Exhibit 2-1 presents an example of this type of matrix.

**Exhibit 2-1
Energy Efficiency Actions and Behavior Dynamics**

	Emergency Behavior	Planned Behavior			Ongoing/Maintenance Behavior
		Planned Replacement	Planned EE Improvement	Planned Renovation/Remodeling Project	
Install central air conditioning system	☒	☒		☒	
Install heat pump	☒	☒		☒	
Install central heating system	☒	☒		☒	
Install refrigerator	☒	☒		☒	
Clean refrigerator coils					☒
Install clothes washer	☒	☒			
Install screw-in lamps	☒	☒			
Install hard-wired lighting fixtures	☒	☒		☒	
Install water heater	☒	☒			
Install new windows		☒		☒	
Weatherstrip, caulk doors and windows			☒		
Install programmable thermostat			☒		
Insulate ceiling, wall, floor			☒		
Insulate and seal-up ducts			☒		
Remove, unplug second refrigerator, freezer			☒		☒
Clean, replace HVAC system filters					☒

Key: ☒ denotes an applicable market event. Shaded cells represent market events selected for detailed study through this research.

Obviously, addressing the full range of awareness, attitude, and behavior dimensions for each of these scenarios in our baseline survey would be excessively burdensome for respondents. To minimize this burden, while at the same time include a range of dimensions likely to be applicable to a broad range of respondents, we agreed to:

- ♦ ask a limited set of questions (i.e., awareness, penetration, barriers) for all 17 measures, and
- ♦ ask a more detailed set of questions for specific behavior scenarios, including:
 - central air conditioning – emergency replacement
 - refrigerator – kitchen remodeling project
 - windows – major home renovation project
 - clothes washers – emergency replacement
 - lighting fixtures – kitchen or bathroom remodeling project

These scenarios are shown in the shaded cells of Exhibit 2-1. It should be noted that, based on our review of available baseline data and our expectations regarding PY99 residential program emphasis, we felt these five behavior scenarios represented market events for which:

- ♦ limited statewide baseline data existed to adequately reflect current market conditions, and
- ♦ a significant share of the PY99 residential program expenditures would be targeted.

2.1.2 Ultimate Indicators of Awareness, Attitudes and Behavior

This study was designed to facilitate measurement of certain indicators of change within the residential market for energy efficiency products and services, specifically: awareness, attitudes, and behaviors. But there are many dimensions upon which one might consider measuring change in these areas.

In the area of consumer energy efficiency “awareness” alone there are many dimensions we could measure. We could, for instance, be interested in whether consumers are aware of the existence of energy efficiency options for certain equipment and appliances (e.g., clothes washers, windows). Or, for some measures, we might be more interested in knowing if consumers are aware of the actual terms and ratings used to determine a specific product’s energy efficiency level (e.g., SEER level, R-value, percent above federal standards, etc.).

The following represent the dimensions of awareness, attitudes, and behavior we selected for baseline measurement through this study:

- ♦ **Awareness** – awareness (unaided and aided) of the existence/availability of energy efficient products and services; where consumers might look to find information about or

to purchase these products and services; and whether consumers are aware of any price differential between standard and energy efficient product and service offerings.

- ♦ **Attitudes** – specific features or attributes consumers prefer with respect to various products and services (including both energy and non-energy features); importance of energy efficiency when deciding to purchase a given product or service; and general opinions on issues concerning energy use, energy efficiency and resource conservation.
- ♦ **Behaviors** – specific energy efficiency actions taken in the past; sources through which customers have purchased these energy efficiency products (e.g., utility programs, retail outlets, etc.); intentions to take action in the future; identification of the time frame for these actions and/or intentions

2.1.3 Attribution and Measurement Over Time

As mentioned above, this study was designed to provide a baseline for measuring changes in key dimensions of awareness, attitudes, and behaviors over the next two to three years. The goal of monitoring these dimensions is to demonstrate that changes are taking place and that these changes are attributable to the various market transformation efforts. To effectively accomplish this objective, the design of this specific study and the overall strategy for data collection over the next three years must deal with the problem of measuring and attributing change. Any observed changes in attitudes may be the result of the various market transformation initiatives or they may be coincidental changes that are due to other ongoing shifts in society. To the extent possible, the research design must offer mechanisms for ruling out alternative explanations for observed changes such that we can draw reasonable conclusions that the changes are due to the programs.

In thinking through this design problem, there are several obvious types of events that will make attributing changes to the market transformation programs difficult. For example:

- ♦ The broader changes associated with deregulation of electric markets in California and in the U.S. may cause changes in energy efficiency awareness, attitudes and behaviors independent of market transformation initiatives.
- ♦ Changes in the energy efficiency awareness, attitudes and behaviors will be the cumulative result of many specific programs, so there will be confounding of effects of multiple programs.
- ♦ Many of the behaviors are associated with use of consumers' discretionary income and, as a result, broad changes in economic conditions may substantially impact energy efficiency attitudes and behaviors independent of the market transformation programs.

There are several possible research strategies to deal with the problem of attribution. The primary mechanism for measuring and attributing change is to conduct the research using some

form of experimental or quasi-experimental design. True experiments are implausible here because of the inability to randomize the offering of programs to customers. The primary quasi-experimental designs are versions of pre- and post measurement strategies using control groups that are selected to provide an appropriate matched comparison group. The use of control groups can be further refined by using various levels of statistical controls (e.g., multivariate regression and choice-based modeling) to further statistically adjust for differences between the control groups and the groups who were exposed to the market transformation programs.

As the evaluation efforts unfold over the next few years, each of these strategies are likely to be used to some extent. What is important at this stage is to conduct the baseline data collection such that it facilitates future implementation of as many alternative strategies as possible.

With this in mind, there are three elements of the current study that provide an appropriate starting point for these future efforts. First, the current study was conducted with a sample in California and a national comparison or control sample. Use of this control group now and in future measurement will help sort out whether specific events that occur in California but not elsewhere – other than the market transformation initiatives in California – are causing observed changes in energy efficiency awareness, attitudes and behaviors.

Second, a broad range of potentially important household characteristics data have been collected as part of the study. These data will allow the use of statistical controls in future studies to determine whether observed changes in California and in the U.S. are due to differences in household composition.

Finally, the use of a statewide random sample provides the most flexibility for constructing future samples for monitoring change. We are not recommending that future data collection be a series of independent random samples, or a panel study (where the same households are studied through time). This decision will depend in part on what role in performance measurement the baseline study ultimately serves. But we are making the point that the method of sampling used in the baseline survey allows for future implementation of either approach.

The primary issue for this study if future efforts are in the form of a panel study is attrition (loss of households from the panel). With a sample of over 1,000 households in California and about 650 nationally, we could expect as much as 30 to 40 percent attrition over three years, leaving us with a sample of only 600 or so households in California (and about 400 households nationally). This is not a significant problem if this study is ultimately used to track broad-based changes in attitudes in California and nationally. This is a more significant problem if this study became the basis for specific program performance measurement where a large enough sample of key subgroups was required through time (e.g., tracking households that bought CFLs or installed new air conditioners).

2.2 KEY ELEMENTS OF THE RESEARCH METHODOLOGY

There were five primary data collection tasks included in this research study:

- ♦ Prior Research Assessment
- ♦ Focus Groups
- ♦ Telephone Surveys
- ♦ On-Site Inspections
- ♦ Follow-up “Blind” Telephone Survey²

Each of these data collection elements are discussed in the sections that follow.

2.2.1 Assessment of Prior Research

At the outset of this project, we began collecting and cataloguing the available literature on consumer awareness, attitudes, and behaviors with respect to energy efficiency. The primary sources for this research into California markets were the four investor-owned utilities, CADMAC, and the CEC. As appropriate, we coordinated our efforts with that of XENERGY and RER, the firms hired to collect and compile secondary baseline and market share tracking data for two complementary CBEE studies.

We also initiated a critical review and assessment of the existing literature. These sources included formal program planning and design documents, prior evaluation and market research reports, and relevant attitude tracking studies exploring the market for residential energy efficient products and services. A complete listing of the sources reviewed as part of this task is included as an appendix to this report.

The ultimate objective of this first task was to determine the extent to which pre-existing information was available to help inform our study design and support/interpret our study results. Based on an early review of the available research, it was determined that existing sources did not provide significant input into the study design with one notable exception. The PY99 program planning documents that were available during the study design phase of this project (as well as the general lack of available baseline data for the measures to be targeted in PY99) were instrumental in determining which specific energy efficiency measures and awareness, attitudes, and behavior dimensions would be included in our study.

In addition, the data available from existing secondary data sources has been integrated into the study to the extent that it has helped us support or interpret the findings from the telephone and on-site research tasks.

² This survey was conducted as a follow-up activity (i.e., after the draft report was submitted). The results from this follow-up survey have been incorporated, as appropriate, into this final report.

2.2.2 Focus Groups

Focus Group Objectives

The primary objective of the focus groups was to assist in designing the telephone survey. That is, the focus groups were designed to *complement* the telephone survey research by offering an opportunity to explore the terms and phrases customers use in describing energy efficiency issues and their decisionmaking processes. The focus group results were used to determine the simplest and most unambiguous wording for the survey questions and to help define the range of answers respondents may be likely to offer during the telephone survey.

A secondary objective of the focus groups was to gather insights into future program design. During the course of the discussions, focus group participants were asked to offer opinions regarding program design elements, preferences for marketing and delivery mechanisms, etc – information critical to designing successful programs. However, as we only conducted four focus groups, the results of this phase of the research alone cannot be used to make generalizations about the larger population of residential customers. In addition, the focus groups were not designed to specifically test new program concepts and therefore we were not able to explore issues at the depth or level of coverage typically required for developing a complete program design (let alone a slate of program designs targeting the entire residential sector).

Focus Group Research Design

We had originally planned to use the focus groups to explore awareness, attitudes, and behaviors among two distinct segments of the residential market. The first, “planned behavior,” included customers who had recently implemented or were currently planning equipment replacement, renovation and/or remodeling, or energy efficiency improvement projects. The second, “emergency behavior,” included those who had recently made an “emergency” replacement of a major home appliance (e.g., central air conditioner, refrigerator, water heater, clothes washer, etc.).

The original plan for the focus group discussions was to explore the specific terms and phrases customers use in describing their behavior within the context of these two distinct scenarios. We initially used two different discussion guides to conduct these groups, although each group was intended to cover fairly similar issues. However, after the first focus group, it became apparent that it was not particularly productive to engage customers in discussions related to their attitudes and awareness of energy efficiency issues associated with only these two specific types of behavior.

A more insightful discussion involved the exploration of a broader range of energy efficiency issues – e.g., the relative importance in different purchase decisions; identification of sources for credible information on energy efficiency; suggestions for information, programs and services that would be helpful in making energy efficiency purchase decisions, etc. Exhibit 2-2 provides a

topical outline used to guide the remaining three focus groups within this more general framework.

Focus Group Recruitment

As noted above, we had originally planned to recruit specific types of customers to the focus groups: (1) customers had recently made or are planning major home improvements, and (2) customers who had recently replaced a failed appliance in an “emergency” situation. Two focus groups were held with customers who had recently made or were planning home improvements – one in Sacramento and the other in the Los Angeles area (Encino). The two focus groups with customers who had made emergency purchases were conducted in the San Jose (Santa Clara) and Los Angeles (Torrance) areas.

Customers were offered a financial incentive to encourage their participation in the discussions and to compensate them for their time and opinions. Once a customer was recruited for the group, they were sent a confirmation letter indicating the time and place of the group and the directions to the facility. On the day before the groups, all participants were called to confirm their attendance and clarify directions to the group.

Following each focus group, we conducted short debriefing meetings with observers to highlight the key issues and concerns. Once all the groups were completed, we prepared a brief memorandum with our recommendations for survey design. Other deliverables from the focus groups include copies of the audio/video tapes and copies of the recruitment materials.

Exhibit 2-2 Outline of Focus Group Discussion Guide

Energy Efficient Attitudes

- ♦ Positive/negative images of energy efficiency
- ♦ Kinds of decisions where energy efficiency is important
- ♦ Participant’s definition of energy efficiency
- ♦ Self-rating of energy efficiency awareness

Energy Efficiency Awareness & Behavior

- ♦ Energy efficiency included into decisionmaking?
 - ♦ Examples of decisions involving/not involving energy efficiency criteria
 - ♦ Methods of comparing energy efficiency
 - ♦ Ranking of energy efficiency within buying criteria
-

Exhibit 2-2
Outline of Focus Group Discussion Guide (continued)

Energy Efficiency Information Sources

- ♦ Sources of energy efficiency information
- ♦ Quality/accessibility of energy efficiency information
- ♦ Credible sources for energy efficient information

Assistance Needed and Suggestions

- ♦ Program design preferences (e.g., useful kinds of products/services)
- ♦ Program delivery preferences (e.g., who, how, what should be offered)
- ♦ Media preferences (e.g., best promotion and marketing techniques)

Proposition 9

- ♦ Awareness (e.g., approval, disapproval)
 - ♦ Media coverage (e.g., what type of coverage, what was the message)
 - ♦ Influence (e.g., awareness of this issue/deregulation affect view of energy efficiency?)
-

2.2.3 Baseline Survey

Baseline Survey Objective

The underlying objective of the baseline survey task was to measure the current awareness and attitudes of California residents (and a national comparison area sample) regarding general energy efficiency issues and determine how awareness and attitudes are linked to energy efficiency behaviors. In addition, the baseline survey was designed to include questions that addressed consumer preferences for program design and marketing strategies.

Baseline Survey Research Design

As described earlier, there were over 30 different behavior scenarios for which baseline measurement information was needed. While our approach limited the number of scenarios that could be explored during the baseline survey, we anticipated exploring many different issues concerning energy efficiency awareness, attitudes and behavior for each scenario included in this research. In designing the telephone survey questionnaire, we feel we found a reasonable balance between the depth of coverage we could give to important baseline issues and the desire to include a broad number of actions/behaviors to represent programs planned for PY99.

One key goal of market transformation is to establish an ongoing motivation for customers to seek more and more energy efficient “solutions” to their daily problems. This dynamic will manifest itself in ongoing or increasing public interest in or concern about energy efficiency. Consequently, the telephone survey questionnaire included a set of questions designed to explore each respondent’s “energy conservation ethic” – i.e., their opinions regarding a number of different dimensions concerning energy use, energy efficiency and resource conservation. The survey also included a short battery of items on environmental attitudes to test what correlation, if any, exists between attitudes toward the environment and attitudes/behaviors related to the purchase of more energy efficient products.

Exhibit 2-3 presents an outline of the issues explored during the baseline survey.

**Exhibit 2-3
Outline of Baseline Survey Research Topics**

<p>Energy Efficiency Attitudes</p> <ul style="list-style-type: none"> ♦ opinions of energy use and conservation ♦ preferred product attributes ♦ concern for energy efficiency in purchase decision <p>Energy Efficiency Awareness</p> <ul style="list-style-type: none"> ♦ unaided and aided awareness of energy efficiency resources ♦ cost differential between high efficiency and standard efficiency options ♦ features that distinguish high efficiency from standard efficiency options ♦ information sources for energy efficiency products ♦ related energy efficiency measures 	<p>Energy Efficiency Behaviors</p> <ul style="list-style-type: none"> ♦ stated behaviors (measure penetration) ♦ utility assistance in measure penetration ♦ stated intentions ♦ barriers <p>Program Design and Marketing</p> <ul style="list-style-type: none"> ♦ types of information helpful in energy efficiency decisionmaking ♦ credible information sources ♦ marketing and information dissemination ♦ other assistance and services helpful in decisionmaking <p>Demographics</p> <ul style="list-style-type: none"> ♦ home ownership ♦ utilities ♦ housing type, age, size ♦ household size, composition ♦ respondent education and household income
---	--

The comparison area survey was designed to be similar to the survey for California residents, which would help us assess whether any observed trends in California were due to the effects of California’s PGC programs or were simply a reflection of nationwide trends. Using a comparison area for the baseline study was critical, given the nature of the ongoing changes in the energy

industry throughout the nation and the speed at which changes in the energy industry are occurring in California compared to the rest of the nation.

Sample Plan

Exhibit 2-4 summarizes the sample design for this study. A total of 1,000 telephone interviews were to be completed with California households. An additional 600 surveys were to be conducted with randomly selected households across the U.S., excluding California. Because there was an interest in baseline measurement across different climate regions, the California population was stratified into five regions – North Coast, Central Valley, South Coast, South

**Exhibit 2-4
Sample Design**

Target Area	Target Number of Completed Surveys
California	
North Coast	200
Central Valley	200
South Coast	200
South Inland	200
Desert	200
All California	1,000
<i>U.S. (excluding California)</i>	600
Total	1,600

Inland, and Desert. These regions were based on the CEC Forecasting Model climate zones. The mapping of CEC climate zones to these five regions, plus a listing of the California counties included within each of these five regions, is shown in Exhibit 2-5.

A Random Digit Dial (RDD) sample of telephone numbers, corresponding to the five California regions and the U.S. (excluding California), was provided by Genesys Sampling Systems. Prior to delivering the sample, Genesys purged all known business exchanges and non-working telephone exchanges from the sample. The RDD sample was then sent to Telematch, a vendor that matches telephone numbers with name, address, city and ZIP code information (this information was collected in the event that we might later want to attempt to match the RDD survey data with utility account information). Telematch achieved a match rate of approximately 35%. Regardless of whether Telematch was successful in matching the phone number with a name and address, all sample received from Genesys was eligible to be called for the baseline study.

Data Collection

The full-scale baseline survey was conducted between November 18, 1998, and January 15, 1999, using Computer Assisted Telephone Interviewing (CATI) software. Once it was verified that a household had been reached (rather than a business, cellular phone, car phone, dormitory, or other non-household/non-business number), interviewers identified a target respondent. The target respondent was an adult member of the household who was knowledgeable about and involved in energy decisionmaking activities in the household. Both California and U.S. respondents were informed that the study was being sponsored by the CBEE.

**Exhibit 2-5
California Climate Regions by County**

North Coast Region

(CEC Climate Zones 1, 4, 5)

Alameda	Mariposa	San Mateo
Alpine	Mendocino	Santa Barbara*
Calaveras	Modoc	Santa Clara
Contra Costa	Monterey	Santa Cruz
Del Norte	Napa	Shasta
El Dorado	Nevada	Sierra
Humboldt	Placer	Siskiyou
Lake	Plumas	Solano
Lassen	San Benito	Sonoma
Marin	San Francisco	Trinity

Central Valley Region

(CEC Climate Zones 2, 3, 6, 7)

Amador	Madera	Sutter
Butte	Merced	Tehama
Colusa	Sacramento	Tulare
Fresno	San Joaquin	Yolo
Glenn	Stanislaus	Yuba
Kings		

South Coast Region

(CEC Climate Zones 8, 11, 13)

Los Angeles*
Orange
San Diego
Santa Barbara*
Ventura

South Inland Region

(CEC Climate Zones 9, 12, 16)

Inyo
Los Angeles*
Mono

Desert Region

(CEC Climate Zones 10, 15)

Imperial
Riverside
San Bernardino

**The borders of Santa Barbara and Los Angeles counties overlapped climate zone regions. For these counties, assignment to a climate region was based on zip codes rather than county.*

As shown in Exhibit 2-6, telephone surveys were completed with a total of 1,170 California and 651 national households. The telephone survey averaged slightly over 17 minutes in length. Telephone calls were conducted primarily during evening and weekend hours. Attempts were also made during daytime hours to reach customers not at home during the evening/weekend hours.

**Exhibit 2-6
Telephone Survey Completions**

Target Area	Number of Completed Surveys
California	
North Coast	204
Central Valley	290
South Coast	215
South Inland	200
Desert	261
All California	1,170
<i>U.S. (excluding California)</i>	651
Total	1,821

Response Rate

Numerous call-backs were attempted for this study: a minimum of five attempts were made, although many households were contacted up to 14 times. We also utilized refusal conversion techniques, where all “soft” refusals are called back at a later date, asked if there had been a problem with the interviewer during our initial contact, and asked if they would now be willing to complete an interview. However despite these efforts, the overall response rates for both the California and U.S. samples were 23% and 25%, respectively (see Exhibit 2-7).

**Exhibit 2-7
Survey Response Rate**

	California		U.S.		Total	
Starting Sample	8,349		4,576		12,925	
Not a household phone number*	3,282	39%	1,958	43%	5,240	41%
Adjusted sample	5,067		2,618		7,685	
Refused	1,350	27%	849	32%	2,199	29%
Not available during study period, communication problems	858	17%	248	10%	1,106	14%
Active sample	1,689	33%	870	33%	2,559	33%
Completed surveys	1,170	23%	651	25%	1,821	24%
Response rate**	23%		25%		24%	

* Includes: businesses, fax/computer lines, disconnected numbers

** Computed as: number of completed surveys divided by adjusted sample

During the data collection period, interviewers were regularly monitored by supervisory staff to ensure they were reading questions verbatim. The monitoring sessions were also used to coach interviewers on more successful techniques for avoiding refusals and answering questions respondents might have had.

2.2.4 Onsite Survey

Onsite Survey Objectives

There were two primary objectives for completing this phase of the research:

- ♦ Verify self-reported data obtained from telephone survey respondents, and
- ♦ Assess the remaining potential for energy efficiency improvements.

Onsite Survey Research Design

The on-site data collection form was designed to capture the following:

- ♦ Model numbers/name plate data (refrigerators, central air conditioners, and central heating systems when accessible)
- ♦ Building efficiency data (type of windows, extent of air leakage, level of insulation, etc.)
- ♦ Phone survey verification data (actions taken, intentions)

A list of the specific data elements collected on-site is presented in Exhibit 2-8.

Onsite Survey Sample Plan

A separate nested sample plan (i.e., nested within the California telephone survey sample) was used to complete 124 onsite surveys. A financial incentive (\$20) was offered to encourage respondents to participate in the onsite phase of the research. Households were recruited for the onsite visits at the end of the telephone interview. Overall, 34% of California respondents agreed to participate in the on-site portion of the study. Exhibit 2-9 presents a breakdown of these onsite surveys by region.

The names, addresses and telephone numbers of those agreeing were forwarded to Conservation Services Group (CSG), the on-site data collection contractor, for purposes of scheduling an appointment. Prior to any onsite data collection, CSG field staff received project-specific training on the study objectives, data collection instruments, and expected customer contact protocol.

**Exhibit 2-8
Outline of On-Site Data Collection Form**

-
- ♦ HVAC system (manufacturer, age, model #, size)
 - ♦ HVAC maintenance (frequency of tune-up)
 - ♦ Use of programmable thermostat
 - ♦ Ducts (tightness, insulation R-value)
 - ♦ Water heating system (tank type, age, size, insulation)
 - ♦ Clothes washer (installed, H-axis)
 - ♦ Refrigeration (installed, size, age, configuration, make, model #)
 - ♦ Second refrigerator/freezer removal in last 2 years (size, age, configuration)
 - ♦ Windows (single, single w/storm, double, triple, high efficiency)
 - ♦ Showerheads (number, number low-flow)
 - ♦ Lighting (CF lamps, CF fixtures, halogen torchiere)
 - ♦ Building shell tightness (attic, doors/windows/walls, basement)
 - ♦ Insulation (wall R-value, ceiling R-value, floor R-value)
-

**Exhibit 2-9
On-Site Survey Completions**

	Climate Regions					Total
	<i>North Coast</i>	<i>Central Valley</i>	<i>South Coast</i>	<i>South Inland</i>	<i>Desert</i>	
Number of Completed Surveys	204	290	215	200	261	1170
Number Agreeing to Onsite Visit	73	97	73	63	92	398
Number Completing an Onsite Visit	24	25	25	25	25	124
Agreement Rate	36%	33%	34%	32%	35%	34%
Completion Rate	12%	9%	12%	13%	10%	11%

2.2.5 Follow-up “Blind” Survey

Follow-up Survey Objective

A follow-up survey of California and U.S. households was conducted in an attempt to remove a suspected bias from key baseline measurements, including awareness of energy efficiency products, and importance of energy efficiency in product selection decisions. We felt that this bias was introduced in the initial baseline survey for two reasons. First, respondents were told of the study focus as well as the study sponsor as part of the introduction to the survey. Specifically, the survey was introduced with the following statement: “We’re conducting a study among households regarding energy issues for several electric and gas utilities, as well as the California Board for Energy Efficiency.”

Second, respondents were asked a series of energy efficiency attitude questions prior to being asked about product attribute preferences. Respondents were asked to rate their general knowledge of ways to save energy at home, as well as the efforts they have taken to save energy at home, and a series of attitude questions on energy use, energy efficiency and resource conservation, prior to the product attribute preference questions. For most respondents, answering these questions would take anywhere from 2-5 minutes depending on how much thought was given to each question and answer.

Therefore, we feel respondents may have been influenced to provide biased awareness measurements, as well as over-reported “mentions” of energy efficiency as a preferred product attribute. This follow-up survey was designed to test for and (if applicable) remove this inherent bias from these key baseline measurements.

Follow-up Survey Research Design

As mentioned above, the follow-up survey was designed to provide more accurate measurement of key baseline indicators. One of these indicators was the frequency with which respondents mention energy efficiency as a preferred product attribute. In order to test to determine if significant bias was introduced through the initial baseline survey, this follow-up survey was designed such that:

- ♦ Respondents were told that the survey was “a very brief, national household opinion survey about appliance purchase behavior.” They were not told about the study sponsor (CBEE), nor the study focus (“energy efficiency”).
- ♦ Questions about preferred product attributes were asked *first* in an unaided and unprompted fashion. Basically, respondents were asked to give their “top of mind” considerations when selecting among replacement products.

Immediately following the product attribute questions, respondents were asked to rate their concern for four specific attributes (brand, price, features, and energy efficiency) when selecting replacement products. Then, respondents were asked to indicate whether or not they were aware

of five specific energy efficient products – central air conditioning, windows, clothes washers, refrigerators and lighting fixtures. Respondents were read a fairly detailed description of these energy efficient products to potentially improve our measurement of aided awareness over the initial baseline results. Next, respondents were asked about their likelihood of purchasing energy efficient products (over standard efficiency alternatives).

Respondents who indicated they were aware of the energy efficient products were then asked about their awareness of the price differential and savings potential associated with purchasing high efficiency over standard efficiency products. Finally, all respondents (regardless of their awareness) were given some information about the typical incremental cost and savings potential associated with the high efficiency product. Given this information, respondents were (again) asked about their likelihood of purchasing the high efficiency product.

Sample Plan and Data Collection

A total of 650 surveys were planned in this follow-up effort – 350 for California respondents and 300 for U.S. respondents. In addition, the California sample was stratified by region to be comparable to the initial baseline effort. The survey utilized a Random Digit Dial (RDD) approach, again similar to the baseline effort.

The follow-up survey was conducted in May 1999. A total of 350 California and 301 U.S. households were reached through this effort.

CHAPTER 3

BASELINE RESULTS

As previously discussed, this study was designed to provide measurements of the baseline level of energy efficiency awareness, attitudes, and behaviors. In addition, this study was intended to identify the specific barriers to action that still exist within the market for residential energy efficiency products and services, and characterize the remaining potential for developing new energy efficient programs. This chapter presents the results of these assessments.

3.1 BASELINE LEVEL OF ENERGY EFFICIENCY AWARENESS

As mentioned in Chapter 2, several dimensions of awareness were selected for baseline measurement through this study. Some of these correspond to very general aspects of energy efficiency awareness, while others relate to very specific questions related to specific aspects of awareness for various energy efficiency measures. The following presents a listing of awareness dimensions for which baseline measurements were developed through this study:

- ◆ *General Awareness*: respondent self-rating of knowledge of ways to save energy at home and lower energy bills
- ◆ *Unaided Awareness*: respondent suggestions for energy efficiency improvements to lower household energy bills
- ◆ *Aided Awareness*: respondent awareness based on a specific list of energy efficiency improvements
- ◆ *Measure-Specific Awareness*: respondent awareness of energy efficiency issues related to specific measures

The main source of data for measuring these awareness indicators is the statewide and comparison area (U.S.) telephone survey.¹ A detailed discussion of the baseline measurement results for each awareness dimension is presented in the sections that follow.

¹ In addition, a follow-up “blind” telephone survey of CA and U.S. households was complete to test for bias in our first survey effort. In some cases, the results of this survey have been used to provide baseline measurements of awareness and attitudes.

3.1.1 General Awareness

An important dimension of awareness is the extent to which consumers feel, in general, they are knowledgeable about or are aware of ways to save energy at home to lower their energy bills. To measure this dimension, respondents were asked during the telephone survey to provide a self-rating of their knowledge of ways to save energy in their homes and lower their energy bills. Specifically, respondents were asked to rate their knowledge using a scale of 1 to 10, with 1 meaning “not at all knowledgeable” and 10 meaning

Exhibit 3-1 summarizes the results from this question. As shown, overall, respondents rated themselves as fairly knowledgeable: 42% of California residents provided self-ratings of 8-10 (“top box”). Single-family homeowners in California tend to consider themselves to be somewhat more knowledgeable than do renters (47% v. 34% in the “top box”).

When compared to the U.S., California residents reported slightly lower overall knowledge ratings. For example, over half of the U.S. sample rated themselves in the “top box” (53%), which is statistically different from the 42% reported by the California sample.

Exhibit 3-1 General Knowledge Levels

How knowledgeable are you about ways to save energy in your home?

	CA	U.S.
Not at all	3%	3%
2	2%	2%
3	3%	2%
4	4%	3%
5	22%	13%
6	8%	9%
7	15%	14%
8	22%	25%
9	7%	9%
Extremely	13%	18%
Don't Know	1%	2%
<i>“Top Box” (>7)*</i>	<i>42%</i>	<i>53%</i>
<i>Mean</i>	<i>6.71</i>	<i>7.21</i>
Base	1170	651

** Difference between U.S. and CA is statistically significant.*

There were some noteworthy differences in overall knowledge ratings between CA and U.S. respondents based on home ownership patterns. For example, single-family homeowners in the U.S. rate themselves slightly more knowledgeable than do CA single-family homeowners (55% v. 47%, respectively), while the difference between U.S. renters and CA renters is not

statistically significant (37% v. 34%, respectively). The difference in mean awareness ratings, however, between CA and U.S. respondents based on housing type and ownership is not statistically significant.

3.1.2 Unaided Awareness Levels

Another dimension of awareness explored through this study is the extent to which respondents are aware of energy efficiency improvements one could make to their home to lower energy bills. In this regard, respondents tend to exhibit a relatively low level of (unaided) awareness for the range of improvements addressed through this study.² Some measures respondents were more commonly aware of included insulation (31%), weatherstripping and caulking (23%), high efficiency windows (19%), and water heater tank and pipe insulation (14%). Exhibit 3-2 presents the results of the unaided awareness question. As shown, about one third (33%) of the California residents were not aware of *any* of these 17 energy efficiency improvements.

An index was created as a general measure of unaided awareness across the broad range of energy efficiency improvements applicable in the residential sector. This index was calculated based on the 17 energy efficiency measures included in this study. The index represents the average number of energy efficiency improvements (out of these 17 measures) respondents were aware of when asked in an unaided fashion. (Or, it could be reported as the percent of all 17 measures that respondents were aware of when asked in an unaided fashion.)

The index for California residents was calculated to be 1.53 (or 9% of 17), indicating that on average respondents are aware of only one or two energy efficiency improvements. With respect to this index, California residents are no different than U.S. respondents, and there does not appear to be much variation in this index across respondent types (e.g., single-family homeowners v. renters). There appears to be a slight upward trend in this index as household income levels and respondent education levels rise; however, these differences were not found to be statistically significant.

In addition to these 17 measures, this unaided awareness question produced baseline measurements for other miscellaneous energy efficiency improvements. These measures are listed in Exhibit 3-3.

² For a discussion and list of the 17 energy efficiency measures included in this study, see Chapter 2, Section 2.1.1.

Exhibit 3-2
Unaided Awareness Levels

If someone had high energy bills in their home, what are some of the energy efficiency improvements you can think of that they might make to lower their energy bills?

	CA	U.S.
None mentioned	33%	32%
Insulation of ceilings, walls, floors*	31%	20%
Weatherstripping or caulking around doors and windows	23%	22%
Energy efficient, double-pane windows	19%	16%
Insulation of water heater tank and pipes*	14%	6%
Programmable thermostat	10%	8%
Sealing and insulation of ducts	9%	10%
Compact fluorescent light bulbs (CFLs)	8%	7%
High efficiency refrigerator*	7%	2%
High efficiency fluorescent lighting fixtures	5%	6%
High efficiency central air conditioning	5%	4%
High efficiency central heating (furnace, boiler)*	5%	2%
High efficiency heat pump	4%	4%
Regular maintenance of central heating or cooling system	4%	4%
High efficiency, front-loading clothes washer	4%	3%
Removal or unplugging second refrigerator or freezer	3%	3%
Low-flow showerheads and faucet aerators	2%	2%
Cleaning refrigerator coils	2%	1%
Base	1170	651

* *Difference between CA and U.S. is significant.*

Exhibit 3-3
Awareness of Other Energy Efficiency Measures

If someone had high energy bills in their home, what are some of the (other) energy efficiency improvements you can think of that they might make to lower their energy bills?

	CA	U.S.
Turn off lights, appliances	20%	14%
Adjust thermostat settings (manually)	8%	4%
Other conservation (including off-peak usage, solar)	4%	1%
Other O&M measures	1%	1%
Buy new, energy efficient appliances (general)	2%	2%
Reduce heat gain/loss through windows (close windows, use shades, storms, etc.)	6%	4%

3.1.3 Overall Awareness Levels

After recording all unaided responses, respondents were then asked if they were aware of specific energy efficiency measures (the same list of 17 discussed above). When aided by a list of energy efficiency measures, respondents tended to report much higher levels of overall awareness. For example, three out of four California residents surveyed reported being aware of the following measures:

- ♦ weatherstripping or caulking around doors and windows
- ♦ insulation of ceilings, walls, floors
- ♦ low-flow showerheads and faucet aerators
- ♦ insulation of water heater tank and pipes
- ♦ energy efficient, low-E, double-pane windows
- ♦ cleaning or replacing air conditioners or furnace filters
- ♦ programmable thermostats

A frequency of overall awareness levels (unaided plus aided responses) for all measures included in this study is shown in Exhibit 3-4.

Exhibit 3-4
Overall Awareness Levels

Before we talked today, had you ever heard of the following energy efficiency improvements that people could make to save energy and lower their monthly energy bills?

	CA	U.S.
Weatherstripping or caulking around doors and windows*	88%	91%
Insulation of ceilings, walls, floors	88%	86%
Low-flow showerheads and faucet aerators*	84%	71%
Insulation of water heater tank and pipes	83%	80%
Energy efficient, low-E, double-pane windows	78%	75%
Cleaning or replacing air conditioners or furnace filters*	76%	87%
Programmable thermostats	75%	71%
Insulation and seal-up materials for ducts	71%	69%
Compact fluorescent light bulbs (CFLs)	71%	68%
Energy efficient fluorescent lighting fixtures	70%	71%
High efficiency refrigerators*	68%	57%
Cleaning refrigerator coils*	62%	70%
Removing or unplugging 2 nd refrigerator or freezer	60%	57%
High efficiency central heating*	52%	46%
High efficiency central air conditioners*	45%	55%
High efficiency, front-loading clothes washer	45%	45%
High efficiency heat pump*	34%	59%
Base	1,170	651

* Difference between U.S. and CA is significant.

A similar index was created to provide a general measure of overall awareness across this broad range of 17 energy efficiency improvements. The overall awareness index (unaided plus aided responses) for California residents was calculated to be 11.49 (or 68% of 17), indicating that on average respondents are aware of about a dozen energy efficiency improvements (out of the list of 17). There do not appear to be any significant differences between CA residents and the sample of U.S. residents, and there is no significant variation across respondent types (e.g., single-family homeowners v. renters, income and education groups, etc.).

The follow-up “blind” survey included some questions designed to address aided awareness of high efficiency central air conditioners, refrigerators, clothes washers, lighting fixtures, and windows. These questions were asked in this follow-up survey due to a concern that the first survey effort may have produced biased results. In this initial survey, there was some concern that respondents may have been more likely to indicate awareness of energy efficient products due to their awareness of the survey sponsor and the nature of the questions asked of respondents prior to the aided awareness questions.

Aided awareness results from both the initial baseline survey and the follow-up effort are shown in Exhibit 3-5. There are no significant differences in the results obtained from both survey efforts. Therefore, we find no reason to doubt the results obtained from the initial baseline survey with respect to aided awareness.

Exhibit 3-5
Comparison of Aided Awareness Results
(Percent of Respondents Aware of Product When Aided by Product Description)

	California		U.S.	
	Initial Baseline	Follow-up	Initial Baseline	Follow-up
High efficiency windows	78%	77%	75%	79%
High efficiency lighting fixtures	70%	65%	71%	73%
High efficiency refrigerators*	68%	61%	57%	60%
High efficiency clothes washers	45%	47%	45%	43%
High efficiency central air conditioners*	45%	45%	55%	57%

* The difference between California and U.S. responses to the initial baseline survey is statistically significant.

3.1.4 Awareness of Measure-Specific Energy Efficiency Issues

As discussed in Chapter 2, a range of awareness dimensions was explored during this study to provide measurements of baseline conditions for a specific set of behavior scenarios. These behavior scenarios included:

- ♦ Emergency replacement of central air conditioning equipment
- ♦ Planned replacement of refrigerators as part of kitchen remodeling projects
- ♦ Planned replacement of windows as part of major home renovation projects
- ♦ Emergency replacement of clothes washers
- ♦ Planned replacement or addition of lighting fixtures as part of kitchen or bathroom remodeling projects

For each of these behavior scenarios, a variety of specific awareness dimensions were addressed, including:

- ♦ Awareness of sources for product-specific energy efficiency information
- ♦ Awareness of price differential between high efficiency and standard efficiency products
- ♦ Awareness of energy savings potential from high efficiency products
- ♦ Awareness of features or attributes that distinguish high efficiency from standard efficiency products
- ♦ Awareness of related energy efficiency improvements

The baseline measurements for each of these product-specific awareness dimensions are discussed in the sections that follow.

Awareness of Sources for Product-Specific Energy Efficiency Information

An important dimension of awareness is the extent to which residents are aware of sources they can look to for information on product energy efficiency. A question was included in the survey that specifically asked respondents (unaided) about where they would look to find energy efficiency information for specific products. As described above, this question addressed the following products: central air conditioning, refrigerators, windows, clothes washers, and lighting fixtures.

As shown in Exhibit 3-6, most respondents would look to salespeople or contractors for energy efficiency information related to these five products. In addition, utilities are regarded by a fair

number of respondents as a source for this information. For certain products, especially appliances like refrigerators and clothes washers, respondents were also likely to look at other sources (e.g., consumer reports, product labeling). Overall, there do not appear to be many respondents who could not identify a potential source for measure-specific energy efficiency information. The one exception may be clothes washers – 22% of the California respondents (and 21% of the U.S. respondents) reported being unaware of where to look for this type of information.

In California, there are a few differences in awareness measurements based on type of home, home ownership, etc. For example, CA renters tend to be somewhat more likely than single-family homeowners to look to their local utility for energy efficiency information, especially for refrigerators. Single-family homeowners in CA, on the other hand, are more likely than renters to consult information sources such as Consumer Reports for product efficiency information (especially for refrigerators and clothes washers).

Overall, there does not appear to be many differences between CA and the U.S. with respect to awareness of energy efficiency information sources for specific measures. One notable difference among the U.S. respondents involves the extent to which renters are aware of information sources for central air conditioning energy efficiency. Exactly one-third of U.S. renters reported that they “did not know” where to find information on central air conditioning energy efficiency. This compares to only 3% of the single-family homeowners in the U.S. sample.

Several findings from the telephone survey can be further explained based on insights gained from the focus groups. For example, a fair number of California respondents (22%) reported during the telephone survey that they would look to “friends, family” for information about central air conditioning energy efficiency. The focus group results suggest that consumers in the market to purchase central air conditioning equipment are likely to first ask their friends/family for recommendations about reputable contractors. They may not be getting advice on central air conditioner energy efficiency from their friends and family, but they may get recommendations for contractors who are knowledgeable in this area if it is of interest to them (and their circle of friends and family).

Exhibit 3-6
Awareness of Sources for Measure-Specific Energy Efficiency Information
How would you go about finding out about energy efficient...? (unaided)

	California					U.S.				
	Central Air	Refrigerators	Windows	Clothes Washers	Fixtures	Central Air	Refrigerators	Windows	Clothes Washers	Fixtures
Ask salesperson, contractor	49%	47%	55%	55%	50%	48%	47%	60%	56%	48%
Ask utility	25%	17%	23%	20%	33%	32%	12%	24%	8%	32%
Ask friends, family	22%	11%	9%	6%	13%	22%	6%	15%	10%	15%
Look at consumer reports	15%	21%	9%	30%	4%	18%	32%	18%	23%	0%
Look on Internet	12%	6%	15%	8%	12%	11%	9%	11%	10%	10%
Look for energy efficiency label/tag	3%	32%	0%	13%	3%	2%	32%	0%	10%	3%
Look at manufacturer literature	2%	0%	2%	1%	0%	1%	1%	4%	5%	0%
Ask state agency	0%	0%	1%	0%	1%	1%	0%	0%	1%	0%
Look at other sources (misc.)	5%	12%	12%	4%	9%	9%	14%	13%	6%	14%
Don't know	10%	7%	8%	22%	7%	12%	8%	10%	21%	10%
Base*	253	224	218	240	235	130	139	126	145	111

* As discussed in Chapter 2, this question was asked of a subset of the total sample such that at least 200 CA responses and 120 U.S. responses were obtained for each product.

In addition, some people who say they look to “friends and family” for this type of information are actually referring to utility employees who are among their group of friends and family (i.e., “my brother-in-law works for the utility, so we asked him for advice”). In California, where the utility workforce is quite large, it may be that there are a fair number of utility employees included in the general category of “friends and family.

Finally, it is interesting to note that references to “Internet sources” were somewhat common for certain measures – for example, 15% of the California residents reported during the telephone survey that they would look on the Internet for information about energy efficient windows. As documented through this study as well as other research, “the Internet” is growing in terms of its appeal to consumers who are seeking specific information about household products (as well as more general ideas for home improvement projects). However, we did not assess through this study whether the specific Internet sites consumers are looking to for product information are providing consistent and reliable information about energy efficiency. Similarly, we did not assess whether salespeople or contractors are providing this information in a consistent or reliable manner. Therefore, we suggest that future studies attempt to evaluate the type of information provided to consumers through these channels to better assess the efficacy of these information sources in supporting the goals of market transformation.

Awareness of Price Differential Between High Efficiency and Standard Efficiency Options

Another important dimension of awareness is the extent to which consumers are aware of the price differential between high efficiency and standard efficiency products. For each of the five products discussed above, we asked respondents if they thought high efficiency products would cost “about as much” or more than standard efficiency products.

To provide a baseline measurement of this awareness dimension, we assessed the extent to which consumers are able to state, within some reasonable range, the magnitude of the cost differential between high efficiency and standard efficiency products. Exhibit 3-7 presents a summary of these results for each product. The shaded areas reflect what prior research suggests to be a reasonable range of price differences for each of these five products. As shown, after being read the various choices, about 10%-20% of the California respondents were able to accurately report the magnitude of the cost difference.

Exhibit 3-7
Awareness of Cost Differential
Between High Efficiency and Standard Efficiency Options

How much more would a high efficiency...cost over a standard efficiency unit? (aided)

	CA	U.S.
Central Air		
About as much	14%	5%
Up to \$200 more	21%	20%
Between \$200-\$500 more	18%	25%
More than \$500 more	16%	17%
Don't know	31%	33%
Base	253	130

	CA	U.S.
Refrigerators		
About as much	19%	14%
Up to \$100 more	21%	26%
Between \$100-\$200 more	20%	22%
More than \$200 more	22%	17%
Don't know	19%	20%
Base	224	139

	CA	U.S.
Windows		
About as much	4%	2%
Up to \$50 more	27%	19%
Between \$50-\$100 more	21%	30%
More than \$100 more	27%	19%
Don't know	22%	29%
Base	218	126

	CA	U.S.
Clothes Washers		
About as much	25%	20%
Up to \$200 more	49%	41%
Between \$200-\$500 more	12%	15%
More than \$500 more	4%	5%
Don't know	10%	19%
Base	240	145

	CA	U.S.
Fixtures		
About as much	25%	19%
Up to \$50 more	39%	36%
Between \$50-\$100 more	10%	16%
More than \$100 more	6%	5%
Don't know	20%	23%
Base	235	111

**Shaded area represents a reasonable range of price differences (based on prior research).*

The full range of responses shown in Exhibit 3-7 highlight some interesting trends for specific measures, as discussed below.

Central air conditioners. A fair number of respondents (31%) could not even guess at a figure that might represent the price differential between high efficiency and standard efficiency equipment. This is probably due (at least in part) to the limited applicability of central air conditioners across the state. It may also be due to specific lack of awareness (among consumers who have the potential to be in the market for central air conditioning equipment) of the distinction between high efficiency and standard efficiency options. For example, the focus group results suggest that homeowners tend to equate “new” equipment (available in today’s market) with energy efficient equipment because they are thinking that the new equipment is certainly going to be more energy efficient than their old system. (This is true for most replacement purchases, not just central air conditioning equipment.)

Refrigerators. Respondent perceptions regarding the price differential between high efficiency and standard efficiency refrigerators were fairly evenly mixed across the different scenarios. That is, about 20% of the California respondents felt there was no price difference, while a similar percentage felt this difference was up to \$100, between \$100-\$200, and over \$200. There is little data available to explain this trend in the results.

Windows. There is a sizeable group (27% of California residents) who feel that a high efficiency window would cost \$100+ more than a standard efficiency window. This is even more pronounced for single-family homeowners: in CA, 31% of the single-family homeowners feel this price difference is more than \$100 per window. For the average replacement window, this price difference seems a bit excessive given that it was expressed on a per window basis. It is possible that, since homeowners tend to replace more than one window at a time, some respondents were thinking more of the difference in price between several high efficiency windows and several standard efficiency windows

Clothes Washers. Nearly three-quarters of the California respondents think the price differential between high efficiency, front-loading clothes washers and standard efficiency clothes washers is less than \$200. In fact, 25% feel there is no price differential at all. This result clearly indicates that what consumers believe to be the truth about this price differential is not consistent with what they would find in the marketplace today (unless the effect of utility rebates is taken into account).³ Further, this finding has implications concerning potential barriers that may exist as this relatively new technology is more broadly introduced into the California marketplace. This research suggests that most consumers think that the price differential between high efficiency

³ Since few respondents were aware of high efficiency, front-loading clothes washers and even fewer reported that they had installed this appliance with the assistance utility rebates (see Section 3.3 for more detail), it is doubtful that the availability of utility rebates prior to 1999 has influenced these respondents’ answers regarding the magnitude of the price differential between high efficiency and standard efficiency clothes washers.

and standard efficiency clothes washers is lower than what it actually is (or in some cases, even nonexistent).

Lighting Fixtures. Similar to the result presented above for clothes washers, few respondents could accurately report the price difference between high efficiency lighting fixtures and standard efficiency lighting fixtures. In fact, nearly two-thirds of the California respondents felt that high efficiency lighting fixtures cost less than \$50 more than standard efficiency lighting fixtures (with 25% reporting that the price difference is \$0). As with clothes washers, the marketing and promotion of a wider variety of improved, high-efficiency lighting fixtures has been limited. It is possible that consumers are not fully aware of the new options (and their respective price tags) that are available in today's market. Again, these results shed light on potential future barriers as these products become more widely marketed and promoted.

The follow-up "blind" survey included some questions designed to address awareness of the price differential between high efficiency and standard efficiency products. As mentioned above, this survey was conducted due to a concern that the first survey effort may have produced biased results.

In the follow-up survey, respondents were asked about their awareness of both the incremental cost and energy savings potential associated with energy efficient products. For example, respondents were asked the following series related to "high efficiency refrigerators:"

- ♦ How much do you think a high efficiency refrigerator cost in comparison to a standard efficiency refrigerator with the same features and attributes? Would the retail price of a high efficiency refrigerator be...
 - About as much as the retail price of a standard efficiency refrigerator
 - Up to \$100 more
 - Between \$100 and \$200 more, or
 - More than \$200 more than a standard efficiency refrigerator?

- ♦ How much money do you think you would save on energy costs in one year if you purchased a high efficiency refrigerator over a standard efficiency refrigerator? Do you think you'd save ...
 - Less than \$25 a year
 - Between \$25 and \$50 a year
 - Or more than \$50 a year?

These questions were administered to respondents only if they had indicated they were aware of high efficiency refrigerators (after being read a fairly detailed product description). The initial baseline survey, however, asked all respondents about their awareness of the price differential between high efficiency and standard efficiency refrigerators – regardless of whether or not they had previously indicated they were aware of the existence of high efficiency refrigerators. To be

consistent with the follow-up survey results, we removed the unaware respondents from the analysis and show a comparison of the two survey results in Exhibit 3-8.

As shown, there are a few significant differences in results from the initial baseline survey and the results of the follow-up effort. Basically, we see that respondents’ ability to accurately guess the price differential is higher in the follow-up survey than the initial baseline effort. For example, among California respondents, awareness of a reasonable price differential between high efficiency and standard efficiency clothes washer increased from 9% (baseline) to 23% (follow-up). A similar jump in awareness is seen for U.S. respondents.

Exhibit 3-8
Comparison of Results on Awareness of Reasonable Price Differential
(Percent of Respondents who are Aware of Product and Reasonable Price Differential)

	California		U.S.	
	Initial Baseline	Follow-up	Initial Baseline	Follow-up
High efficiency clothes washer [*]	9%	23%	14%	40%
High efficiency lighting	13%	19%	16%	28%
High efficiency refrigerator ^{** ,***}	21%	22%	22%	48%
High efficiency window [*]	17%	46%	33%	42%
High efficiency air conditioner ^{**}	23%	34%	32%	53%

^{*} Difference between initial baseline and follow-up survey results is significant (CA and U.S.)

^{**} Difference between initial baseline and follow-up survey results is significant (U.S. only)

^{***} Difference between California and U.S. responses to follow-up survey is statistically significant.

The most likely explanation for the difference in results is that, in the follow-up effort, respondents were read a more detailed description for the various products in order to more accurately measure awareness. This more detailed description was read prior to answering the question related to awareness of the price differential. It is possible that the detailed product description provided respondents something more concrete on which to base their response related to the price differential.

Awareness of Energy Savings Potential

As mentioned above, the follow-up “blind” survey addressed awareness of the energy savings potential from purchasing high efficiency products over standard efficiency alternatives. Specifically, respondents were asked how much money they thought they would save on energy costs in one year if they purchased a high efficiency product (i.e., refrigerator, clothes washer, etc.) over a standard efficiency product. Exhibit 3-9 presents the results of these questions.

Exhibit 3-9
Awareness of Energy Savings Potential
(Asked of Respondents who are Aware of Product)

How much money would you save on energy costs in one year if you purchased a high efficiency ... over a standard efficiency ... ? (aided)

	CA	U.S.
Central Air		
Up to \$50	14%	12%
Between \$50-\$100	36%	34%
More than \$100	40%	48%
Don't know	9%	6%
Base	65	67

	CA	U.S.
Refrigerators		
Up to \$25	11%	11%
Between \$25-\$50	41%	51%
More than \$50	44%	35%
Don't know	4%	3%
Base	98	65

	CA	U.S.
Window (per window)		
Up to \$5	4%	0%
Between \$5-\$10	23%	23%
More than \$10	66%	73%
Don't know	7%	4%
Base	97	102

	CA	U.S.
Clothes Washers		
Up to \$50	29%	38%
Between \$50-\$100	48%	40%
More than \$100	14%	19%
Don't know	9%	4%
Base	66	48

	CA	U.S.
Fixtures		
Up to \$10	21%	28%
Between \$10-\$25	49%	41%
More than \$25	20%	22%
Don't know	10%	8%
Base	82	95

**Shaded area represents a reasonable range of energy savings potential (based on prior research).*

Awareness of Issues Related to Central Air Conditioning

This study was designed to explore a number of energy efficiency awareness issues specifically related to central air conditioning equipment, including (unaided) awareness of SEER levels and related energy efficiency improvements. The results of the baseline measurement for these specific awareness dimensions are summarized below.

Awareness of SEER Levels. Respondents were asked a series of questions designed to measure (unaided) awareness of technical terms or definitions used to distinguish high efficiency central air conditioning equipment from standard efficiency equipment. First, respondents were asked if they were aware of the industry rating used to identify the energy efficiency of central air conditioning equipment. Then, those who were aware of the rating in concept were asked if they knew what this rating was called. Finally, those who were able to provide the term “SEER” were asked what SEER level would constitute a high efficiency air conditioner. As shown in Exhibit 3-10, a fair number of respondents appear to have been aware of the concept of the SEER rating but very few reported the actual term “SEER,” and even fewer knew that SEER levels of 12 or greater are typically considered “high efficiency.”

**Exhibit 3-10
Awareness of Central Air Conditioning Efficiency Levels (unaided)**

	CA	U.S.
Aware of industry rating used to identify the energy efficiency of central air conditioning equipment *	23%	33%
Aware that this rating is referred to as “SEER”	2%	5%
Aware that high efficiency central air conditioning equipment would have a SEER rating of 12 or greater	1%	3%
Base	253	130

* Difference between U.S. and CA is significant

Awareness of Related Energy Efficiency Improvements. Respondents were asked a few questions to further explore their (unaided) awareness of related energy efficiency measures. In one of these questions, respondents were asked to suggest ways – other than purchasing high efficiency equipment — one could go about improving the energy efficiency of their existing central air conditioner. As shown in Exhibit 3-11, a fair number of respondents reported they “did not know” of any related energy efficiency improvements: 43% in CA and 38% in the U.S. Others offered suggestions that included ongoing, maintenance type measures – e.g., adjusting thermostat set-points, cleaning or changing filters, conducting regular system maintenance, etc. Others offered specific energy efficiency measures, such as duct insulation, improved windows, and building shell insulation upgrades, as ways of enhancing the efficient operation of their central air conditioning system. Only a few respondents reported that one could improve the energy efficiency of their air conditioning system by using it less, or by using fans instead.

Exhibit 3-11
Awareness of Related Energy Efficiency Improvements (unaided)
*What are some other ways you could improve the energy efficiency
of your existing central air conditioner?*

	CA	U.S.
Insulate ducts	20%	18%
Reset, adjust temperature settings	18%	19%
Seal-up ducts	13%	10%
Clean filters, coils	12%	18%
Get regular tune-ups, maintenance	12%	13%
Change filters	9%	14%
Improve windows, insulate	6%	5%
Use CAC less, use fans	5%	5%
Other (misc.)	7%	3%
Don't know	43%	38%
Base	253	130

To further explore awareness of related energy efficiency measures, respondents were asked to rate the importance of properly sealed and insulated central air conditioning ducts in terms of lowering one's energy bills. Respondents were asked to provide their rating on a scale of 1 to 10, with 1 meaning "not at all" important and 10 meaning "extremely" important. As shown in Exhibit 3-12, the majority of respondents in both the California and U.S. samples felt this measure was very important in terms of lowering energy bills. California residents were slightly less extreme in their opinions on this matter – although 70% were reported in the "top box" (8-10).

Exhibit 3-12
Awareness of Importance of Duct Sealing and Insulation
*In terms of lowering your energy bill, how important is it to
 Properly insulate and seal your central air conditioning ducts?*

	CA	U.S.
Not at all	2%	2%
2	0%	1%
3	0%	2%
4	1%	0%
5	10%	2%
6	1%	2%
7	7%	2%
8	9%	14%
9	8%	7%
Extremely	52%	63%
Don't know	10%	6%
<i>Top Box (>7)*</i>	<i>70%</i>	<i>84%</i>
<i>Mean</i>	<i>8.65</i>	<i>9.01</i>
Base	253	130

* Difference between U.S. and CA is significant.

Awareness of Issues Related to Windows

The following describes the findings related to the baseline measurement of awareness dimensions specifically related to windows.

Awareness of Energy Efficient Window Features. Respondents were asked a question designed to measure (unaided) awareness of features or attributes that distinguish high efficiency windows from standard efficiency windows. As shown in Exhibit 3-13, few respondents were able to report specific attributes that are commonly used in the industry to characterize high efficiency windows. Only 10% of the California residents specifically mentioned the low-E coating or shading used to improve window efficiency, and even fewer (5%) mentioned the triple-paned glass used in some high efficiency windows. U.S. residents, by comparison, were more likely to associate high efficiency with triple-pane windows (12%).

Exhibit 3-13
Awareness of Energy Efficient Window Features (unaided)
What is it about high efficiency windows that differentiates them from standard efficiency windows?

	CA	U.S.
Two panes of glass, double-panes	34%	25%
More efficient, work/built better (general responses)	22%	23%
Gas-fill insulation between panes of glass	21%	21%
Low-E coating, shading	10%	9%
Three panes of glass, triple-panes*	5%	12%
Other features, benefits (misc.)	7%	3%
Other (misc.)	4%	6%
Don't know	22%	26%
Base	218	126

* Difference between U.S. and CA is significant.

About one-third of the California sample (34%) reported that double-pane glass distinguishes high efficiency windows from standard efficiency windows. Although not statistically different, U.S. residents were somewhat less likely to report this response. This implies that, for at least a portion of the state, residents feel that double-pane windows are energy efficient and (most likely, based on focus group results) their standard efficiency counterpart would be single-pane windows.

There were a fair number of respondents (21% of both the CA and U.S. samples), however, who reported being aware that high efficiency windows have some form of insulating material between (at least) two panes of glass. Others were not as sure about specific attributes of high efficiency windows, reporting such general responses as high efficiency windows are “more efficient” or they “work or are built better.”

Awareness of Related Energy Efficiency Improvements. Respondents were asked a question to explore (unaided) awareness of ways they could improve the energy efficiency of their existing windows. As shown in Exhibit 3-14, few respondents reported that they “did not know” of any related energy efficiency improvements: 13% in CA and 2% in the U.S. Instead, a considerable percentage of California respondents reported being aware of such measures as using window sunscreens or shades (41%), weatherstripping and caulking (37%), and window insulation (35%). About 8% reported being aware of the use of shade trees and other landscaping techniques to reduce heat loss/gain through windows.

Exhibit 3-14

Awareness of Related Energy Efficiency Measures (unaided)

What are some other ways you could improve the energy efficiency of your existing windows?

	CA	U.S.
Use window sunscreens, shades, awnings*	41%	18%
Weatherstrip, caulk	37%	35%
Cover/insulate windows (plastic and storm)	35%	34%
Plant shade trees outside windows	8%	9%
Repair/replace broken windows	3%	1%
Other	3%	2%
Don't know*	13%	2%
Base	218	126

* *Difference between U.S. and CA is significant.*

Awareness of Issues Related to Refrigerators

A number of specific awareness dimensions related to refrigerators were explored through the survey. These include: rating of the importance of removing or unplugging 2nd refrigerators and freezers; (aided) awareness of the Energy Guide labels and the importance of the information contained in the labels when making purchase decisions; and (unaided) awareness of related refrigerator energy efficiency measures. The results of the baseline measurement for these specific awareness dimensions are summarized below.

Awareness of Importance of Removing/Unplugging 2nd Refrigerators and Freezers. Respondents were asked to rate the importance of this measure in terms of lowering their electric bill. As shown in Exhibit 3-15, most respondents felt this measure would be fairly important. About half of the respondents rated the importance of this measure in the “top box” (8-10).

Respondents were also asked whether or not they currently own a 2nd refrigerator or freezer. About one-quarter of the California respondents (27%) reported that they have a 2nd refrigerator or freezer. This is significantly less common in California than in the U.S. sample where about 42% of the respondents reported owning one or both of these secondary appliances. Despite this difference in saturation, the average rating of importance for removing or unplugging these secondary appliances does not vary significantly between the two samples, as shown in Exhibit 3-15.

Exhibit 3-15
Awareness of Importance of Removing/Unplugging 2nd Refrigerators and Freezer
*How important, in terms of lowering your electric bill,
do you think removing or unplugging second refrigerators and freezer*

	CA	U.S.
Not at all	8%	12%
2	3%	4%
3	3%	7%
4	3%	4%
5	17%	16%
6	4%	4%
7	9%	4%
8	9%	10%
9	3%	5%
Extremely	34%	27%
Don't know	7%	9%
<i>Top Box (>7)</i>	<i>47%</i>	<i>42%</i>
<i>Mean</i>	<i>7.03</i>	<i>6.32</i>
Base	224	139

Awareness of Energy Guide Labels and Importance of Information Contained on Energy Guide Labels. Respondents were also asked if they had ever heard of or seen the Energy Guide labels on refrigerators. This label was described to them as “the yellow sticker found on the outside of refrigerator doors that provides information on typical energy costs.” Exactly three-quarters of the California respondents reported that they had either heard of or seen these labels on refrigerators. Similarly, most of the U.S. respondents reported being aware of these labels (81%).

Respondents were asked to rate the importance of the information contained in the labels in helping them decide which refrigerator to buy, assuming they were in the market to purchase a new refrigerator. Respondents were asked to provide their rating on a scale of 1 to 10, with 1 meaning “not at all” important and 10 meaning “extremely” important. Most California respondents reported that this information would be fairly important in helping them make a decision about which model to purchase. Most (70%) rated the importance of this information in the “top box” (8-10) and the mean rating was calculated to be 8.23. U.S. respondents were somewhat more extreme, although not statistically different from CA respondents: 78% reported ratings in the “top box” and the average rating was 8.84.

Awareness of Related Energy Efficiency Improvements. Respondents were asked a question to explore (unaided) awareness of ways they could improve the energy efficiency of their existing refrigerator or reduce their energy costs for refrigerators and freezers. A summary of responses is shown in Exhibit 3-16. Awareness of O&M type measures, such as cleaning refrigerator coils (17%), defrosting and regular professional maintenance (11%), etc., was reported to be fairly low.

Exhibit 3-16

Awareness of Related Energy Efficiency Measures (unaided)

What might be some other ways you could improve the energy efficiency of your existing refrigerator or reduce your energy costs for refrigerators and freezers?

	CA	U.S.
Reduce internal temperature	28%	35%
Don't open the door as much	18%	17%
Clean coils*	17%	27%
Other O&M (e.g., defrost, get serviced)	11%	1%
Remove/unplug 2nd refrigerator, freezer	5%	5%
Other (misc.)	5%	4%
Don't know	29%	31%
	Base 224	139

** Difference between U.S. and CA is significant.*

Awareness of Issues Related to Lighting Fixtures

To further explore dimensions of awareness specifically related to high efficiency lighting fixtures, respondents were asked to indicate what it is about high efficiency lighting fixtures that distinguishes them from standard efficiency lighting fixtures. As shown in Exhibit 3-17, (unaided) awareness of distinguishing features is rather limited. For example, few respondents reported features such as longer bulb life, compact fluorescent bulbs, or fluorescent tubes. A fair number of respondents (27% in CA and 34% in the U.S.) think that low-wattage incandescent bulbs distinguish high efficiency lighting fixtures from standard efficiency lighting fixtures. A few specifically mentioned halogen lamps as a specific feature associated with high efficiency lighting fixtures (2% in both samples). Finally, some reported negative attributes, such as inferior light quality or color and higher price, as features that distinguish high efficiency lighting fixtures from standard efficiency fixtures.

Exhibit 3-17
Awareness of Energy Efficient Lighting Fixture Features (unaided)
*What is it about a high efficiency lighting fixture
that differentiates it from a standard efficiency lighting fixture?*

	CA	U.S.
Low-wattage incandescent bulbs	27%	34%
Inferior light quality, color*	13%	5%
Longer bulb life*	10%	20%
Saves energy (general response)	8%	6%
Costs more	5%	8%
Compact fluorescent bulbs	5%	6%
Fluorescent tubes	3%	6%
Halogen lamps	2%	2%
Other (misc.)	4%	3%
Don't know	38%	33%
Base	235	111

**Difference between U.S. and CA is significant.*

Awareness of Issues Related to Clothes Washers

To explore awareness dimensions for clothes washers, respondents were asked (unaided) to indicate features or attributes that distinguished high efficiency clothes washers from standard efficiency clothes washers. As shown in Exhibit 3-18, about half of the respondents reported that they “did not know” of any distinguishing features. Few respondents were able to cite its front-loading design or the benefits of reduced water consumption and reduced drying time.

Exhibit 3-18
Awareness of Energy Efficient Clothes Washer Features (unaided)
*What do high efficiency clothes washers look like?
What is it that differentiates them from standard efficiency units?*

	CA	U.S.
Uses less water*	16%	30%
Is front-loading	14%	14%
Uses less energy (general responses)	9%	6%
Rinses clothes better (less drying time)	6%	8%
Has a bigger tub, can fit more clothes	4%	4%
How it works/is built	4%	3%
Nothing	3%	3%
Has a shorter wash cycle, time	1%	2%
Other features (misc.)	5%	3%
Don't know	54%	46%
Base	240	145

** Difference between U.S. and CA is significant.*

3.2 BASELINE CUSTOMER ATTITUDES TOWARD ENERGY EFFICIENCY

As discussed in Chapter 2, several attitude dimensions were selected for baseline measurement in this study. Some of these address energy efficiency attitudes that relate to specific purchase decisions, while others address more general opinions concerning energy use, energy efficiency, and resource conservation. The following lists the attitude dimensions for which baseline measurements were developed:

- ♦ *Product Attribute Preferences* – importance of energy efficiency among a set of preferred product features or attributes
- ♦ *Stated Concern for Energy Efficiency* – importance of energy efficiency in product selection decisions
- ♦ *General Attitude Scores* – opinions regarding energy use, energy efficiency, and resource conservation.

The baseline measurement results for these attitude dimensions are presented in the following sections.

3.2.1 Product Attribute Preferences

As mentioned above, the survey was designed to explore consumer attribute preferences for five specific products: central air conditioning, refrigerators, windows, clothes washers, and lighting fixtures. The intent was to assess the extent to which energy efficiency is included within a set of preferred product attributes. For each of the five products, respondents were asked to indicate the (unaided) “features or qualities” they would look for if they were in the market to make a purchase. Specifically, respondents were asked one of the following questions:

- ♦ *Central air conditioner, emergency purchase* – “Suppose it’s the middle of summer and your aging central air conditioner breaks down. What features or qualities would you want to make sure you got in your new central air conditioning system?”
- ♦ *Refrigerator, planned replacement (remodeling)* – “Let’s suppose you are thinking of remodeling your kitchen. Since your refrigerator is approaching its last days, you are considering a replacement. What features or qualities would you be looking for when shopping for a new refrigerator?”
- ♦ *Windows, planned replacement (renovation)* – “Let’s suppose you were thinking about making a major home improvement, like replacing your windows. What features or qualities would you be looking for when selecting your replacement windows?”
- ♦ *Clothes washer, emergency purchase* – “Let’s suppose your clothes washer suddenly quits working on you. What features or qualities would you be looking for when shopping for a new clothes washer?”

- ♦ *Lighting fixture, planned replacement (remodeling)* – “Let’s suppose you are thinking about remodeling your kitchen or bathroom. You’re specifically looking at upgrading the lighting. What features or qualities would you be looking for when selecting your new lighting fixtures?”

As shown in Exhibit 3-19, a fairly substantial portion of the respondents reported “energy efficiency” as a feature or quality they would look for when shopping for replacement equipment or appliances. In fact, energy efficiency was more frequently reported than all or most other attributes depending on the product.

These findings appeared in conflict with other product preference research that has found energy efficiency much less frequently included in a consumer’s list of attribute preferences for these kinds of products. For example, we know that energy efficiency is rarely mentioned with this level of frequency in other, generic product “buying studies.” Consumers are much more likely to be interested in attributes such as price, brand, features, etc. than they are in energy efficiency.

We think that energy efficiency may have been mentioned more frequently than typically found in other research studies for two reasons. First, respondents were told of the study focus as well as the study sponsor as part of the introduction to the survey. Specifically, the survey was introduced with the following statement: “We’re conducting a study among households regarding energy issues for several electric and gas utilities, as well as the California Board for Energy Efficiency.”

Second, respondents were asked a series of energy efficiency attitude questions prior to being asked about product attribute preferences. Respondents were asked to rate their general knowledge of ways to save energy at home, as well as the efforts they have taken to save energy at home, and a series of attitude questions on energy use, energy efficiency and resource conservation, prior to the product attribute preference questions. For most respondents, answering these questions would take anywhere from 2-5 minutes depending on how much thought was given to each question and answer.

Therefore, we feel respondents were influenced to include “energy efficiency” as one of the attributes they would look for when considering purchasing one the various products described in the survey. We feel this influence was significant and led to an overly inflated baseline measurement for energy efficiency as a preferred product attribute. As a result, we conducted the follow-up “blind” survey to remove this bias and provide a more accurate measurement of this baseline indicator.

Exhibit 3-19
Product Attribute Preferences
What qualities would you look for when selecting a new ... ? (unaided)

	California					U.S.				
	Central Air	Refrigerators	Clothes Washers	Lighting Fixtures	Windows	Central Air	Refrigerators	Clothes Washers	Lighting Fixtures	Windows
Brand	7%	4%	13%	5%	6%	7%	8%	14%	4%	7%
Price	15%	8%	15%	7%	11%	12%	14%	17%	10%	19%
Features	32%	59%	54%	48%	63%	28%	68%	57%	31%	48%
Energy Efficiency	44%	70%	61%	45%	36%	47%	65%	55%	44%	58%
Warranty	6%	3%	3%		4%	9%	1%	3%		9%
Other	16%		1%	3%	1%	8%		1%	3%	
Don't know	27%	10%	10%	17%	12%	34%	8%	5%	20%	10%
Base	253	224	240	235	218	130	139	145	111	126

As discussed in Chapter 2, the follow-up survey used a more generic introduction (i.e., “We’re conducting a brief, household opinion survey about appliance purchase behavior...”) and did not explicitly mention “energy efficiency” until after asking the initial product attribute preference questions. As shown in Exhibit 3-20, the frequency with which respondents “blindly” mentioned energy efficiency as a preferred product attribute was reduced significantly in this follow-up effort. The differences between the two surveys in this regard is statistically significant for all five product types. Therefore, we recommend using the measurements provided in Exhibit 3-20 below for this important set of baseline indicators.

In addition, it may also be useful in future research to track the frequency with which “energy *first* – an indication of the extent to which energy efficiency represents a “top of mind” attribute preference for consumers when selecting among different product options. As shown in Exhibit 3-20, few respondents mentioned “energy efficiency” as their first mention, although for refrigerators, we see that California households are more likely than U.S. households to report “energy efficiency” as their first mention for a preferred attribute.

Exhibit 3-20
Energy Efficiency as a Preferred Product Attribute
(Percent of Respondents who Mentioned “Energy Efficiency” as a Preferred Product Attribute)

	California		U.S.	
	Initial Baseline	Follow-up	Initial Baseline	Follow-up
Energy Efficiency “Mentions”*				
Central air conditioning	44%	25%	47%	26%
Clothes washer	61%	12%	55%	12%
Lighting fixture	45%	17%	44%	13%
Refrigerator**	70%	22%	65%	15%
Window	36%	25%	58%	28%
Energy Efficiency <i>First Mention</i>				
Central air conditioning	--	14%	--	18%
Clothes washer	--	4%	--	4%
Lighting fixture	--	10%	--	9%
Refrigerator	--	11%	--	5%
Window	--	15%	--	17%

* The difference between the initial baseline and follow-up survey results is statistically significant.

** The difference between California and U.S. responses to the follow-up survey is statistically significant.

Note: Respondents first mention was not captured as part of the initial baseline effort.

As shown in Exhibit 3-21 below, the measurements for other product attribute preferences provided through the initial baseline survey also vary somewhat from what was found in the follow-up effort. However, most often these variations appear to be the result of shifts away from “energy efficiency” mentions to mentions of other product features (e.g., size, appearance, style, reliability, etc.).

**Exhibit 3-21
Comparison of Product Attribute Preferences**

California								
		Brand	Price	Features	Energy Efficiency	Warranty	Other	Don't know
Central Air	Initial Baseline	7%	15%	32%	44%	6%	16%	27%
	Follow-up	5%	12%	63%	25%	11%	2%	21%
Refrigerators	Initial Baseline	4%	8%	59%	70%	3%		10%
	Follow-up	9%	11%	92%	22%	5%	1%	2%
Clothes Washers	Initial Baseline	13%	15%	54%	61%	3%	1%	10%
	Follow-up	21%	10%	81%	12%	8%	3%	5%
Lighting Fixtures	Initial Baseline	5%	7%	48%	45%	-	3%	17%
	Follow-up	3%	5%	77%	17%	1%	4%	13%
Windows	Initial Baseline	6%	11%	63%	36%	4%	1%	12%
	Follow-up	5%	11%	81%	25%	4%	1%	9%

U.S.								
		Brand	Price	Features	Energy Efficiency	Warranty	Other	Don't know
Central Air	Initial Baseline	7%	12%	28%	47%	9%	8%	34%
	Follow-up	10%	11%	50%	26%	11%	2%	24%
Refrigerators	Initial Baseline	8%	14%	68%	65%	1%	-	8%
	Follow-up	15%	9%	89%	15%	3%	1%	2%
Clothes Washers	Initial Baseline	14%	17%	57%	55%	3%	1%	5%
	Follow-up	26%	11%	79%	12%	5%	2%	5%
Lighting Fixtures	Initial Baseline	4%	10%	31%	44%	-	3%	20%
	Follow-up	2%	7%	75%	13%	1%	4%	16%
Windows	Initial Baseline	7%	19%	48%	58%	9%	-	10%
	Follow-up	5%	14%	75%	28%	5%	5%	7%

A summary of the findings for the other attribute preferences is provided below:

- ♦ *Central air conditioning* – Central air conditioning represents one of the most expensive products in our study – both to purchase and to operate. It is not surprising, therefore, that price and energy efficiency were mentioned somewhat frequently as important product attributes. In addition, respondents were somewhat more likely to be unsure about their attribute preferences for this product, reflecting both the complexity of this measure and respondents’ general lack of understanding of what might differentiate one central air conditioner from another.
- ♦ *Refrigerators* – Specific features, such as size, style, color, etc., were considered to be the most important attributes when selecting replacement refrigerators. CA residents appear to be somewhat more interested in refrigerator energy efficiency, whereas US respondents are more concerned about brand.
- ♦ *Windows* – It appears that U.S. residents are somewhat more concerned about window prices and energy efficiency. CA residents seem to be more concerned, by comparison, with the “look and feel” (i.e., appearance, style, etc.) of replacement windows.
- ♦ *Clothes washers* – Brand (and manufacturer/dealer reputation) stands out as being more important for this product than others.
- ♦ *Lighting fixtures* – Price is somewhat less of a concern for most respondents considering replacement lighting fixtures. Similarly, brand is not as significant of a concern for lighting fixtures as for other products.

3.2.2 Concern for Energy Efficiency in Product Selection Decisions

As a follow-up to the attribute preference question, respondents were asked to specifically rate their concern for energy efficiency when making product selection decisions. That is, respondents were asked to indicate, on a 10-point scale, whether they were “not at all” (1) or “extremely” (10) concerned about energy efficiency when selecting the replacement products described in the previous question. Exhibit 3-22 presents a summary of these findings for all five measure scenarios.

Initially, we speculated that these data tended to overestimate respondents’ overall concern for energy efficiency in product selection decisions. That is, we assumed that the caveat discussed above regarding the bias introduced into the initial baseline survey also applied to interpretations of these data. However, the follow-up survey results suggest that while energy efficiency may not be a “top of mind” concern when making product selection decisions, it does hold considerable value or appeal as an attribute or feature consumers believe to be important to them in a general sense.

**Exhibit 3-22
Concern for Energy Efficiency in Product Selection Decision**

	California					U.S.				
	Central Air	Refrigerators	Windows	Clothes Washers	Fixtures	Central Air	Refrigerators	Windows	Clothes Washers	Fixtures
Not at all	1%	1%	0%	2%	0%	3%	4%	4%	3%	1%
2	0%	1%	0%	0%	0%	1%	1%	1%	1%	2%
3	0%	1%	1%	3%	2%	1%	3%	1%	2%	0%
4	2%	0%	1%	1%	1%	1%	1%	2%	0%	1%
5	6%	9%	8%	8%	11%	7%	4%	2%	10%	10%
6	5%	8%	1%	3%	12%	3%	4%	2%	9%	4%
7	22%	15%	27%	28%	24%	4%	12%	10%	12%	13%
8	22%	22%	20%	29%	16%	15%	18%	21%	25%	26%
9	12%	9%	10%	7%	12%	12%	12%	4%	7%	5%
Extremely	26%	34%	30%	19%	22%	50%	42%	53%	32%	35%
Don't know	1%	0%	1%	1%	0%	5%	1%	2%	0%	1%
<i>Top Box (>7)</i>	<i>72%</i>	<i>68%</i>	<i>79%</i>	<i>57%</i>	<i>57%</i>	<i>76%</i>	<i>72%</i>	<i>78%</i>	<i>64%</i>	<i>66%</i>
<i>Mean</i>	<i>8.01</i>	<i>8.02</i>	<i>8.00</i>	<i>7.66</i>	<i>7.60</i>	<i>8.50</i>	<i>8.19</i>	<i>8.50</i>	<i>7.77</i>	<i>7.95</i>
Base	253	224	218	240	235	130	139	126	145	111

During the follow-up survey, respondents were asked to rate their concern for energy efficiency when selecting replacement products. Using the same scale as discussed above, the follow-up survey produced average ratings for “energy efficiency” that were even *higher* than the average ratings from the initial baseline survey.

In addition, the follow-up survey took this assessment a step further and asked respondents to also provide ratings for other product attributes – brand, price and product features. Exhibit 3-23 presents these results. It would seem that the value placed on “energy efficiency” (when read to respondents) is still significant in comparison to these other attributes. However, as shown above in Exhibit 3-20, for most respondents it does not manifest itself as a “top of mind” concern and it is not likely to be considered priority over and above other important product attributes (e.g., features, appearance, style, size) when faced with actual product selection decisions.

Exhibit 3-23
Importance of Selected Product Attributes
(Mean Score, Scale: 1 = Not at all important, 10 = Extremely important)

California				
	Energy Efficiency	Brand	Features	Price
Central Air	9.20	6.21	8.92	8.25
Refrigerator	8.80	6.26	7.56	7.92
Window	9.17	5.45	8.52	7.96
Clothes Washer	8.51	6.70	6.88	7.99
Lighting Fixture	7.94	4.88	8.06	7.38
U.S.				
	Energy Efficiency	Brand	Features	Price
Central Air	9.15	6.50	9.00	8.30
Refrigerator	8.58	6.97	7.98	8.24
Window	9.44	5.77	8.15	8.33
Clothes Washer	8.80	7.07	6.46	8.12
Lighting Fixture	8.24	5.13	8.30	8.01

3.2.3 Energy Efficiency Attitudes

As stated above, this study was designed to establish baseline measurements of the overall “energy conservation ethic.” To this end, our survey included questions designed to explore respondent opinions regarding a number of different dimensions concerning energy use, energy efficiency and resource conservation. Specifically, respondents were asked to indicate how strongly they agreed or disagreed with a series of attitude statements.⁴ Mean agreement scores for each attitude statement are shown in Exhibit 3-24. California respondents did not differ from U.S. respondents for most of these statements. A more detailed discussion of the underlying structure of general attitudes regarding energy efficiency and the possible relationships with awareness and intentions to take action is provided in Chapter 4.

Exhibit 3-24
Mean Agreement Scores for Attitude Statements

	CA	U.S.
I am not very concerned about the amount of energy used in my home.	3.73	4.06
The household consumer is such a small part of the whole energy consumption picture that it really doesn’t matter how a family uses energy.	3.37	3.27
My life is too busy to worry about making energy-related improvements in my home.	3.70	3.38
It is worth it to me for my household to use less energy in order to help preserve the environment.	7.71	7.69
It is my right to use as much energy as I want, as long as I can pay for it.	4.31	4.47
Scarce energy supplies will be a major problem in the future.	6.89	7.13
Everyone should make a real effort to conserve energy even if they don’t have to worry about the cost.	8.28	8.35
There is very little I can do to reduce the amount of electricity I am now using.	4.85	4.78
Instead of building new power plants, customers should use less electricity	6.24	6.32
Conserving energy in my home is an economic necessity.	6.79	7.15
It is possible to save energy without sacrificing comfort by being energy efficient.	7.69	7.86
Base	1,170	651

Scale: 1 = “strongly disagree,” 10 = “strongly agree.”

* Difference between CA and U.S. is significant.”

⁴ It should be noted that the bias discussed above for the initial baseline survey was not considered to be a factor in the attitudes assessment presented in this section of the report (as well as Chapter 4). The attitude questions were asked *first* in the initial baseline survey and, as a result, we do not feel they were subject to the same type of bias as the questions about awareness and attribute preferences.

3.3 BASELINE ENERGY EFFICIENCY BEHAVIORS

Another important aspect of baseline measurement involves energy efficiency behaviors. As described in Chapter 2, several aspects of energy efficiency behavior were measured in this study:

- ♦ *Overall Effort* – respondents’ self-rating of efforts taken to save energy at home and lower energy bills
- ♦ *Stated Behavior* – respondents’ self-reports of specific energy efficiency actions taken to save energy and lower energy bills
- ♦ *Utility Assistance* – respondents’ self-reports of energy efficiency actions taken with the direct assistance of utility programs and services
- ♦ *Stated Intentions* – respondents’ reported of likelihood of taking future action

3.3.1 Overall Energy Efficiency “Effort”

An important dimension of energy efficiency behavior is the extent to which consumers feel, in general, they have taken action or made efforts to save energy at home to lower their energy bills. To measure this dimension, respondents were asked to provide a self-rating of their overall efforts to save energy in their homes and lower their energy bills. Specifically, they were asked to rate their efforts using a scale of 1 to 10, with 1 meaning “have not done much” and 10

Exhibit 3-25 presents a summary of the results from this question. As shown, respondents provided ratings that would indicate they feel their efforts have been less than complete. That is, the average rating provided by California respondents was about 6.5, with 37% reporting ratings in the “top box.” Only about 13% feel they have done everything they can to save energy and lower their bills.

For both samples, single-family homeowners tend to give higher ratings of their level of effort when compared to renters (see Exhibit 3-26), but the difference is only statistically significant in the U.S. sample. There were no significant trends in either sample across different household income and education levels.

Exhibit 3-25
Overall Rating of Energy Efficiency “Effort”

How would you rate your overall efforts to save energy in your home?

	CA	U.S.
Haven't done much	5%	3%
2	4%	3%
3	3%	3%
4	4%	4%
5	21%	14%
6	12%	10%
7	14%	15%
8	17%	23%
9	6%	7%
Have done everything	13%	18%
Don't Know	1%	1%
“Top Box” (>7)*	37%	47%
Mean	6.54	6.96
Base	1170	651

* Difference between U.S. and CA is significant.

Exhibit 3-26
Overall Energy Efficiency “Effort “ Rating
(Single-family homeowners v. renters)

	CA	U.S.*
“Top Box”		
Single-family homeowners	39%	51%
Renters	31%	37%
Mean		
Single-family homeowners	6.72	6.93
Renters	6.19	6.53

* Difference between single-family homeowners and renters is significant in the U.S. sample.

3.3.2 Stated Behavior

This section addresses the extent to which specific energy efficiency actions, or “stated behaviors,” have been taken by residential customers. These results are based on self-reported data collected from respondents via the telephone survey (comparison of these data with the onsite data is presented in Section 3.3.3).

There are two ways of presenting these self-reported data:

- ♦ as a percent of the general population (i.e., all respondents)
- ♦ as a percent of the target population (i.e., respondents who are aware of the measure and for whom the measure is applicable based on housing type, ownership, climate-related factors, etc.)

Both sets of results are presented in the sections that follow.

General Population

As mentioned above, respondents were asked about the actions they have taken to save energy in their homes and lower their energy bills. Over half of the California sample reported that they had installed low-flow showerheads and aerators (63%), weatherstripping and caulking (56%), and ceiling, wall or floor insulation (54%). Less than 10% of the California sample reported that they had implemented the following energy efficiency measures: removed or unplugged 2nd refrigerators or freezers (8%), installed high efficiency clothes washers (8%), and installed high efficiency heat pumps (4%). Stated behavior results for the general population are shown in Exhibit 3-27.

Respondents who reported that energy efficiency actions had been taken were then asked if these actions were taken in the past 12 months (i.e., 1998). These results are also shown in Exhibit 3-27. The more commonly implemented measures involved ongoing, maintenance behaviors (e.g., cleaning refrigerator coils, cleaning or replacing central air or furnace filters) and/or low-cost measures (e.g., CFLs, low-flow showerheads, faucet aerators, weatherstripping and caulking).

Stated behaviors among the general population vary as expected by housing type and ownership. That is, across all measures, penetration rates are higher for single-family homeowners:

- ♦ 80% of single-family homeowners in California report they have installed ceiling, wall and/or floor insulation (v. 20% of renters)
- ♦ 50% of California single-family homeowners claim that their ducts are insulated and well sealed (v. 17% of renters)

Aside from differences based on housing type and ownership, there do not appear to be any additional meaningful trends in the stated behavior results based on other variables (e.g., household income, respondent education, etc.).

Exhibit 3-27
Stated Behaviors Among General Population
(Percentage of All Respondents)

	Measure Implemented		Measure Implemented in 1998	
	CA	U.S.	CA	U.S.
Low-flow Showerheads and Aerators [*]	63%	47%	12%	10%
Weatherstripping, Caulking ^{**}	56%	51%	11%	24%
Ceiling, Wall, Floor Insulation [*]	54%	68%	3%	3%
Water Heater Tank and Pipe Insulation	46%	42%	7%	6%
Cleaning Refrigerator Coils ^{**}	42%	45%	26%	23%
Cleaning, Replacing CAC/Furnace Filters ^{*,**}	39%	67%	23%	35%
Compact Fluorescent Bulbs	37%	33%	14%	15%
Programmable Thermostat [*]	36%	28%	5%	4%
Duct Sealing and Insulation [*]	34%	39%	2%	2%
High Efficiency Fluorescent Fixtures	34%	35%	8%	10%
High Efficiency Refrigerator	33%	29%	8%	6%
Energy Efficient Windows [*]	29%	41%	4%	4%
High Efficiency Central Heating	22%	22%	2%	2%
High Efficiency CAC ^{*,**}	13%	21%	1%	4%
Remove Second Refrigerator/Freezer	8%	11%	3%	3%
High Efficiency Clothes Washer	8%	10%	2%	4%
High Efficiency Heat Pump [*]	4%	13%	1%	1%
Base	1170	651	1170	651

* Difference in overall measure penetration between U.S. and CA is significant.

** Difference in 1998 measure penetration rate between U.S. and CA is significant.

Target Population

It is also useful to track stated behavior among households who are aware of specific energy efficiency actions and for whom the measure is applicable (i.e., given specific climate and dwelling characteristics). Exhibit 3-28 presents the results of the stated behavior questions expressed as a percent of this base of respondents. For many measures with limited awareness and limited applicability, stated behavior levels increase substantially over what can be found in the general population. For example:

- ♦ 82% of this group of respondents indicated that ceiling, wall or floor insulation is installed in their homes (versus 54% of the general population)

- ♦ 38% report that high efficiency central air conditioning equipment is installed (versus 13% as reported among the general population)

Exhibit 3-28 also presents 1998 annual penetration data based on the percent of respondents who were aware of the measure and for whom the measure was applicable.

Exhibit 3-28
Stated Behaviors Among Target Population
(Percent of Aware and Applicable Respondents)

	Measure Implemented		Measure Implemented in 1998	
	CA	U.S.	CA	U.S.
Ceiling, Wall, Floor Insulation	82%	89%	5%	3%
Low-flow Showerheads and Aerators	77%	67%	15%	15%
Water Heater Tank and Pipe Insulation	74%	63%	12%	10%
Cleaning, Replacing CAC/Furnace Filters	72%	91%	41%	47%
Duct Sealing and Insulation	71%	71%	5%	4%
Cleaning Refrigerator Coils	71%	64%	41%	33%
Weatherstripping, Caulking	65%	57%	13%	27%
High Efficiency Refrigerator	64%	60%	16%	12%
Programmable Thermostat	63%	46%	9%	6%
High Efficiency Central Heating	57%	57%	4%	6%
Compact Fluorescent Bulbs	55%	48%	19%	21%
High Efficiency Fluorescent Fixtures	50%	49%	12%	14%
Energy Efficient Windows	48%	62%	7%	7%
High Efficiency CAC	38%	47%	4%	9%
Remove Second Refrigerator/Freezer	26%	30%	10%	9%
High Efficiency Clothes Washer	24%	25%	7%	10%
High Efficiency Heat Pump	15%	26%	2%	3%

3.3.3 Onsite Verification of Stated Behaviors

As discussed in Chapter 2, 124 onsite inspections were completed with California residents who also responded to the telephone survey. The primary purpose of these onsite inspections was to collect data to verify self-reported claims regarding the stated behaviors described above. In addition, onsite data were used to address the remaining potential for energy efficiency among residential households (see Section 3.4).

The results of the onsite verification activities are summarized in Exhibit 3-29. The first column (with percentages) refers to the percent of respondents who correctly claimed that measures were installed. The second column shows how often respondents were unaware that measures were

actually installed. The third column identifies the percent of respondents who correctly claimed that measures were *not* installed. And the fourth column indicates how often respondents reported incorrectly reported that measures were installed. As shown, for each measure, at least 50% of the telephone survey data was verified as accurate (the sum of the first and third columns).

**Exhibit 3-29
On-Site Verification of Stated Behaviors Among General Population**

	Installed		Not Installed	
	✓ Onsite ✓ Phone	✓ Onsite Phone	✓ Onsite ✓ Phone	✓ Onsite Phone
Low-flow showerheads and faucet aerators	51%	28%	10%	10%
Insulation of ceilings, walls and floors	44%	38%	13%	6%
Regular maintenance of HVAC system	29%	27%	28%	16%
Insulation of water heater tank and pipes	17%	7%	48%	27%
Compact fluorescent light bulbs (CFLs)	12%	10%	54%	24%
Programmable thermostat	10%	2%	65%	23%
Weatherstripping, caulking doors and windows	9%	6%	44%	42%
Sealing and insulation of ducts	3%	1%	48%	48%
Removal or unplugging of 2 nd refrigerator, freezer	2%	5%	85%	8%
High efficiency heat pumps	1%	4%	91%	4%
High efficiency fluorescent lighting fixtures	1%	2%	60%	38%
High efficiency central heating (gas furnace)	1%	1%	74%	24%
High efficiency, front-loading clothes washers	1%	1%	91%	7%
Energy efficient, double-pane windows	1%	0%	74%	25%
High efficiency central air conditioning	0%	4%	84%	12%
Clean refrigerator coils	n/a	n/a	n/a	n/a
High efficiency refrigerator	n/a	n/a	n/a	n/a

The shaded area in Exhibit 3-29 identifies measures that were found during the onsite inspection to be installed. A comparison of the stated behavior results from the telephone survey with the measure penetration results verified by the onsite inspections is presented in Exhibit 3-30. As

shown, a significant number of claims regarding measure installations were found to be incorrect – for example:

- ♦ Sealing and insulation of ducts (4% installed based on onsite v. 34% self-reported)
- ♦ High efficiency central heating, gas furnace (2% installed based on onsite v. 22% self-reported)
- ♦ Energy efficient, double-pane windows (1% installed based on onsite v. 29% self-reported)

For a few others, such as low-flow showerheads and faucet aerators, and ceiling, wall and floor insulation, stated behaviors expressed through the telephone survey were found to underestimate the actual measure penetration found during the onsite inspection.

**Exhibit 3-30
Comparison of Stated Behaviors and Measure Penetration Results**

	<i>Telephone Survey (Stated Behavior)</i>	<i>Onsite Inspection (Measure Penetration)</i>
Low-flow showerheads and faucet aerators	63%	79%
Weatherstripping or caulking around doors and windows	56%	15%
Insulation of ceilings, walls and floors	54%	82%
Insulation of water heater tank and pipes	46%	24%
Regular maintenance of HVAC system	39%	56%
Compact fluorescent light bulbs (CFLs)	37%	22%
Programmable thermostat	36%	12%
Sealing and insulation of ducts	34%	4%
High efficiency fluorescent lighting fixtures	34%	3%
Energy efficient, double-pane windows	29%	1%
High efficiency central heating (gas furnace)	22%	2%
High efficiency central air conditioning	13%	4%
Removal or unplugging of 2nd refrigerator, freezer	8%	7%
High efficiency, front-loading clothes washers	8%	2%
High efficiency heat pumps	4%	5%
Clean refrigerator coils	42%	n/a
High efficiency refrigerator	33%	n/a
Base	1170	124

The data presented in this section suggest that most respondents are unclear (or unaware) of the criteria used to define energy efficiency for various measures. This can lead to both under- and overestimation of actual market penetration, as shown in second and fourth columns of Exhibit 3-29. One good example of this involves high efficiency windows. As mentioned previously, most consumers in California tend to regard double-pane windows as “energy efficient,” since they are being compared most often to single-pane windows. Despite efforts in this study to clarify what was meant by “energy efficient” windows (i.e., low-E coating, insulation), many telephone survey respondents appear to be unaware of this important distinction. This confusion in the mind of consumers may continue to lead to overestimation of actual measure penetration as this relatively new product becomes more prominent in the marketplace.

Just as lack of awareness can lead to overestimation of actual measure penetration, it can also lead to underestimation of measure penetration. CFLs were under-reported by 10% of the onsite sample, and 28% did not report using low-flow devices (showerheads, faucet aerators). If future studies use self-reported data for tracking measure penetration, these studies should be designed to take into account both types of measurement bias.

3.3.4 Utility Assistance

As mentioned above, respondents were asked during the telephone survey about actions taken with the direct assistance of utility programs and services. Specifically, respondents who had reported that they (or their landlord) had installed energy efficiency measures in their homes were then asked if they (or their landlord) had received assistance from their local utility to implement these measures. Exhibit 3-31 presents these results based on the percent of all respondents as well as the percent of respondents who reported that they had implemented measures. In this way, we track utility program influence in the market as a whole as well as the share of the overall market for which utility programs can claim direct influence.

Respondents who reported that they had implemented energy efficiency measures with assistance from their local utility were then asked about the type of assistance they received. The results for California are shown in Exhibit 3-32. It should be noted that these data are based on respondent self-report and have not been verified with actual utility program tracking information.

**Exhibit 3-31
Energy Efficiency Actions Taken with Utility Assistance**

	<i>Base: All Respondents</i>		<i>Base: Respondents Taking Action</i>	
	CA	U.S.	CA	U.S.
High Efficiency Heat Pump	0%	1%	25%	24%
High Efficiency CAC	1%	2%	18%	17%
High Efficiency Central Heating	1%	2%	16%	14%
Ceiling, Wall, Floor Insulation	3%	2%	16%	12%
High Efficiency Refrigerator	3%	2%	12%	8%
Low-flow Showerheads and Aerators	4%	2%	11%	5%
High Efficiency Clothes Washer	1%	0%	10%	5%
Water Heater Tank and Pipe Insulation	2%	2%	9%	7%
Compact Fluorescent Bulbs	2%	1%	9%	5%
Remove Second Refrigerator/ Freezer	1%	0%	9%	4%
Duct Sealing and Insulation	1%	2%	7%	12%
Weatherstripping, Caulking	2%	2%	6%	4%
Cleaning, Replacing CAC/Furnace Filters	2%	1%	6%	3%
Programmable Thermostat	1%	2%	5%	12%
High Efficiency Fluorescent Fixtures	1%	1%	4%	3%
Cleaning Refrigerator Coils	1%	0%	2%	1%
Energy Efficient Windows	0%	2%	1%	11%

**Exhibit 3-32
Type of Assistance Received from Local Utility**

	California					U.S.				
	Energy Survey	Rebate	Loan	Contractor Referral	Direct Install	Energy Survey	Rebate	Loan	Contractor Referral	Direct Install
High Efficiency CAC	9%	35%	9%	17%	0%	13%	27%	0%	20%	33%
High Efficiency Heat Pump	12%	24%	12%	0%	0%	13%	50%	0%	13%	25%
High Efficiency Central Heating	41%	25%	4%	8%	5%	9%	36%	9%	27%	0%
High Efficiency Refrigerator	3%	67%	0%	3%	0%	18%	45%	0%	0%	9%
High Efficiency Clothes Washer	12%	95%	0%	12%	12%	0%	50%	0%	0%	50%
Energy Efficient Windows	72%	72%	0%	0%	0%	0%	15%	0%	46%	23%
Water Heater Tank and Pipe Insulation	18%	18%	0%	21%	18%	8%	8%	0%	0%	50%
Ceiling, Wall, Floor Insulation	24%	29%	10%	34%	5%	0%	29%	0%	14%	29%
Duct Sealing and Insulation	33%	17%	17%	17%	0%	10%	20%	10%	30%	20%
Programmable Thermostat	12%	24%	12%	0%	0%	10%	10%	10%	30%	10%
Cleaning, Replacing CAC/Furnace Filters	48%	7%	0%	14%	7%	13%	0%	0%	25%	25%
Remove Second Refrigerator/ Freezer	0%	32%	0%	0%	0%	0%	50%	0%	0%	0%
Low-flow Showerheads and Aerators	10%	15%	5%	8%	39%	10%	0%	0%	0%	70%
Weatherstripping, Caulking	22%	5%	0%	5%	49%	10%	10%	0%	20%	20%
Cleaning Refrigerator Coils	0%	63%	0%	16%	0%	33%	0%	0%	0%	33%
Compact Fluorescent Bulbs	22%	22%	4%	4%	60%	13%	0%	0%	13%	25%
High Efficiency Fluorescent Fixtures	30%	0%	0%	15%	30%	25%	0%	0%	25%	50%

**Base equals respondents who received some form of assistance from a local utility.*

3.3.5 Stated Intentions

An important aspect of this baseline measurement study is to assess the extent to which consumers *intend* to implement energy efficiency measures. As such, respondents who were aware of specific energy efficiency measures yet had not taken any action were asked whether or not they had considered taking action. As shown in Exhibit 3-33, many respondents indicated that despite being aware of specific measures they have yet to consider implementing them.

Those who have considered implementing specific measures were then asked whether or not they planned on taking action within the next 12 months (i.e., in 1999). As shown in Exhibit 3-33, stated intentions for 1999 are quite low for most measures.

**Exhibit 3-33
Stated Intentions for Implementing Measures***

	Have Not Considered Implementing Measure		Have Considered But Don't Plan in 1999		Plan on Implementing Measure in 1999	
	CA	U.S.	CA	U.S.	CA	U.S.
Cleaning Refrigerator Coils	73%	74%	3%	21%	24%	5%
Programmable Thermostat	50%	73%	32%	15%	18%	12%
High Efficiency Refrigerator	61%	73%	22%	22%	17%	5%
Weatherstripping, Caulking	71%	77%	12%	10%	16%	13%
Compact Fluorescent Bulbs	71%	75%	12%	14%	16%	11%
Low-flow Showerheads and Aerators	71%	86%	14%	5%	15%	9%
Water Heater Tank and Pipe Insulation	67%	75%	19%	7%	14%	18%
Energy Efficient Windows	50%	63%	37%	28%	13%	10%
Cleaning, Replacing CAC/Furnace Filters	84%	50%	6%	50%	10%	0%
Ceiling, Wall, Floor Insulation	83%	50%	8%	17%	9%	33%
High Efficiency Central Heating	81%	76%	11%	6%	8%	18%
High Efficiency Clothes Washer	71%	74%	21%	20%	8%	5%
Duct Sealing and Insulation	87%	50%	6%	21%	7%	29%
High Efficiency Fluorescent Fixtures	84%	86%	8%	7%	7%	7%
High Efficiency CAC	77%	65%	19%	27%	5%	7%
Remove Second Refrigerator/Freezer	92%	92%	3%	4%	5%	3%
High Efficiency Heat Pump	88%	85%	9%	13%	3%	2%

* Base includes respondents who have yet to implement measures but are aware of the measure and the measure is applicable (based on climate and/or dwelling characteristics).

If one compares stated intentions for 1999 with stated behaviors for 1998 we see that stated intentions tend to exceed stated behaviors for certain measures including programmable thermostats, energy efficient windows, insulation, and high efficiency central heating systems. On the other hand, for many of the ongoing, maintenance measures (e.g., cleaning refrigerator coils, cleaning or replacing central air or furnace filters, etc.) stated behaviors tended to outpace stated intentions.

3.4 REMAINING BARRIERS AND POTENTIAL

This study was also designed to address the extent to which specific barriers to energy efficiency action exist and as well as the remaining potential for developing new energy efficient programs to reduce these barriers. As presented in Section 3.1, one of the primary barriers to widespread adoption of energy efficiency measures is awareness.

To assess what barriers (besides awareness) remain, respondents were asked what is keeping them from making some of the energy efficiency improvements they have considered. The results are shown in Exhibit 3-34. Some of the more commonly reported barriers included:

- ♦ improvement not needed, existing equipment works fine (e.g., high efficiency refrigerators, central heating, clothes washers)
- ♦ costs too much to make improvement (e.g., ceiling, wall or floor insulation, duct sealing and insulation, energy efficient windows)

Barriers that were reported very infrequently included: not enough savings to be worthwhile, cannot find materials/services needed to make improvements, moving/selling home, rental property, and procrastination.

**Exhibit 3-34
Barriers to Measure Implementation***

	California							
	Not Needed, Existing Equipment Works Fine	Costs Too Much to Make Improvement	Not Enough Energy Savings To Be Worthwhile	Can't Find Materials/ Services Needed to Make Improvement	Moving, Selling Home	Rental Property	Too Busy, Haven't Gotten Around To It	Don't Think It Is Necessary
Ceiling, Wall, Floor Insulation	0%	82%	0%	6%	0%	6%	0%	0%
Cleaning Refrigerator Coils	15%	9%	0%	8%	0%	0%	8%	0%
Cleaning, Replacing CAC/Furnace Filters	28%	10%	7%	0%	7%	7%	10%	0%
Compact Fluorescent Bulbs	19%	29%	2%	2%	8%	2%	0%	0%
Duct Sealing and Insulation	6%	78%	0%	0%	6%	0%	0%	0%
Energy Efficient Windows	13%	57%	1%	1%	4%	10%	0%	0%
High Efficiency CAC	37%	24%	4%	1%	2%	9%	4%	15%
High Efficiency Central Heating	61%	12%	2%	0%	2%	2%	0%	2%
High Efficiency Clothes Washer	52%	21%	10%	1%	0%	0%	1%	8%
High Efficiency Fluorescent Fixtures	22%	29%	0%	0%	8%	4%	18%	0%
High Efficiency Heat Pump	16%	42%	22%	2%	2%	3%	0%	13%
High Efficiency Refrigerator	64%	11%	7%	1%	14%	2%	0%	0%
Low-flow Showerheads and Aerators	9%	0%	0%	0%	12%	14%	2%	0%
Programmable Thermostat	30%	18%	2%	2%	2%	2%	0%	4%
Remove Second Refrigerator/ Freezer	46%	20%	0%	0%	0%	0%	0%	27%
Water Heater Tank and Pipe Insulation	41%	7%	1%	0%	0%	2%	0%	10%
Weatherstripping, Caulking	23%	15%	0%	1%	27%	12%	10%	2%

* Percentages based on number of respondents who have considered implementing measures, but are not planning to do so in 1999.

**Exhibit 3-34
Barriers to Measure Implementation***

	U.S.							
	Not Needed, Existing Equipment Works Fine	Costs Too Much to Make Improvement	Not Enough Energy Savings To Be Worthwhile	Can't Find Materials/ Services Needed to Make Improvement	Moving, Selling Home	Rental Property	Too Busy, Haven't Gotten Around To It	Don't Think It Is Necessary
Ceiling, Wall, Floor Insulation	0%	50%	0%	0%	0%	0%	50%	0%
Cleaning Refrigerator Coils	13%	13%	0%	0%	13%	0%	0%	0%
Cleaning, Replacing CAC/Furnace Filters	0%	0%	0%	0%	0%	0%	0%	0%
Compact Fluorescent Bulbs	24%	47%	6%	0%	6%	0%	0%	6%
Duct Sealing and Insulation	0%	50%	0%	0%	0%	0%	25%	0%
Energy Efficient Windows	10%	74%	0%	3%	3%	0%	0%	3%
High Efficiency CAC	27%	45%	9%	0%	12%	3%	0%	0%
High Efficiency Central Heating	17%	67%	0%	6%	0%	0%	0%	6%
High Efficiency Clothes Washer	67%	23%	0%	0%	0%	0%	0%	0%
High Efficiency Fluorescent Fixtures	0%	42%	0%	8%	17%	8%	0%	8%
High Efficiency Heat Pump	23%	62%	4%	0%	0%	0%	4%	0%
High Efficiency Refrigerator	43%	50%	0%	0%	7%	0%	0%	0%
Low-flow Showerheads and Aerators	20%	0%	0%	0%	20%	20%	0%	0%
Programmable Thermostat	24%	36%	0%	4%	4%	4%	8%	12%
Remove Second Refrigerator/ Freezer	60%	20%	0%	0%	0%	0%	0%	0%
Water Heater Tank and Pipe Insulation	50%	13%	0%	13%	0%	0%	0%	0%
Weatherstripping, Caulking	28%	22%	0%	6%	6%	0%	6%	0%

* Percentages based on number of respondents who have considered implementing measures, but are not planning to do so in 1999.

Stated intentions were also explored through the initial baseline effort (as well as the follow-up survey) for the five specific behavior scenarios discussed previously (i.e., central air, refrigerators, windows, clothes washers and lighting fixtures). As shown in Exhibit 3-35, respondents reported fairly consistent results across all five of these products as part of the initial baseline survey effort. Most indicated that they would be likely to purchase high efficiency products over standard efficiency, assuming they were in the market to make a purchase. These results were not statistically different from the results of the follow-up survey.

Barriers to implementation for these five products are shown in Exhibit 3-36. As shown, some respondents reported that they were unlikely to purchase high efficiency products because of their impression that the products cost too much⁵ (e.g., clothes washers and central air conditioners), or because they are unconvinced that the amount of energy savings would make the purchase worthwhile (e.g., refrigerators).

It should be noted that the follow-up survey also explored the extent to which purchase intentions would change once the barrier of awareness was reduced or eliminated. In other words, we asked respondents if they were likely to purchase the high efficiency product – regardless of the extent to which they were aware the product even existed, how much it cost, what the potential benefits might be, etc. Then, we gave respondents an indication of the likely costs and savings relative to standard efficiency products and repeated the question, “Knowing this, how likely would you be to purchase the high efficiency product over the standard efficiency product?”

Based on this information alone, most respondents report that they are either “very likely” or somewhat likely” to purchase the high efficiency product. However, the mean likelihood rating does shift away from “very likely” somewhat. This indicates that as consumers gain awareness or knowledge of the cost/benefit trade-off associated with energy efficient products they may be less likely to consider the purchase as worthwhile without additional information about other product benefits.

⁵ A cross-tabulation of likelihood of purchasing and perceptions of the magnitude of price difference between high efficiency and standard efficiency products did not produce any meaningful conclusion.

Exhibit 3-35
Stated Intentions for Specific Energy Efficiency Measures
How likely are you to purchase a high efficiency ... over a standard efficiency ... with the same features?

	California					U.S.				
	Central Air	Refrigerators	Windows	Clothes Washers	Fixtures	Central Air	Refrigerators	Windows	Clothes Washers	Fixtures
Very Likely (1)	66%	75%	57%	62%	41%	68%	68%	66%	59%	54%
Somewhat Likely (2)	22%	15%	29%	30%	46%	19%	27%	22%	30%	34%
Somewhat Unlikely (3)	3%	3%	5%	4%	5%	2%	2%	6%	3%	4%
Very Unlikely (4)	5%	4%	7%	3%	6%	8%	3%	4%	3%	6%
Don't know	4%	3%	2%	0%	2%	2%	1%	2%	4%	2%
Mean	1.49	1.33	1.61	1.47	1.76	1.49	1.40	1.46	1.48	1.61
Base	253	224	218	240	235	130	139	126	145	111

Exhibit 3-36
Barriers to Implementation for Specific Energy Efficiency Measures
Why wouldn't you be likely to purchase a high efficiency....? (Base: Respondents unlikely to purchase)

	California					U.S.				
	Central Air	Refrigerators	Windows	Clothes Washers	Fixtures	Central Air	Refrigerators	Windows	Clothes Washers	Fixtures
Costs too much	49%	32%	36%	57%	42%	15%	29%	40%	22%	20%
Not enough energy savings	5%	41%	23%	21%	14%	23%	14%	30%	22%	0%
Can't find energy efficient measures	-	5%	2%	9%	7%	-	14%	0%	0%	30%
Moving, selling home	2%	-	10%	4%	2%	0%	-	10%	11%	0%
Other (misc.)	5%	-	0%	-	12%	0%	-	0%	-	10%
Rental property/condo	-	-	5%	-	3%	-	-	0%	-	10%
Need more information	-	-	-	-	2%	-	-	-	-	0%
Don't know	38%	22%	17%	9%	18%	62%	43%	20%	44%	30%
Base	21	17	23	18	25	13	7	12	9	10

CHAPTER 4

ENERGY EFFICIENCY ATTITUDES

A key goal of market transformation is to alter the way consumers think and act with regard to making decisions about energy efficiency. Successful market transformation will lead consumers to view energy efficiency as an important attribute to at least consider in making choices, and ultimately may lead to sustaining energy efficient choices with an underlying energy efficiency ethic. Consumers, however, have many views of the energy situation, its role in decisions, and reasons for either attending to energy efficiency or ignoring it when they make decisions. This chapter examines more thoroughly the structure of general attitudes regarding energy efficiency and the relationships of these attitudes to awareness and intentions to take action.

4.1 DIMENSIONS OF ENERGY EFFICIENCY ATTITUDES

To examine the general structure of energy efficiency attitudes, we conducted a factor analysis of the battery of opinion statements that represent different customer views on energy issues. Factor analysis is a statistical technique that groups items based on their inter-correlation such that items that are highly inter-correlated “load” together on a factor. Any group of items may have one or several factors that indicate which items are highly interrelated and which are less interrelated. This technique is used to identify the underlying dimensions in a set of items and to understand which types of items load together. We conducted the analysis on the entire sample including both California and U.S. sample data to assure a large number of observations for the multivariate analysis (the factor analysis and cluster analysis described below).

The results of the factor analysis of the 11 attitude items is shown in Exhibit 4-1. The results show that consumers manifest several different dimensions in their thinking about energy efficiency and that these dimensions operate somewhat independently of each other. This can be seen by observing the pattern of the factor loadings in Exhibit 4-1. Items that have a high loading ($\pm .6$ or higher) on one factor and generally low loadings on the other factors are evidencing a pattern suggesting a strong underlying dimension that is relatively unique.

Exhibit 4-1
Summary of Factor Analysis

Items:	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
I'm Too Busy					
1. I am not very concerned about the amount of energy used in my home.	.70	.02	-.01	-.11	.07
2. The household consumer is such a small part of the whole energy consumption picture that it really doesn't matter how a family uses energy.	.70	-.18	-.02	.10	.08
3. My life is too busy to worry about making energy-related improvements in my home.	.70	-.06	.03	-.14	.16
Conservation Ethic					
11. It is possible to save energy without sacrificing comfort by being energy efficient.	-.03	.87	-.03	.00	.02
7. Everyone should make a real effort to conserve energy even if they don't have to worry about the cost.	-.12	.71	.27	.13	-.02
Energy Supply Concerns					
6. Scarce energy supplies will be a major problem in the future.	-.02	.09	.76	.08	.14
9. Instead of building new power plants, customers should use less electricity.	.18	.23	.60	.20	-.40
Economic Necessity					
10. Conserving energy in my home is an economic necessity.	-.10	.16	.19	.88	.08
Little I Can Do					
8. There is very little I can do to reduce the amount of electricity I am now using.	.30	.03	.06	.10	.86
Individual Rights					
5. It is my right to use as much energy as I want, as long as I can pay for it.	.56	.52	.47	.23	-.07
Environmental Preservation					
4. It is worth it to me for my household to use less energy in order to help preserve the environment.	-.14	-.04	-.47	.34	-.10

Factor 1 is made up of three items that have high loadings (Items #1, 2, and 3). These items express a general sense among households that “my life is busy and individuals are only a small part of the problem, so I am not concerned about energy in my household.” We have labeled this dimension “I’m Too Busy.” Consumers who have high scores on this dimension appear less concerned about energy efficiency; they don’t have the time to worry about energy efficiency; and they do not believe they are a big part of the energy picture.

Factor 2, “Conservation Ethic,” includes two items that load highly. It is perhaps too strong a label to call this the conservation ethic dimension, but these two items are the closest to a moral imperative to conserve. In essence, these two items seem to tap the basic idea that energy conservation is the right thing to do, even if you do not have to, and that you can do it without sacrifice.

Factor 3, “Energy Supply Concerns,” also includes two items. These two items tap consumer views on the future of energy supplies and on building power plants. The items share a focus on supply and energy efficiency’s role with regard to supply. People who score high on this dimension are expressing a concern about future energy supply and the need to use energy efficiency to offset the need to build additional power plants.

The final two factors are single-item factors, but they show the same basic pattern that identifies them as relatively unique — a high loading on one factor and low loadings on the others. Factor 4, “Economic Necessity,” captures the idea that saving energy is an economic necessity for the household. People who have a high score on this item believe they must conserve energy for economic reasons. Factor 5, “Little I Can Do,” measures the extent to which customers believe they can control their energy consumption. Consumers who score high on this item are indicating they feel there is little they can do to reduce their consumption.

The final two items in Exhibit 4-1 did not surface in the factor analysis as completely unique dimensions. This is seen by the fact that they do not have high factor loadings (.6 or higher) on any factor, and they have fairly high factor loadings (e.g., .4 to .6) on several of the factors. For example, Item 5, “Individual Rights,” has a loading of .52 on Factor 2 and .47 on Factor 3. This suggests that each item is really correlated with several of the other factors and does not really fall in one dimension. These results do not mean that these items are not measuring important beliefs, only that they are not uniquely related to one of the factors. We have labeled these last two items: “Individual Rights” and “Environmental Preservation.”

To summarize the factor analysis, the results show that the consumer beliefs about energy efficiency measured in this study are organized around five relatively unique dimensions. These dimensions operate somewhat independently of each other as consumers show patterns of beliefs that represent all combinations of high and low scores on these dimensions. Rather than one single underlying set of beliefs or attitudes that operate as a single “energy conservation ethic,” consumers demonstrate that their general attitudes about energy efficiency have many dimensions. For market transformation programs, this means that communications designed to change these general beliefs will face a patchwork market in which many different philosophies

about energy efficiency exist and the fact that there are many reasons for both attending to energy efficiency and ignoring it.

4.2 ENERGY EFFICIENCY ATTITUDE SEGMENTS

To examine the combinations of these dimensions that might exist, we conducted a segmentation analysis. We used cluster analysis on the five dimensions outlined above. We also included in the cluster analysis the specific item on individual rights (Item 5) believing that this would also be important in understanding consumer attitudes, even though it did not emerge as a unique dimension. Cluster analysis is basically a technique for grouping customers with similar patterns of response on a set of items. The goal is to find groups that are relatively homogeneous in their pattern of response and as different as possible from the other groups. In this case we were testing for similarities and differences in the pattern of response to the five factor dimensions and the individual rights item. We used the cluster analysis to test segmentations from 4 to 12 segments.

The results of this analysis suggested that seven segments are adequate for distinguishing meaningful groups with respect to their energy efficiency attitudes. The results of the segmentation analysis are summarized in Exhibits 4-2 and 4-3. Exhibit 4-2 shows the proportion of households in the California sample and the U.S. sample that fall into each segment. The results are fairly similar for California and the U.S. Exhibit 4-3 shows the profile of responses on the energy efficiency attitude items used in the segmentation analysis. The following provides a brief description of each segment:

- ♦ *Segment 1: Well Meaning, but Lack Control.* This segment represents about 20% of CA households. This group has a profile that is generally supportive of taking energy-efficiency actions, but they stand out as believing there is little they can do to personally reduce their energy use.
- ♦ *Segment 2: I'm Too Busy and Lack Control.* This segment represents about 14% of U.S. households, but only 8% of California households. This group strongly believes that they are too busy and they are too small a part of the problem. They also strongly hold the belief that there is little they can do to reduce electricity they are currently using.
- ♦ *Segment 3: Supportive, but It's My Right.* This segment is about 16% of CA households and 16% of U.S. households. This group, like group 1, has many beliefs that are supportive of energy efficiency behavior, but they have a very strong sense that it is their right to use as much energy as they want.
- ♦ *Segment 4: Say No to Energy Efficiency.* This segment represents 5% of both CA and U.S. households. This group has the strongest set beliefs that do not favor energy efficiency actions. It is too strong to say that they are anti-energy efficiency, but they agree they are too busy, disagree that they should save, do not believe supplies are scare,

do not feel that saving energy is an economic necessity, and strongly believe it is their right to use as much energy they want.

- ♦ *Segment 5: Economic Necessity, But....* This segment also represents 5% of both CA and US households. This group most strongly agrees that saving energy is an economic necessity, but they also strongly hold several beliefs that act against energy efficiency actions. These include: disagreeing that everyone should make an effort to save energy, believing that it is their right to use as much energy as they want, and believing there is little they can do to reduce their electricity use.
- ♦ *Segment 6: Concerned but Not Committed.* This segment represents 15% of California households, but only 9% of U.S. households. This group expresses a concern about energy use in their homes, but they do not believe supplies are scarce, they don't think people should feel obligated to save energy, and they do not see energy efficiency as an economic necessity.
- ♦ *Segment 7: The Middle.* This segment is 30% of California households and 35% of the U.S. households. This is the largest segment and represents the group whose response pattern is near the average on most items. They demonstrate that the status quo, if there is one, leans toward the following: I'm not too busy, I should save, scarce supplies are a concern, it is not my right to use as much as I want, I could do more, and it is an economic necessity.

Exhibit 4-2
Summary of Attitude Segment Sizes

	CA	U.S.
Segment 1 , Well meaning but lack control	20%	17%
Segment 2 , I'm too busy and lack control	8%	14%
Segment 3 , Supportive but it's my right	16%	16%
Segment 4 , Say no to energy efficiency	5%	5%
Segment 5 , Economic necessity, but...	5%	5%
Segment 6 , Concerned but not committed	15%	9%
Segment 7 , Middle	30%	35%

**Exhibit 4-3
Summary of Segment Attitude Profile**

Items:	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6	Segment 7	CA Sample	U.S. Sample
	Well meaning but lack control	I'm too busy and lack control	Supportive but it's my right	Say no to energy efficiency	Economic necessity, but...	Concerned but not committed	Middle		
I am not very concerned about the amount of energy used in my home.	17%	71%	17%	54%	14%	9%	17%	21%	28%
The household consumer is such a small part of the whole energy consumption picture that it really doesn't matter how a family uses energy.	9%	64%	5%	43%	12%	7%	9%	15%	17%
My life is too busy to worry about making energy-related improvements in my home.	14%	63%	11%	47%	12%	5%	10%	18%	16%
It is possible to save energy without sacrificing comfort by being energy efficient.	95%	91%	90%	25%	34%	24%	84%	73%	76%
Everyone should make a real effort to conserve energy even if they don't have to worry about the cost.	95%	94%	92%	19%	55%	35%	94%	78%	82%

ENERGY EFFICIENCY ATTITUDES ♦ 4-7

Items:	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6	Segment 7	CA Sample	U.S. Sample
	Well meaning but lack control	I'm too busy and lack control	Supportive but it's my right	Say no to energy efficiency	Economic necessity, but...	Concerned but not committed	Middle		
Scarce energy supplies will be a major problem in the future.	79%	74%	48%	31%	73%	23%	71%	56%	59%
Instead of building new power plants, customers should use less electricity.	62%	65%	29%	19%	41%	7%	51%	41%	45%
Conserving energy in my home is an economic necessity.	47%	84%	32%	12%	92%	15%	88%	55%	64%
There is very little I can do to reduce the amount of electricity I am now using.	71%	80%	8%	27%	73%	26%	7%	34%	34%
It is my right to use as much energy as I want, as long as I can pay for it.	2%	73%	60%	72%	65%	4%	3%	24%	28%
It is worth it to me for my household to use less energy in order to help preserve the environment.	86%	83%	72%	21%	66%	35%	85%	70%	71%

The results of the segmentation analysis point to the difficult communication problems that must be overcome to successfully transform the many patterns of beliefs about energy efficiency. But this is only half the problem. The other half is how to change behavior. This is a more complicated problem because of the many different potential influences on behavior. Research regularly suggests the broad patterns of beliefs like energy efficiency attitudes may not be particularly predictive of any one specific action. Many other types of beliefs, besides energy efficiency concerns, will enter into the decision to take a specific efficiency action. These could include:

- ♦ other product attributes like brand or features,
- ♦ financial concerns such as price,
- ♦ service delivery issues such as when the product can be delivered, and
- ♦ the influence of other decision-makers like other members of the household.

4.3 LINKING ENERGY EFFICIENCY ATTITUDE SEGMENTS WITH AWARENESS AND INTENTIONS

As part of this analysis, we also examined how these energy efficiency attitude segments vary in terms of consumer awareness and willingness to take energy efficiency actions. Exhibit 4-4 summarizes awareness and willingness to purchase for the behavioral scenarios related to each measure. These awareness and willingness-to-purchase questions were the most consistently asked of all survey questions. In addition, they were rotated across the sample (each of the five series was asked of one-fifth of the sample), so they provide an opportunity to examine whether the segments show robust differences in awareness and intentions across a range of efficient measures.

Overall, the results show that there is some consistent variation in awareness and willingness to purchase, but that the differences among segments are not generally substantial.

In terms of aided awareness, the results show that Segment 5, “Economic Necessity, But...” is consistently the least likely to be aware of all five measures. This is the group that views energy efficiency measures as an economic necessity, but also has a lower conservation ethic and believes it is their right to use as much energy as they want. Segment 3, “Supportive, But It’s My Right,” is consistently among the highest in awareness, suggesting this group attends more closely to ways to improve efficiency. The other segments tend to be less consistent and nearer to the average awareness of all customers. Segment 1, “Well Meaning, But Lack Control,” and Segment 6, “Concerned but Not Committed,” tend to be a little higher on most measures. Clearly these results suggest that there is some filtering of awareness of these measures depending on overall attitudes, but in general they show that awareness of these five energy efficient measures has seeped into all of the attitude segments.

Exhibit 4-4
Summary of Awareness and Intentions by Attitude Segments

	Segment 1 Well meaning but lack control	Segment 2 I'm too busy and lack control	Segment 3 Supportive but it's my right	Segment 4 Say no to energy efficiency	Segment 5 Economic necessity, but...	Segment 6 Concerned but not committed	Segment 7 Middle	CA Sample	U.S. Sample
Aided Awareness									
High Efficiency Central Air Conditioner	43%	42%	47%	51%	39%	42%	45%	41%	51%
High Efficiency Windows	61%	59%	59%	58%	57%	61%	58%	59%	59%
High Efficiency Refrigerator	59%	61%	62%	57%	47%	59%	59%	61%	56%
High Efficiency Clothes Washer	41%	37%	43%	38%	32%	40%	45%	41%	42%
High Efficiency Lighting Fixtures	72%	60%	62%	67%	52%	65%	66%	65%	66%
Intentions to Buy*									
High Efficiency Central Air Conditioner	73%	63%	67%	65%	63%	65%	66%	66%	69%
High Efficiency Windows	72%	60%	72%	30%	57%	57%	57%	57%	66%
High Efficiency Refrigerator	80%	49%	67%	57%	80%	66%	81%	75%	68%
High Efficiency Clothes Washer	73%	61%	59%	27%	42%	53%	68%	63%	59%
High Efficiency Lighting Fixtures	45%	45%	49%	20%	71%	47%	41%	41%	54%

* Intentions to buy shown as the percent of respondents "very likely" to purchase high efficiency product (using four-point scale, where 1 is "very

In terms of intentions to buy high efficiency equipment, the story is also mixed but a bit more dramatic. Segment 4, “Say No to Energy Efficiency,” clearly has the lowest intentions to purchase among all the segments, and this fits well with expectations given their strong attitudes that do not favor conservation actions. Their scores are consistently and significantly lower than the average. Segment 1, “Well Meaning, But Lack Control,” on the other hand is generally high in their intentions to take efficiency actions across the five scenarios. The remaining segments show mixed results varying by the measure.

Taken together, the results show that general attitudes are related to awareness and intentions to purchase specific measures, but that this relationship is not particularly strong. This suggests that the market transformation programs need to reinforce a broad array of messages concerning the value of energy efficiency, but this alone is unlikely to generate substantial action. These efforts must be married to specific messages on the benefits of these actions and directed to the specific audiences being targeted by specific programs.

Finally, it is useful to see how these attitude segments differ in their demographic profile. Exhibit 4-5 shows the differences between the segments on five key socio-demographic variables. On many of these characteristics, the segments are similar, but a few key differences emerge.

- ♦ *Segment 1: Well Meaning, but Lack Control.* This group tends to have higher than average education levels.
- ♦ *Segment 2: I’m Too Busy and Lack Control.* This group tends to have lower than average income and lower than average education levels.
- ♦ *Segment 3: Supportive, but It’s My Right.* This group tends to be near average on all the socio-demographic items, although has higher than average income (57% with income of \$50,000 or more).
- ♦ *Segment 4: Say No to Energy Efficiency.* This group has higher than average incomes and lower than average education.
- ♦ *Segment 5: Economic Necessity, But.* This group is distinctive in several ways. They tend to have lower than average income and education, they tend to have small homes, and they are more likely than average to be seniors or adults with kids.
- ♦ *Segment 6: Concerned But Not Committed.* This group is more likely than average to be adults without kids.
- ♦ *Segment 7: The Middle.* The middle has average characteristics.

Exhibit 4-5
Summary of Segment Demographics

	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6	Segment 7	CA Sample	U.S. Sample
	Well meaning but lack control	I'm too busy and lack control	Supportive but it's my right	Say no to energy efficiency	Economic necessity, but...	Concerned but not committed	Middle		
Income									
Less than \$50,000	50%	68%	43%	48%	66%	54%	53%	49%	59%
\$50,000 to \$100,000	37%	28%	45%	36%	33%	31%	37%	38%	33%
\$100,000 or more	13%	4%	12%	16%	1%	15%	10%	13%	8%
Education									
High School Graduate or Less	18%	42%	20%	29%	31%	29%	20%	19%	33%
College Graduate or Post Grad	53%	26%	50%	33%	38%	42%	46%	48%	38%
Dwelling Type									
Single Family Home	71%	72%	73%	69%	71%	77%	73%	71%	76%
Apartment	21%	18%	19%	23%	23%	14%	20%	23%	13%
Dwelling Size									
Less than 1,000 Square Feet	18%	10%	19%	20%	28%	16%	16%	21%	11%
1,000 to 2,000 Square Feet	46%	46%	38%	38%	37%	40%	41%	44%	36%
2,000 or More	24%	21%	28%	24%	15%	27%	24%	21%	29%
Household Composition									
Adults Without Kids	34%	30%	37%	39%	14%	41%	33%	35%	33%
Adults With Kids	35%	31%	39%	33%	48%	36%	45%	38%	40%
Seniors	30%	38%	23%	26%	38%	22%	22%	26%	26%

4.4 CONCLUSIONS

The analysis of general attitudes, awareness and intentions points to several key conclusions. First, consumers appear to have a multi-dimensional view of energy efficiency issues rather than responding to a range of items with a single uni-dimensional conservation ethic. The analysis identified several different dimensions that operate relatively independently of each other.

Second, fairly distinct segments could be identified in the pattern of beliefs about energy efficiency. We identified seven segments that appeared to have fairly different patterns in the way they think about energy efficiency. The seven segments represented groups as small as 5% of the population and as large as 35%.

Third, there was some evidence that the different general attitudes exhibited by each segment affect the level of awareness of energy efficiency measures and any intentions to choose these measures in the future, but the relationship was not very strong. This suggests that market transformation programs focusing on specific attitudes and beliefs for specific measures may have a more significant impact on behavior. However, communications strategies should be coordinated with specific messages targeted to specific attitudes that facilitate taking energy efficiency actions.

CHAPTER 5

RECOMMENDATIONS

This chapter presents recommendations pertaining to two distinct areas: future program design and marketing strategies, and future tracking and measurement research strategies. The first section discusses recommendations that can be offered based on the research completed through this study to increase customer awareness of energy efficiency, influence energy efficiency decisions, and support the development of new energy efficiency programs. This second section addresses specific issues arising from this study that need to be considered prior to designing future attitude tracking and measurement studies.

5.1 PROGRAM DESIGN AND MARKETING RECOMMENDATIONS

The program design and marketing recommendations developed through this research are summarized in this section. At first glance, these recommendations may seem fairly intuitive and obvious to many experienced program designers and marketing professionals. In addition, the content of many of these recommendations is somewhat generic and vague such that it is unlikely to be sufficient for designing actionable strategies for a diverse set of program elements.

However, it should be recalled that developing program design and marketing recommendations was one of several important objectives to be addressed through this study. At the outset, it was agreed that given these multiple objectives, this study should strive to obtain as much broad-based program design and marketing insight as possible. However, we agreed that it was unlikely that this research would provide design and marketing input that would be applicable in any specific way to the slate of residential programs that, until recently, had yet to be designed for PY99.

With this caveat in mind, we can report on the results of this research and present recommendations that are likely to have some broad-based appeal and serve to confirm general design and marketing concepts currently being formulated by program planning and design staff.

The baseline survey included a number of program design related questions, some of which have previously been discussed in Chapter 3. These program design related questions addressed five behavior scenarios – central air conditioning, refrigerators, windows, clothes washers and lighting fixtures – and are summarized below:

- ◆ What features or qualities would you want to make sure you got in your new <product>?
- ◆ How would you go about finding out about <product> energy efficiency?

- ♦ What types of information would be helpful to you when making a decision whether or not to purchase a high efficiency <product>?
- ♦ Who would you see as a credible source for this information?
- ♦ What would be the best way to get you this information?
- ♦ Aside from information, what other types of assistance or services would be helpful to you when making a decision whether or not to purchase a high efficiency <product>?

The questions were administered in an open-ended, unaided fashion to capture unprompted suggestions for program design and marketing elements. The sections that follow briefly summarize the results of these questions, along with the associated recommendations regarding future program design and marketing strategies.

5.1.1 Product Attribute Preferences

Chapter 3 presented the baseline results for consumer attribute preferences. These results documented, for each of the five products, “features or qualities” that consumers would be looking for assuming they were in the market to make a purchase. This information can also be used to improve the effectiveness of program design and marketing efforts by identifying key selling points – including energy and non-energy attributes – around which program messages and information can be developed.

A brief summary of the results for product attribute preferences is summarized below¹, along with recommendations for program design and marketing strategies:

- ♦ *Central air conditioning* – Given the expense involved, it is not surprising that price was mentioned as an important attribute for central air conditioning. In addition, respondents tend to be somewhat unsure of their attribute preferences for this product, reflecting both the complexity of this measure and respondents’ general lack of understanding of what might differentiate one product from another. *Recommendations* – monitor recent changes in incremental measure costs and formulate program design elements which address this price issue (rebates, favorable financing, etc.), develop marketing and communications strategies that serve to improve the consumer’s understanding of features that differentiate high efficiency from standard efficiency central air conditioning equipment.
- ♦ *Refrigerator* – There appears to be a strong interest among California consumers for energy efficient refrigerators that also have desired features (i.e., size, appearance, etc.). However, the incremental cost for high efficiency refrigerators remains a significant barrier for most consumers. *Recommendations* – continue to develop materials that

¹ For more detail on the baseline measurement results for this attitude dimension, see Chapter 3.

emphasize energy efficient aspects of refrigerators and provide a “features comparison” to highlight similarities and differences between high efficiency and standard efficiency models.

- ♦ *Windows* – While the higher cost for high performance, energy efficient windows is a barrier for many consumers, there is a substantial group in California who may be attracted to energy efficient windows because of non-energy benefits such as appearance, comfort, etc. *Recommendations* – improved availability of this product (in terms of quantity and variety) is needed, as is the use of hands-on demonstrations and/or display-based advertising to effectively communicate product benefits.
- ♦ *Clothes washers* – Clearly, cost is an issue for this product and, for many consumers, brand is also a key determinant in purchase decisions. *Recommendations* – continue offering some form of financial incentive to minimize first cost burden, while at the same time working closely with market actors involved in product development and distribution to improve both availability and competition.
- ♦ *Lighting fixtures* – Similar to windows, California consumers seem somewhat more interested in the “look and feel” of lighting fixtures and less concerned about product price. *Recommendations* – continue to work with manufacturers and national/regional efforts to improve the availability of quality products (in terms of quantity and variety), and use display-based advertising to show-case product attributes

5.1.2 Sources of Information on Product Energy Efficiency

As presented in Chapter 3, a question was included in the baseline survey to measure the extent to which residents are aware of sources they can look to for information on product energy efficiency. In addition to providing a measurement of baseline for this awareness dimension, this question also offers some insight for developing new program design and marketing strategies.

The following is a summary of the results along with recommendations for program design and marketing strategies²:

- ♦ *Sales people, contractors* – Most respondents would look to salespeople or contractors for energy efficiency information related to specific products. This finding is, at least on the surface, consistent with what one might be looking for in a transformed market. However, additional effort is required to improve the effectiveness of this widely used yet often unreliable information channel. *Recommendations* – develop contractor and retailer training programs (e.g., certification programs, sales training courses, etc.), and prepare “Consumers Guide” type materials emphasizing what consumers should be asking and what contractors, retailers, etc. should be saying. Since it is usually somewhat difficult to get salespeople and contractors to participate in these types of initiatives, consideration

² For more detail on the baseline measurement results for this awareness dimension, see Chapter 3.

needs to be given to the types of incentives that might be required to encourage their involvement (e.g., SPIFF's, co-op advertising and communication materials, etc.).

- ♦ *Utilities* – Utilities are also regarded by a fair number of respondents as a source for product-specific energy efficiency information. Despite changes in the structure of and the key players actively engaged in California energy markets, consumers are likely to continue to seek information from their local electric and gas utility. *Recommendations* – to the extent possible, explore options for utility co-sponsorship, co-branding, co-operative advertising, etc. to maximize credibility for new programs/initiatives in a way that is consistent with goals of market transformation.
- ♦ *Consumer reports, product labeling* – For certain products, especially appliances like refrigerators and clothes washers, these information sources are highly valued and can be effective in communicating product information. *Recommendations* – explore options available at Consumer Reports (if none, consider developing comparable yet targeted information resources for energy efficient products), and work with retailers to improve effectiveness of point-of-purchase materials (including product tags).
- ♦ *Internet* – As more and more people go on-line, the potential for the internet to increase in value as a tool for communicating product benefits and features is inevitable. *Recommendations* – explore options for using the internet as a means of storing and updating energy efficiency information, as well as actively marketing and selling energy efficient products and services.

5.1.3 Credible Sources for Energy Efficiency Information

Respondents were also asked to indicate who they believed to be credible sources of energy efficiency information for these five product categories. As shown in Exhibit 5-1, across all measures, the most frequently reported credible source of energy efficiency information included private market actors (e.g., contractors, retailers, manufacturers). This finding confirms that program design and marketing strategies which effectively target these key market players will have the added value of being perceived as “credible” in the minds of many consumers. As stated above, however, specific program design and communications support (e.g., training, consumers guide, etc.) will be needed to improve the effectiveness and reliability of this important information channel.

Exhibit 5-1
Perceptions Regarding Credible Information Provides
Who would you see as credible providers of information about energy efficient ... ?

	Central Air	Refrigerators	Windows	Clothes Washers	Fixtures
Private contractors, retailers, manufacturers	48%	50%	60%	56%	46%
Utilities	28%	35%	31%	24%	38%
Consumer reports	8%	10%	6%	13%	4%
Community, non-profit organizations	7%	7%	5%	9%	9%
Friends, family	7%	7%	4%	6%	3%
Environmental organizations	6%	3%	5%	5%	3%
State agencies	5%	5%	2%	2%	5%
Local government	4%	3%	4%	2%	3%
Internet	1%	0%	0%	3%	1%
Other (misc.)	4%	3%	3%	6%	4%
Don't know	17%	0%	15%	7%	16%
Base	253	224	218	240	235

5.1.4 Types of Information Helpful in Decisionmaking

As shown in Exhibit 5-2, respondents suggested a variety of types of information that would be helpful to them when making a decision to purchase a high efficiency product. Some of the more commonly reported suggestions for information content included:

- ♦ *Energy, cost savings benefits – how much energy/dollar savings should be expected?* Nearly half of the respondents would like this type of information for central air conditioning equipment and clothes washers (47% respectively).
- ♦ *Pricing information – how much does the high efficiency product cost in comparison to the standard efficiency option?* This type of information would be particularly useful for central air conditioning equipment and windows (36%, respectively).
- ♦ *Features, technical data, equipment comparisons – will the high efficiency product perform as well as and look the same as (or better than) the standard efficiency product?* About 29% would be interested in this type of information when considering high efficiency lighting fixture purchases.
- ♦ *Contacts for retailers, suppliers and repair services – where can the products be obtained and who will service/maintain them?* Overall, less than 15% would be interested in this type of information, with the greatest interest reported among potential purchasers of central air conditioning equipment (12%).
- ♦ *Other benefits – what are the other, non-energy/non-monetary benefits from these products (e.g., environmental improvement, increased comfort, noise reduction, etc.)?* Few respondents would be interested in this type of information – e.g., 14% would be interested in the environmental benefits of refrigerators and another 14% would find information on the benefits of increased comfort and reduced noise useful.
- ♦ *Testimonials, case studies – how has this product worked in “the real world” and how does it work for households like mine?* About 9-10% would be particularly interested in this type of information for high efficiency clothes washers and lighting fixtures.

Exhibit 5-2
Types of Information Needed for Decisionmaking

<i>What types of information would be helpful when making a purchase decision?</i>					
	Central Air	Refrigerators	Windows	Clothes Washers	Fixtures
Energy, cost savings benefits	47%	44%	42%	47%	39%
Pricing information	36%	28%	36%	32%	26%
Features, technical data, equipment comparisons	28%	25%	27%	24%	29%
Contacts for retailers, suppliers	12%	8%	4%	8%	7%
Other benefits (including environmental, comfort)	10%	14%	14%	6%	5%
Testimonials, case studies	4%	6%	4%	10%	9%
Other (misc.)	6%	5%	10%	10%	9%
Don't know	21%	18%	19%	14%	22%
Base	253	224	218	240	235

5.1.5 Suggestions for Information Dissemination

Building upon the responses cited above for credible information providers, respondents were asked to suggest some of the best ways for these organizations to provide them with energy efficiency information. These suggestions are presented in Exhibit 5-3 and summarized below:

- ♦ *Direct mail, utility bill insert or bill message* – Despite evidence from other studies that indicates consistently low readership, these vehicles of information dissemination continue to be reported as preferences with considerable frequency in the consumer marketplace. For all but one product (clothes washers), over half of the sample reported one or both of these communication vehicles as the best way to get them information on product energy efficiency.
- ♦ *Mass media advertising, POP displays and advertising* – These two methods seem to be increasing in popularity as effective means of communicating energy efficiency

information. For example, these vehicles were suggested by nearly half of the sample as the best ways to get information on energy efficient clothes washers and lighting fixtures.

- ♦ *Internet marketing* – There is a small yet well-defined group of consumers who would prefer to receive product information via the internet and/or internet marketing vehicles.
- ♦ *Coverage in consumer reports* – A fair number of respondents would look to publications such as Consumer Reports as vehicles of disseminating product efficiency information (especially for major appliances, such as clothes washers).
- ♦ *Private contractors, sales people* – There is also a small group of consumers who would prefer one-on-one information exchange with private market actors (e.g., contractors, sales people, etc.).
- ♦ *Telemarketing* – Some consumers, although limited to a very small group, prefer to be contacted by telephone to obtain information about new products and product features.

Exhibit 5-3
Suggestions for Information Dissemination

<i>What would be the best way to get you information about energy efficient ... ?</i>					
	Central Air	Refrigerators	Windows	Clothes Washers	Fixtures
Direct mail	41%	42%	46%	33%	46%
Utility bill insert, bill message	15%	16%	13%	11%	23%
Mass media advertising	12%	18%	19%	19%	27%
POP displays/ advertising	10%	13%	12%	26%	15%
Internet marketing	8%	9%	10%	7%	6%
Coverage in consumer reports	8%	7%	5%	21%	7%
Private contractors, sales people	10%	6%	12%	11%	7%
Telemarketing	6%	3%	4%	6%	2%
Other (misc.)	16%	12%	14%	15%	14%
Don't know	10%	8%	11%	9%	11%
Base	235	224	218	240	235

5.1.6 Other Assistance and Services Helpful in Decisionmaking

Finally, respondents were asked if there were other types of assistance or services that they would consider helpful when deciding whether or not to purchase a high efficiency product. As shown in Exhibit 5-4, a substantial percentage of respondents suggested some type of financial assistance or incentive would aid their decisionmaking process. Some respondents specifically reported that cash rebates would be helpful, while others indicated that they would prefer some type of financing (e.g., low/no-interest loan, “zero-down, no payment ‘til 1999” financing arrangement). Finally, some consumers indicated that they could use various implementation assistance services such as contractor referrals, warranty services, delivery/purchase assistance services, etc.

Exhibit 5-4
Other Types of Assistance or Services Helpful in Decisionmaking
What other assistance or services would be helpful when making a purchase decision?

	Central Air	Refrigerators	Windows	Clothes Washers	Fixtures
Cash rebates	16%	12%	15%	14%	17%
Contractor, retailer, service/repair referrals	11%	7%	4%	11%	11%
Customer recommendations, referrals	8%	6%	8%	6%	5%
Low/no-interest loans	7%	5%	4%	1%	4%
Zero-down/no interest payment programs	6%	5%	6%	2%	5%
Other financial incentives, assistance	3%	3%	7%	7%	6%
Implementation, delivery, purchase assistance	2%	5%	14%	4%	3%
Warranty services, customer services	2%	4%	3%	6%	1%
Other (misc.)	3%	5%	1%	4%	2%
Don't know	56%	53%	48%	57%	60%
Base	235	224	218	240	235

5.1.7 Program Design and Marketing Elements by Attitude Segment

In this section, we present some highlights from the research into program design and marketing preferences according to the seven attitude segment classifications described in Chapter 4.

As shown in the preceding exhibits, there did not appear to be considerable variation across measures with respect to different program design and marketing preferences. For this assessment, we collapsed the preference data for all five measures such that preferences for product attributes, information sources, etc. can be analyzed across the whole sample. These data on consumer preferences have been cross-tabulated by the seven attitude segments, as shown in Exhibit 5-5. A “+” in this exhibit indicates that a particular preference is favored by respondents in a given segment more often than the average respondent in the sample. Conversely, a “-“ means that a preference is less important to respondents in a given segment than the average respondent.

These results should not be interpreted to imply significant differences exist between segments with respect to these various factors; instead, they are provided to show distinction across the sample for various program design and marketing elements. Perhaps more importantly, these results serve to expand our definition of these seven attitude segments by profiling various aspects of consumer “likes and dislikes” and “wants and needs” with respect to energy efficiency information content and information resources.

It is within the context of these two somewhat different interpretations that these results have been summarized below:

- ♦ *Segment 1: Well Meaning, but Lack Control.* This group tends to be differentiated from the average consumers in a variety of ways – i.e., they are less interested in price and more interested in energy efficient features, they would look to utilities for efficiency information but also see other sources as credible, etc.
- ♦ *Segment 2: I’m Too Busy and Lack Control.* Preferences among this group fit well within its attitude profile – they do not appear to give much thought to their product preferences or information needs, and they are fairly likely to be influenced by the private market actors (and friends/family) when faced with purchasing decisions.
- ♦ *Segment 3: Supportive, but It’s My Right.* This group represents consumers who have fairly strong preferences for many product attributes, and appear to have an independent streak when it comes to seeking out information from various sources – referring to energy efficiency labels/tags, consumer reports, the internet, etc.
- ♦ *Segment 4: Say No to Energy Efficiency.* The group tends to be less in favor than the average consumer of any type of financial assistance/services programs, but also feels that information about product pricing would be helpful in decisionmaking. This group is

also distinguished from the average respondent by its interest in “internet marketing” options.

- ♦ *Segment 5: Economic Necessity, But.* This group fits well within its attitude profile in that it exhibits higher than average interest in various kinds of financial incentive programs (e.g., rebates, low-interest loans, zero-down financing, etc.).
- ♦ *Segment 6: Concerned by Not Committed.* Consumers in this segment are distinguished based on their interest in pricing and energy savings information, but less than average interest in specific financial incentive programs. They also appear more interested than the average consumer in value-added implementation services (e.g., purchase/delivery assistance, home visits, 800#s).
- ♦ *Segment 7: The Middle.* Finally, the middle segment represents the average consumer fairly well – very interested in the energy efficiency features of various products, likely to see utilities as credible information sources, prefer (or are at least used to) receiving information in the mail, and would be interested in a variety of services to help them take action (e.g., financial incentives, referrals, warranty services, etc.).

Exhibit 5-5
Stated Preferences for Carious Program Design and Marketing Elements, by Attitude Segments

	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6	Segment 7
	<i>Well meaning but lack control</i>	<i>I'm too busy and lack control</i>	<i>Supportive but it's my right</i>	<i>Say no to energy efficiency</i>	<i>Economic necessity but</i>	<i>Non-believers</i>	<i>Middle</i>
Preferred product attributes	– price + energy eff	– price – appearance – warranty – other benefits + don't know	+ price + brand + appearance – don't know	– price – appearance + warranty – energy eff + other benefits + don't know	+ brand – appearance + other benefits – don't know	+ price – brand – energy eff + don't know	– brand + energy eff – other benefits
Who to ask, where to look for energy efficiency information	+ utility	+ private sector – utility – EE labels/tags – consumer rpt. – internet	– private sector – friends/family + EE labels/tags + consumer rpt. + internet	– private sector – friends/family – utility – consumer rpt	+ friends/family + EE labels/tags – internet	+ private sector + utility	+ friends/family + consumer rpt
Types of energy efficiency information helpful in decision-making	+ energy saving + other benefits + tech. data + case studies – don't know	– pricing info. – energy saving – case studies + don't know	+ contact info.	+ pricing info. – energy savings – tech. data – contact info.	– tech. data + case studies	+ pricing + energy savings – other benefits – case studies	– pricing + tech. data

	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6	Segment 7
	<i>Well meaning but lack control</i>	<i>I'm too busy and lack control</i>	<i>Supportive but it's my right</i>	<i>Say no to energy efficiency</i>	<i>Economic necessity but</i>	<i>Non-believers</i>	<i>Middle</i>
Credible sources of energy efficiency information	+ local govt. + state agencies – private sector + friends/family + consumer rpt – don't know	– utilities – state agencies – non-profit orgs + friends/family – consumer rpt + don't know	+ environ. orgs. – friends/family + consumer rpt	– utility – local govt. – non-profit orgs – friends/family + internet + don't know	+ utilities – state agencies – environ. orgs + private sector – consumer rpt – don't know	+ non-profit org + consumer rpt	+ utilities – internet
Best ways to deliver energy efficiency information	– direct mail + mass media + telemarketing	– bill insert/msg – mass media – POP displays + private sector – internet mktg	+ mass media + POP displays – private sector + consumer rpt – telemarketing	+ direct mail – bill insert/msg – mass media – POP displays + private sector + internet mktg – consumer rpt	+ bill insert/msg – internet mktg – consumer rpt	– direct mail + mass media + POP displays – private sector – don't know	+ direct mail + bill insert/msg + consumer rpt
Other services, assistance helpful in decision-making	– rebates	– rebates – implem. asst. + don't know	+ don't know	– financial asst – referrals	+ financial asst – referrals – warranty – don't know	– financial asst + implem. asst + don't know	+ financial asst + referrals + warranty

5.2 RESEARCH STRATEGY RECOMMENDATIONS

This project was started with two broad goals in mind. First, to collect baseline data on awareness, attitudes, intentions, and behavior with regard to key energy efficiency actions that would be the focus of market transformation program efforts. Second, to provide recommendations to inform future program design. With the results in, it is possible to evaluate the success of these efforts and make recommendations for future program monitoring.

The baseline measurements have again demonstrated the difficulty of tracking what is a very complex set of actions related to energy efficiency. On the one hand, it is easy to identify a list of attitudes and measures or actions that could be important for efficiency, but the process of counting up these actions and correctly linking them to decision-makers defies simple tracking systems. This is true for a variety of reasons:

- ♦ First, the actions are frequently made on the dwelling and they have a fairly long life and as a consequence:
 - many different household members may be involved in the decision,
 - the current occupants of a dwelling may be aware or unaware of the measure,
 - the occupants may have had no involvement in the decision or no ability to affect the decision (e.g., renters),
 - and the actions are not taken regularly so the recollection of how and why decisions were made deteriorates.
- ♦ Second, the primary driver for taking many of the actions is not energy efficiency — that is, people buy major appliances, make household improvements, and purchase or rent dwellings with particular characteristics for reasons of comfort, prestige, peace of mind, investment, and many others. As a result, tracking the specific linkages between attitudes and beliefs about energy efficiency and taking particular actions may be difficult.
- ♦ In addition, even for individuals who are motivated to take the “energy efficient” action, the markets provides a confusing environment in which to determine what the correct action is. This results from two key characteristics of the class of actions and measures of interest to market transformation including:
 - Energy efficiency is a sliding scale. What was efficient in the past is now not efficient (e.g., HVAC SEER moving from 8 to 10 to 12 to 14) over the years. Consumers who took an action that was energy efficient at one point in time will say the action was energy efficient even if by current standards it is not energy efficient.

- Energy efficiency is hard to see. Many of the actions require that the consumer trust the manufacturer's claims, or a label, or the utility; it is not something that they can see for themselves. Consequently it is easy for a consumer to say they have taken energy efficient actions because it is difficult for them or others to confirm that they have not.

Given these issues, how successful was this effort to measure baseline conditions and what is the value of continuing this study in its current form in the future? The results suggest the following:

- ♦ There is no reason to believe people were not accurate in representing their general attitudes, so this worked well.
- ♦ The awareness measures are also likely fairly accurate and serve the purpose of characterizing some dimensions of awareness.
- ♦ The follow-up survey confirmed that energy efficiency is not a “top of mind” concern that is likely to be automatically considered in most product selection decisions, but it does hold considerable importance for most consumers as an individual or societal goal to be pursued.
- ♦ The behavioral intention measures are problematic. They probably overstated to some extent the actual willingness to buy high efficiency, but the larger problem is that it is not clear what the consumer had in mind when they stated the intention.
- ♦ The self-reports of behavior are also problematic. There is no reason to believe that consumers are consciously trying to over or underreport their behavior on the items of interest, so this information is still useful in exploring the structure of attitude dimensions. However, it is clear from the onsite data that for a variety of reasons that consumer self-reports (and, for some measures, cursory visual inspection by a trained field inspector) do not provide the level of accuracy required to estimate measure penetration (which is needed to measure market effects and attribution of influence).

In terms of future measurement strategies, these results point toward several recommendations. First, there is probably very limited value in repeating this study as conducted as part of an overall performance measurement program. Rather this study needs to be more tightly coordinated with the various program efforts. Several options are possible:

- ♦ If a broad attitude measurement program is to continue, it should be done in the context of whatever broad communication goals are established as part of the programs. If the programs will include either a coordinated effort to reinforce certain key themes or a separate umbrella campaign to emphasize the importance of energy efficiency, then a broad attitude survey tracking awareness and comprehension of the key communication goals would be valuable.

- ♦ If a coordinated effort across the various programs is needed to collect the data on awareness of specific technologies or measures, then a master awareness study would be valuable and is feasible.

In terms of tracking behavior and even behavioral intentions, this study points to the difficulty of doing this type of tracking for a broad number of measures in a single study using primarily a telephone survey methodology. Each action requires quite a bit of questioning to determine the correct circumstances for determining whether the measure is present and whether the respondent is responsible for the action (let alone what factors influenced the customer to take the action). It would take a very long survey to have asked all of these qualifying questions to make correct inferences for all the measures being examined (ignoring any other types of survey data that might be collected). More importantly, the onsite verification points to the substantial difficulty respondents have in both correctly indicating whether the measure is present, and whether they were responsible.

This suggests that tracking behaviors and behavioral intentions at a broad and perhaps superficial level may not be a very good use of performance measurement resources. A more effective strategy may be to imbed the detailed questions needed to measure decision-making and intentions to take specific efficiency actions in the evaluation efforts for individual programs that focus on those actions (with perhaps some development of guidelines for questions construction across the programs to maximize comparability) and then to conduct a more coordinated study (combining global market share data with in-field validation) to track actual measure penetration.

There exists, however, at least the potential to use the results of this to monitor change in awareness and comprehension of key messages as they are introduced through broad, sector-wide information and promotional campaigns. Also, there may also be value in repeating parts of this study to measure changes in attitudes and awareness of specific measures and intervention strategies (e.g., labeling programs, appliance turn-in programs, etc.). It may also be useful to revisit awareness issues for specific products that are only recently being introduced to the market (e.g., high efficiency windows, clothes washers, and improved fluorescent lighting). As program designs are still being finalized for PY99, it is still too soon to tell whether or not it will be possible to make use of this type of a broad-based study for tracking changes due to any type of mass-market or measure-specific set of market intervention strategies.