



# **Residential Discretionary Retrofit and Time of Sale Renovation Market Characterization**

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**THE DISCRETIONARY RETROFIT AND TIME-OF-SALE RENOVATION (“R&R”) MARKET CHARACTERIZATION ADDRESSED A WIDE RANGE OF END-USER AND SUPPLY-SIDE MARKET ACTORS, AND EXAMINED SEVERAL KEY RESIDENTIAL ENERGY-EFFICIENCY MEASURES. MARKET CHARACTERISTICS, BARRIERS, POTENTIAL INTERVENTIONS, AND PRELIMINARY MARKET EFFECTS INDICATORS WERE IDENTIFIED, FOR BOTH INDIVIDUAL-MEASURE AND “WHOLE-HOUSE” (MULTIPLE-MEASURE) APPLICATIONS.**

This section briefly summarizes the highlights from this important market characterization study. The research method, end-user and supply-side market actor survey results, end-user and supply-side market barrier assessments, recommended interventions, and potential for development of a whole-house discretionary retrofit (DR) and time-of-sale renovation (TOS) market are addressed in much more detail in the body of this report.

*Highlights Among End Users – Survey Results and Market Barriers (please see chapter 2)*

The size of the addressable R&R market in PG&E territory is estimated at 2,165,000 households, three-quarters (75%) of whom reside in non-rural single-family dwellings (SFDs), while one-fifth (19%) own and occupy non-rural condominiums or townhomes, and the remaining 7 percent are in rural areas. (These three segments were the end-user focus of this study; percentages add to 101 due to rounding.)

- Conservatively, 20,000 to 25,000 PG&E customers experience TOS renovations annually, and roughly one-half of these events involve multiple measures (i.e., whole-house applications). Approximately 96,000 customers undertake whole-house DR actions each year, with windows the most common measure change, followed by HVAC.
- While there is some awareness of EEMs (energy-efficiency mortgages) and EELs (energy-efficiency loans) among residential customers in the R&R program’s addressable market, awareness remains relatively low, and active consideration and use of these products are very low (under 1 percent).
- Five percent of respondents overall reported being Hispanic households living in their first home. However, the proportion who were first-time Hispanic home buyers since January 1997 was very small, resulting in a conservative *per annum* estimate of 2,400 first-time Hispanic home buyers, within the addressable R&R market, in PG&E territory. (This estimate is conservative because of minimum income qualifications for the SFD segment, which will tend to result in under-estimates of first-time homebuyers.)

Regarding results from the end-user TOS survey, respondents indicated relatively high willingness to at least investigate replacement of “less-than-perfect” windows, lighting, and HVAC (in that order of desirability) in their next home purchase. (The less-than-perfect scenarios were worded to be distinct from any highly urgent replacement of a failing product.)

- TOS respondents claimed that energy efficiency would be fairly important in driving their decision to replace windows, lighting, or HVAC, and also claimed a fair amount of confidence in their ability to identify high-efficiency measures. However, trustworthy information sources beyond PG&E were fairly uncommon.
- High first cost remains a key barrier to active shopping regarding TOS renovations, while the home energy survey shows significant potential for mitigating these concerns. First-time Hispanic home buyers placed particular value on both the home energy survey and the option of obtaining product information from home centers like Home Depot.
- Assuming reliable information that mitigates performance uncertainty, respondents were most open to TOS renovation of windows, and least open to TOS renovation of lighting, with access to financing an important barrier to be addressed by the R&R program. TOS respondents attributed reasonably high importance to EEMs, but responses were mixed regarding willingness to invest \$200 in CHEERS as an EEM prerequisite.
- Assuming that respondents typically can save 10 to 30 percent by upgrading to high-efficiency windows, HVAC, and lighting (in that order). TOS respondents reported significant willingness to consider TOS renovations based on that robust scenario.

While most of the above highlights also hold true for the discretionary retrofit (DR) sample, in approximately the same proportions and areas of emphasis, a few key differences emerged between DR and TOS respondents.

- Regarding results from DR events, windows, followed by HVAC (not lighting), were reported to be the most likely candidates for prompting whole-house retrofit events.
- Assuming reliable information about energy-efficient products, DR respondents report they are most likely to consider window retrofits, followed by kitchen appliance retrofits, and HVAC retrofits.

- The perception of whole-house barriers was generally lower among DR respondents than among TOS respondents. Specifically, transaction/hassle costs, information/search cost, and hidden cost barriers, and access to financing were rated at least somewhat lower by DR respondents than by TOS respondents.
- Regarding market barriers, the most critical barriers vary somewhat across retrofit and renovation events, and by single-measure vs. whole-house application; however, high perceived first cost (low perceived value) remains the most pervasive barrier across the different scenarios investigated. Access to financing, bounded rationality, and asymmetric information emerge as common, secondary market barriers across the DR and TOS individual-measure and whole-house scenarios, with service unavailability and transaction costs as significant barriers in the whole-house TOS renovation context.

*Highlights Among Supply-Side Market Actors – Survey Results and Market Barriers*

- Based on the relatively low efficiency of existing residential **windows**, this is one of the highest-potential R&R measures, in terms of potential energy savings through replacement of existing stock with state-of-the-market windows. (Please see chapter 3 for more supply-side windows information).
  - Advances in windows technology, combined with more stringent codes, have led to current product offerings that are far more efficient than the current installed window stock. Windows distributors report that over 80 percent of the windows they sell meet their definition of energy efficiency.
  - However, cost-effectiveness of energy-efficient windows varies within PG&E territory, necessitating careful targeting of market interventions and marketing messages to different regions and climate zones.
- Specialized windows contractors, who account for most of the retrofit window installations in the residential market, are more knowledgeable about window efficiency issues than are general contractors, but are unwilling to take the lead in whole-house energy projects. General contractors reported a lower level of efficient windows installed, but are more receptive to the whole-house approach to energy efficiency. This same general pattern was seen among general and specialty contractors for lighting, HVAC, and kitchen applications as well.

- Although architects are involved in only about 25 percent of window retrofits, they play an important role in the market, since they actively promote energy-efficient windows as well as a whole-house approach to energy efficiency. They also play an important role in promoting energy-efficient HVACs.
- The **HVAC** replacement market is an important component of the retrofit market in PG&E's service territory. While manufacturers and distributors see energy-efficient HVAC equipment as part of a "niche market", they acknowledge the possibility of higher revenue and profit margins. As with many incremental investments in energy-efficient equipment, the payback on high-efficiency HVAC systems is relatively long. Integrated energy-efficiency solutions in which downsizing of the HVAC equipment is possible, innovative financing approaches, as well as informational messages in which energy and non-energy benefits are highlighted, are therefore recommended. (Please see chapter 4 for more HVAC information).
- Although **kitchen appliances** (refrigerators and dishwashers) are less important—in terms of total annual sales revenue in PG&E's service territory—than windows and HVAC in the retrofit and renovation market, there are still substantial opportunities available for increases in energy efficiency. (Please see chapter 5 for more kitchen appliances information).
  - A large number of market actors can be involved in the kitchen remodeling market. These include manufacturers, distributors, and retailers in the window, lighting, insulation, cabinet, flooring, and appliance markets—as well as contractors, architects, inspectors, and lenders.
  - Architects and general contractors each are involved in specifying and/or installing approximately one-third of the kitchen appliances sold to consumers in the remodeling market.
- According to contractors, homeowners are primarily concerned with **lighting** quality, style and aesthetics, and not energy efficiency, when selecting lighting equipment. This has led to a generally low level of energy efficiency in residential retrofit lighting, although CFL installations have increased over time, as new CFL technologies have been developed to address customers' quality and aesthetic concerns. Although the first costs of CFLs are high compared to incandescent lamps, the energy savings and longer life of CFLs yield reasonable paybacks over the life of the CFL. (Please see chapter 6 for more lighting information).

- The most pervasive and significant supply-side market barrier across all measures is high first cost, reflective of market actors' feel for end-user concerns and barriers. Regarding whole-house TOS applications, realtors clearly have transaction/hassle cost concerns, as they and others reported.
  - In addition, market uncertainty among supply chain participants and information/search costs among contractors are secondary barriers that complicate high-efficiency windows use.
  - Lighting distributors, retailers, and contractors express concerns about hidden costs in attempting to promote and stock high-efficiency lighting more aggressively.
  - Because product development and stocking decisions are more significant for HVAC supply chain participants, market uncertainty is a heightened barrier among that group. Information/search costs are also perceived as a major barrier across the range of supply-side market actors (except realtors). The shortage of well-trained technicians renders service unavailability a key HVAC barrier as well.
  - By the nature of their market, kitchen remodelers and appliance suppliers have a similar, yet somewhat different view of high-efficiency barriers. Kitchen appliance retailers voiced style and transaction/cost issues, while distributors and contractors were more focused on high first cost and performance uncertainty (the two complementary halves of “payback”). (Please see chapter 7 for more information on whole-house issues).

### *Preliminary Intervention Recommendations*

QC's preliminary recommendations for R&R program interventions address a combination of individual-measure and whole-house issues (please see chapter 8). This market characterization study confirmed that the first “layer” of individual-measure market barriers (i.e., mitigation and education regarding measure first cost) must be addressed successfully, before the second layer of barriers more tied to whole-house applications (e.g., the void in willing *and* able whole-house service integrators) are fully relevant to the R&R program. The items below are highlights, and significantly more discussion and analysis is available in Chapter 8 of this report.



- While the ultimate indicator of effectiveness of any intervention is the adoption of efficient solutions as standard practice in the retrofit and renovation markets, different interventions would be expected to have their primary effects at different stages of the awareness-interest-intention-adoption process for different market actors.
- The single barrier most consistently identified as very important – high initial cost relative to perceived value – appears to be best addressed by improving the level of understanding of affected market actors through a variety of information, promotion, and education and training interventions.
- Interventions that help assure market actors of the quality and cost-effectiveness of energy-efficiency measures should be effective in overcoming asymmetric information, bounded rationality, and performance uncertainty barriers. The ENERGYSTAR® label could be a key component of such interventions.
- Since market uncertainty reflects supply-side actor doubts about whether investments in the production, stocking, or marketing of energy-efficient technologies will pay off, this barrier can generally be mitigated through diversified information interventions that visibly show a commitment to building or sustaining demand for such technologies.
- Organizational practice and other barriers that come into play as supply-side market actors consider changes in the way they do business can be countered primarily by information-based interventions and training, as well as third-party certification that enables supply-side actors to differentiate themselves. Likewise, end-user bounded rationality can be addressed by interventions that reinforce confidence in high-efficiency investments and facilitate end-user action, including financing and incentives, energy surveys, and (for TOS applications) accessible, standardized resources for obtaining EEMs and whole-house solutions.
- In order to maximize program efficiency and synergy, the R&R portfolio must address the full range of supply-side actor knowledge, interest, positive intentions, actions, and “habituation” with respect to high-efficiency measures and the whole-house model.

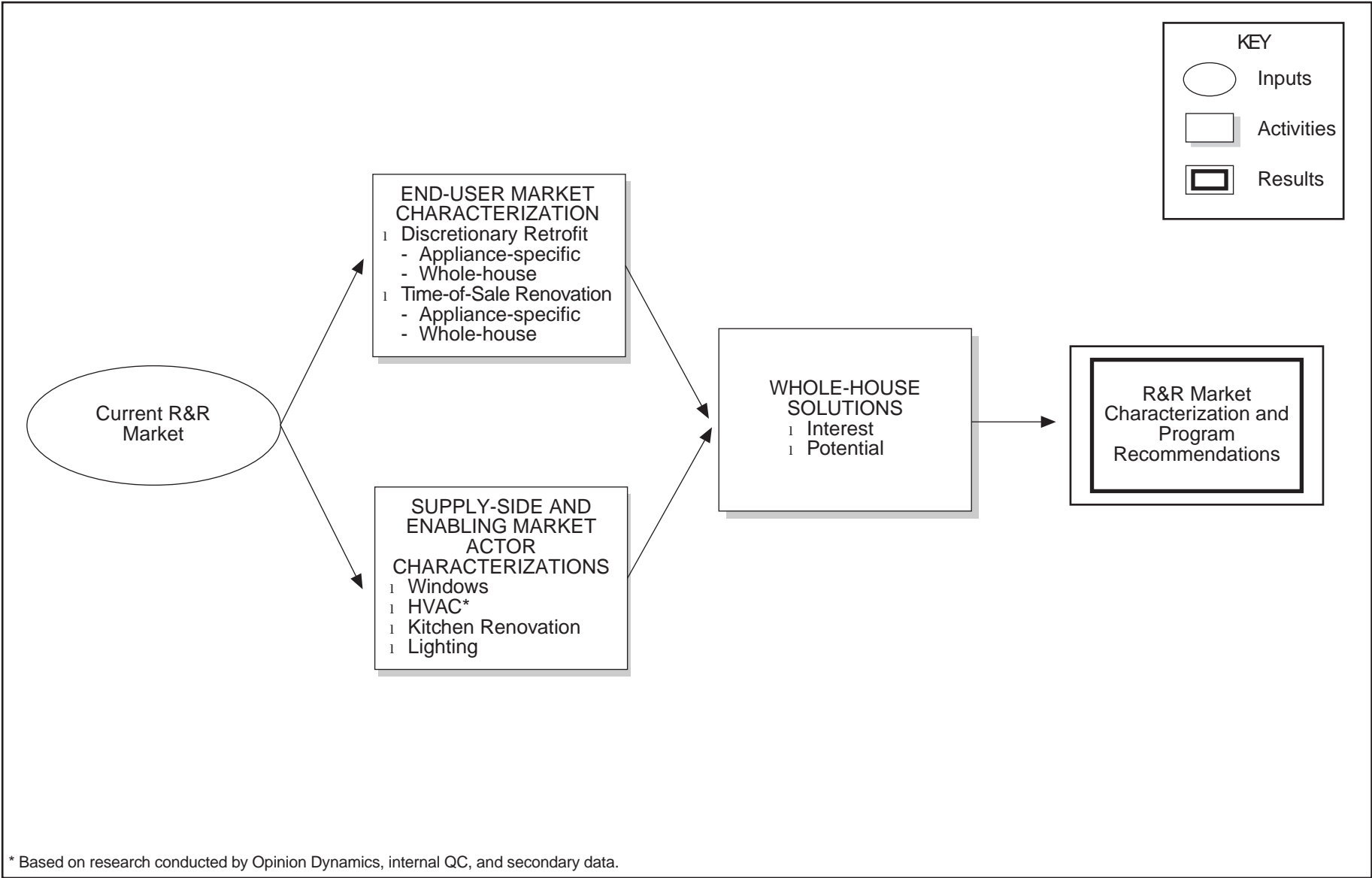
*EXECUTIVE SUMMARY . . . CONTINUED*

- Information and promotion of high-efficiency benefits – particularly targeted, proactive communication that does not rely upon market actor initiative – is critical to increasing supply-side interest in high-efficiency measures and whole-house applications.
- This is particularly true because the R&R program targets an opportunity driven by situational factors (desire to buy, sell, or upgrade a home) that are difficult for potential suppliers to target or anticipate ahead of time. Every effort must be made to use market actor awareness generation activities to persuade prospective consumers to identify themselves, and to link these prospects with quality suppliers.
- Education and training interventions are designed to address specific supply-side barriers requiring detailed technical knowledge best conveyed in a more structured setting. Training efforts should be linked to program information and promotion, to ensure that sessions are attended by the right market actors.
- Testing and third-party certification interventions can help address concerns about measure and installer performance. By creating a list of pre-screened suppliers, certification programs can also help bring buyers and sellers together, and can be a particularly powerful intervention if linked with the SmarterEnergy™ site.
- While financial incentives were downplayed during interviews with supply-side market actors, a number of respondents nevertheless suggested them as effective ways to overcome the first-cost barrier to more efficient products, including windows. Financial incentives will only be able to gradually recede as purchase motivators as other, less ephemeral market transformation processes take root.

All of the information briefly touched upon in this executive summary is addressed in much more depth in subsequent report chapters. In summary, the R&R program has real opportunities to target complementary interventions to end users and supply-side actors in a way that addresses their concerns (some more valid than others), and to demonstrate the viability of appropriately targeted high-efficiency measures in general, and whole-house applications in particular. While small, the TOS renovation niche appears growable, and the DR market already is robust, with the need for more emphasis on high-efficiency replacements of multiple measures.

## 1. INTRODUCTION

Exhibit 1-1  
Residential R&R Market Characterization  
Project Overview



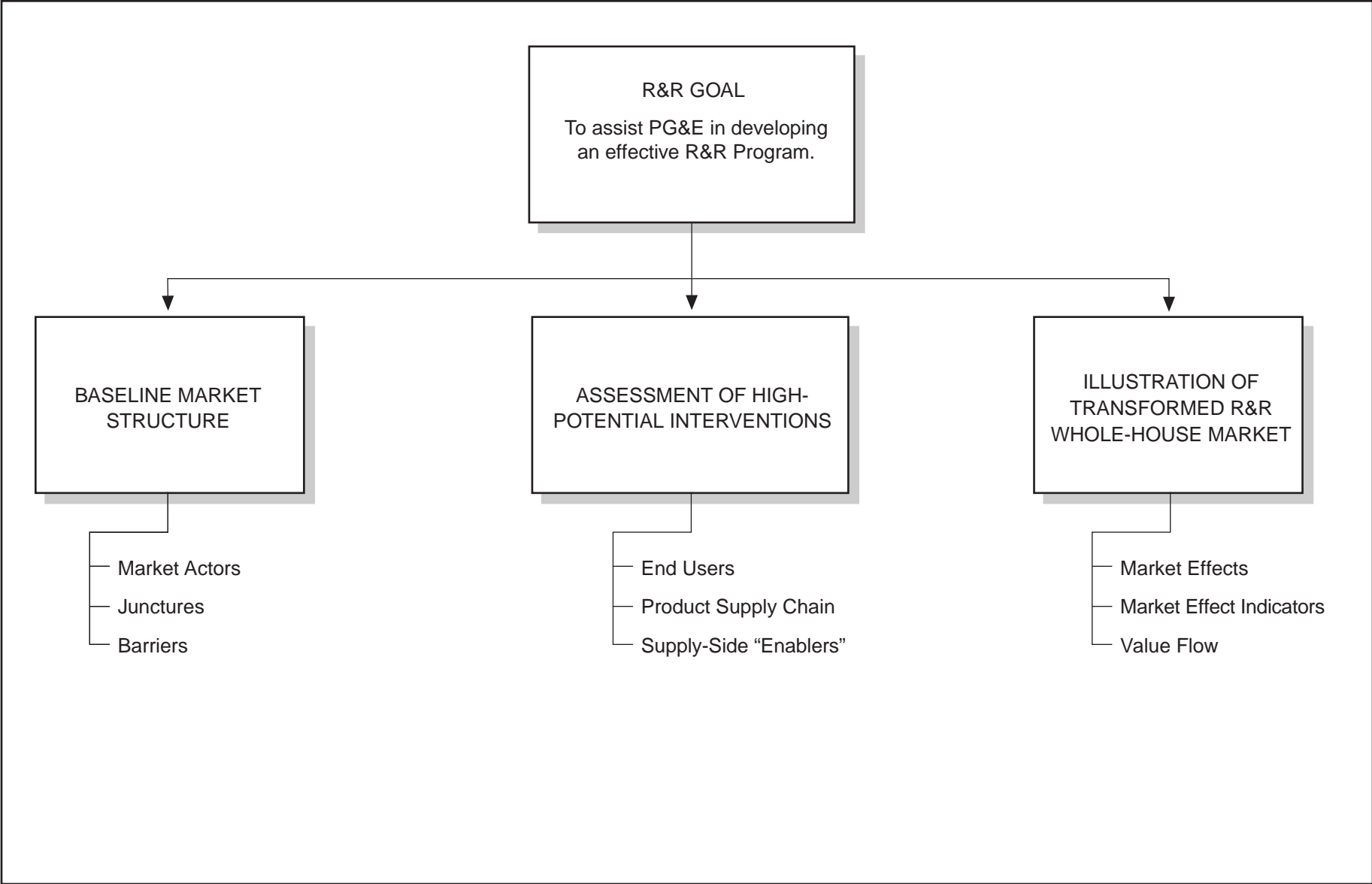
**THE RESULTS OF THE RESIDENTIAL DISCRETIONARY RETROFIT AND TIME-OF-SALE RENOVATION (R&R) MARKET CHARACTERIZATION ARE PRESENTED IN THIS REPORT.**

- Project goals and objectives, method, and primary data collection activities are discussed in the remainder of this chapter.
- Key findings of the End-User Market Characterization are presented in Chapter 2, concentrating on individual appliance and whole-house barriers from both a discretionary retrofit (DR) and time-of-sale (TOS) renovation perspective. Chapter 2 also includes detailed tables and discussion regarding the “core” end user surveys for this study: the baseline survey, the discretionary retrofit (DR) survey, and the TOS (time-of-sale renovation) survey. Results from the targeted first-time Hispanic home buyers survey are included in the TOS survey section (for data comparable to TOS data), and also in a separate appendix. Results of a small survey of CHEERS participants also reside in a separate appendix.
- This is followed by Supply-side and Enabling Market Actor Characterizations in Chapters 3-6, for the residential Windows, HVAC, Kitchen Renovation and Lighting markets, respectively. These chapters contain in-depth analyses of the major characteristics of each market, as they pertain to implementing appliance-specific, and, especially, whole-house energy-efficient solutions. The relationship among market actors is presented, key characteristics of each actor are analyzed, and the barriers to energy-efficiency investments are described.
- The interest in, and potential for, whole-house energy-efficient investments on the part of key market actors is then investigated in Chapter 7. End users generally expressed openness to at least considering whole-house discretionary retrofits and TOS renovations, including use of some of the enabling tools (energy-efficient mortgages, energy-efficient loans, and CHEERS analyses), assuming a reasonable payback opportunity. Because there appear to be no fundamental end user barriers to whole-house activities (beyond circumstantial need), Chapter 7 focuses on the potential, barriers, and possible whole-house opportunities among supply-side market actors, where the most basic “enabling” changes need to occur. As a result, this chapter provides insight into the likely role of different market actor groups in the evolving whole-house energy-efficiency industry, tying together results of previous chapters.

- Chapter 8 discusses potential intervention strategies, along with preliminary market effects indicators (pending final program development and execution).

THE MAJOR THRUST OF THE REPORT IS THE SINGLE-FAMILY DETACHED MEDIUM AND HIGH INCOME SEGMENT. KEY DIFFERENCES IN MARKET CHARACTERISTICS AND BARRIERS BETWEEN THE SFD END USER SEGMENT AND THE OWNER/OCCUPIED CONDOMINIUM, RURAL AND FIRST-TIME HISPANIC HOMEBUYER SEGMENTS ARE HIGHLIGHTED AS APPROPRIATE.

Exhibit 1-2  
Residential R&R Market Characterization Goals and Objectives



THE OVERALL GOAL OF THIS PROJECT IS TO ASSIST PACIFIC GAS AND ELECTRIC COMPANY (PG&E) IN DEVELOPING THE MOST EFFECTIVE R&R PROGRAM POSSIBLE.

In meeting this goal, Quantum Consulting (QC) characterized the existing market for R&R program interventions, particularly emphasizing whole-house DRs and TOS renovations. There are three stages to characterizing the retrofit and renovation market.

- Characterization of the baseline market structure, actors, junctures, and barriers.
- Assessment of the high-potential interventions among the key market actors.
- Illustration of the transformed R&R whole-house market, including identification of likely market effects and market effect indicators.

THE THREE KEY STAGES THEN WILL CULMINATE IN STRATEGIC RECOMMENDATIONS FOR DEVELOPING THE R&R PROGRAM.



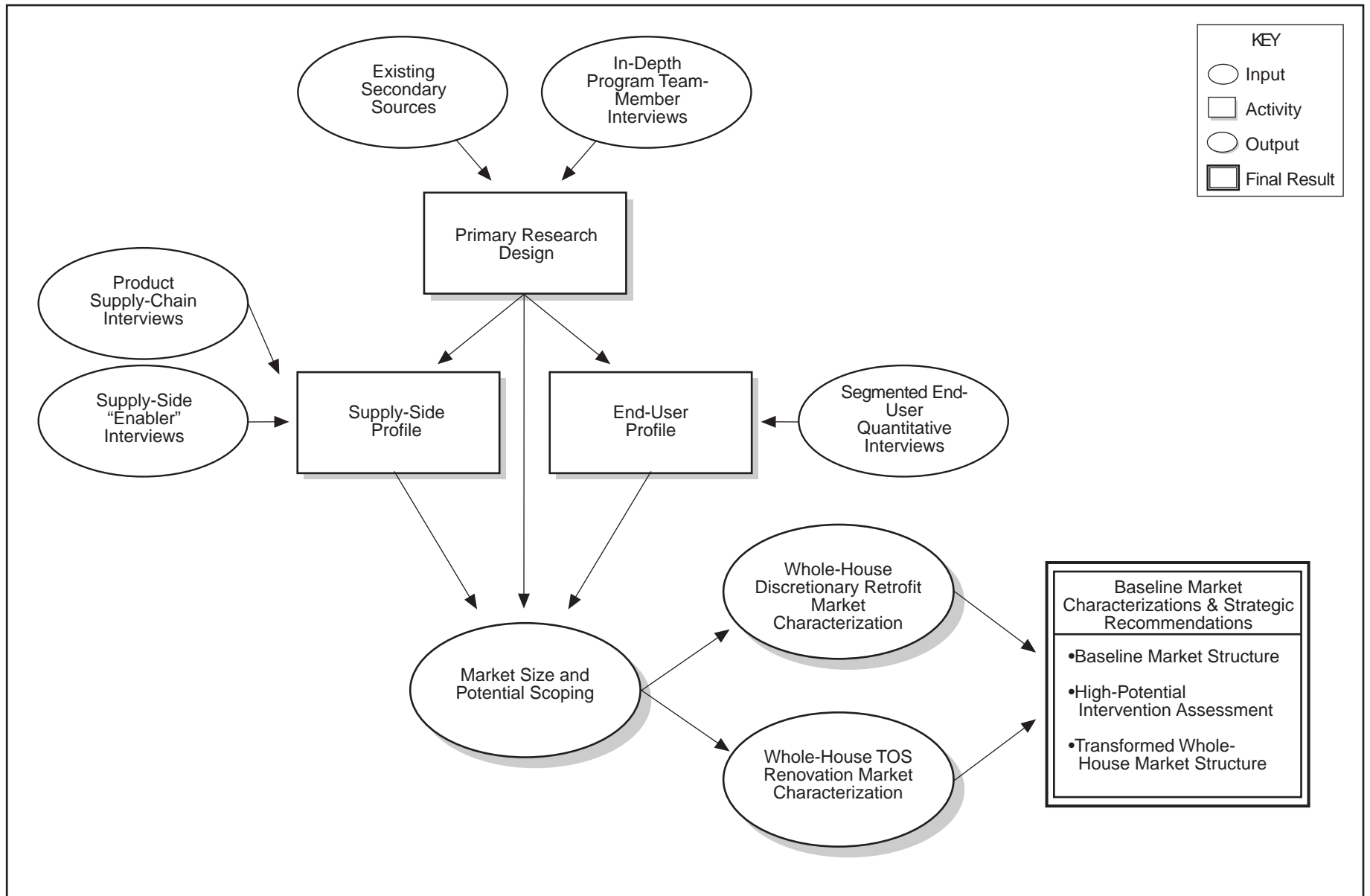
- This R&R Market Characterization was conducted to develop a profile of the market in terms of current activity and development potential, with the goal of making it more robust through the use of market transformation (MT) interventions. The study was designed to characterize the market consistent with the commonly-accepted, evolving model used in California to describe and evaluate energy-efficiency markets in terms of Market Barriers, Market Interventions, Market Effects (and Market Effects Indicators), and a vision of what a “transformed” market looks like and how to move toward that state. Two key reference documents for this study were the Scoping Study<sup>1</sup> and the Summary Study.<sup>2</sup>
- Project team members included Lisa Cooper and Forest Harrison from PG&E’s Customer Opinion Research Section, as well as numerous R&R team members who contributed input and feedback at various points throughout the process. From QC, lead team members were Michael Sedmak, Todd Board, Phil Willems, Sheryl Curtsinger, Tom Talerico, and Rod Ehler, supported by other QC staff and consultants as needed.
- The deliverable of this study consists of QC’s recommendations for developing the R&R program, as well as preliminary insights on execution as well. Data from primary research among a wide range of supply-side and end-user market actors also are recapped in detail. Results from primary research, in selected cases augmented by QC knowledge about energy-efficiency technologies, trends, and market actors, were used to formally evaluate market barriers and map them to specific intervention recommendations.

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<sup>1</sup> Eto, Joseph, Ralph Prael, and Jeff Schlegel. 1996. *A Scoping Study on Energy Efficiency Market Transformation by California Utility DSM Programs*, Ernest Orlando Lawrence Berkeley National Laboratory, LBNL-39058 UC-1322, Prepared for The California Demand-Side Measurement Advisory Committee, Berkeley, CA.

<sup>2</sup> Peters, Jane S., Bruce Mast, Patrice Ignelzi, and Lori M. Megdal. 1998. *Market Effects Summary Study, Final Report, Volume 1*, Research Into Action, prepared for The California Demand-Side Measurement Advisory Committee, Portland, OR.

Exhibit 1-3  
Research Method Overview



PRIMARY AND SECONDARY RESEARCH WERE USED TO SCOPE THE CURRENT MARKET SIZE AND POTENTIAL, CHARACTERIZE THE KEY MARKET ACTORS, JUNCTURES, AND BARRIERS, AND IDENTIFY AND PRIORITIZE INTERVENTION STRATEGIES.

- The primary research design, which was a product of program team member interviews and review of secondary data sources, defined the dimensions on which the supply-side market actors and end users were profiled in terms of perceived market barriers, individual-measure and whole-house market potential, and response to potential interventions. The primary design also contributed directly to scoping the market size and potential.
- The supply-side and end-user profiles quantified the importance and prevalence of market barriers, and quantified the relevance of planned interventions. They also quantified existing market activities with respect to single-measure retrofit and renovation, as well as response to whole-house concepts.
- Because the whole-house renovation and retrofit market is relatively new, scoping the market size and potential was an essential step, and an important precursor to subsequent market characterizations.
- The individual measure and whole-house DR and TOS renovation market characterizations provided a clear prioritization of barriers to be addressed. They also provided insight into interventions to be emphasized and integrated into the broader R&R program.

THE SUPPLY-SIDE ELEMENTS OF THE RESEARCH METHOD ARE DISCUSSED NEXT.

**Exhibit 1-4  
Data Sources**

**Supply Side**

<b>Market Actor</b>	<b>Window</b>	<b>HVAC</b>	<b>Lighting</b>	<b>Kitchen</b>	<b>Service Integrators/ Facilitators</b>	<b>Total</b>
<b>Distributors</b>	5		5	5	3	18
<b>Retailers</b>	5		5	5		15
<b>Architects/Designers</b>	9					9
<b>Contractors</b>	10		10	10	21	51
<b>Home inspectors*</b>	10					10
<b>Lenders**</b>	11					11
<b>Realtors</b>	10					10
<b>Media</b>	1	1	1	1	1	5
<b>Trade Organizations</b>	2	2	2	2	2	10
<b>CHEERS Raters</b>	9					9
<b>Building Inspectors</b>	10					10
<b>Total</b>	NA	NA	NA	NA	NA	158

\*Home inspectors may include realtors' listing inspectors, as well as independent inspectors.

\*\*Lenders includes targeted HUD/FNMA contacts.

Note: In addition, findings from 20 in-depth and 227 quantitative HVAC contractor interviews were referenced from the concurrent HVAC market Characterization and Baseline Study.

**QC USED STRUCTURED SURVEYS AMONG A WIDE RANGE OF SUPPLY-SIDE MARKET ACTORS TO ASSESS THE CURRENT AND POTENTIAL MARKETS FOR WHOLE-HOUSE DR AND TOS RENOVATION APPLICATIONS.**

- As the facing exhibit shows, supply-side market actors in the product supply chain were interviewed, along with market actors hypothesized to have an “enabling” role in support of whole-house applications.
  - Market actors dedicated to, or emphasizing, a specific measure (windows, lighting, and kitchen-related measures) were interviewed. In addition, market actors (primarily general contractors) who regularly deal with multiple measures also were interviewed.
  - The HVAC segment was mostly excluded by QC’s supply-side interviews; instead, results were drawn from the concurrent HVAC Market Characterization Study.
  - While customized for the different market actor groups, the surveys were targeted to individuals with decision-making influence and knowledge of the organization’s (or industry’s) sales and/or stocking practices. Supply-side market actors generally were paid a \$50 incentive.
- Interviews were conducted via telephone by senior QC professional staff between April 26 and June 3, 1999. They generally averaged 20 minutes in length, with some interviews ranging up to 30 minutes or more.
- In addition to the interviews summarized in the facing table, for additional insight and background QC conducted 7 face-to-face interviews with lighting manufacturer reps at Lightfair 99 in San Francisco the week of May 10, 1999. These generally were the same individuals (or contact types) that would have been interviewed via telephone.
- For most supply-side surveys, D&B (Dun & Bradstreet) business listings within PG&E territory were used as the sample frame. The sample frame of CHEERS raters was provided by PG&E. The media and trade organization sample frames were developed from sources that QC was already aware of, and occasionally from suggestions made by other supply-side respondents.

**Exhibit 1-5  
Data Sources**

**Supply Side**

<b>Market Actor</b>	<b>Window</b>	<b>HVAC</b>	<b>Lighting</b>	<b>Kitchen</b>	<b>Service Integrators/ Facilitators</b>	<b>Total</b>
<b>Distributors</b>	5		5	5	3	18
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<b>Home inspectors*</b>	10					10
<b>Lenders**</b>	11					11
<b>Realtors</b>	10					10
<b>Media</b>	1	1	1	1	1	5
<b>Trade Organizations</b>	2	2	2	2	2	10
<b>CHEERS Raters</b>	9					9
<b>Building Inspectors</b>	10					10
<b>Total</b>	NA	NA	NA	NA	NA	158

\*Home inspectors may include realtors' listing inspectors, as well as independent inspectors.

\*\*Lenders includes targeted HUD/FNMA contacts.

Note: In addition, findings from 20 in-depth and 227 quantitative HVAC contractor interviews were referenced from the concurrent HVAC market Characterization and Baseline Study.

- The sample sizes were modest in any given supply-side interview “cell” because of the breadth of market actors whose input was needed, balanced against budget and timing factors.
  - However, results were used to generate best estimates of product volume and other descriptive, quantitative information.
  - Where possible, volume data captured in supply-side interviews were compared to end-user survey results, secondary data, and/or general information that QC is aware of from comparable sources.
- While tailored to specific supply-side market actor groups, these surveys generally had a common structure, particularly regarding perceived high-efficiency market barriers and purchase factors, and response to the whole-house concept. Other common elements of the supply-side surveys are summarized below.
  - Surveys among supply chain participants included questions on market structure and “value flow,” or the proportional breakdown of purchases from and/or sales to other market actors in the supply chain. Whole-house “enablers” also answered related questions where relevant.
  - Supply-side respondents also answered questions about high-efficiency sales and/or involvement, including criteria for defining a measure as energy-efficient (where they might be expected to know).
  - Where relevant, these surveys addressed high-efficiency market barriers and perceptions not only from the respondents’ own perspective, but also from the perceived perspective of end users.
  - Financing of customer purchases also was described by relevant market actors.
  - In addition, energy-efficiency training practices and needs were summarized for each supply-side group.
  - Challenges faced when doing business with non-English-speaking customers were addressed, along with methods for meeting these challenges, and ways that PG&E might help.

**KEY FACTS REGARDING THE RESEARCH METHOD FOR THE END-USER SURVEYS ARE SUMMARIZED NEXT.**

**Exhibit 1-6  
Data Sources**

**End Users**

<b>Target</b>	<b>Segment</b>	<b>SFD</b>	<b>Condo</b>	<b>Rural</b>	<b>Total</b>
<b>Baseline</b>		572	115	134	821
<b>TOS Renovation</b>		246	114	29	389
<b>Discretionary retrofit</b>		381	30	189	600
<b>Hispanic first-time</b>			62		62
<b>CHEERS Follow-up</b>			13		13
<b>Total</b>		1,274	259	352	1,885



QC USED TARGETED END-USER SURVEYS AND SAMPLE FRAMES TO DERIVE A BASELINE PROFILE OF THE DR AND TOS MARKETS, AND TO ASSESS MARKET BARRIERS AS WELL AS HIGH-POTENTIAL SEGMENTS, TECHNOLOGIES, AND INTERVENTIONS FOR "WHOLE-HOUSE" APPLICATIONS.

Each of the following end-user surveys is discussed in more detail on subsequent pages.

- A sample of 821 homeowners was surveyed via computer-aided telephone interviewing (CATI) to provide a "baseline" profile of the frequency of DR and TOS renovation events within PG&E territory.
  - Awareness, consideration, and use of energy-efficient mortgages (EEMs) and energy-efficient loans (EELs) also were measured.
  - Data were segmented by three key end-user groups: (1) non-rural, mid-to-upper-income single-family dwelling (SFD) homeowners (household incomes of \$50,000 or greater); (2) non-rural, owner-occupied condo/townhome owners; and (3) rural home owners. These segments are discussed later as "SFD," "condo," and "rural" segments.
  - Baseline survey results were weighted to reflect each home type's proportion of the PG&E territory, based on 1990 U.S. census data, and 1990-1996 growth rates extrapolated through 1999, resulting in an estimated 2.38 million non-rural SFD homes, 1.22 million condo/townhomes, and 0.15 million rural homes.
- A CATI survey was conducted to assess market barriers to high-efficiency measures and the "whole-house" concept, as well as to identify high-potential end-user segments, measures, and intervention strategies, all pertaining to TOS applications.
  - The TOS sample frame was drawn from qualified baseline respondents who also had either bought their home since January 1997, or intended to buy a home within the next two years, within PG&E territory.
  - In total, 107 TOS interviews were completed among the 821 baseline respondents summarized above.
  - After the baseline survey was completed, another 282 TOS respondents were screened and completed on an oversample basis, bringing the total to 389 TOS completes.
- A CATI survey was conducted among 62 first-time Hispanic home buyers in PG&E territory, using an augmented TOS survey (for comparison to the SFD, condo, and rural segments), and also including audience-specific questions related to any special barriers that may exist for first-time Hispanic home buyers. The majority of these interviews were conducted in Spanish based on respondent need or preference, with the remainder conducted in English.

**Exhibit 1-7  
Data Sources**

**End Users**

<b>Target</b>	<b>Segment</b>	<b>SFD</b>	<b>Condo</b>	<b>Rural</b>	<b>Total</b>
<b>Baseline</b>		572	115	134	821
<b>TOS Renovation</b>		246	114	29	389
<b>Discretionary retrofit</b>		381	30	189	600
<b>Hispanic first-time</b>			62		62
<b>CHEERS Follow-up</b>			13		13
<b>Total</b>		1,274	259	352	1,885

- A CATI survey was conducted to assess market barriers to high-efficiency measures and the “whole-house” concept, as well as to identify high-potential end-user segments, measures, and intervention strategies, all pertaining to DR applications.
  - The sample frame consisted of 17,211 participants in PG&E’s Home Energy Survey (HES) database from 1997 and 1998, who owned an SFD or condo year-round, with cooling or heating, and who had indicated in the HES survey that they planned to remodel within the following two years.
  - In total, 600 DR surveys were conducted.
- A small sample frame (fewer than 100 records) of recent CHEERS participants was provided by PG&E, from which QC completed 13 telephone interviews in paper-and-pencil mode. The CHEERS participant survey was conducted to obtain descriptive information and additional insights into the characteristics, needs and motivations of residential customers who have CHEERS inspections completed.

**KEY FACTS ABOUT THE BASELINE SURVEY FOLLOW.**

**Exhibit 1-8  
Data Sources**

**End Users**

<b>Target</b>	<b>Segment</b>	<b>SFD</b>	<b>Condo</b>	<b>Rural</b>	<b>Total</b>
<b>Baseline</b>		572	115	134	821
<b>TOS Renovation</b>		246	114	29	389
<b>Discretionary retrofit</b>		381	30	189	600
<b>Hispanic first-time</b>			62		62
<b>CHEERS Follow-up</b>			13		13
<b>Total</b>		1,274	259	352	1,885

**THE BASELINE SURVEY WAS CONDUCTED TO PROFILE THE EXISTING MARKET FOR DR AND TOS RENOVATION APPLICATIONS.**

As noted earlier, the baseline survey also served as the screening source for the TOS respondents. After the baseline survey was completed, the screening portion was augmented slightly to conduct “oversample” screening for TOS renovation respondents.

- The sample frame for the baseline survey consisted of listed homeowners obtained from STS. SFD and condo/townhome dwellings were identified, and PRIZM codes were used to identify homeowners in rural ZIP codes, which enabled classification of households into SFD, condo, and rural cells prior to telephone contact.
- Screening criteria for the baseline survey included ownership of primary residence (at the residence contacted); SFD households also had to self-report an income of \$50,000 or more.
- The baseline survey averaged 5 minutes in length, and was completed at an incidence of 60 percent.
- The total of 821 respondents was comprised of 572 in the SFD segment, 115 in the condo segment, and 134 in the rural segment. In addition, 107 TOS respondents were identified, recruited and interviewed from among the 821 baseline respondents.
- The baseline survey was conducted between May 5 and May 27, 1999.
- Baseline results among the SFD, condo, and rural respondents were weighted using 1990 U.S. Census data, with 1990-1996 growth rates extrapolated through 1999. The resulting weight targets were 2.38 million non-rural SFD households, 1.22 million non-rural condo/townhome households, and 150,000 rural homes (these estimates were in line with data used in the companion HVAC Market Characterization Study). Weighted data then were used to derive best-estimate projections of the number of households engaging in a range of DR- and TOS-related behaviors on an annual basis, factoring in the different survey incidence-of-qualification levels for each sample type.
- Data were analyzed using SAS software, with unweighted results segmented by SFD, condo, and rural respondents. Excel was used to weight the results by segment as described above.

**Exhibit 1-9  
Data Sources**

**End Users**

<b>Target</b>	<b>Segment</b>			
	<b>SFD</b>	<b>Condo</b>	<b>Rural</b>	<b>Total</b>
<b>Baseline</b>	572	115	134	821
<b>TOS Renovation</b>	246	114	29	389
<b>Discretionary retrofit</b>	381	30	189	600
<b>Hispanic first-time</b>	62			62
<b>CHEERS Follow-up</b>	13			13
<b>Total</b>	1,274	259	352	1,885

**THE TOS SURVEY FOCUSED ON MARKET BARRIERS TO HIGH-EFFICIENCY MEASURES AND THE "WHOLE-HOUSE" CONCEPT, AS WELL AS IDENTIFYING HIGH-POTENTIAL END-USER SEGMENTS, MEASURES, AND INTERVENTION STRATEGIES, PERTAINING TO TOS APPLICATIONS.**

The baseline survey and sample frame served as the screening and sample source for TOS respondents as well. After the baseline survey was completed, the screening portion was augmented slightly to conduct "oversample" screening for TOS renovation respondents.

- As with the baseline survey, the sample frame for TOS respondents consisted of listed homeowners obtained from STS. SFD and condo/townhome dwellings were identified, and PRIZM codes were used to identify homeowners in rural ZIP codes, which enabled classification of households into SFD, condo, and rural cells prior to telephone contact.
- In addition to meeting baseline survey screening criteria, TOS respondents had to *either* have bought their current home since January 1997 *or* be at least somewhat likely to buy a different home within the next two years. The purpose of this screening was to focus the TOS survey among end users who had recently been through the home purchase experience, or were contemplating the experience in the near future.
- Following pretesting and revision of the survey, the final TOS survey averaged 17 minutes in length, and the oversample incidence of qualification was 9 percent.
- The total of 389 TOS respondents included 246 SFD respondents, 114 condo respondents, and 29 rural respondents. Interviewing was stopped at that point because TOS incidence was trending at 9 percent, which, when combined with the 60 percent incidence for the baseline survey, in turn caused the "net" incidence across the two, linked studies to be 24 percent (versus the study spec of 30 percent). The forecast for "net" incidence across the two studies if 600 TOS surveys (the initial target) had been completed was 19 percent, far below the study spec of 30 percent. The rural segment was particularly problematic in terms of identifying households that qualified on all of the survey criteria.
- Data collection occurred from May 5, 1999 through June 14, 1999.

**Exhibit 1-10  
Data Sources**

**End Users**

<b>Target</b>	<b>Segment</b>	<b>SFD</b>	<b>Condo</b>	<b>Rural</b>	<b>Total</b>
<b>Baseline</b>		572	115	134	821
<b>TOS Renovation</b>		246	114	29	389
<b>Discretionary retrofit</b>		381	30	189	600
<b>Hispanic first-time</b>			62		62
<b>CHEERS Follow-up</b>			13		13
<b>Total</b>		1,274	259	352	1,885



- TOS results were analyzed with SFDs as the benchmark segment, with comparisons of the condo and rural segments against the SFD segment. On comparable questions, responses from the first-time Hispanic home buyers survey also were incorporated in the analysis, and their results were compared to the SFD segment.
- Data were analyzed by SAS, with results presented in table form and discussed in Chapter 2. Statistical tests of mean and proportion differences at the 95 percent confidence level were conducted using t/Z-tests and binomial p-tests, respectively, again comparing the SFD segment to the other segments.

**Exhibit 1-11  
Data Sources**

**End Users**

<b>Target</b>	<b>Segment</b>			
	<b>SFD</b>	<b>Condo</b>	<b>Rural</b>	<b>Total</b>
<b>Baseline</b>	572	115	134	821
<b>TOS Renovation</b>	246	114	29	389
<b>Discretionary retrofit</b>	381	30	189	600
<b>Hispanic first-time</b>	62			62
<b>CHEERS Follow-up</b>	13			13
<b>Total</b>	1,274	259	352	1,885

**THE FIRST-TIME HISPANIC HOME BUYERS SURVEY WAS CONDUCTED TO FOCUS ON TOS-RELATED ISSUES AND OPPORTUNITIES AMONG THIS IMPORTANT AND GROWING END-USER SEGMENT.**

The targeted survey among first-time Hispanic home buyers was intended to provide baseline information on how this segment may differ from the broader end-user market (specifically the SFD segment), and also on specific information and access barriers that may exist for first-time Hispanic home buyers who may want to install energy-efficient measures at TOS events.

- The sample source for this segment was the same as for the baseline and TOS surveys, and then PRIZM codes were used to identify Hispanic-prevalent ZIP codes to define the sample frame. This sample frame was then further refined by visually screening for Hispanic surnames prior to telephone contact.
- To qualify for this survey, respondents needed to self-report Hispanic household membership, and also needed to have bought their first home (in the U.S.) since January 1997. The screening process also determined whether the appropriate household respondent preferred or required completion of the survey in Spanish or English.
- The interviews averaged 20 minutes in length, and were completed by the QC survey center director and another staff interviewer, both of whom are fluently bilingual. The majority of interviews were conducted in Spanish.
- Data collection occurred from May 28 to June 14, 1999.
- Responses to comparable questions were included in the TOS portion of the end-user analysis, and compared to SFD responses. A synopsis of results from this survey, along with supply-side input on challenges in doing business with non-English-speaking customers, is included as a separate appendix.
- Data were analyzed by SAS, and presented and discussed as described above.
- This survey was conducted as an adjunct to the main TOS survey, and as a pilot in beginning to address this unique and important segment. More statewide work is needed to fully understand and address its needs.

**Exhibit 1-12  
Data Sources**

**End Users**

<b>Target</b>	<b>Segment</b>	<b>SFD</b>	<b>Condo</b>	<b>Rural</b>	<b>Total</b>
<b>Baseline</b>		572	115	134	821
<b>TOS Renovation</b>		246	114	29	389
<b>Discretionary retrofit</b>		381	30	189	600
<b>Hispanic first-time</b>			62		62
<b>CHEERS Follow-up</b>			13		13
<b>Total</b>		1,274	259	352	1,885

**THE DR SURVEY FOCUSED ON MARKET BARRIERS TO HIGH-EFFICIENCY MEASURES AND THE "WHOLE-HOUSE" CONCEPT, AS WELL AS IDENTIFYING HIGH-POTENTIAL END-USER SEGMENTS, MEASURES, AND INTERVENTION STRATEGIES, PERTAINING TO DR APPLICATIONS.**

- The sample frame consisted of 17,608 participants in PG&E's Home Energy Survey (HES) database from 1997 and 1998, who owned an SFD or condo year-round, with cooling or heating, and who had indicated in the HES survey that they planned to remodel within the following two years. PRIZM codes were used to identify rural customers. The number of condo respondents was small (397), which in turn constrained the number of condo respondents interviewed.
- To qualify for the survey, respondents had to either have made a voluntary change in one or more measures of interest to the study since January 1997, or had to be planning such a voluntary change within the next two years. This was in addition to the baseline screening criteria (ownership and occupancy of primary residence; SFD households self-reported incomes of \$50,000 or more).
- The interviews averaged 18 minutes in length and occurred at a 60 percent incidence.
- The total of 600 DR respondents included 381 SFD respondents, 30 condo respondents, and 189 rural respondents.
- Data collection occurred from May 27 to June 10, 1999.
- DR results were analyzed with SFDs as the benchmark segment, with comparisons of the condo and rural segments against the SFD segment.
- Data were analyzed by SAS, with results presented in table form and discussed in Chapter 2. Statistical tests of mean and proportion differences at the 95 percent confidence level were conducted using t/Z-tests and binomial p-tests, respectively, again comparing the SFD segment to the other segments.

**Exhibit 1-13  
Data Sources**

**End Users**

<b>Target</b>	<b>Segment</b>	<b>SFD</b>	<b>Condo</b>	<b>Rural</b>	<b>Total</b>
<b>Baseline</b>		572	115	134	821
<b>TOS Renovation</b>		246	114	29	389
<b>Discretionary retrofit</b>		381	30	189	600
<b>Hispanic first-time</b>			62		62
<b>CHEERS Follow-up</b>			13		13
<b>Total</b>		1,274	259	352	1,885

**THE CHEERS PARTICIPANT SURVEY WAS CONDUCTED TO OBTAIN DESCRIPTIVE INFORMATION AND ADDITIONAL INSIGHTS INTO THE CHARACTERISTICS, NEEDS AND MOTIVATIONS OF RESIDENTIAL CUSTOMERS WHO HAVE CHEERS INSPECTIONS COMPLETED.**

- PG&E provided a targeted (fewer than 100 records) sample frame of CHEERS participants since January 1997 who had agreed to follow-up contact of this type. QC used directory assistance to obtain telephone numbers.
- This sample frame included some records that were unable to be contacted because they were no longer at the listed address, and a few records where the occupant had not been the decision maker (e.g., military housing).
- QC exhausted the sample frame and completed 13 paper-and-pencil interviews via telephone, averaging approximately 15 minutes in length.
- Data collection occurred from May 20 to June 1, 1999.
- Questions and results were not directly comparable to the main baseline, TOS, or DR surveys, because of the special nature of this population. Results therefore were summarized in a separate appendix, including both narrative description of results, and an Excel distillation of responses.

*INTRODUCTION . . . RESEARCH METHOD . . . OTHER KEY FACTS*

Quantum Consulting (QC) conducted this study, and was responsible for all phases of the study, including report writing, under the direction of PG&E.

Contacts are Michael Sedmak, Ph.D., 410-897-0337, and Todd Board, 510-540-7200.



- The End-User Market Characterization begins by presenting the baseline survey data, which serves as a backdrop for examining individual-measure and whole-house activity and potential in more detail in the TOS and DR surveys. Included in this first section are baseline rates of consumer behavior within PG&E territory relevant to the R&R program, as well as volume projections of key market characteristics.
- The second section of this chapter discusses highlights of market barriers, based primarily on “voice-of-the-customer” input, but also – importantly – leavened by knowledge and input from other relevant sources, including input from supply-side market actors and knowledgeable industry observers. These market barriers are clearly mapped to specific TOS and DR survey questions, the degree of importance attached to specific market barriers is commented on in detail, and selected barriers where QC judgement or other input beyond solely end user input was used are clearly indicated. This section also provides data-driven information on high-potential measure “catalysts” and overall whole-house potential.
- The third section of this chapter provides detail on the results from the TOS renovation end user survey. Survey data pertaining to the market barriers are included, as well as questions pertaining to potential R&R program interventions, purchase intent toward individual high-efficiency measures and whole-house investments under specific scenarios, and respondent demographics and other pertinent characteristics.
- The final section of Chapter 2 recaps the same basic information as in the preceding bullet, for the DR survey.

**NEXT ARE RESULTS FROM THE BASELINE SURVEY.**

This section discusses “baseline” market characteristics among non-rural SFD households (with minimum incomes of \$50,000); non-rural, resident condo/townhome owners; and rural home owners. Results shown for these three end-user segments (“SFD,” “condo,” and “rural,” respectively) are shown unweighted in this section, as they are in subsequent sections in Chapter 2 on TOS and DR results. In addition, data are shown here on a *weighted* basis, where segment-level population sizes and survey qualification data have been incorporated to develop a projectable view of the “addressable” marketplace for the R&R program – that is, the population of homeowners who are estimated to qualify for this survey, within PG&E territory.

- The first step in weighting the data was to obtain U.S. census counts of the three dwelling types within PG&E territory. 1990 census estimates, extrapolated through 1999 based on 1990-1996 growth estimates, resulted in an estimate of 2.38 million non-rural SFDs, 1.22 million non-rural condos, and 150,000 rural homes within PG&E territory.
- These populations then were filtered by the survey “incidence of qualification” data for each segment, since they differed notably.
  - The SFD sample of 572 respondents qualified for the survey at a 68 percent rate; the remaining contacts generally screened out because they did not meet the \$50,000 income threshold previously used to define the non-rural segment of the addressable market for R&R. Multiplying 2.38 million times 68 percent results in an estimated, addressable non-rural SFD population of 1,618,400 households.
  - The condo sample of 115 respondents qualified at only a 33 percent incidence, because so many condos and townhomes are not owner-occupied. Multiplying 1.22 million times 33 percent results in an estimated, addressable non-rural condo population of 402,600 households.
  - The rural sample of 134 respondents qualified at a 96 percent incidence, because neither income threshold nor owner-occupation issues exist in that segment, as defined. Multiplying 150,000 times 96 percent results in an estimated, addressable rural population of 144,000 households.
  - The three segments sum to 2,165,000 total, estimated addressable households in PG&E territory.

- When each of these three segment populations is expressed as a proportion of the total of 2,165,000 households, the proportions are SFD-.747, condo-.186, and rural-.067. These weights were multiplied times the percentage distribution of responses, by segment, to derive baseline survey results weighted to reflect the total, addressable market for the R&R program.
- In this section, as in the subsequent TOS and DR end-user survey results sections, data generally are presented as a percentage of the total base within that segment, to show the proportion of the entire sample that falls into specific survey response categories on a “net” basis. (Where relevant, results are displayed and discussed in terms of the proportions of respondents *reaching the question* who answered a certain way.) Differences between SFD respondents and other segments described as “significant” were found to be statistically significant at the 95 percent confidence level.
- These “baseline” descriptive and demographic questions also are presented when TOS and DR results are discussed. However, in this baseline section the results are representative of the three end-user groups surveyed for the baseline, and in addition the “weighted total” data account for the weighting of SFD, condo, and rural responses to collectively represent the entire addressable market for whole-house TOS and DR applications. In contrast, when these same “baseline” questions are summarized within the TOS and DR samples, they are *not* representative of the addressable market as a whole, but rather are representative of the more specialized samples that were constructed to address TOS and DR issues. Specifically, household information on homes purchased since January 1997 or anticipated home purchases within two years of the survey date were additional TOS and DR screening criteria.

**BASELINE SURVEY RESULTS ARE DISCUSSED NEXT, STARTING WITH THE RATE OF RECENT HOME PURCHASES AND NEAR-TERM CONSIDERATION OF NEW HOME PURCHASES.**

**Exhibit 2-1**  
**Baseline Survey Results**  
**Home Purchase/Sale Characteristics**

**BLO08. HOME PURCHASED BEFORE OR AFTER JANUARY**

	SFD	CONDO	RURAL	WTD TOTAL	
N POPULATION	572	115	134	821	
BEFORE	94	95	95	94	%
AFTER	6	5	5	6	%
REFUSED	0	0	0	0	%
DON'T KNOW	0	0	0	0	%
N OBS	572	115	134	821	

**WHETHER HOME WAS BRAND NEW OR  
 BLO11. PREVIOUSLY OWNED AT TIME OF PURCHASE**

	SFD	CONDO	RURAL	WTD TOTAL	
N POPULATION	572	115	134	821	
BRAND NEW	29	30	44	30	%
PREVIOUSLY O	71	70	56	70	%
REFUSED	0	0	0	0	%
DON'T KNOW	0	0	0	0	%
N OBS	572	115	134	821	

**LIKELIHOOD OF SELLING CURRENT HOME AND  
 BLO09. BUYING NEW**

	SFD	CONDO	RURAL	WTD TOTAL	
N POPULATION	572	115	134	821	
VERY LIKELY	5	4	5	5	%
SOMEWHAT LIK	9	10	6	9	%
NOT VERY LIKE	24	23	19	24	%
NOT AT ALL LIK	62	59	68	62	%
REFUSED	0	1	1	0	
DON'T KNOW	0	3	1	1	
N OBS	572	115	134	821	

**BLO16. SOLD A HOME SINCE JANUARY 1, 1997**

	SFD	CONDO	RURAL	WTD TOTAL	
N POPULATION	572	115	134	821	
YES	6	5	10	6	%
No	94	95	90	94	%
REFUSED	0	0	0	0	%
DON'T KNOW	0	0	0	0	%
N OBS	572	115	134	821	

REGENCY OF HOME PURCHASE/SALE, LIKELIHOOD OF NEAR-TERM HOME PURCHASE, AND PREVIOUS OWNERSHIP OF CURRENT HOME ARE SUMMARIZED BELOW.

- Overall, six percent of baseline respondents in the addressable R&R market had bought their current home since January 1997 (i.e., a 28-month period through April 1999). Likewise, six percent of baseline respondents had sold a home in the PG&E territory since January 1997. QC believes these are conservative estimates based on general real estate home sales volumes reported statewide in recent quarters by the California Association of Realtors (CAR). It is difficult to fully calibrate baseline estimates to CAR data because data are tracked and reported differently, and because different counties and regions of the state are known to experience dramatically different (and variable) home sales rates.
- One in seven baseline households was very or somewhat likely to sell their current home and buy a new home within PG&E territory within the next two years following the survey.
- Three in ten baseline respondents said their home was new (not previously owned). Rural respondents were significantly more likely than SFD (or condo) respondents to say they home was new when they bought it.

TOS " TIME-OF-PURCHASE" RENOVATION CHARACTERISTICS ARE DISCUSSED NEXT.

**Exhibit 2-2**  
**Baseline Survey Results**  
**"Time-of-Purchase" TOS Renovations**

BLO12. IMPROVEMENTS OR UPGRADES MADE AT THE SELLER'S BLO14. IMPROVEMENTS OR UPGRADES MADE AT THE YOUR E)

	SFD	CONDO	RURAL	WTD TOTAL	
N POPULATION	572	115	134	821	
YES	1	1	1	1	%
NO	5	4	4	5	%
REFUSED	0	0	0	0	%
DON'T KNOW	0	0	0	0	%
N OBS	35	6	7	48	

	SFD	CONDO	RURAL	WTD TOTAL	
N POPULATION	572	115	134	821	
YES	2	2	2	2	%
NO	5	3	3	4	%
REFUSED	0	0	0	0	%
DON'T KNOW	0	0	0	0	%
N OBS	35	6	7	48	

#

CONSERVATIVELY, 23,000 PG&E CUSTOMERS ANNUALLY EXPERIENCE TOS RENOVATIONS, AND ROUGHLY ONE-HALF OF THESE EVENTS INVOLVE MULTIPLE MEASURES (I.E., WHOLE-HOUSE APPLICATIONS).

- Fewer than 1 percent (0.87 percent) of baseline respondents reported having bought a home since January 1997, where improvements or upgrades were undertaken at that time, paid for by the seller. While measure-specific seller-paid TOS changes were captured in the survey, the overall TOS change rate was far too low for meaningful analysis or projection of measure-level data. Please see the TOS discussion of these data for more meaningful information, among the TOS renovation survey group that passed additional qualification screening.
  - This translates to a best estimate of 18,721 households in PG&E territory who have encountered seller-paid TOS home purchase in the past 28 months.
  - On a *per annum* basis this translates to approximately 8,000 households (18,721 times 12, divided by 28) who have encountered seller-funded TOS changes. Because we believe the home sales rate reported by baseline respondents may be conservative, this “volumetric” estimate also is viewed as conservative.
- Slightly under 2 percent (1.65 percent) of baseline respondents reported having bought a home since January 1997, where they funded improvements or upgrades at that time. (Again, the overall rate was far too low for meaningful analysis or projection of measure-level data; please see the TOS discussion of these data for more meaningful information, among the TOS renovation survey group that passed additional qualification screening.) Using the same approach outlined in the preceding bullet, the “volumetric” best estimate of *per annum*, buyer-funded TOS changes in PG&E territory is 15,300. For the reasons discussed earlier, QC believes this may be a conservative estimate.
- Additional analysis showed that 0.26 percent of baseline respondents reported whole-house (multiple-measure) TOS renovations that were seller-funded, 1.13 percent reported buyer-funded whole-house TOS renovations, and a “net” of 1.26 percent reported whole-house TOS renovations in total. This translates to a conservative *per annum* estimate of 11,700 whole-house TOS renovations in PG&E territory.

**Exhibit 2-3  
Baseline Survey Results  
"Time-of-Sale" TOS Renovations**

BLO17. IMPROVEMENTS OR UPGRADES MADE AT THE YOUR E; BLO19. IMPROVEMENTS OR UPGRADES MADE AT THE BUYER

	SFD	CONDO	RURAL	WTD TOTAL	
N POPULATION	572	115	134	821	
YES	2	1	1	1	%
NO	0	0	0	0	%
REFUSED	0	0	0	0	%
DON'T KNOW	0	0	0	0	%
N OBS	33	6	13	52	

	SFD	CONDO	RURAL		
N POPULATION	572	115	134	821	
YES	1	0	1	1	%
NO	0	0	0	0	%
REFUSED	0	0	0	0	%
DON'T KNOW	0	0	0	0	%
N OBS	33	6	11	50	



PROJECTION OF BASELINE RESPONDENT REPORTS OF TOS EVENTS WHERE THEY WERE THE SELLER INDICATES A BEST ESTIMATE OF 20,000 TOS EVENTS ANNUALLY IN PG&E TERRITORY, IN LINE WITH THE 23,000 DERIVED FROM " RESPONDENT-AS-BUYER" DATA DISCUSSED ON THE PRECEDING TEXT PAGE.

- Slightly over 1 percent (1.43 percent) of baseline respondents reported having sold a home since January 1997, where improvements or upgrades were undertaken at that time, paid for by them as the seller. (Again, measure-specific data were too sparse to meaningfully analyze because the change rate was so low; the TOS renovation discussion provides more detail.) This translates to a *per annum* best estimate of 13,300 seller-funded TOS renovations, on the same order of magnitude as reported by respondents as buyers on the preceding text page.
- Under 1 percent (0.75 percent) of baseline respondents reported having sold a home since January 1997, where improvements or upgrades were undertaken at that time, paid for by the buyer. (Again, measure-specific data were too sparse to meaningfully analyze because the change rate was so low; the TOS renovation discussion provides more detail.) This translates to a *per annum* best estimate of 7,000 seller-funded TOS renovations, on the same order of magnitude as reported by respondents as buyers on
- Although the seller/buyer balance varies depending on whether baseline respondents are reporting on transactions where they were the buyer, versus where they were the seller, data from these questions converge to suggest that 20,000 to 25,000 TOS renovation events occur each year in PG&E territory. As noted in previous pages, QC believes this may be a conservative estimate in light of information available from the CAR.

BASELINE RESPONDENTS' AWARENESS, CONSIDERATION, AND USE OF ENERGY-EFFICIENT MORTGAGES ARE SUMMARIZED NEXT.

**Exhibit 2-4**  
**Baseline Survey Results**  
**Energy-Efficient Mortgages**

**BLO21-BLO24 ENERGY-EFFICIENT MORTGAGES**

	SFD	CONDO	RURAL	WTD TOTAL	
N POPULATION	572	115	134	821	
% AWARE EEI	17	13	19	17	%
% AWARE @ T	0	0	0	0	%
USED EEM	0	0	0	0	%
CONSIDERED	0	0	0	0	%

WHILE THERE IS SOME AWARENESS OF EEMs AMONG BASELINE RESPONDENTS, THE LEVEL REMAINS LOW, AND THE PRODUCT DOES NOT HAVE A PLACE IN THE MARKET'S EVOKED SET OF TOS OPTIONS.

- One in six baseline respondents reported awareness of EEMs (energy-efficient mortgages), based on the brief concept description provided in the survey.
- Only a fraction of a percent (0.18%) of baseline respondents reported both buying a home since January 1997, and being aware of EEMs at the time.
- No baseline respondents in any end-user segment reported having considered or obtained an EEM at the time when TOS renovations were undertaken.

DISCRETIONARY RETROFIT (DR) EVENTS ARE BRIEFLY SUMMARIZED NEXT; THE DR SECTION OF THIS CHAPTER CONTAIN MORE RELEVANT DATA ON DR EVENTS.

**Exhibit 2-5**  
**Baseline Survey Results**  
**Discretionary Retrofits**

BLO25. NUMBER OF VOLUNTARY CHANGES SINCE JANUARY 1, 1997.

	SFD	CONDO	RURAL	WTD TOTAL	
N POPULATION	572	115	134	821	
WINDOWS	23	8	16	19	%
INDOOR LIGHTING	6	3	6	5	%
OUTDOOR LIGHTING	6	4	2	5	%
HEATING AND/OR COOLING	12	6	7	10	%
KITCHEN	5	4	4	5	%
OTHER	7	2	8	6	%
REFUSED	0	0	1	0	%
DON'T KNOW	0	2	0	0	%
N OBS	572	115	134	821	

BLO25A NUMBER OF VOLUNTARY

	SFD	CONDO	RURAL	TOTAL	
N POPULATION	572	115	134	821	
ONE	23	11	16	20	%
TWO	0	0	0	0	%
THREE	0	0	0	0	%
FOUR	0	0	0	0	%
FIVE	0	0	0	0	%
SIX	0	0	0	0	%
SEVEN	0	0	0	0	%
EIGHT	0	0	0	0	%
NINE	0	0	0	0	%
TEN	0	0	0	0	%
N OBS	572	115	134	821	

BLO25A SUMMARY TABLE OF MEAN DISCRETIONARY RETROFIT

	SFD	CONDO	RURAL	WGT TOTAL
N POPULATION	572	115	134	821
WINDOWS	\$5,811	\$6,000	\$1,691	\$3,581
N WINDOWS	116	9	19	144
INDOOR LIGHTING	\$2,122	\$238	\$229	\$1,177
N INDOOR LIGHTING	31	4	7	42
OUTDOOR LIGHTING	\$1,077	\$215	\$500	\$667
N OUTDOOR LIGHTING	32	5	2	39
HVAC	\$3,491	\$1,440	\$2,263	\$2,160
N HVAC	57	5	8	70
KITCHEN	\$9,130	\$1,970	\$5,050	\$4,996
N KITCHEN	28	5	6	39

WINDOWS WERE THE MOST COMMON DISCRETIONARY RETROFIT AMONG BASELINE RESPONDENTS OVERALL, FOLLOWED BY HVAC. TEN PERCENT OF BASELINE RESPONDENTS REPORTED WHOLE-HOUSE (MULTI-MEASURE) DISCRETIONARY RETROFITS SINCE JANUARY 1997.

- Baseline respondents most often had made discretionary changes in their home's windows since January 1997, followed by changes in their HVAC. Outdoor lighting, indoor lighting, and kitchen-related changes followed at a modest distance.
- Condo respondents were significantly less likely than SFD respondents to have made changes in their windows or HVAC, as might be expected both because of the lack of 360-degree exposure of condos/townhomes, and also because of covenants that may restrict building envelope changes in those dwellings.
- While measure-level change rates do not support statistical comparison of amounts across end-user segments, on the facing page is a table that summarizes average values for each measure type, across the entire weighted sample.
- Ten percent of baseline respondents reported making more than one discretionary measure change of interest to the R&R program since January 1997. Since these changes were not necessarily made at the same time, but conceivably might have been, the *per annum* volumetric estimate of 96,000 whole-house DR events in PG&E territory is probably not as conservative as preceding TOS event estimates are.

BASELINE RESPONDENTS' AWARENESS, CONSIDERATION, AND USE OF ENERGY-EFFICIENT LOANS ARE SUMMARIZED NEXT.

**Exhibit 2-6**  
**Baseline Survey Results**  
**Energy-Efficient Loans**

**BLO26-BLO29 ENERGY EFFICIENT LOANS**

	SFD	CONDO	RURAL	WTD TOTAL	
N POPULATION	572	115	134	821	
% AWARE EEL	24	20	28	24	%
% AWARE @ D	7	3	5	6	%
USED EEL	1	0	0	1	%
CONSIDERED	1	0	0	0	%

WHILE THERE IS SOME AWARENESS OF EELs AMONG TOS RESPONDENTS, THE LEVEL REMAINS LOW, AND THE PRODUCT DOES NOT HAVE A PLACE IN THE MARKET'S EVOKED SET OF DR OPTIONS.

- One in four baseline respondents reported awareness of EELs (energy-efficient loans), based on the brief concept description provided in the survey.
- Only 6 percent of SFD respondents reported both making discretionary changes since January 1997, and being aware of EELs at the time. Condo owners reported a directionally smaller proportion primarily because of their lower rate of discretionary changes.
- Five baseline respondents, all SFD owners, had obtained EELs to pay for their discretionary retrofits. reported earlier. In addition, three SFD respondents had considered EELs.

THIS SECTION PRESENTING BASELINE SURVEY RESULTS ENDS WITH A SUMMARY OF DEMOGRAPHIC HIGHLIGHTS ON THE FOLLOWING PAGE.

**Exhibit 2-7  
Baseline Survey Results  
Respondent Demographics**

DE091. YEAR CURRENT HOME PURCHASED

	SFD	CONDO	RURAL	WTD TOTAL	
N POPULATION	572	115	134	821	
1999	0	0	1	0	%
1998	1	4	2	2	%
1997	4	3	3	4	%
1996	7	10	3	7	%
1995	3	2	5	3	%
1990-1994	19	30	22	21	%
1985-1989	19	28	19	21	%
1980-1984	12	8	11	11	%
1970-1979	23	12	29	21	%
1960-1969	7	3	1	6	%
1950-1959	3	0	1	2	%
1940-1949	1	0	1	1	%
BEFORE 1940	0	0	1	0	%
REFUSED	0	1	0	0	%
DON'T KNOW	0	1	0	0	%
N OBS	572	115	134	821	

DE094. HISPANIC

	SFD	CONDO	RURAL	WTD TOTAL	
N POPULATION	572	115	134	821	
YES, HISPANIC					
HOUSEHOLD/HOUSEHO	6	4	7	5	%
NO, NOT HISPANIC HOL	26	30	29	27	%
REFUSED	1	0	0	0	%
DON'T KNOW	0	0	0	0	%
N OBS	185	40	48	273	

DE092. DECADE CURRENT HOME BUILT

	SFD	CONDO	RURAL	WTD TOTAL	
N POPULAT	572	115	134	821	
90s	8	10	17	9	%
80s	18	30	19	20	%
70s	24	41	31	28	%
60s	17	10	13	16	%
50s	17	2	9	13	%
40s	6	1	4	5	%
BEFORE 19	8	2	4	7	%
REFUSED	1	1	0	1	%
DON'T KNC	1	3	2	1	%
N OBS	572	115	134	821	

DE095. AGE

	SFD	CONDO	RURAL	WTD TOTAL	
N POPULAT	572	115	134	821	
UNDER 25	1	1	0	1	%
25 TO 34	5	4	2	4	%
35 TO 44	24	19	20	23	%
45 TO 54	37	28	45	36	%
55 TO 64	18	18	19	18	%
65 OR OLD	14	29	13	16	%
DON'T KNC	0	0	0	0	%
REFUSED	1	1	1	1	%
N OBS	572	115	134	821	

DE097. GENDER

	SFD	CONDO	RURAL	WTD TOTAL	
N POPULAT	572	115	134	821	
FEMALE	47	47	53	47	%
MALE	53	53	47	53	%
N OBS	572	115	134	821	

DE093. FIRST HOME EVER BOUGHT

	SFD	CONDO	RURAL	WTD TOTAL	
N POPULATION	572	115	134	821	
YES, FIRST HOME	32	35	36	33	%
OTHER HOMES					
BEFORE	67	64	63	66	%
REFUSED	1	1	1	1	%
DON'T KNOW	0	0	0	0	%
N OBS	572	115	134	821	

DE096. 1998 INCOME

	SFD	CONDO	RURAL	WTD TOTAL	
N POPULATION	572	115	134	821	
UNDER \$20,000	1	9	6	3	%
\$20,000 BUT UNDER \$	0	9	9	2	%
\$30,000 BUT UNDER \$	3	19	19	7	%
\$50,000 BUT UNDER \$	34	21	28	31	%
\$75,000 BUT UNDER \$	22	15	14	20	%
OVER \$100,000	32	12	10	27	%
REFUSED	5	13	8	7	%
DON'T KNOW	2	3	5	2	%
N OBS	572	115	134	821	



**END-USER SEGMENTS VARIED DEMOGRAPHICALLY AS DESCRIBED BELOW, WITH SOME DIFFERENCES DRIVEN IN TURN BY DIFFERENCES IN SURVEY SCREENING AND QUALIFICATION CRITERIA.**

Respondent demographics are summarized in table form on the following page.

- Baseline SFD respondents were significantly less likely than condo respondents to have bought their homes between the mid-80s and mid-90s (38 vs. 58 percent), while condo owners were significantly less likely to have bought in the 70s. Rural respondents appeared to have bought their current homes a slightly longer time ago than had SFD respondents, when the distribution of responses is viewed.
- SFD respondents were significantly less likely than rural respondents to say their home was built in the 90s, and significantly less likely than condo respondents to say their home was built in the 70s or 80s. Condo owners were the most likely to report that their home had been built in the last 30 years, while SFD respondents were the least likely; all three end-user segments differed significantly from each other on this particular “break-point” in the data.
- One-third of respondents overall and in each segment said their current home was their first home.
- Five percent of respondents overall reported being Hispanic households living in their first home. However, the proportion who were first-time Hispanic home buyers since January 1997 was very small, resulting in a *per annum* best estimate of 2,400 first-time Hispanic home buyers, within the addressable R&R market, in PG&E territory. (The separate sample of 62 first-time Hispanic home buyers addressed in the TOS survey results, and also in Appendix B, included SFD households that were *not* subject to the \$50,000 income floor, as was the case in the baseline sample.) As with earlier TOS data referring to home purchases since January 1997, QC believes this is a conservative estimate.
- Considering the entire age distribution across the three segments, SFD respondents were somewhat younger than condo and rural respondents.
- By virtue of screening criteria, SFD respondents reported significantly higher incomes than did condo or rural respondents.
- The female/male mix was fairly well-balanced across all three end-user segments.

**NEXT IS A DISCUSSION OF KEY FINDINGS AND CONCLUSIONS ABOUT END USER MARKET BARRIERS, BASED PRIMARILY ON DATA FROM THE DR AND TOS SURVEYS.**

**Exhibit 2-8**  
**End-User Market Barriers/Question Mapping - Discretionary Retrofit**

Activity	Question #s	Barriers										Comments About Barrier Source/Definition	
		High Initial Cost	Info/Search Costs	Performance Uncertainty	Transaction Costs	Hidden Cost	Bounded Rationality	Asymmetric Information	Svc/Product Unavailability	Access to Financing			
Individual Measures	TR055a-c, 6; TR055d, 2	4											TR055 Qs were pick-any barriers offered by respondents. High first cost was THE dominant mention, across measures and end user segments, by a significant margin.
	TR055a-c, 1-3		1										TR055 Qs were pick-any barriers offered by respondents. In this context information/search costs were "unimportant" as one of the end users' volunteered concerns.
	TR055a-c, 5, 7 (TR055c, 8); TR055d, 1, 4; TR064, 2nd			1									TR055 Qs were pick-any barriers offered by respondents, and corresponding mentions were sparse. TR064 was a 10-point rating scale, and the SFD mean was significantly lower (3.7) than for most other barriers.
	TR064, 3rd				1								TR064 was a 10-point rating scale, and the SFD mean was significantly lower (3.1) than for most other barriers.
						1							We believe, based on general industry experience and research on similar, sole-measure topics, that perceived hidden costs are not a pervasive barrier for most end users for these kinds of measures.
							2						Obtaining a clear reading of "bounded rationality" for a single measure is difficult, based on QC's previous applications of surveys in support of market transformation initiatives, and without the ability to expose end users to scenarios with specific cost, savings, and payback assumptions. We judgmentally assigned moderate importance to this barrier in the DR context, based on input from PG&E team members and supply-side market actors regarding the extreme time pressures and "path-of-least-resistance" desire of most home buyers and sellers.
	TR054							2					TR054 is a pick-any question asking for sources of reliable, objective information about HE products. PG&E received by far the most mentions, followed at a distance by Consumer Reports and measure contractors. Other market actors received significantly fewer mentions each. We interpret this to indicate that, outside of the PG&E auspices, there are relatively few market actor types that have widespread end user trust as information sources.
									1				Customer perceptions of product/service unavailability are not obtainable in this context, because the hypothesized event is not imminent enough for end users to "know" or have concrete perceptions of product/service availability. Based on supply-side interviews and similar research regarding the key R&R measures, high-efficiency product/service unavailability generally is not a barrier for individual measures.
	TR064, 1st; TR071; TR072											2	TR064 and TR072 were 10-point rating scales. Although concern with the "hassle" of obtaining an EEM was low, the other finance-related measures indicated reflected the highest barrier ratings of the survey (importance of financing, and specifically EEMs). TOS ratings were higher than DR ratings on 3 of the 4 measures, and in part to distinguish DR and TOS access-to-finance barriers, the DR barrier was assigned moderate importance.
Whole-House	TR055a-c, 6; TR055d, 2	4											Repeated from individual-section - there is no reason to believe that end user first-cost concerns would diminish in the whole-house context.
	TR081, 1st		1										This was a 10-point scale, with a low (4.0) SFD mean compared to other ratings.
	TR081, 3rd			1									This was a 10-point scale, with a low (3.6) SFD mean.
	TR081, 2nd				1								This low importance rating corresponds to one of the lowest (3.2) barrier ratings
	TR081, 4th					1							This was a 10-point scale, with a low (4.4) SFD mean compared to other ratings.
	TR079; TR048-051; TR061-063A						2						For whole-house bounded rationality, we compared the whole-house purchase intent (PI) at TR079, to the preceding, single-measure PI questions (48-50, 61-63). Unlike TOS results, we found that that with specific information implying a combined 3-10 year payback, whole-house PI generally was similar to PI at the preceding, single-measure questions. As a result, we assigned moderate importance to this barrier in a DR context.
	TR054							2					TR054 is a pick-any question asking for sources of reliable, objective information about HE products. We see no reason why concerns about asymmetric information would significantly decrease in moving from individual measures to whole-house events.
									4				Service provider unavailability is widely known by supply-side market actors and industry observers to be a significant barrier to whole-house adoption.
	TR064, 1st; TR071; TR072											2	TR064 and TR072 were 10-point rating scales. From supply-side interviews it was determined that access to financing is not a function of the number of HE measures involved (though it is a function of loan amount). Therefore we assigned a moderate importance rating in the whole-house context, as in the single-measure context.

Note: Shading denotes a barrier where QC judgment was involved in rating or adjusting the barrier indicator.

THE MOST CRITICAL BARRIERS VARY SOMEWHAT ACROSS RETROFIT AND RENOVATION EVENT, AND BY SINGLE-MEASURE VS. WHOLE-HOUSE APPLICATION; HOWEVER, HIGH PERCEIVED FIRST COST (LOW PERCEIVED VALUE) REMAINS THE BROADEST MAJOR BARRIER.

- The discussion about market barriers is based primarily on end-user input. However, in cases where end users may not be able to provide reliable input (for instance, around bounded rationality or service/product unavailability), input from supply side interviews and QC category experience were incorporated into the evaluation of barrier importance and noted in the “comments” section.
- For DR *single-measure* events, perceived first cost/value is the chief (high importance) barrier, followed by bounded rationality, asymmetric information, and access to financing as a second tier of (moderately important) barriers. The facing table provides data and commentary regarding this assessment.
- For DR *whole-house* events, first cost/value is joined by service unavailability as a primary barrier, while bounded rationality, asymmetric information, and access to financing remain secondary barriers. (Again, the facing table provides data and commentary regarding this assessment.)
  - Given the current absence of contractors who are both knowledgeable about energy efficiency and who work in multiple measure areas, service unavailability shifts from being a tertiary barrier to a primary barrier, as we compare the whole-house DR scenario to the individual measure scenario.
  - “Voice-of-the-customer” input based on detailed, hypothetical scenarios resulted in low importance ratings for information/search costs, performance uncertainty, and transaction costs for whole-house DR events. At the same time, these more “latent” barriers cannot be dismissed, and follow-up research conducted on a transaction-oriented basis (among consumers who have or are about to invest in whole-house DR measure changes) may reflect somewhat different barrier rankings.

- There generally were no significant differences across the comparable end user segments (SFD, condo, and rural respondents).
  - However, condo respondents were more cost-sensitive than SFD respondents regarding HVAC changes, though this finding must be viewed with caution due to the small condo base involved (see DR survey results regarding question TR055c in the subsequent DR survey results discussion).
  - Rural respondents appeared significantly more sensitive to the presence of financing than did SFD respondents, based on rural respondents' ratings on financing- and EEM-related barrier statements.
  - Rural respondents also were significantly more sensitive than SFD respondents to whole-house information/search costs.

**Exhibit 2-9**  
**End-User Market Barriers/Question Mapping - TOS Renovation**

Activity	Question #s	Barriers										Comments About Barrier Source/Definition		
		High Initial Cost	Info/Search Costs	Performance Uncertainty	Transaction Costs	Hidden Cost	Bounded Rationality	Asymmetric Information	Svc./Product Unavailability	Access to Financing				
Individual Measures	TR055a-c, 6	4											TR055 Qs were pick-any barriers offered by respondents. High first cost was THE dominant mention, across measures and end user segments, by a significant margin.	
	TR055a-c,1-3		2										TR055 Qs were pick-any barriers offered by respondents. In this context information/search costs were "unimportant" as one of the end users' volunteered concerns. However, we judgmentally adjusted this barrier's importance because we strongly believe that residential customers generally have significant knowledge shortfall regarding high-efficiency measures and criteria, in time-sensitive TOS situations.	
	TR055a-c, 5, 7 (TR055c, 8); TR064, 2nd			1									TR055 Qs were pick-any barriers offered by respondents, and corresponding mentions were sparse. TR064 was a 10-point rating scale, and the SFD mean was significantly lower (3.9) than for most other barriers.	
	TR064, 3rd				1								TR064 was a 10-point rating scale, and the SFD mean was significantly lower (4.1) than for most other barriers.	
							1						We believe, based on general industry experience and research on similar, sole-measure topics, that perceived hidden costs are not a pervasive barrier for most end users for these kinds of measures.	
								4						Obtaining a clear reading of "bounded rationality" for a single measure is difficult, based on QC's previous applications of surveys in support of market transformation initiatives, and without the ability to expose end users to scenarios with specific cost, savings, and payback assumptions. We judgmentally assigned high importance to this barrier in the TOS context, based on input from PG&E team members and supply-side market actors regarding the extreme time pressures and "path-of-least-resistance" desire of most home buyers and sellers.
	TR054								2					TR054 is a pick-any question asking for sources of reliable, objective information about HE products. PG&E received by far the most mentions, followed at a distance by Consumer Reports and measure contractors. Other market actors received significantly fewer mentions each. We interpret this to indicate that, outside of the PG&E auspices, there are relatively few market actor types that have widespread end user trust as information sources.
	TR064, 1st; TR071; TR072									1			4	Customer perceptions of product/service unavailability are not obtainable in this context, because the hypothesized event is not imminent enough for end users to "know" or have concrete perceptions of product/service availability. Based on supply-side interviews and similar research regarding the key R&R measures, high-efficiency product/service unavailability generally is not a barrier for individual measures.
Whole-House	TR055a-c, 6	4											Repeated from individual-section - there is no reason to believe that end user first-cost concerns would diminish in the whole-house context.	
	TR081, 1st		2										This was a 10-point scale, with a moderate (5.3) SFD mean compared to other ratings.	
	TR081, 3rd			1									This was a 10-point scale, with a low (4.2) SFD mean.	
						4							From all indications from input from PG&E team members and supply-side market actors, installing multiple measures during the TOS event would involve significantly higher transaction/hassle cost than just one measure (which end users, above, indicated would NOT be a significant barrier).	
	TR081, 4th					2							This was a 10-point scale, with a moderate (5.8) SFD mean.	
	TR079; TR048-050; TR061-063							4					For whole-house bounded rationality, we compared the whole-house purchase intent (PI) at TR079, to the preceding, single-measure PI questions (48-50, 61-63). We found that even with more specific information implying a combined 3-10 year payback, whole-house PI generally was lower than at the preceding, single-measure questions. While some respondents may have interpreted that scenario information as poor payback, or may have had other barriers, we believe this pattern is consistent with a moderate degree of bounded rationality toward whole-house investments.	
	TR054								2				TR054 is a pick-any question asking for sources of reliable, objective information about HE products. We see no reason why concerns about asymmetric information would significantly decrease in moving from individual measures to whole-house events.	
	TR064, 1st; TR071; TR072										4		4	Service provider unavailability is widely known by supply-side market actors and industry observers to be a significant barrier to whole-house adoption.
												4	TR064 and TR072 were 10-point rating scales. From supply-side interviews it was determined that access to financing is not a function of the number of HE measures involved (though it is a function of loan amount). Therefore we assigned a high importance rating in the whole-house context, as in the single-measure context.	

Note: Shading denotes a barrier where QC judgment was involved in rating or adjusting the barrier indicator.

**THE TIME-SENSITIVITY OF THE TOS EVENT RENDERS SOME MARKET BARRIERS, OF ONLY SECONDARY IMPORTANCE IN DISCRETIONARY RETROFIT EVENTS, OF PRIMARY IMPORTANCE IN TOS RENOVATION EVENTS.**

- For TOS renovation (TOS) *single-measure* events, perceived first cost/value issues are joined as a primary barrier by bounded rationality and access to financing because of the time pressures associated with the event. These same time pressures also cause asymmetric information and information/search costs to emerge as secondary barriers in this scenario. The facing table provides data and commentary regarding this assessment.
- For TOS whole-house events, a number of primary barriers exist: perceived first cost/value, transaction costs, bounded rationality, service unavailability, and access to financing. In addition, information/search costs and asymmetric information remain secondary barriers, joined by concerns about hidden costs. The time-sensitivity of the event appears to be more critical than the multiple measures involved in creating barriers to greater TOS consideration and activity, from the end-user perspective. (Again, the facing table provides data and commentary regarding this assessment.)
- There generally were no significant differences across the comparable end user segments (SFD, condo, and rural respondents).
  - However, rural respondents were more cost-sensitive than SFD respondents regarding lighting, though this finding must be viewed with caution due to the small rural base involved (see TOS survey results regarding question TR055b in the subsequent TOS survey results discussion).
  - While the first-time Hispanic segment also discussed in the TOS results section sometimes reported significantly higher barrier agreement ratings, it should be noted that this segment is not totally comparable to the SFD, condo, and rural segments because of different survey qualification criteria.

**DETAILED RESULTS FROM THE END-USER TOS SURVEY BEGINS ON THE FOLLOWING PAGE.**

**Exhibit 2-10**  
**TOS Survey Results**  
**Baseline Characteristics**

BL008. Home Purchased Before or After January 1, 1997?

	SFD	Condo	Rural	Hispanic	
N population	246	114	29	62	
Before	59	75	69	0	%
After	42	25	31	100	%
Refused	0	0	0	0	%
Don't Know	0	0	0	0	%
N obs	246	114	29	62	

BL009. Likelihood of Selling Current Home and Buying New Home in Next Two Years

	SFD	Condo	Rural	Hispanic	
N population	246	114	29	62	
Very likely	24	25	24	11	%
Somewhat likely	39	56	45	15	%
Not very likely, o	13	4	0	27	%
Not at all likely	24	15	28	47	%
Refused	0	0	0	0	%
Don't know	0	0	3	0	%
N obs	246	114	29	62	

BL011. Whether Home was Brand New or Previously Owned at Time of Purchase

	SFD	Condo	Rural	Hispanic	
N population	246	114	29	62	
Brand new	27	20	35	10	%
Previously owned	73	80	66	90	%
Refused	0	0	0	0	%
Don't know	0	0	0	0	%
N obs	246	114	29	62	

BL016. Sold a Home Since January 1, 1997

	SFD	Condo	Rural	
N population	246	114	29	
Yes	18	8	21	%
No	82	92	79	%
Refused	0	0	0	%
Don't know	0	0	0	%
N obs	246	114	29	

Please note that, as is generally the case with all of the survey results sections, data are presented as a percentage of the total base within that segment, to show the proportion of the entire sample that falls into specific survey response categories on a “net” basis. (Where relevant, results are displayed and discussed in terms of the proportions of respondents *reaching the question* who answered a certain way.) The overall discussion is focused on SFD respondents as a benchmark, and differences between SFD respondents and other segments described as “significant” were found to be statistically significant at the 95 percent confidence level.

- TOS responses to baseline questions are included for descriptive purposes; as with all TOS results, they are reported on an unweighted basis, in order to compare condo, rural, and (for some questions) first-time Hispanic home buyer responses to SFD responses. TOS respondents had additional screening beyond “baseline” screening to ensure they had bought their home since January 1997, or were contemplating a home purchase within two years. The weighted versions of baseline questions in the earlier “baseline” results section provide data combined across end-user segments, and projectable to PG&E territory.
- Please note that some, but not all, questions in this section display information from the similar, but separate, first-time Hispanic home buyer survey (“Hispanic”). In particular, it should be kept in mind that first-time Hispanic respondents were screened to have bought their first home since January 1997, which impacted their responses to certain questions. Questions where first-time Hispanic home buyer data are not presented were not asked in that separate survey, in order to accommodate questions customized to the needs and issues of that market segment (see Appendix B for a full discussion of study results pertaining to first-time Hispanic home buyers, as well as issues encountered by supply-side market actors in serving non-English-speaking customers).



- SFD respondents were significantly more likely than condo respondents, and directionally more likely than rural respondents, to have bought their home since January 1997 (all Hispanic respondents had done so as a condition for completing that survey). Conversely, the proportion of SFD respondents saying they were at least somewhat likely to buy a new home within the next two years was significantly lower than among condo respondents. (Note that to qualify for the survey, all TOS respondents had to have bought their homes since January 1997 or to be at least somewhat likely to buy a new home within the next two years). Hispanic respondents were significantly less likely to say this, as a function of different survey screening.
- Approximately one-quarter of SFD respondents said their home was new (not previously owned) when they bought it; condo responses were directionally lower and rural responses directionally higher at this question. Hispanic respondents were significantly more likely than SFD respondents to have bought a previously owned home.
- One-sixth of SFD respondents had sold a home within PG&E territory since January 1997; condo respondents were significantly less likely to have done so. (As with the preceding responses regarding home purchases, please note that these are findings among respondents screened on these same criteria in order to qualify for the TOS survey itself, and are not representative of the larger PG&E residential population. Results are shown to compare end-user segments within the TOS sample.)

**TOS " TIME-OF-PURCHASE" RENOVATION CHARACTERISTICS ARE DISCUSSED NEXT.**

## Exhibit 2-11 TOS Survey Results Time-of-Purchase TOS Renovations

BL012. Improvements or Upgrades Made at the Seller's Expense

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Yes	7	3	7	24%
No	34	22	24	76%
Refused	0	0	0	0%
Don't know	0	0	0	0%
N obs	102	28	9	62

BL014. Improvements or Upgrades Made at the Your Expense

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Yes	14	13	14	26%
No	27	11	17	74%
Refused	0	0	0	0%
Don't know	0	0	0	0%
N obs	102	28	9	62

BL013. Kind of Upgrades Done at the Seller's Expense

	SFD	Condo	Rural	Hispanic
Windows	1	0	0	3%
Lighting – inside	0	0	0	3%
Lighting – outdoors	0	0	0	0%
Heating and/or cooling – HVAC	1	0	3	2%
Water heater	0	0	0	2%
Plumbing – kitchen	0	0	0	3%
Plumbing – bathroom	0	1	0	3%
Refrigerator	0	0	0	0%
Dishwasher	0	0	0	2%
Other kitchen remodeling/ renovation	1	1	0	2%
Other bathroom remodeling/ renovation	0	1	0	3%
Roof	1	0	0	3%
Insulation	0	0	0	0%
Weather stripping/ other weatherization	0	0	0	0%
Other	3	2	3	10%
Refused	0	0	0	0%
Don't know	0	0	0	2%
N obs	18	3	2	23

BL015. What Kind of Upgrades Done at Your Expense

	SFD	Condo	Rural	Hispanic
N population	246	114	29	6
Windows	3	3	3	6%
Lighting – inside	1	2	7	2%
Lighting – outdoors	0	0	7	2%
Heating and/or cooling – HVAC	3	1	3	2%
Water heater	2	2	0	2%
Plumbing – kitchen	2	1	3	8%
Plumbing – bathroom	2	2	0	10%
Refrigerator	1	3	0	5%
Dishwasher	1	2	3	2%
Other kitchen remodeling/ renovation	4	4	0	5%
Other bathroom remodeling/ renovation	2	2	0	2%
Roof	1	1	0	3%
Insulation	3	3	3	0%
Weather stripping/ other weatherization	0	0	0	0%
Other	7	9	7	15%
Refused	0	0	0	0%
Don't know	0	0	0	0%
N obs	35	15	4	38

The number of renovations reported at time-of-sale paid for by the buyer/respondent.

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
One	9	5	0	16%
Two	3	5	7	2%
Three	1	1	7	2%
Four	0	0	0	3%
Five	0	0	0	2%
Six	0	2	0	2%
Seven	0	0	0	0%
Eight	0	0	0	0%
Nine	0	0	0	2%
Ten	0	0	0	0%
N obs	35	15	4	16

The number of renovations reported at time-of-sale paid for by either the buyer or seller as reported by the buyer.

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
One	10	4	3	20%
Two	5	6	7	15%
Three	1	1	3	2%
Four	0	1	3	5%
Five	0	0	0	0%
Six	0	2	0	2%
Seven	0	0	0	0%
Eight	0	0	0	0%
Nine	0	0	0	2%
Ten	0	0	0	0%
N obs	45	16	5	27

The number of renovations reported at time-of-sales paid for by the seller.

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
One	7	1	7	13%
Two	0	2	0	8%
Three	0	0	0	0%
N obs	18	3	2	13

**TOS RESPONDENTS WHO HAD BOUGHT THEIR HOMES SINCE JANUARY 1997 REPORTED BUYER-FUNDED TOS RENOVATIONS AT TWICE THE RATE AS SELLER-FUNDED TOS RENOVATIONS.**

- On a “net” basis, 7 percent of SFD respondents reported having bought a home since January 1997, where improvements or upgrades were undertaken at that time, paid for by the seller. Condo respondents were directionally less likely to say this, both because dwelling turnover among this group was less, and also because “time-of-purchase” TOS renovations were less common. Perhaps because they were more likely to buy previously owned homes, Hispanics were significantly more likely than SFD respondents to report seller-funded TOS upgrades.
- The facing exhibit shows the “net” rates of measure-specific, time-of-purchase changes. While these net percentages are all very small, and none are statistically significant, it appears that Hispanic respondents perform the most seller-funded TOS changes (scattered across the various measure upgrade types), condo respondents perform the fewest, and rural respondents’ changes are more centered around HVAC.
- Again on a “net” basis, 14 percent of SFD respondents reported that they paid for time-of-purchase renovations when buying their current home; i.e., buyers reported they paid for renovations at twice the rate as sellers paid for them. Hispanic reported buyer-funded TOS upgrades significantly more often than did SFD respondents, again perhaps in part because they were more likely to buy previously owned homes.
- The facing exhibit shows the “net” rates of measure-specific, time-of-purchase changes. While these net percentages are all small, and only the difference in kitchen plumbing mentions between SFD respondents (2 percent) and Hispanics (10 percent) is significant, Hispanics perform the most buyer-funded TOS changes.

**TOS “ TIME-OF-SALE” RENOVATION CHARACTERISTICS ARE DISCUSSED NEXT.**

## Exhibit 2-12 TOS Survey Results Time-of-Sale TOS Renovations

BL017. Improvements or Upgrades Made at the Your Expense

	SFD	Condo	Rural	
N population	246	114	29	%
Yes	9	1	3	%
No	9	7	17	%
Refused	0	0	0	%
Don't Know	0	0	0	%
N obs	44	9	6	

BL019. Improvements or Upgrades Made at the Buyer's Expense

	SFD	Condo	Rural	
N population	246	114	29	%
Yes	4	1	7	%
No	13	7	10	%
Refused	0	0	0	%
Don't know	1	0	3	%
N obs	44	9	6	

BL018. What Kind of Upgrades Done at Your Expense

	SFD	Condo	Rural	
N population	246	114	29	%
Windows	2	1	0	%
Lighting – inside	0	0	0	%
Lighting - outdoors	0	0	0	%
Heating and/or cooling – HVAC	1	0	0	%
Water heater	0	0	0	%
Plumbing – kitchen	0	0	0	%
Plumbing – bathroom	0	0	0	%
Refrigerator	0	0	0	%
Dishwasher	0	0	0	%
Other kitchen remodeling/renovation	1	0	0	%
Other bathroom remodeling/renovation	0	0	0	%
Roof	1	0	0	%
Insulation	0	0	0	%
Weather stripping/other weatherization	0	0	0	%
Other	3	0	3	%
Refused	2	0	0	%
Don't know	0	0	0	%
N obs	21	1	1	

BL020. What Kind of Upgrades Done at Buyer's Expense

	SFD	Condo	Rural	
N population	246	114	29	%
Windows	0	0	0	%
Lighting – inside	0	0	0	%
Lighting - outdoors	0	0	0	%
Heating and/or cooling – HVAC	0	0	0	%
Water heater	0	0	0	%
Plumbing – kitchen	0	0	0	%
Plumbing – bathroom	0	0	0	%
Refrigerator	0	0	0	%
Dishwasher	0	0	0	%
Other kitchen remodeling/renovation	0	0	0	%
Other bathroom remodeling/renovation	0	0	0	%
Roof	0	0	0	%
Insulation	0	0	0	%
Weather stripping/other weatherization	0	0	0	%
Other	3	1	7	%
Refused	0	0	0	%
Don't know	0	0	0	%
N obs	10	1	2	

The number of renovations reported at time-of-sale paid for by the buyer as reported by the seller.

	SFD	Condo	Rural	
N population	246	114	29	%
One	4	1	3	%
Two	0	0	0	%
Three	0	0	0	%
Four	0	0	0	%
Five	0	0	0	%
Six	0	0	0	%
Seven	0	0	0	%
Eight	0	0	0	%
Nine	0	0	0	%
Ten	0	0	0	%
N obs	10	1	2	

The number of renovations reported at time-of-sale paid for by either the buyer or the seller as reported by the seller.

	SFD	Condo	Rural	
N population	246	114	29	%
One	7	1	3	%
Two	2	0	7	%
Three	1	0	0	%
Four	0	0	0	%
Five	0	0	0	%
Six	0	0	0	%
Seven	0	0	0	%
Eight	0	0	0	%
Nine	0	0	0	%
Ten	0	0	0	%
N obs	25	1	1	

The number of renovations reported at time-of-sale paid for by the seller as reported by the seller.

	SFD	Condo	Rural	
N population	246	114	29	%
One	7	1	3	%
Two	1	0	0	%
Three	0	0	0	%
Four	0	0	0	%
Five	0	0	0	%
Six	0	0	0	%
Seven	0	0	0	%
Eight	0	0	0	%
Nine	0	0	0	%
Ten	0	0	0	%
N obs	21	1	1	

**TOS RESPONDENTS WHO HAD SOLD THEIR HOMES SINCE JANUARY 1997 REPORTED BUYER-FUNDED TOS RENOVATIONS AT HALF THE RATE AS SELLER-FUNDED TOS RENOVATIONS.**

- On a “net” basis, 9 percent of SFD respondents reported having sold a home since January 1997 where improvements or upgrades were undertaken at that time, paid for by them (as the seller). Condo respondents were significantly less likely to say this, both because dwelling turnover among this group was less, and also because “time-of-sale” TOS renovations were less common.
- The facing exhibit shows the “net” rates of measure-specific, time-of-purchase changes. While these net percentages are all very small, and none are statistically significant, it appears that SFD respondents perform the most seller-funded TOS changes, condo respondents the fewest, and rural respondents’ changes are more centered around “other” changes not of central interest to this study.
- Again on a “net” basis, 4 percent of SFD respondents reported having sold a home in PG&E territory since January 1997, where the buyer paid for TOS renovations. (Note that the ratio of reported buyer-funded vs. seller-funded TOS renovations when respondents were the sellers was reversed, compared to when respondents were the buyers. This underscores the inherent “fuzziness” of self-reported data of this type, particularly when the time frame cannot be very tightly defined.)
- The facing exhibit shows the “net” rates of measure-specific, time-of-purchase changes. These data generally were inconclusive because of the small percentages involved although, again, rural respondents’ changes are more centered around “other” changes not of central interest to this study.

**TOS RESPONDENTS’ AWARENESS, CONSIDERATION, AND USE OF ENERGY-EFFICIENT MORTGAGES ARE SUMMARIZED NEXT.**

**Exhibit 2-13**  
**TOS Survey Results**  
**Energy-Efficient Mortgages**

BL021. Have Heard of an Energy Efficient Mortgage

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Yes	15	18	21	15
No	85	82	79	84
Refused	0	0	0	0
Don't Know	0	0	0	2
N obs	246	114	29	62

BL022. Aware of Energy Efficient Mortgages at Time of Home Purchase

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Yes	2	0	3	7
No	1	6	7	8
Refused	0	0	0	0
Don't Know	0	0	0	0
N obs	8	7	3	9

BL023. Did you OBTAIN an energy efficient mortgage for the renovations you paid for, around the time you were BUYING your new home?

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Yes	0	0	0	0
No	1	0	3	7
Refused	0	0	0	0
Don't Know	0	0	0	0
N obs	5	0	1	4

BL024. Did you CONSIDER an energy efficient mortgage for the renovations you paid for, around the time you were BUYING your new home?

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Yes	0	0	0	2
No	2	0	3	5
Refused	0	0	0	0
Don't Know	0	0	0	0
N obs	5	0	1	4

**WHILE THERE IS SOME AWARENESS OF EEMs AMONG TOS RESPONDENTS, THE LEVEL REMAINS LOW, AND THE PRODUCT DOES NOT HAVE A PLACE IN THE MARKET'S EVOKED SET OF TOS OPTIONS.**

- One in six SFD respondents reported awareness of EEMs (energy-efficient mortgages), based on the brief concept description provided in the survey.
- Only 2 percent of SFD respondents reported both buying a home since January 1997, and being aware of EEMs at the time.
- No TOS respondents in any end-user segment reported having considered or obtained an EEM at the time when TOS renovations were undertaken. No Hispanic respondents reported use of an EEM, and only 2 percent reported consideration of an EEM at the time of their home purchase.

**ADDITIONAL CHARACTERISTICS OF TOS EVENTS REPORTED BY TOS RESPONDENTS ARE SUMMARIZED NEXT.**

**Exhibit 2-14**  
**TOS Survey Results**  
**Additional TOS Event Characteristics**

TR043 Importance of Energy Efficiency in Choosing Items to Upgrade  
(Scale of 1-10)

	SFD	Condo	Rural	Hispanic
N population	246	114	29	25
Mean Rating	6.8	5.5	7.2	8.8
Upper Bound	7.5	7.0	10.0	9.4
Lower Bound	6.1	4.0	4.4	8.1
N obs	40	15	5	1
Standard Error	0.4	0.9	1.4	0.4

TR044. Used an Architect or Designer

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Yes, used architect or designer	2	4	3	3%
No, did not use architect or designer	15	9	14	40%
Refused	0	1	0	0%
Don't Know	0	1	0	2%
N obs	45	16	4	28



**THE IMPORTANCE ATTRIBUTED TO ENERGY EFFICIENCY WHEN RESPONDENTS MADE TOS RENOVATION DECISIONS WAS PARTICULARLY HIGH AMONG FIRST-TIME HISPANIC HOME BUYERS. USE OF ARCHITECTS AND DESIGNERS TO CONSULT ON TOS RENOVATIONS WAS VERY INFREQUENT.**

Please note that this section of questions was only asked of the 45 SFD, 16 condo, and 5 rural TOS respondents who reported TOS events when buying a home since January 1997. Results are discussed only for the 45 SFD respondents.

- On a 10-point scale where 1 meant not important and 10 meant very important, SFD respondents reported a moderately high mean rating of 6.8 to describe the importance of energy efficiency in selecting which energy-related products to install during the TOS event. Hispanic respondents reported a significantly higher mean rating of 8.8, indicating that energy efficiency was quite important to them when making TOS renovation decisions during their first home purchase.
- Six of the 45 SFDs who had made a TOS investment reported that they had consulted with an architect or designer about the changes they made. This translates to a “net” of 1 percent of TOS respondents who had consulted with an architect or designer and made TOS changes since January 1997.
- (For each TOS renovation measure, respondents were asked whether they believed the measure was high- or standard efficiency. Because of the very small bases involved – 7 or less – and because of the well-known tendency of end users to overstate energy efficiency of measures used, these data were excluded from this discussion. This sample size constraint also applied to a question asking who had installed each measure.)

**DISCRETIONARY RETROFIT (DR) EVENTS ARE BRIEFLY SUMMARIZED NEXT; THE BASELINE AND DR SECTIONS OF THIS CHAPTER CONTAIN MORE RELEVANT DATA ON DR EVENTS.**

**Exhibit 2-15**  
**TOS Survey Results**  
**Discretionary Retrofits**

BL025. Number of Voluntary Changes since January 1, 1997.

	SFD	Condo	Rural	
N population	246	114	29	
Windows	21	6	14	%
Indoor lighting	7	4	0	%
Outdoor lighting	9	4	10	%
Heating and/or cooling - HVAC	13	9	14	%
Kitchen	6	7	7	%
Other	6	6	17	%
Refused	0	0	0	%
Don't Know	0	1	0	%
N obs	246	114	29	

BL025a-e. Average Dollars Spent on New Indoor Lighting

	SFD	Condo	Rural
N population	246	114	29
Mean Dollars	656	2638	0
Upper Bound	1188	7870	0
Lower Bound	125	-2595	0
N obs	16	4	0
Standard Error	304	2454	0

BL025a-e. Average Dollars Spent on New Windows

	SFD	Condo	Rural
N population	246	114	29
Mean Dollars	6293	2671	1084
Upper Bound	7697	3938	2217
Lower Bound	4889	1405	-50
N obs	49	7	4
Standard Error	838	669	532

BL025a-e. Average Dollars Spent on New Outdoor Lighting

	SFD	Condo	Rural
N population	246	114	29
Mean Dollars	631	1300	300
Upper Bound	1055	4804	884
Lower Bound	207	-2204	-284
N obs	21	2	2
Standard Error	246	1200	200

BL025a-e. Average Dollars Spent on New Cooling Equipment

	SFD	Condo	Rural
N population	246	114	29
Mean Dollars	3445	3111	2433
Upper Bound	4924	5626	4288
Lower Bound	1965	597	579
N obs	29	9	3
Standard Error	871	1372	788

BL025a-e. Average Dollars Spent on New Kitchen

	SFD	Condo	Rural
N population	246	114	29
Mean Dollars	11507	3338	4750
Upper Bound	16673	5706	14240
Lower Bound	6340	969	-4740
N obs	15	8	2
Standard Error	2947	1274	3250

**WINDOWS WERE THE MOST COMMON DISCRETIONARY RETROFIT AMONG TOS  
RESPONDENTS OVERALL, AND PARTICULARLY AMONG SFD RESPONDENTS.**

- TOS SFD respondents most often had made discretionary changes in their home's windows since January 1997, followed by changes in their HVAC. Outdoor lighting, indoor lighting, and kitchen-related changes followed in terms of discrete types of mentions.
- Condo respondents were significantly less likely than SFD respondents to have made changes in their windows, as might be expected both because of the lack of 360-degree exposure of condos/townhomes, and also because of covenants that may restrict building envelope changes in those dwellings. Condo owners also appeared to have made fewer discretionary retrofits overall than SFD respondents.
- While expenditures should be viewed and compared across segments with caution due to very small condo and rural changer samples, SFD respondents appear to spend notably more on their discretionary window retrofits and kitchen remodels than do condo or rural respondents.

**TOS RESPONDENTS' AWARENESS, CONSIDERATION, AND USE OF ENERGY-  
EFFICIENT LOANS ARE SUMMARIZED NEXT.**

**Exhibit 2-16**  
**TOS Survey Results**  
**Energy-Efficient Loans**

BL026. Aware of Energy Efficient Loans at Time of Home Purchase

	SFD	Condo	Rural	
N population	246	114	29	
Yes	19	16	24	%
No	81	84	76	%
Refused	0	0	0	%
Don't Know	0	0	0	%
N obs	246	114	29	

BL027. Awareness of Energy Efficient Loans at Time of Voluntarily Replacement of Measures

	SFD	Condo	Rural	
N population	246	114	29	
Yes	5	1	7	%
No	4	2	10	%
Refused	0	0	0	%
Don't Know	0	0	3	%
N obs	13	3	3	

BL028. Obtained an Energy Efficient Loan for the Voluntary Replacement of Measures

	SFD	Condo	Rural	
N population	246	114	29	
Yes, for windows	0	1	0	%
Yes, for indoor lighting	0	0	0	%
Yes, for outdoor lighting	0	0	0	%
Yes, for heating and cooling – HVAC	0	0	0	%
No/No to all	4	0	3	%
Refused	0	0	0	%
Don't Know	0	0	0	%
N obs	10	1	1	

BL028a. Who the Loan Was Obtained From

	SFD	Condo	Rural	
N population	246	114	29	
PG&E	0	0	0	%
Wells Fargo	0	0	0	%
Bank of America	0	0	0	%
Washington Mutual	0	0	0	%
Great Western Bank	0	0	0	%
Other	0	1	0	%
Refused	0	0	0	%
Don't Know	0	0	0	%
N obs	0	0	0	

BL029. Consideration of an Energy Efficient Loan at Time of Voluntarily Replacement

	SFD	Condo	Rural	
N population	246	114	29	
Yes, for windows	1	0	0	%
Yes, for indoor lighting	0	0	0	%
Yes, for outdoor lighting	0	0	0	%
Yes, for heating and cooling – HVAC	0	0	0	%
No	3	0	3	%
Refused	0	0	0	%
Don't Know	0	0	0	%
N obs	10	1	1	

**WHILE THERE IS SOME AWARENESS OF EELs AMONG TOS RESPONDENTS, THE LEVEL REMAINS LOW, AND THE PRODUCT DOES NOT HAVE A PLACE IN THE MARKET'S EVOKED SET OF TOS OPTIONS.**

- One in five SFD respondents reported awareness of EELs (energy-efficient loans), based on the brief concept description provided in the survey.
- Only 5 percent of SFD respondents reported both making discretionary changes since January 1997, and being aware of EELs at the time. Condo owners reported a directionally smaller proportion primarily because of their lower rate of discretionary changes.
- One TOS respondent, a condo owner, had obtained an EEL to pay for the discretionary retrofit reported earlier. In addition, two SFD respondents had considered EELs for window replacements, and one had considered an EEL for outdoor lighting replacement.

**DISCUSSION OF " CORE" TOS SURVEY RESPONSES BEGINS IN THE NEXT SECTION, STARTING WITH RESPONSES TO HYPOTHETICAL TOS SCENARIOS AT THE " SHOPPING" PHASE OF THE TOS PROCESS.**

**Exhibit 2-17**  
**TOS Survey Results**  
**Shopping Phase**

TR048. Likelihood of investigating replacing the windows (scale of 1-10).

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Mean Rating	8.0	7.5	7.4	7.5
Upper Bound	8.4	8.2	10.7	8.6
Lower Bound	7.6	6.8	4.1	6.3
N obs	86	40	5	17
Standard Error	0.3	0.4	1.7	0.7

TR049. Likelihood of investigating replacing the lighting (scale of 1-10).

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Mean Rating	7.6	7.3	7.0	6.7
Upper Bound	8.1	8.0	8.2	7.9
Lower Bound	7.1	6.6	5.8	5.5
N obs	79	43	22	19
Standard Error	0.3	0.4	0.7	0.7

TR050. Likelihood of investigating replacing the HVAC (scale of 1-10).

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Mean Rating	6.9	6.5	6.5	7.4
Upper Bound	7.4	7.3	10.9	8.5
Lower Bound	6.4	5.8	2.1	6.4
N obs	90	31	2	23
Standard Error	0.3	0.4	1.5	0.6

**TOS RESPONDENTS INDICATED RELATIVELY HIGH WILLINGNESS TO AT LEAST INVESTIGATE REPLACEMENT OF "LESS-THAN-PERFECT" WINDOWS, LIGHTING, AND HVAC IN THEIR NEXT HOME PURCHASE.**

Note that for most of the remaining questions until the discussion of respondent demographics, TOS respondents were given hypothetical scenarios that progressed through the hypothesized TOS "awareness-interest-desire-action" chain. That is, these are prospective, not retrospective, questions, which underscores the importance of pre-screening TOS respondents to have some minimum level of experience and/or consideration of the home-buying process. Sections of questions that did not specify whole-house (multi-measure) renovations were posed first, and as the survey progressed respondents were exposed to scenarios that were explicitly whole-house in nature. Also note that the DR survey posed scenarios that included kitchen remodeling/retrofits, but this TOS survey did not include kitchen change scenarios due to priority and budget tradeoffs.

- A scenario was posed in which the respondent was considering purchase of his/her next home, and encountered windows that were functional, but perhaps had a few broken seals and not particularly desirable styling. On a 10-point scale (where 1 meant they would not investigate replacing the windows, and 10 meant they would actively investigate doing so), SFD respondents reported a fairly high mean rating of 8.0.
- Respondents likewise were given a scenario in which the indoor lighting was functional in their prospective new home, but the lighting quality and fixture styles were not particularly to their tastes. On the same 10-point scale for consideration of replacement, SFD respondents reported a mean rating of 7.6, competitive with the windows mean rating.
- When given a similar scenario for HVAC, where the system functions but the respondent "knows" it is 10 years old, SFD respondents gave a mean rating of 6.9, a step down from responses regarding windows and indoor lighting.
- Although no differences were statistically significant, for all three measures SFD respondents gave directionally higher ratings (likelihood of investigating TOS changes) than did condo or rural respondents.

**RESPONDENT ATTITUDES TOWARD ENERGY EFFICIENCY AND INFORMATION SOURCES ARE DISCUSSED NEXT.**

**Exhibit 2-18**  
**TOS Survey Results**  
**Attitudes Toward Energy Efficiency and Information Sources**

TR052. Importance of energy efficiency be in deciding whether to upgrade  
(scale of 1-10)

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Mean Rating	7.8	7.8	8.4	8.4
Upper Bound	8.0	8.1	9.1	9.0
Lower Bound	7.5	7.5	7.8	7.9
N obs	246	113	29	61
Standard Error	0.1	0.2	0.4	0.3

TR053. Confidence in Ability to Distinguish Between High Efficiency and  
Standard Efficiency Products

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Completely confident	20	23	28	19
Fairly confident	61	55	66	48
Not too confident, or	15	11	3	19
Not at all confident	5	11	3	11
Refused	0	0	0	0
Don't Know	0	0	0	2
N obs	246	114	29	62

TR054. Sources of RELIABLE, OBJECTIVE information about high-efficiency products

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
PG&E (general/unlisted mentions)	33	40	41	47
PG&E REBATE program	1	0	0	2
PG&E ENERGY ANALYSIS program	7	3	3	0
Home inspector	5	4	7	2
Realtor	2	3	0	0
Measure manufacturer	11	6	3	0
Measure distributor	2	3	3	2
Home Depot (specific mentions)	4	7	0	6
OTHER retailers	7	10	14	5
Measure installer/contractors	13	12	10	0
Yellow pages	0	1	0	0
Other advertising	2	1	7	0
Consumer Reports	11	11	7	0
Other media	1	2	0	0
Government/DOE/Energy Star	0	0	3	2
Other	5	0	1	13
Refused	0	0	0	0
Don't Know	0	0	0	23
N obs	85	9	18	62



RESPONDENTS CLAIMED THAT ENERGY EFFICIENCY WOULD BE FAIRLY IMPORTANT IN DRIVING THEIR DECISION TO REPLACE WINDOWS, LIGHTING, OR HVAC, AND ALSO CLAIMED A FAIR AMOUNT OF CONFIDENCE IN THEIR ABILITY TO IDENTIFY HIGH-EFFICIENCY MEASURES. HOWEVER, TRUSTWORTHY INFORMATION SOURCES BEYOND PG&E WERE UNCOMMON.

- Respondents overall reported that energy efficiency would be fairly important in deciding whether to make TOS upgrades in the preceding scenarios; the mean ratings among SFD respondents was 7.8 (where 1 meant energy efficiency was not important, and 10 meant it was extremely important). We suspect some degree of respondent overstatement of the importance of energy efficiency, both because of the common tendency for respondents to exaggerate “agency” in a survey context, and also possibly because of social factors.
- One-fifth of SFD respondents said they were completely confident in their ability to distinguish between high-efficiency and standard-efficiency windows, lighting, and HVAC. The clear majority (81 percent) of SFD respondents said they were at least fairly confident in being able to make these distinctions. Though the difference from SFD respondents was only directional, rural respondents appeared particularly confident in this regard. In contrast, the proportion of Hispanic respondents who described themselves as at least fairly confident was significantly lower than the proportion among SFD respondents (67 vs. 81 percent).
- When respondents were asked which information sources they would trust to provide reliable, objective measure information, PG&E (and PG&E-provided sources) received by far the most mentions.
  - Although measure installers and Consumer Reports received modest numbers of mentions as trustworthy sources, most other supply-side market actor types included in this market characterization study received few mentions each. This suggests that a meaningful void currently exists – heightening the potential for “asymmetric information” to act as a barrier to energy-efficiency adoption – outside of PG&E.
  - SFD respondents were significantly more likely than rural respondents to mention measure manufacturers as a source of reliable, objective information.

END-USER INPUT REGARDING OTHER SHOPPING-LEVEL BARRIERS AND POTENTIAL INTERVENTIONS IS SUMMARIZED NEXT.

**Exhibit 2-19**  
**TOS Survey Results**  
**Perceived Barriers and Response to Interventions**

TR055a. Reasons Why High Efficiency Windows Would not be Considered

	SFD	Condo	Rural	Hispanic	
N population	246	114	29	62	
Concern that information is incomplete	0	2	0	2	2%
Concern that information may become outdated quickly	0	0	0	0	0%
Concern that I didn't ask some important question	0	0	0	2	2%
Seems uncommon/don't know others who have done it	0	1	0	0	0%
Doubts that they really save money/are worth it	5	1	0	5	5%
Concern about high first (costs too much)	23	21	14	3	3%
Concerns about comfort	0	1	3	0	0%
Concerns about style/aesthetic aspect	2	0	0	2	2%
Concerns about other non-energy aspect	0	1	0	0	0%
None	2	6	0	6	6%
What I have now is fine/works well	0	0	0	3	3%
Other	0	0	0	3	3%
Refused	0	0	0	0	0%
Don't Know	0	0	0	3	3%
N obs	83	40	5	18	

TR055b. Reasons Why High Efficiency Lighting Would not be Considered

	SFD	Condo	Rural	Hispanic	
N population	246	114	29	62	
Concern that information is incomplete	1	0	0	2	2%
Concern that information may become outdated quickly	0	0	3	0	0%
Concern that I didn't ask some important question	0	0	3	0	0%
Seems uncommon/don't know others who have done it	0	1	0	0	0%
Doubts that they really save money/are worth it	4	3	14	2	2%
Concern about high first (costs too much)	18	20	41	11	11%
Concerns about lighting quality	3	1	3	3	3%
Concerns about style/aesthetic aspect	2	4	0	2	2%
Concerns about other non-energy aspect	0	1	0	0	0%
None	2	6	3	6	6%
What I have now is fine/works well	0	0	0	0	0%
Other	0	0	0	3	3%
Refused	0	0	0	0	0%
Don't Know	1	2	0	5	5%
N obs	76	43	22	21	

TR055c. Reasons Why High Efficiency HVAC Would not be Considered

	SFD	Condo	Rural	Hispanic	
N population	246	114	29	62	
Concern that information is incomplete	1	2	0	0	0%
Concern that information may become outdated quickly	1	0	0	3	3%
Concern that I didn't ask some important question	1	0	0	0	0%
Seems uncommon/don't know others who have done it	0	0	0	0	0%
Doubts that they really save money/are worth it	3	4	0	2	2%
Concern about high first (costs too much)	22	17	3	10	10%
Concerns about comfort	0	0	0	0	0%
Concerns about reliability	0	1	0	3	3%
Concerns about other non-energy aspect	0	0	0	0	0%
None	3	3	0	5	5%
What I have now is fine/works well	0	0	0	0	0%
Other				6	6%
Refused	0	0	0	0	0%
Don't Know	0	0	0	10	10%
N obs	87	31	2	24	

TR056. Importance of PG&E home energy analysis in deciding to upgrade energy-related items (scale of 1-10)

	SFD	Condo	Rural	Hispanic	
N population	246	114	29	62	
Mean Rating	8.3	7.7	8.2	9.0	
Upper Bound	8.4	8.1	9.0	9.4	
Lower Bound	8.1	7.4	7.4	8.7	
N obs	246	114	29	62	
Standard Error	0.1	0.2	0.5	0.2	

(scale of 1-10)

	SFD	Condo	Rural	Hispanic	
N population	245	114	29	62	
Mean Rating	7.0	6.7	6.8	8.0	
Upper Bound	7.3	7.1	7.6	8.5	
Lower Bound	6.8	6.3	5.9	7.4	
N obs	245	114	29	62	
Standard Error	0.1	0.2	0.5	0.3	

HIGH FIRST COST REMAINS A KEY BARRIER TO ACTIVE SHOPPING REGARDING TOS RENOVATIONS, WHILE THE HOME ENERGY SURVEY SHOWS SIGNIFICANT POTENTIAL FOR MITIGATING THESE CONCERNS. FIRST-TIME HISPANIC HOME BUYERS PLACED PARTICULAR VALUE ON BOTH THE HOME ENERGY SURVEY AND THE OPTION OF OBTAINING PRODUCT INFORMATION FROM HOME CENTERS.

Individual respondents provided responses to just one of the following three open-ended questions about measure-specific shopping barriers, in order to manage survey length and avoid respondent fatigue.

- When asked on an open-ended basis about shopping barriers (i.e., barriers to active consideration) for window replacement, the most common reason given by far was high first cost. No other responses came close. SFD respondents were significantly more likely than condo or rural respondents to also express doubts that energy-efficient windows will really save money, or performance uncertainty (this may reflect some degree of correlation between SFDs and more temperate climate zones).
- When asked about shopping barriers regarding lighting, high first cost again was by far the most common barrier offered. Rural respondents mentioned high first cost significantly more often than did SFD respondents. Rural respondents also mentioned performance uncertainty directionally more often than did SFD respondents.
- When asked about shopping barriers regarding HVAC, high first cost again was the dominant mention.
- Respondents were exposed to a description of PG&E's home energy survey, and asked to rate how important this potential intervention would be in their consideration of high-efficiency measures. SFD respondents reported a solidly high mean rating of 8.3, indicating the survey (coupled with PG&E auspices) has significant potential for bolstering active consideration of TOS renovation actions. Hispanic respondents rated the free PG&E home energy survey significantly more important than even SFD respondents did.

- Respondents were exposed to a scenario in which they could obtain energy-efficient product information from knowledgeable staff at home center retailers like a Home Depot, and asked to rate the importance of this potential intervention in their consideration of high-efficiency measures. SFD respondents reported a moderately high mean rating of 7.0, while Hispanic respondents reported a significantly higher 8.0 mean.

THE NEXT SECTION DISCUSSES RESULTS FROM A SECTION OF THE SURVEY WHERE SHOPPING WAS PRESUMED, AND RESPONDENTS WERE PROBED REGARDING THEIR ATTITUDES AND INTENTIONS DURING THE " EVALUATION/DECISION" PHASE.

**Exhibit 2-20**  
**TOS Survey Results**  
**Evaluation/Decision Phase**

TR061. Likelihood of Replacing Lighting When Customer has Reliable Information about High Efficiency Units

	SFD	Condo	Rural	Hispanic
N population	246	114	29	
Mean Rating	7.0	7.0	8.0	7.3
Upper Bound	7.4	7.7	9.9	8.6
Lower Bound	6.6	6.3	6.1	6.1
N obs	83	40	5	18
Standard Error	0.2	0.4	0.9	0.7

TR064. Agreement or Disagreement Barriers

My decision to invest in high efficiency energy-related products would depend on the availability of financing

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Mean Rating	6.4	6.9	7.2	7.3
Upper Bound	6.7	7.3	8.0	8.0
Lower Bound	6.1	6.4	6.4	6.6
N obs	246	113	29	62
Standard Error	0.2	0.3	0.5	0.4

TR062. Likelihood of Replacing Windows When Customer has Reliable Information about High Efficiency Units

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Mean Rating	7.9	7.6	7.9	8.7
Upper Bound	8.4	8.2	8.7	9.6
Lower Bound	7.5	7.1	7.0	7.9
N obs	75	42	21	19
Standard Error	0.3	0.3	0.5	0.5

I would hesitate to invest in high efficiency energy-related products because of serious doubts that they will save me as much money as claimed

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Mean Rating	3.9	4.1	3.7	6.0
Upper Bound	4.2	4.6	4.6	6.8
Lower Bound	3.6	3.7	2.9	5.3
N obs	246	114	29	62
Standard Error	0.2	0.3	0.5	0.4

TR063. Likelihood of Replacing HVAC When Customer has Reliable Information about High Efficiency Units

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Mean Rating	7.6	7.3	7.5	8.2
Upper Bound	7.9	7.9	14.8	9.1
Lower Bound	7.2	6.8	0.2	7.3
N obs	86	31	2	24
Standard Error	0.2	0.3	2.5	0.5

Regardless of how much money I can save, and the information I have about high efficiency energy-related products, I would want to avoid the hassle of installing them at the time I'm buying a home

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Mean Rating	4.1	3.9	4.4	6.3
Upper Bound	4.4	4.4	5.4	7.1
Lower Bound	3.8	3.5	3.4	5.6
N obs	246	114	29	61
Standard Error	0.2	0.3	0.6	0.4

**ASSUMING RELIABLE INFORMATION THAT MITIGATES PERFORMANCE UNCERTAINTY, RESPONDENTS WERE MOST OPEN TO TOS RENOVATION OF WINDOWS, AND LEAST OPEN TO TOS RENOVATION OF LIGHTING, WITH ACCESS TO FINANCING A BARRIER TO BE ADDRESSED.**

Individual respondents provided responses to just one of the following three measure-specific purchase intent questions, in order to manage survey length and avoid respondent fatigue.

- Respondents were asked to assume they had objective, reliable information showing they could save “a significant amount” on their energy bill by replacing their prospective new home’s windows. On a scale from 1 to 10 where 1 meant not at all likely and 10 meant extremely likely, SFD respondents gave a mean rating of 7.9.
- When respondents were presented with the same scenario regarding lighting, SFD respondents gave a mean rating of 7.0, a step down from their response regarding windows. Though the difference was not significant, rural respondents gave a directionally higher mean rating for lighting (recall that rural respondents reported heightened performance uncertainty regarding lighting earlier).
- When respondents were presented with the same scenario regarding HVAC, SFD respondents gave a mean rating of 7.6, directionally higher than the mean for lighting, directionally lower than the mean for windows.
- When presented with three hypothesized barriers at this evaluation/decision phase of the TOS renovation process, the availability of financing was deemed fairly important by SFD respondents (a mean of 6.4 on a 10-point agree/disagree scale), but performance uncertainty and transaction/hassle costs were rated significantly lower in importance. However, Hispanic respondents indicated that both performance uncertainty and transaction/hassle costs were significantly greater barriers than did SFD respondents.

**THE NEXT SECTION SUMMARIZES RESPONSE TO FINANCING-RELATED BARRIERS AND INTERVENTIONS.**

**Exhibit 2-21**  
**TOS Survey Results**  
**Financing**

TR071. Importance of Availability of EEM in Persuading Upgrades

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Mean Rating	7.1	7.3	7.5	8.1
Upper Bound	7.4	7.7	8.4	8.6
Lower Bound	6.9	6.9	6.6	7.5
N obs	243	113	29	61
Standard Error	0.2	0.2	0.5	0.3

TR072. Agreement or Disagreement Barriers to EEMs

Obtaining information about energy efficient mortgages on a timely basis from a reliable source would have a major impact on whether or not I invest in high efficiency measures when buying a home

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Mean Rating	7.2	7.4	7.1	7.8
Upper Bound	7.5	7.9	8.0	8.4
Lower Bound	6.9	7.0	6.2	7.2
N obs	244	114	29	61
Standard Error	0.2	0.3	0.5	0.3

Going through the process of applying for and obtaining an energy efficient mortgage at the time when I'm buying my next home would just be too much of a hassle

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Mean Rating	3.9	3.8	3.4	5.6
Upper Bound	4.2	4.2	4.4	6.3
Lower Bound	3.7	3.4	2.5	4.9
N obs	243	111	29	61
Standard Error	0.2	0.3	0.5	0.4

TR074. Awareness of CHEERS

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Yes	22	16	41	21
No	78	84	59	74
Refused	0	0	0	0
Don't Know	0	0	0	5
N obs	246	114	29	62

TR075. Likelihood of Considering CHEERS to Obtain an EEM

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Mean Rating	5.2	6.0	5.0	5.8
Upper Bound	5.5	6.5	6.1	6.5
Lower Bound	4.9	5.6	3.8	5.2
N obs	243	113	29	61
Standard Error	0.2	0.3	0.7	0.4

RESPONDENTS ATTRIBUTED REASONABLY HIGH IMPORTANCE TO EEMs, INDICATING THAT ANY SIGNIFICANT BARRIERS TO OBTAINING AN EEM ON A TIMELY BASIS COULD IN TURN POSE A SIGNIFICANT BARRIER TO TOS RENOVATIONS. RESPONDENTS WERE MIXED REGARDING WILLINGNESS TO INVEST \$200 IN CHEERS AS AN EEM PREREQUISITE.

- When re-exposed at this point in the survey to the EEM concept, and asked to assume they were actively considering a TOS renovation of one (or more) of the measures, SFD respondents placed moderately but not exceptionally high importance on the availability of EEMs (a mean rating of 7.1). Hispanic respondents placed significantly greater importance (a mean rating of 8.0) on EEMs than did SFD respondents.
- When asked about the importance of timely EEM availability in a TOS context, SFD respondents gave a similar 7.2 mean rating on a 10-point agree/disagree scale.
- However, SFD respondents anticipated relatively little transaction/hassle costs involved with obtaining an EEM during a TOS event (while the perceived barrier might be intensified during a real-life TOS event, this response means that there at least is no pervasive, reflexive assumption of “extra hassle” involved with EEMs). In contrast, Hispanic respondents expressed significantly more concern about the transaction/ hassle costs involved in getting an EEM.
- While one-fifth of SFD respondents reported awareness of CHEERS when it was described to them, four in ten rural respondents reported CHEERS awareness, a significantly higher proportion.
- When presented with the knowledge that a CHEERS analysis costing \$200 was a prerequisite for obtaining an EEM, then asked their likelihood of obtaining the analysis, responses were mixed on a 10-point purchase intent scale. SFD respondents reported significantly less likelihood than condo respondents of obtaining a CHEERS analysis.

THE NEXT SECTION SUMMARIZES RESULTS FROM QUESTIONS AS RESPONDENTS WERE THEN BROUGHT TO THE WHOLE-HOUSE SCENARIO.



**Exhibit 2-22**  
**TOS Survey Results**  
**Whole-House Scenario**

TR077. Likelihood of Persuing an EEM for Windows, Lighting, and HVAC

	SFD	Condo	Rural
N population	246	114	29
Mean Rating	6.6	6.9	6.7
Upper Bound	6.8	7.3	7.6
Lower Bound	6.3	6.5	5.7
N obs	245	113	29
Standard Error	0.2	0.2	0.6

TR079. Likelihood of Replacing Windows, Lighting, and HVAC

	SFD	Condo	Rural
N population	246	114	29
Mean Rating	7.0	6.5	6.4
Upper Bound	7.2	6.9	7.4
Lower Bound	6.7	6.1	5.5
N obs	245	110	29
Standard Error	0.1	0.2	0.6

TR081. Agreement or Disagreement with Barriers to Whole-House Retrofit

THREE products to know how to get the higher-efficiency versions for the home installed.

	SFD	Condo	Rural
N population	246	114	29
Mean Rating	5.3	5.3	4.9
Upper Bound	5.6	5.8	6.0
Lower Bound	5.0	4.8	3.8
N obs	246	114	28
Standard Error	0.2	0.3	0.6

I would hesitate to invest in high efficiency windows, lighting, AND heating and cooling at the same time because of serious doubts that I'd save the money I've been told I will.

	SFD	Condo	Rural
N population	246	114	29
Mean Rating	4.2	4.5	3.2
Upper Bound	4.5	5.0	4.1
Lower Bound	3.9	4.0	2.4
N obs	245	113	28
Standard Error	0.2	0.3	0.5

I'd be concerned that getting several higher-efficiency products installed at the same time I'm buying a home would involve costs I can't anticipate.

	SFD	Condo	Rural
N population	246	114	29
Mean Rating	5.8	5.7	5.7
Upper Bound	6.1	6.2	6.9
Lower Bound	5.5	5.3	4.5
N obs	246	114	29
Standard Error	0.2	0.3	0.7

**ASSUMING THAT RESPONDENTS TYPICALLY CAN SAVE 10 TO 30 PERCENT BY UPGRADING TO HIGH-EFFICIENCY WINDOWS, HVAC, AND LIGHTING, END-USER SURVEY RESPONSES INDICATE SIGNIFICANT POTENTIAL FOR DEVELOPING A TOS RENOVATION MARKET.**

- Respondents were asked to assume that they in fact had invested in the \$200 CHEERS analysis, and the analysis showed that they could save money by installing higher-efficiency windows, lighting, and HVAC. Respondents then were asked to rate their likelihood of pursuing an EEM to finance all three installations, and the mean SFD rating was a moderately high 6.6 on a 10-point likelihood scale (from not at all likely to extremely likely).
- Respondents then were asked their likelihood of replacing all three measures, assuming the result would be a 10 to 30 percent saving on their current energy bills. SFD respondents reported a moderately high 7.0 mean rating; condo and rural respondents were directionally less likely than were SFD respondents.
- Respondents were asked to rate their agreement with three whole-house-based barrier statements, on a 10-point agree/disagree scale. SFD respondents gave moderately high agreement with statements about information/search cost (5.3) and hidden cost (5.8) barriers, and relatively low agreement with the performance uncertainty barrier (4.2).
- Few respondents offered comments when asked what would cause them to seriously consider replacement of all three measures in their next home with higher-efficiency versions. Comments offered included “reliability of information,” “age of existing products,” “cost and long-term cost savings,” and “length of stay.”

**RESPONSES TO TWO WRAP-UP QUESTIONS ARE DESCRIBED NEXT.**

**Exhibit 2-23**  
**TOS Survey Results**  
**Other End-User Input**

TR088. Importance of Energy Efficiency in Future Replacements

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Mean Rating	8.5	7.9	9.1	8.4
Upper Bound	8.6	8.2	9.6	8.9
Lower Bound	8.3	7.6	8.5	8.0
N obs	246	114	28	62
Standard Error	0.1	0.2	0.3	0.3

TR089. Likelihood of Investing in Energy Efficient Measures Given  
Hypothetical \$250 Federal Tax Credit

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Mean Rating	7.8	7.5	7.5	7.7
Upper Bound	8.1	7.9	8.5	8.2
Lower Bound	7.6	7.0	6.5	7.1
N obs	245	114	28	59
Standard Error	0.1	0.3	0.6	0.3

TOS RENOVATION RESPONDENTS CLAIMED THAT ENERGY EFFICIENCY WILL BE AN IMPORTANT FACTOR IN FUTURE DECISIONS ABOUT MEASURE REPLACEMENT. AS MIGHT BE EXPECTED, TOS RENOVATION RESPONDENTS ATTRIBUTED FAIRLY HIGH IMPACT TO A \$250 HIGH-EFFICIENCY TAX CREDIT.

- Respondents were asked to rate the importance of energy efficiency to them when evaluating replacement of windows, lighting, and HVAC, and also products like refrigerators and dishwashers in the future. SFD respondents reported a high 8.5 mean rating on the 10-point importance scale. It is likely that some response inflation occurred at this question, because of the exaggerated “agency” and social factors referenced earlier, and also because of bias introduced by the preceding questions and discussions.
- Respondents then were asked to rate the impact that a \$250-per-installation Federal or state tax credit would have on their likelihood of investing in high-efficiency windows, lighting, HVAC, refrigerators, and dishwashers. On a 10-point scale the mean SFD rating was a relatively high 7.8.

TOS RESPONDENT DEMOGRAPHICS ARE SUMMARIZED NEXT, AS THE FINAL ELEMENT OF THE SUMMARY OF TOS RESPONDENT SURVEY RESPONSES.

**Exhibit 2-24**  
**TOS Survey Results**  
**Respondent Demographics**

DE091. Year Current Home Purchased

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
1999	3	4	3	0%
1998	11	5	14	36%
1997	24	11	14	65%
1996	5	4	3	0%
1995	1	2	3	0%
1990-1994	17	38	14	0%
1985-1989	14	18	14	0%
1980-1984	8	7	14	0%
1970-1979	11	9	10	0%
1960-1969	4	2	7	0%
1950-1959	1	0	0	0%
1940-1949	0	0	0	0%
Refused	0	0	0	0%
Don't Know	0	0	3	0%
N obs	246	114	29	62

DE093. First Home Ever Bought

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Yes, first home ever bought	33	47	28	100%
No, have bought other homes before (self or other HH head)	67	54	72	0%
Refused	0	0	0	0%
Don't Know	0	0	0	0%
N obs	246	114	29	62

DE095. Age

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Under 25	0	2	0	11%
25 to 34	10	13	0	42%
35 to 44	41	28	24	26%
45 to 54	26	28	52	16%
55 to 64	14	15	7	3%
65 or older	9	14	14	2%
Don't Know	0	0	0	0%
Refused	0	0	3	0%
N obs	246	114	29	62

DE092. Decade Current Home Built

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
90s	22	11	14	16%
80s	17	33	35	8%
70s	17	40	28	15%
60s	18	10	3	15%
50s	14	2	10	24%
40s	5	2	3	7%
Before 1940s	7	3	3	0%
Refused	0	0	0	0%
Don't Know	0	1	3	16%
N obs	246	114	29	62

DE094. Hispanic

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Yes, Hispanic household/ household head	6	2	7	100%
No, not Hispanic household	27	45	17	0%
Refused	0	0	0	0%
Don't Know	0	0	3	0%
N obs	82	53	8	62

DE096. 1998 Income

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Under \$20,000	0	1	7	26%
\$20,000 but under \$30,000	0	1	7	31%
\$30,000 but under \$50,000	3	22	17	26%
\$50,000 but under \$75,000	26	26	31	13%
\$75,000 but under \$100,000	26	25	24	2%
Over \$100,000	42	21	10	2%
Refused	0	3	3	2%
Don't Know	2	1	0	0%
N obs	246	114	29	62

DE097. Gender

	SFD	Condo	Rural	Hispanic
N population	246	114	29	62
Female	54	47	52	63%
Male	46	53	48	37%
N obs	246	114	29	62

**END-USER SEGMENTS VARIED DEMOGRAPHICALLY AS DESCRIBED BELOW, WITH SOME DIFFERENCES DRIVEN IN TURN BY DIFFERENCES IN SURVEY SCREENING AND QUALIFICATION CRITERIA.**

Respondent demographics are summarized in table form on the following page.

- SFD respondents were significantly more likely than condo respondents to have bought their homes since 1997 (39 vs. 20 percent), while condo owners were significantly more likely to have bought in the 1990-1994 period. As a function of survey screening and the list source, all first-time Hispanic home buyers had bought in 1997 or 1998.
- SFD respondents were significantly more likely than condo respondents to say their home was built in the 90s, and significantly more likely than rural respondents to say it was built in the 60s. Conversely, condo and rural respondents were significantly more likely than SFD respondents to say their homes were built in the 70s or 80s. Hispanic respondents were significantly more likely than SFD respondents to say their homes were built in the 40s.
- While one-third of SFD respondents said their current home was their first home, condo respondents were significantly more likely to say this (and, as a function of screening criteria, all Hispanic respondents were in their first home). Six percent of the SFD sample described their households as Hispanic; condo owners were significantly less likely to say this. (In the baseline survey, responses to these two questions are combined to provide a projectable estimate of the prevalence of first-time Hispanic home buyers within the larger population of study.)
- Rural respondents were significantly less likely to be age 44 or less when compared to SFD respondents, while Hispanics (first-time home buyers) were significantly more likely to be in that age range, all as might be expected based on the nature of these different end-user segments.
- The end-user segments varied significantly in terms of household income, with SFD respondents reporting the highest incomes (as expected, given the \$50,000 income screening floor for that segment), and Hispanic respondents (again, first-time home buyers) reporting the lowest incomes.

**RESULTS FROM THE DR (DISCRETIONARY RETROFIT) SURVEY ARE DETAILED BEGINNING ON THE FOLLOWING PAGE.**

**Exhibit 2-25**  
**Discretionary Retrofit Survey Results**  
**General Characteristics**

DR001. Voluntary CHANGES since January 1, 1997

	SFD	Condo	Rural	
N Population	381	30	189	
Refrigerator	18	23	23	%
Dishwasher	17	23	17	%
Water Heater	13	7	16	%
Windows	29	17	29	%
Indoor lighting	6	10	9	%
Outdoor lighting	7	0	6	%
Heating and/or cooling – HVAC	18	23	13	%
None	38	43	38	%
Refused	0	0	1	%
Don't Know	0	0	0	%
N Obs	556	44	285	

DR003. Considering Voluntary Changes in the Next Couple of Years

	SFD	Condo	Rural	
N Population	381	30	189	
Refrigerator	14	27	7	%
Dishwasher	9	13	6	%
Water Heater	7	17	7	%
Windows	29	13	24	%
Indoor lighting	4	10	4	%
Outdoor lighting	6	3	4	%
Heating and/or c	14	20	13	%
None	47	40	48	%
Refused	2	3	3	%
Don't Know	1	0	4	%
N obs	505	44	227	

DR004. Made Replacements as a Result of a Kitchen Remodel

	SFD	Condo	Rural	
N Population	381	30	189	
Yes	8	13	12	%
No	24	20	27	%
Refused	1	0	2	%
Don't Know	0	0	0	%
N Obs	127	10	78	

Number of Voluntary Actions Since January 1997

	SFD	Condo	Rural	
N Population	381	30	189	
One	22	1	12	%
Two	11	1	4	%
Three	4	0	2	%
Four	2	0	1	%
Five	1	0	0	%
Six	0	0	1	%
Seven	0	0	0	%

All the discretionary retrofit (DR) results, are reported on an unweighted basis, in order to compare condo and rural to SFD responses. The overall discussion is focused on SFD respondents as a benchmark, and differences between SFD respondents and other segments described as “significant” were found to be statistically significant at the 95 percent confidence level. DR respondents were screened to ensure they had made voluntary changes to the measures of central interest to this study since January 1997, or were contemplating a voluntary change of these items within the next couple of years. Please note that the sample pool of respondents had also completed PG&E’s Home Energy Survey, which may indicate a self-selection of respondents particularly interested and/or seriously considering retrofits or other upgrades in their home.

- SFD respondents were more than twice as likely than both condo and rural respondents to have made a voluntary change in their home since January 1997.
- While SFD respondents were more likely to have made changes, changes made by both SFD and rural respondents were more likely to be changes to the outside or envelope of the home, including windows and outdoor lighting. Condo dwellers reported a directionally higher occurrence of changes to items inside the home, such as the refrigerator, dishwasher, water heater, and heating and cooling system. This difference may be due in part to bylaws imposed on condo owners by their respective condominium owner associations.
- Surprisingly, condo and rural respondents reported consideration of the same kinds of measures as SFD respondents for possible voluntary retrofit in the next couple of years, including outside or envelope measures.

**DISCRETIONARY RETROFIT REASONS FOR CHANGE ARE DISCUSSED NEXT.**



## Exhibit 2-26 Discretionary Retrofit Survey Results Measures

DR005a. Reasons for Replacing Windows

	SFD	Condo	Rural	
N Population	381	30	189	
They were too big	0	0	1	%
They were too small	0	0	1	%
They looked "fogged up" all the time/ there was condensation between the panes of glass	2	3	3	%
The frame style was not to my liking	3	3	4	%
The home felt drafty	5	7	5	%
Too light	0	0	1	%
Too dark	0	0	1	%
Furniture was fading	1	0	1	%
Part of the kitchen remodel	1	0	1	%
Moisture/mold on frames	2	0	3	%
Other	17	3	16	%
Refused	0	0	0	%
Don't Know	0	0	1	%
N Obs	118	5	69	

DR005b. Approximate Amount Spent on Windows and Their Installation

	SFD	Condo	Rural
N population	381	30	189
Mean Dollars	3411	2740	3179
Upper Bound	3770	4660	3776
Lower Bound	3051	820	2582
N obs	111	5	55
Standard Error	217	953	357

DR005d. Who Installed the Windows

	SFD	Condo	Rural	
N Population	381	30	189	
Contractor	19	13	12	%
Family member/ friend	2	0	3	%
Did it myself	5	0	9	%
Dealer who sold the	2	3	3	%
Homebuilder	0	0	0	%
Other	0	0	0	%
Refused	0	0	0	%
Don't Know	0	0	0	%
N Obs	108	5	50	

DR006a. Reasons for Replacing your Indoor Lighting

	SFD	Condo	Rural	
N Population	381	30	189	
They were too dim/ did not provide enough light	1	3	3	%
They were too bright/ gave too much light	6	0	1	%
They got too hot when on for extended periods of time	0	0	0	%
The fixtures were not to my liking	1	7	2	%
They were costing too much on my electricity bill	1	0	1	%
Quality of the light/color tone	1	0	2	%
Part of the kitchen remodel	1	0	2	%
Other	2	0	2	%
Refused	0	0	0	%
Don't Know	0	0	0	%
N Obs	23	3	21	

DR006b. Approximate Expenditure on Indoor Lighting

	SFD	Condo	Rural
N population	381	30	189
Mean Dollars	994	3916	2152
Upper Bound	1376	11076	3355
Lower Bound	612	-3243	948
N obs	23	3	16
Standard Error	223	3042	689

DR006d. Who Installed the Indoor Lighting

	SFD	Condo	Rural	
N population	381	30	189	
Contractor	1	3	3	%
Family member/ friend	1	0	2	%
Did it myself	4	3	3	%
Dealer who sold the	0	0	0	%
Homebuilder	0	0	0	%
Other	0	0	0	%
Refused	0	0	0	%
Don't Know	0	0	0	%
N Obs	21	2	15	

DR007a. Reasons for Replacing or Upgrading HVAC

	SFD	Condo	Rural	
N population	381	30	189	
It did not cool or heat well enough	6	7	2	%
It was too expensive to run/ my electricity bill was too high	2	0	4	%
It was too noisy	0	0	0	%
It was too costly/too much hassle to maintain	1	0	1	%
Kitchen remodel	0	0	2	%
NON-kitchen remodel	1	0	1	%
Other	8	17	5	%
Refused	0	0	0	%
Don't Know	0	0	0	%
N Obs	69	7	24	

DR007b. Approximate Expenditure on HVAC

	SFD	Condo	Rural
N population	381	30	189
Mean Dollars	3042	3214	3412
Upper Bound	3454	4283	4168
Lower Bound	2631	2145	2656
N obs	69	7	25
Standard Error	247	564	442

DR007d. Who Installed the HVAC

	SFD	Condo	Rural	
N population	381	30	189	
Contractor	9	13	9	%
Family member/ friend	1	0	1	%
Did it myself	2	0	2	%
Dealer who sold the	3	7	0	%
Homebuilder	0	0	0	%
Other	0	0	0	%
Refused	0	0	0	%
Don't Know	0	0	0	%
N Obs	55	6	22	

**REASONS FOR VOLUNTARY REPLACEMENT OF WINDOWS, HEATING AND COOLING EQUIPMENT (HVAC), AND LIGHTING VARIED LITTLE ACROSS END-USER SEGMENTS.**

- On a “net” basis, 4.5 percent of SFD respondents reported having voluntarily replaced their windows since January 1997 because “the home felt drafty”. Both condo and rural respondents also reported this reason most frequently for changing the windows among the listed categories.
- The facing exhibit shows the “net” rates of reasons reported for measure-specific, voluntary retrofit changes for windows, lighting and HVAC. While each measure has different qualities, reasons reported for change vary insignificantly across end-user segment.
- Not surprisingly, approximately the same mean amount of dollars were spent by each end-user segment on the same technologies. The only case where this differed was in the replacement of indoor lighting in the condo segment. Due to such limited sample size of condos in particular, however, this mean is likely exaggerated and would probably settle closer to the means of the other end-user segments given a larger sample.

**REASONS VOLUNTARY RETROFIT OF KITCHEN-RELATED ITEMS, INCLUDING REFRIGERATORS, DISHWASHERS, WATER HEATERS, AND BROADER KITCHEN REMODELS ARE DISCUSSED NEXT.**

## Exhibit 2-27 Discretionary Retrofit Survey Results Measures

DR008a. Reasons for Replacing Dishwasher

	SFD	Condo	Rural	%
N population	381	30	189	
It did not get the dishes clean enough	3	3	5	%
It was too expensive to run/ my electricity bill was too high	1	0	2	%
It was too noisy	1	3	0	%
It was too costly to maintain	1	3	1	%
It style/color was not to my liking OR it didn't match the kitchen	2	0	1	%
Was part of the kitchen remodel	2	3	3	%
Other	9	10	7	%
Refused	0	0	0	%
Don't Know	0	3	0	%
N Obs	61	8	35	

DR008b. Approximate Expenditure on Dishwasher

	SFD	Condo	Rural
N population	381	30	189
Mean Dollars	1124	1928	464
Upper Bound	1609	4487	566
Lower Bound	639	-630	361
N obs	64	7	32
Standard Error	291	1350	61

DR008D. Who Installed \SFD Condo Rural

	SFD	Condo	Rural	%
N population	381	30	189	
Contractor	3	7	5	
Family member/ friend	4	0	3	%
Did it myself	4	3	8	%
Dealer who sold the equipment	5	13	1	%
Homebuilder	0	0	0	%
Other	0	0	0	%
Refused	0	0	0	%
Don't Know	0	0	0	%
N Obs	59	7	31	

DR009a. Reasons for Replacing the Refrigerator

	SFD	Condo	Rural	%
N population	381	30	189	
It was not keeping food cool enough/ cooling too slow	3	0	2	%
It was too expensive to run/ my electricity bill was too high	2	3	3	%
It was too noisy	1	0	1	%
It was too costly to maintain/ parts kept breaking	1	0	1	%
The style/color was not to my liking OR it didn't match the kitchen	2	3	1	%
Did not have the features I wanted	3	7	2	%
I did not want it to break down at a bad time	0	3	2	%
It was part of the kitchen remodel	1	0	2	%
Other	6	3	10	%
Refused	0	0	0	%
Don't Know	1	3	0	%
N Obs	73	7	47	

DR009B. Approximate Expenditure on Refrigerator

	SFD	Condo	Rural
N population	381	30	189
Mean Dollars	1646	1114	1189
Upper Bound	2057	1490	1505
Lower Bound	1234	739	873
N obs	69	7	43
Standard Error	247	198	188

DR009D. Who Installed the Refrigerator

	SFD	Condo	Rural	%
N population	381	30	189	
Contractor	2	7	2	%
Family member/ friend	2	0	3	%
Did it myself	6	10	10	%
Dealer who sold the equipment	6	7	4	%
Homebuilder	0	0	0	%
Other	0	0	0	%
Refused	0	0	0	%
Don't Know	0	0	0	%
N Obs	63	7	35	

DR010a. Reasons for Replacing Water Heater

	SFD	Condo	Rural	%
N population	381	30	189	
It did not produce enough hot water	3	3	2	%
It was too expensive to run/ my electricity bill was too high	1	0	2	%
It was too costly to maintain/ parts kept breaking	2	3	1	%
I thought it might be a fire hazard during an earthquake	0	0	1	%
It was part of the kitchen remodel	0	0	2	%
It wasn't making enough hot water	0	0	0	%
It wasn't the water hot enough	1	0	0	%
Other	6	0	9	%
Refused	0	0	0	%
Don't Know	0	0	1	%
N Obs	50	2	30	

DR010B. Approximate Expenditure on New Water Heater

	SFD	Condo	Rural
N population	381	30	189
Mean Dollars	1045	5500	1035
Upper Bound	1604	18638	1734
Lower Bound	486	-7639	337
N obs	49	2	31
Standard Error	334	4500	412

DR010D. Who Installed Water Heater

	SFD	Condo	Rural	%
N population	381	30	189	
Contractor	4	7	6	%
Family member/ friend	2	0	1	%
Did it myself	3	0	7	%
Dealer who sold the equipment	2	0	1	%
Homebuilder	0	0	0	%
Other	0	0	0	%
Refused	0	0	0	%
Don't Know	0	0	0	%
N Obs	44	2	28	

DR011A. Reasons for Remodeling the Kitchen

	SFD	Condo	Rural	%
N population	381	30	189	
I didn't like the style of the kitchen (color)	1	10	4	%
The appliances were all getting old and worn out	2	7	4	%
I didn't like the layout of the kitchen/ I wanted to change it	1	3	2	%
We needed a bigger kitchen	1	0	3	%
Part of a broader home remodel	1	0	1	%
Other	3	0	2	%
Refused	2	0	3	%
Don't Know	1	3	1	%
N Obs	41	7	38	

DR011B. Approximately how much money did you spend on your kitchen remodel?

	SFD	Condo	Rural
N population	381	30	189
Mean Dollars	15684	26000	11913
Upper Bound	20455	57951	15518
Lower Bound	10913	-5951	8307
N obs	21	3	16
Standard Error	773	577	65

DR011D. Who performed the work during your Kitchen Remodel

	SFD	Condo	Rural	%
N population	381	30	189	
Family member/ friend	3	10	5	%
Did it myself	1	0	1	%
Dealer who sold the equipment	2	3	5	%
Homebuilder	0	0	1	%
Kitchen/bath design services	0	0	0	%
Other	0	0	0	%
Refused	2	0	4	%
Don't Know	1	3	1	%
N Obs	34	5	30	

**DR RESPONDENTS ACROSS ALL SEGMENTS REPORTED THE REFRIGERATOR AS THE MOST OFTEN REPLACED MEASURE SINCE JANUARY 1997.**

- On a “net” basis, 18 percent of SFD respondents reported having replacing a refrigerator since January 1997. Both condo and rural respondents reported directionally higher rates of refrigerator replacement, each at 23 percent. SFD respondents further indicated the their mean expenditure on refrigerators to be significantly higher than both condo and rural reports. This price difference may be a major contributing factor to the lower replacement rates in the SFD segment.
- The facing exhibit shows the “net” reasons for measure-specific, voluntary changes. For each category of change, dishwasher, refrigerator, water heater, and overall kitchen remodel, the reasons for voluntary replacement are consistently similar and not statistically significant across segments.
- The top three reasons for replacing the refrigerator reported by SFDs were “other,” “it was not keeping food cool enough/ cooling too much”, and “did not have the features I wanted.”
- The top three reasons for replacing the dishwasher reported by SFDs were “other,” “it did not get the dishes clean,” and “its style/color was not to my liking OR it didn’t match the kitchen.” Condos reported directionally higher frequency of kitchen remodel, including changing out the dishwasher, as compared to SFD and rural respondents.
- The top three reasons for replacing the water heater reported by SFDs were “other,” “it did not produce enough hot water,” and “it was too costly to maintain/ parts kept breaking.”
- The top three reasons for remodeling the kitchen reported by SFDs were “other,” “the appliances were all getting old and worn out,” and “we needed a bigger kitchen.”

**POINTS OF PURCHASE FOR EACH TYPE OF MEASURE CHANGED ARE DISCUSSED NEXT.**

**Exhibit 2-28**  
**Discretionary Retrofit Survey Results**  
**Point of Purchase**

TR0841. Purchase Point of Refrigerator

	SFD	Condo	Rural
N population	381	30	189
Measure specialty contractor	0	0	1%
General contractor	0	0	1%
Specific mentions of ESCO, energy services co., performance contractor	1	3	0%
Home center (Home Depot, etc.)	4	7	5%
OTHER kind of retailer	7	10	7%
Product distributor	1	0	1%
Product manufacturer	0	3	1%
Other	0	0	0%
Refused	0	0	0%
Don't Know	1	0	1%
N Obs	53	7	29

TR0842. Purchase Point of Dishwasher

	SFD	Condo	Rural
N population	381	30	189
Measure specialty contractor	1	0	1%
General contractor	0	3	1%
Specific mentions of ESCO, energy services co., performance contractor	0	0	0%
Home center (Home Depot, etc.)	2	3	5%
OTHER kind of retailer	8	10	5%
Product distributor	1	0	2%
Product manufacturer	0	3	0%
Other	0	0	0%
Refused	0	0	0%
Don't Know	1	3	0%
N Obs	49	7	27

TR0843. Purchase Point of Water Heater

	SFD	Condo	Rural
N population	381	30	189
Measure specialty contractor	0	0	1%
General contractor	2	7	2%
Specific mentions of ESCO, energy services co., performance contractor	0	0	0%
Home center (Home Depot, etc.)	6	0	5%
OTHER kind of retailer	2	0	3%
Product distributor	1	0	1%
Product manufacturer	0	0	1%
Other	0	0	0%
Refused	0	0	0%
Don't Know	1	0	1%
N Obs	41	2	26

TR0844. Purchase Point of Windows

	SFD	Condo	Rural
N population	381	30	189
Measure specialty contractor	2	0	2%
General contractor	6	0	5%
Specific mentions of ESCO, energy services co., performance contractor	1	0	1%
Home center (Home Depot, etc.)	8	3	8%
OTHER kind of retailer	3	3	4%
Product distributor	3	7	2%
Product manufacturer	2	0	2%
Other	0	0	0%
Refused	0	0	0%
Don't Know	1	3	1%
N Obs	91	5	46

TR0845. Purchase Point of Indoor Lighting

	SFD	Condo	Rural
N population	381	30	189
Measure specialty contractor	1	0	1%
General contractor	0	0	1%
Specific mentions of ESCO, energy services co., performance contractor	3	0	0%
Home center (Home Depot, etc.)	1	7	3%
OTHER kind of retailer	0	0	2%
Product distributor	0	0	1%
Product manufacturer	0	0	0%
Other	0	0	0%
Refused	0	0	0%
Don't Know	0	0	0%
N Obs	21	2	13

TR0846. Purchase Point of Outdoor Lighting

	SFD	Condo	Rural
N population	381	30	189
Measure specialty contractor	0	0	1%
General contractor	1	0	0%
Specific mentions of ESCO, energy services co., performance contractor	0	0	3%
Home center (Home Depot, etc.)	5	0	1%
OTHER kind of retailer	0	0	5%
Product distributor	1	0	0%
Product manufacturer	0	0	0%
Other	0	0	0%
Refused	0	0	0%
Don't Know	0	0	0%
N Obs	24	0	9

TR0847. Purchase Point of HVAC

	SFD	Condo	Rural
N population	381	30	189
Measure specialty contractor	2	3	1%
General contractor	6	7	6%
Specific mentions of ESCO, energy services co., performance contractor	1	0	0%
Home center (Home Depot, etc.)	2	0	1%
OTHER kind of retailer	1	3	1%
Product distributor	1	3	2%
Product manufacturer	1	0	1%
Other	0	0	0%
Refused	0	0	0%
Don't Know	2	3	0%
N Obs	61	6	21

**THE MAJORITY OF SFD RESPONDENTS REPORTED PURCHASING THEIR EQUIPMENT AT HOME CENTERS, OR OTHER RETAIL CENTERS.**

- With the exceptions of HVAC and indoor lighting, which were reported as most frequently purchased from, general contractors, and Energy Service Companies (ESCOs), respectively, the “net” results are between 7 and 10 percent of SFD respondents indicated that they purchased their equipment through a retail venue. This re-enforces the idea of the retail center as a potential “focal point” for energy-efficiency education.

**Exhibit 2-29**  
**Discretionary Retrofit Survey Results**  
**Point of Purchase**

DR0141. Method of Payment for Refrigerator

	SFD	Condo	Rural	
N population	381	30	189	
Savings	12	3	1	%
Cash/Check	1	0	18	%
Agreement with contractor/retailer to pay over a couple of months	7	0	0	%
Credit card	0	17	6	%
Energy efficiency loan	1	0	0	%
Non- energy efficiency loan/other financing		0	1	%
Other	0	0	0	%
Refused	10	5	10	%
Don't Know	1	0	2	%
N Obs	119	11	68	

DR0142. Method of Payment for Dishwasher

	SFD	Condo	Rural	
N population	381	30	189	
Savings	0	0	0	%
Cash/Check	11	13	14	%
Agreement with contractor/retailer to pay over a couple of months	1	0	0	%
Credit card	4	3	2	%
Energy efficiency loan	0	0	0	%
Non- energy efficiency loan/other financing	0	0	0	%
Other	0	0	0	%
Refused	0	3	0	%
Don't Know	0	0	0	%
N Obs	62	6	6	

DR0143. Method of Payment for Water Heater

	SFD	Condo	Rural	
N population	381	30	189	
Savings	0	0	0	%
Cash/Check	9	3	12	%
Agreement with contractor/retailer to pay over a couple of months	0	0	0	%
Credit card	2	0	2	%
Energy efficiency loan	0	0	0	%
Non- energy efficiency loan/other financing	0	3	0	%
Other	0	0	0	%
Refused	0	0	0	%
Don't Know	0	0	0	%
N Obs	44	2	6	

DR0144. Method of Payment for Windows

	SFD	Condo	Rural	
N population	381	30	189	
Savings	1	0	1	%
Cash/Check	20	13	16	%
Agreement with contractor/retailer to pay over a couple of months	1	0	3	%
Credit card	3	0	3	%
Energy efficiency loan	1	0	1	%
Non- energy efficiency loan/other financing	1	0	4	%
Other	0	0	0	%
Refused	1	3	0	%
Don't Know	0	0	1	%
N Obs	101	5	53	

DR0145. Method of Payment for Indoor Lighting

	SFD	Condo	Rural	
N population	381	30	189	
Savings	0	0	1	%
Cash/Check	4	7	7	%
Agreement with contractor/retailer to pay over a couple of months	0	0	1	%
Credit card	1	3	0	%
Energy efficiency loan	0	0	0	%
Non- energy efficiency loan/other financing	0	0	1	%
Other	0	0	0	%
Refused	0	0	0	%
Don't Know	0	0	0	%
N Obs	23	3	16	

DR0146. Method of Payment for Outdoor Lighting

	SFD	Condo	Rural	
N population	381	30	189	
Savings	0	0	0	%
Cash/Check	5	0	4	%
Agreement with contractor/retailer to pay over a couple of months	0	0	1	%
Credit card	2	0	0	%
Energy efficiency loan	0	0	0	%
Non- energy efficiency loan/other financing	0	0	1	%
Other	0	0	0	%
Refused	0	0	0	%
Don't Know	0	0	1	%
N Obs	27	0	11	

DR0147. Method of Payment for HVAC

	SFD	Condo	Rural	
N population	381	30	189	
Savings	1	0	0	%
Cash/Check	11	23	9	%
Agreement with contractor/retailer to pay over a couple of months	1	0	1	%
Credit card	2	0	2	%
Energy efficiency loan	1	0	0	%
Non- energy efficiency loan/other financing	0	0	1	%
Other	0	0	0	%
Refused	0	0	0	%
Don't Know	1	0	0	%
N Obs	62	7	24	

END-USER MARKET CHARACTERIZATION . . . DISCRETIONARY RETROFIT SURVEY RESULTS .  
. . . RETROFIT CHARACTERISTICS . . . POINT OF PURCHASE . . . CONTINUED

- While the method of payment varied somewhat across measures, the highest use of savings, or cash/check was fairly consistent across all end-user segments. There were also non-significant reports of the use of energy-efficient loans for the purchase of refrigerators, windows, and HVACs in the SFD segment, each reported at less than 1 percent.

GENERAL AWARENESS, USE, AND CONSIDERATION OF ENERGY-EFFICIENT LOANS ARE SUMMARIZED NEXT.



**Exhibit 2-30**  
**Discretionary Retrofit Survey Results**  
**Energy-Efficient Loans**

BL026 - BL029. Energy Efficient Loans

	SFD	Condo	Rural	
N population	381	30	189	
% Aware EEL	42	30	39	%
% Aware @ DL	17	10	13	%
Used EEL- for HVAC				%
Used EEL- for windows	0	13	0	%
Considered EEL for:				%
Refrigerator	1	0	0	%
Dishwasher				%
Water Heater	0	0	0	%
Windows	1	0	1	%
Outdoor lighting	0	0	0	%
HVAC	1	3	1	

BL028a. Who the Loan Was Obtained From

	SFD	Condo	Rural	
N population	381	30	189	
Bank of America	0	0	1.1	%
Energy Star	0	0	0	%
PG&E	1.3	0	0.5	%
Viewtech/Volt Viewtech	0	0	0	%
Other	1	0	3	%
Refused	4	0	4	%
Don't Know	1	0	1	%
N obs	26	0	17	

BL028b. Whether the EEL Was tied to an Energy Efficiency Program

	SFD	Condo	Rural	
N population	381	30	189	
Yes, tied to PG&E program/rebate	0.8	0	0	%
Other	0	0	3	%
Refused	3	0	3	%
Don't Know	0	0	1	%
N obs	17	0	14	

DR015. Most Important Characteristic of the EEL

	SFD	Condo	Rural	
N Population	381	30	189	
Lower interest rate than other loans	7	0	5	%
Longer payback period	0	0	0	%
Lender/contractor recommended it	2	0	1	%
Refused	17	23	11	%
Don't Know	6	0	6	%
N obs	117	7	44	

**WHILE THERE IS GREAT AWARENESS OF EELS AMONG DISCRETIONARY RETROFIT RESPONDENTS, THE NUMBER WHO ACTUALLY OBTAINED AN EEL FOR A RETROFIT REMAINS LOW.**

- Two in five SFD respondents reported awareness of EELs (energy-efficient loans), based on the brief concept description provided in the survey.
- Only 17 percent of SFD respondents reported both making discretionary changes since January 1997, and being aware of EELs at the time.
- One DR respondent, an SFD owner, had obtained an EEL to pay for the discretionary retrofit of the windows, while 2 obtained EELs for the retrofit of the HVAC system. Two rural respondents obtained EELs for window retrofit. In addition, 11 SFD respondents overall had considered EELs for a discretionary retrofit for at least one of the measures.
- When asked about the most important characteristics of the EEL, 7 percent of SFD respondents indicated the lower interest rate, as did 5 percent of rural respondents. Ranking second in both segments was lender/contractor recommended loan. All the condo owners who were posed this question refused to answer.

**THE IMPORTANCE OF ENERGY EFFICIENCY AND ARCHITECTS IN DR CHANGES IS DISCUSSED NEXT.**

**Exhibit 2-31**  
**Discretionary Retrofit Survey Results**  
**Additional DR Event Characteristics**

DR013. The Item That Prompted Other Changes

	SFD	Condo	Rural	
N population	381	30	189	
Refrigerator	1	0	1	%
Dishwasher	0	0	1	%
Water Heater	0	0	2	%
Windows	1	3	1	%
Indoor lighting	0	0	1	%
Outdoor lighting	0	0	1	%
Heating and/or cooling – HVAC	1	0	0	%
None	23	8	20	%
Other	0	0	0	%
Refused	0	0	0	%
Don't Know	2	0	1	%
N Obs	105	9	48	

TR043. Importance of Energy Efficiency in Choosing Items to Upgrade(Scale of 1-10)

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	8.1	6.8	8.2
Upper Bound	8.4	7.7	8.5
Lower Bound	7.9	5.9	7.9
N obs	265	21	134
Standard Error	0.1	0.5	0.2

TR044. Used an Architect or Designer

	SFD	Condo	Rural	
N population	381	30	189	
Yes, used architect or designer	13	13	9	%
No, did not use architect or designer	52	53	55	%
Refused	8	7	11	%
Don't Know	2	3	3	%
N obs	286	23	145	

**THE IMPORTANCE ATTRIBUTED TO ENERGY EFFICIENCY WHEN RESPONDENTS MADE DISCRETIONARY RETROFIT DECISIONS WAS HIGHER AMONG THE SFD AND RURAL SEGMENTS. USE OF ARCHITECTS AND DESIGNERS TO CONSULT ON DISCRETIONARY RETROFITS WAS SOMEWHAT INFREQUENT.**

Please note that this section of questions was only asked of the SFD, condo, and rural DR respondents who reported DR events since January 1997. Results are discussed only for the SFD respondents.

- On a 10-point scale where 1 meant not important and 10 meant very important, SFD respondents reported a high mean rating of 8.1 to describe the importance of energy efficiency in selecting which energy-related products to install during the DR event. Condo respondents reported a directionally lower mean rating of 6.8, indicating that energy efficiency was slightly less important to them when making DR decisions.
- Thirty-seven of the 286 SFDs who had made a DR investments reported that they had consulted with an architect or designer about the changes they made. This translates to a “net” of 13 percent of DR respondents who had consulted with an architect or designer and made DR changes since January 1997.
- (For each DR renovation measure, respondents were asked whether they believed the measure was high- or standard efficiency. Because of the well-known tendency of end users to overstate energy efficiency of measures used, these data were excluded from this discussion. This sample size constraint also applied to a question asking who had installed each measure.)
- Respondents were also asked, in the case where they completed more than one retrofit activity, whether there was a particular item that “catalyzed” the retrofit of others. SFD respondents reported that windows (1.3 percent) and HVAC (1 percent) were responsible for this. Rural respondents reported windows to be a significantly greater catalyst than reported by SFD respondents.

**DISCUSSION OF “ CORE” DR SURVEY RESPONSES BEGINS IN THE NEXT SECTION, STARTING WITH RESPONSES TO HYPOTHETICAL DR SCENARIOS AT THE “ SHOPPING” PHASE OF THE DR PROCESS.**

**Exhibit 2-32**  
**Discretionary Retrofit Survey Results**  
**Shopping Phase**

TR048. Likelihood of investigating replacing the windows (scale of 1-10).

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	7.4	0.0	7.2
Upper Bound	7.8	0.0	7.9
Lower Bound	7.0	0.0	6.6
N obs	111	0	53
Standard Error	0.2	0.0	0.4

TR050. Likelihood of investigating replacing the HVAC (scale of 1-10).

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	6.9	7.5	7.4
Upper Bound	7.4	8.1	8.0
Lower Bound	6.5	6.8	6.8
N obs	125	28	66
Standard Error	0.3	0.4	0.4

TR049. Likelihood of investigating replacing the lighting (scale of 1-10).

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	7.2	6.0	6.8
Upper Bound	7.6	6.0	7.3
Lower Bound	6.9	6.0	6.2
N obs	142	1	69

TR051. Likelihood of investigating replacing kitchen appliances (scale of 1-10).

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	7.3	8.4	6.9
Upper Bound	7.8	10.5	7.7
Lower Bound	6.7	6.3	6.1
N obs	62	5	31

**DR RESPONDENTS INDICATED RELATIVELY HIGH WILLINGNESS TO AT LEAST INVESTIGATE REPLACEMENT OF "LESS-THAN-PERFECT" WINDOWS, LIGHTING, AND HVAC IN A HYPOTHETICAL HOME WHERE THIS HAD NOT BEEN DONE.**

Note that for most of the remaining questions until the discussion of respondent demographics, respondents were given hypothetical scenarios that progressed through the hypothesized DR "awareness-interest-desire-action" chain. That is, these are prospective, not retrospective, questions, which underscores the importance of pre-screening DR respondents to have some minimum level of experience and/or consideration of the home-improvement process. Sections of questions that did not specify whole-house (multi-measure) renovations were posed first, and as the survey progressed respondents were exposed to scenarios that were explicitly whole-house in nature.

- A scenario was posed in which the respondent was considering purchase of his/her next home, and encountered windows that were functional, but perhaps had a few broken seals and not particularly desirable styling. On a 10-point scale (where 1 meant they would not investigate replacing the windows, and 10 meant they would actively investigate doing so), SFD respondents reported a fairly high mean rating of 7.4.
- Respondents likewise were given a scenario in which the indoor lighting was functional in their prospective new home, but the lighting quality and fixture styles were not particularly to their tastes. On the same 10-point scale for consideration of replacement, SFD respondents reported a mean rating of 7.2, competitive with the windows mean rating.
- When given a similar scenario for HVAC, where the system functions but the respondent "knows" it is 10 years old, SFD respondents gave a mean rating of 6.9, a step down from responses regarding windows and indoor lighting.
- When given a similar scenario for kitchen appliances, where they function but they might be unsuited to the respondents' tastes, or lack the features they want, SFD respondents gave a mean rating of 7.3, on par with responses regarding windows, indoor lighting, and HVAC.
- There were no discernable, consistent differences across SFD, condo, rural respondents in these categories.

**RESPONDENT ATTITUDES TOWARD ENERGY EFFICIENCY AND INFORMATION SOURCES ARE DISCUSSED NEXT.**

**Exhibit 2-33**  
**Discretionary Retrofit Survey Results**  
**Attitudes Toward Energy Efficiency and Information Sources**

TR052. Importance of energy efficiency be in deciding whether to upgrade (scale of 1-10)

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	8.0	7.4	7.8
Upper Bound	8.2	8.2	8.1
Lower Bound	7.8	6.6	7.5
N obs	378	29	188
Standard Error	0.1	0.5	0.2

TR053. Confidence in Ability to Distinguish Between High Efficiency and Standard Efficiency Products

	SFD	Condo	Rural
N population	381	30	189
Completely confident	32	30	28
Fairly confident	58	53	66
Not too confident, or	8	13	3
Not at all confident	2	3	3
Refused	0	0	0
Don't Know	0	0	0
N obs	381	30	29

TR054. Sources of RELIABLE, OBJECTIVE information about high-efficiency products

	SFD	Condo	Rural
N population	381	30	189
PG&E (general/unlisted mentions)	37	37	42
PG&E REBATE program	1	3	1
PG&E ENERGY ANALYSIS program	3	0	2
Home inspector	4	7	4
Realtor	2	0	1
Measure manufacturer	8	7	6
Measure distributor	3	13	3
Home Depot (specific mentions)	4	0	3
OTHER retailers	9	10	6
Measure installer/contractors	15	3	12
Yellow pages	0	0	1
Other advertising	1	0	1
Consumer Reports	13	13	6
Other media	2	0	2
Government/DOE/Energy Star	0	0	1
Other	18	20	15
Refused	0	3	0
Don't Know	3	7	6
N obs	381	30	189

RESPONDENTS CLAIMED THAT ENERGY EFFICIENCY WOULD BE FAIRLY IMPORTANT IN DRIVING THEIR DECISION TO REPLACE WINDOWS, LIGHTING, HVAC, OR KITCHEN APPLIANCES AND ALSO CLAIMED A FAIR AMOUNT OF CONFIDENCE IN THEIR ABILITY TO IDENTIFY HIGH-EFFICIENCY MEASURES. HOWEVER, TRUSTWORTHY INFORMATION SOURCES BEYOND PG&E WERE UNCOMMON.

- Respondents overall reported that energy efficiency would be fairly important in deciding whether to make DR retrofit changes in the preceding scenarios; the mean ratings among SFD respondents was 7.9 (where 1 meant energy efficiency was not important, and 10 meant it was extremely important). We suspect some degree of respondent overstatement of the importance of energy efficiency, both because of the common tendency for respondents to exaggerate “agency” in a survey context, and also possibly because of social factors.
- One-third of SFD respondents said they were completely confident in their ability to distinguish between high-efficiency and standard efficiency windows, lighting, HVAC, and kitchen appliances. The clear majority (90 percent) of SFD respondents said they were at least fairly confident in being able to make these distinctions.
- When respondents were asked which information sources they would trust to provide reliable, objective measure information, PG&E (and PG&E-provided sources) received by far the most mentions. Although measure installers and Consumer Reports received modest numbers of mentions as trustworthy sources, most other supply-side market actor types included in this market characterization study received few mentions each. This suggests that a meaningful void currently exists – heightening the potential for “asymmetric information” to act as a barrier to energy-efficiency adoption – outside of PG&E.

END-USER INPUT REGARDING OTHER SHOPPING-LEVEL BARRIERS AND POTENTIAL INTERVENTIONS IS SUMMARIZED NEXT.



**Exhibit 2-34**  
**Discretionary Retrofit Survey Results**  
**Perceived Barriers and Response to Interventions**

TR055a. Reasons Why High Efficiency Windows Would not be Considered

	SFD	Condo	Rural
N population	381	30	189
Concern that information is incomplete	1	0	1%
Concern that information may become outdated quickly	1	0	0%
Concern that I didn't ask some important question	0	0	0%
Seems uncommon/don't know others who have done it	0	0	0%
Doubts that they really save money/are worth it	1	0	2%
Concern about high first (costs too much)	18	0	19%
Concerns about comfort	2	0	1%
Concerns about style/aesthetic aspect	1	0	1%
Concerns about other non-energy aspect	0	0	0%
None	3	0	2%
What I have now is fine/works well	29	0	0%
Other	4	0	4%
Refused	0	0	0%
Don't Know	1	0	0%
N obs	112	0	53

TR055b. Reasons Why High Efficiency Lighting Would not be Considered

	SFD	Condo	Rural
N population	381	30	189
Concern that information is incomplete	2	0	3
Concern that information may become outdated quickly	1	0	0
Concern that I didn't ask some important question	0	0	0
Seems uncommon/don't know others who have done it	0	0	1
Doubts that they really save money/are worth it	1	0	1
Concern about high first (costs too much)	20	3	23
Concerns about lighting quality	4	0	2
Concerns about style/aesthetic aspect	2	0	2
Concerns about other non-energy aspect	0	0	1
None	4	0	3
What I have now is fine/works well	38	0	0
Other	6	0	2
Refused	0	0	0
Don't Know	1	0	1
N obs	143	1	70

TR055c. Reasons Why High Efficiency HVAC Would not be Considered

	SFD	Condo	Rural
N population	381	30	189
Concern that information is incomplete	2	0	4%
Concern that information may become outdated quickly	0	3	1%
Concern that I didn't ask some important question	0	0	0%
Seems uncommon/don't know others who have done it	1	3	1%
Doubts that they really save money/are worth it	4	3	1%
Concern about high first (costs too much)	20	50	18%
Concerns about comfort	0	0	1%
Concerns about reliability	1	0	1%
Concerns about other non-energy aspect	0	0	0%
None	3	20	8%
What I have now is fine/works well	0	0	0%
Other	3	17	2%
Refused	0	0	0%
Don't Know	1	3	1%
N obs	126	29	66

TR055d. Reasons Why High Efficiency Kitchen Appliances Would not be Considered

	SFD	Condo	Rural
N population	381	30	189
Doubts that they really save money/are worth it	0	0	1
Concern about high first (costs too much)	11	7	11
Concerns about other aspect	0	0	1
Don't Know	1	0	1
N obs	61	2	44

TR057. Importance of Reliable Information from Retail Centers Such As Home Depot (scale of 1-10)

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	7.1	7.2	7.3
Upper Bound	7.3	8.0	7.7
Lower Bound	6.9	6.4	7.0
N obs	380	30	188
Standard Error	0.1	0.5	0.2

**HIGH FIRST COST REMAINS A KEY BARRIER TO ACTIVE SHOPPING REGARDING DISCRETIONARY RETROFITS, WHILE CONSUMER REPORTS SHOWS SIGNIFICANT POTENTIAL FOR MITIGATING THESE CONCERNS.**

Individual respondents provided responses to just one of the following three open-ended questions about measure-specific shopping barriers, in order to manage survey length and avoid respondent fatigue.

- When asked on an open-ended basis about shopping barriers (i.e., barriers to active consideration) for window replacement, the most common reason given by far was high first cost. No other responses came close. SFD respondents were just as likely as rural respondents to express doubts that energy-efficient windows will really save money, or performance uncertainty (this may reflect some degree of correlation between SFDs and more temperate climate zones). Condo owners were not asked this question due to the severely limited sample, and the random assignment of these shopping questions.
- When asked about shopping barriers regarding lighting, high first cost again was by far the most common barrier offered. SFD respondents mentioned “what they have now is fine/works well” at a “net” rate of 38 whereas neither condos nor rural segment respondents mentioned this.
- When asked about shopping barriers regarding HVAC, high first cost again was the dominant mention, although condo respondents mentioned this significantly more often than did SFD respondents, while rural respondents mentioned it with about the same frequency.
- When asked about shopping barriers regarding kitchen appliances, high first cost again was the dominant mention, with no significant differences across segments.
- Respondents were exposed to a scenario in which they could obtain energy-efficient product information from knowledgeable staff at home center retailers like a Home Depot, and asked to rate the importance of this potential intervention in their consideration of high-efficiency measures. SFD respondents reported a moderately high mean rating of 7.1, with virtually no difference across segments.

**THE NEXT SECTION DISCUSSES RESULTS FROM A SECTION OF THE SURVEY WHERE SHOPPING WAS PRESUMED, AND RESPONDENTS WERE PROBED REGARDING THEIR ATTITUDES AND INTENTIONS DURING THE “ EVALUATION/DECISION” PHASE.**

**Exhibit 2-35**  
**Discretionary Retrofit Survey Results**  
**Evaluation/Decision Phase**

TR061. Likelihood of Replacing Lighting When Customer has Reliable Information about High Efficiency Units

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	6.6	0.0	6.5
Upper Bound	7.0	0.0	7.1
Lower Bound	6.2	0.0	6.0
N obs	110	0	53
Standard Error	0.3	0.0	0.4

TR062. Likelihood of Replacing Windows When Customer has Reliable Information about High Efficiency Units

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	7.7	9.0	7.9
Upper Bound	8.0	0.0	8.3
Lower Bound	7.4	0.0	7.5
N obs	142	1	67
Standard Error	0.2	0.0	0.2

TR063. Likelihood of Replacing HVAC When Customer has Reliable Information about High Efficiency Units

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	7.2	7.4	7.7
Upper Bound	7.6	8.1	8.2
Lower Bound	6.8	6.7	7.2
N obs	126	28	66
Standard Error	0.2	0.4	0.3

TR063A. Likelihood of Replacing Kitchen Appliances When Customer has Reliable Information about High Efficiency Units

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	7.4	7.9	8.6
Upper Bound	7.8	9.3	9.0
Lower Bound	7.0	6.5	8.1
N obs	124	8	53
Standard Error	0.2	0.8	0.3

TR064. Agreement or Disagreement Barriers

My decision to invest in high efficiency energy-related products would depend on the availability of financing

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	5.7	6.0	7.1
Upper Bound	6.0	7.1	7.5
Lower Bound	5.5	5.0	6.8
N obs	380	30	188
Standard Error	0.2	0.6	0.2

I would hesitate to invest in high efficiency energy-related products because of serious doubts that they will save me as much money as claimed

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	3.7	4.0	4.1
Upper Bound	3.9	5.0	4.4
Lower Bound	3.4	3.1	3.7
N obs	376	29	187
Standard Error	0.1	0.5	0.2

Regardless of how much money I can save, and the information I have about high efficiency energy-related products, I would want to avoid the hassle of having them installed

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	3.1	2.7	3.2
Upper Bound	3.3	3.4	3.5
Lower Bound	2.9	2.0	2.9
N obs	378	30	188
Standard Error	0.1	0.4	0.2

**ASSUMING RELIABLE INFORMATION THAT MITIGATES PERFORMANCE UNCERTAINTY, RESPONDENTS WERE MOST OPEN TO DISCRETIONARY RETROFIT OF WINDOWS, AND LEAST OPEN TO DR OF LIGHTING, WITH ACCESS TO FINANCING A BARRIER TO BE ADDRESSED.**

Individual respondents provided responses to one, and in some cases two, of the following four measure-specific purchase intent questions, in order to manage survey length and avoid respondent fatigue.

- Respondents were asked to assume they had objective, reliable information showing they could save “a significant amount” on their energy bill by replacing their prospective new home’s windows. On a scale from 1 to 10 where 1 meant not at all likely and 10 meant extremely likely, SFD respondents gave a mean rating of 7.7.
- When respondents were presented with the same scenario regarding lighting, SFD respondents gave a mean rating of 6.6, a step down from their response regarding windows.
- When respondents were presented with the same scenario regarding HVAC, SFD respondents gave a mean rating of 7.2, directionally higher than the mean for lighting, directionally lower than the mean for windows.
- When respondents were presented with the same scenario regarding kitchen appliances, SFD respondents gave a mean rating of 7.4, directionally higher than the mean for HVAC, and lighting, and directionally lower than the mean for windows.
- When presented with three hypothesized barriers at this evaluation/decision phase of the DR process, the availability of financing was deemed fairly important by SFD respondents (a mean of 5.7 on a 10-point agree/disagree scale), but performance uncertainty and transaction/hassle costs were rated significantly lower in importance. Both condo and rural respondents availability of finance significantly more important to them.

**THE NEXT SECTION SUMMARIZES RESPONSE TO FINANCING-RELATED BARRIERS AND INTERVENTIONS.**

**Exhibit 2-36**  
**Discretionary Retrofit Survey Results**  
**Financing**

TR071. Importance of Availability of EEM in Persuading Upgrades (Scale of 1-10)

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	6.5	5.8	7.1
Upper Bound	6.7	6.8	7.5
Lower Bound	6.2	4.8	6.8
N obs	378	30	187
Standard Error	0.2	0.6	0.2

TR072. Agreement or Disagreement Barriers to EELs

Obtaining information about energy efficient loans from a reliable source would have a major impact on whether or not I invest in high efficiency measures for my home

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	6.3	6.2	7.0
Upper Bound	6.6	7.2	7.4
Lower Bound	6.1	5.2	6.7
N obs	375	30	187
Standard Error	0.2	0.6	0.2

Going through the process of applying for and obtaining an energy efficient mortgage at the time when I'm buying my next home would just be too much of a hassle

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	4.1	3.9	4.2
Upper Bound	4.4	4.8	4.5
Lower Bound	3.8	3.0	3.8
N obs	373	30	186
Standard Error	0.2	0.5	0.2

DR016. Primary EEL Benefits/Features Desired

	SFD	Condo	Rural
N population	381	30	189
Quick turnaround time	2	3	3%
Low rates	57	33	52%
Lower monthly payments	10	17	14%
Minimal/no fees/points	1	0	0%
Line of credit	1	0	1%
Other	0	0	0%
Refused	2	3	3%
Don't know	7	13	12%
N obs	306	21	163

DR017. Preferred Method for Obtaining EEL

	SFD	Condo	Rural
N population	381	30	189
From primary bank	21	10	19%
Contractor handles it	19	7	24%
800 number application	18	23	12%
Refused	3	0	1%
Don't know	1	3	3%
N obs	234	13	108

DR018. Likelihood of Selecting 6-12-Month Interest-Free EEL Over Others

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	7.5	7.7	7.8%
Upper Bound	7.7	8.6	8.1%
Lower Bound	7.2	6.8	7.5%
N obs	367	29	183%
Standard Error	0.1	0.5	0.2

**RESPONDENTS ATTRIBUTED SOMEWHAT HIGH IMPORTANCE TO EELs IN PERSUADING UPGRADES. IN ADDITION, THEY REPORTED LOW PERCEIVED HASSLE COSTS TO OBTAINING AN ENERGY-EFFICIENT LOAN.**

- When re-exposed at this point in the survey to the EEL concept, and asked to assume they were actively considering a DR of one (or more) of the measures, SFD respondents placed moderately but not exceptionally high importance on the availability of EELs (a mean rating of 6.5).
- When asked about the importance of availability of reliable information EEL in a DR context, SFD respondents gave a similar 6.3 mean rating on a 10-point agree/disagree scale.
- Respondents overall anticipated relatively little transaction/hassle costs involved with obtaining an EEL during a DR event (while the perceived barrier might be intensified during a real-life DR event, this response means that there at least is no pervasive, reflexive assumption of “extra hassle” involved with EELs).
- When asked in an open-ended manner about the primary EEL benefits or features desired in an EEL, respondents cited lower rates and lower monthly payments first and second most frequently, respectively.
- When respondents were posed scenarios of possible methods of obtaining EELs, each end-user segment had a different preference ranking. SFD respondents reported the most evenly distributed results ranking “their primary bank” first, “the contractor handling it” second, and the “800 number application process” third. While the condo and rural responses did not differ significantly from the SFD responses, condos directionally ranked the “800 number application process highest”, and rural respondents reported their preference as having “the contractor handling it.”
- Not surprisingly, when asked the likelihood of selecting a 6 to 12 month interest-free EEL over other loans, respondents, on average, gave relatively high ratings. On a scale of 1 to 10, SFD respondents indicated a mean value of 7.5, and the mean ratings given by condo and rural respondents did not differ significantly.

**THE NEXT SECTION SUMMARIZES RESULTS FROM QUESTIONS AS RESPONDENTS WERE THEN BROUGHT TO THE WHOLE-HOUSE SCENARIO.**

**Exhibit 2-37**  
**Discretionary Retrofit Survey Results**  
**Whole-House Scenario**

TR077. Likelihood of Persuing an EEL for Windows, Lighting, and HVAC

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	6.0	6.5	6.7
Upper Bound	6.3	7.3	7.0
Lower Bound	5.8	5.6	6.3
N obs	376	30	186
Standard Error	0.1	0.5	0.2

TR079. Likelihood of Replacing Windows, Lighting, and HVAC

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	6.8	6.9	7.1
Upper Bound	7.0	7.5	7.4
Lower Bound	6.6	6.2	6.8
N obs	377	30	187
Standard Error	0.1	0.4	0.2

TR083. Preferred Whole-House Payment Method

	SFD	Condo	Rural
N population	381	30	189
Through an EEL	21	10	20
Through other non-EEL loan	11	7	17
Through separate bank loan/credit line	9	0	7
Credit card	8	3	5
Cash	22	33	25
Installer/contractor financing	8	10	8
Other	1	0	1
Refused	2	0	1
Don't know	1	7	3
N obs	309	21	162

TR081. Agreement or Disagreement with Barriers to Whole-House Retrofit  
 MORE of these products to know how to get the higher-efficiency versions for the home installed.

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	4.1	4.2	4.8
Upper Bound	4.3	5.2	5.2
Lower Bound	3.8	3.3	4.4
N obs	379	30	186
Standard Error	0.2	0.6	0.2

Going through the process of installing higher-efficiency versions of TWO OR MORE of the products would just be too much of a hassle.

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	3.2	3.2	3.8
Upper Bound	3.5	4.0	4.2
Lower Bound	3.0	2.5	3.5
N obs	378	30	188
Standard Error	0.1	0.5	0.2

I would hesitate to invest in TWO OR MORE of these items at the same time because of serious doubts that I'd save the money I've been told I will.

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	3.6	3.4	3.9
Upper Bound	3.9	4.1	4.2
Lower Bound	3.4	2.6	3.6
N obs	378	30	184
Standard Error	0.1	0.4	0.2

I'd be concerned that getting TWO OR MORE higher-efficiency products installed at the same time I'm buying a home would involve costs I can't anticipate.

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	4.4	4.7	4.8
Upper Bound	4.6	5.7	5.2
Lower Bound	4.1	3.8	4.5
N obs	379	30	186
Standard Error	0.1	0.5	0.2

**ASSUMING THAT RESPONDENTS TYPICALLY CAN SAVE 10 TO 30 PERCENT BY UPGRADING TO HIGH-EFFICIENCY WINDOWS, HVAC, LIGHTING, AND HIGH-EFFICIENCY KITCHEN APPLIANCES, END-USER SURVEY RESPONSES INDICATE SIGNIFICANT POTENTIAL FOR INCREASING THE SIZE OF THE DISCRETIONARY RETROFIT MARKET.**

- Respondents were asked to assume that they in reliable information that showed they could save money by installing higher-efficiency windows, lighting, and HVAC. Respondents then were asked to rate their likelihood of pursuing an EEL to finance at least two installations, and the mean SFD rating was a moderately high 6.0 on a 10-point likelihood scale (from not at all likely to extremely likely).
- Respondents then were asked their likelihood of replacing two or more measures, assuming the result would be a 10 to 30 percent saving on their current energy bills. SFD respondents reported a moderately high 6.8 mean rating; condo and rural respondents were directionally more likely than were SFD respondents.
- Respondents were asked to rate their agreement with four whole-house-based barrier statements, on a 10-point agree/disagree scale. SFD respondents gave moderate agreement with statements about information/search cost (4.1) and hidden cost (4.4) barriers, and relatively low agreement with the hassle cost (3.2) and performance uncertainty barriers (3.6).
- While assuming they were interested in pursuing, respondents were asked their preferred method of payment for two or more energy-related items. The first most-frequently reported method was cash (at “net” 22 percent), and the second was an EEL (at “net” 21 percent). While the overwhelming response to the concept of the EEL is exciting, given the conversation previously covered in the survey, it is not possible to discern whether this is a reliable response.

**RESPONSES TO TWO WRAP-UP QUESTIONS ARE DESCRIBED NEXT.**



**Exhibit 2-38**  
**Discretionary Retrofit Survey Results**  
**Other End-User Input**

TR088. Importance of Energy Efficiency in Future Replacements

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	8.6	8.2	8.7
Upper Bound	8.8	8.8	8.9
Lower Bound	8.4	7.6	8.5
N obs	380	30	188
Standard Error	0.1	0.4	0.1

TR089. Likelihood of Investing in Energy Efficient Measures Given Hypothetical \$250 Federal Tax Credit

	SFD	Condo	Rural
N population	381	30	189
Mean Rating	7.4	7.3	7.8
Upper Bound	7.6	8.0	8.1
Lower Bound	7.2	6.5	7.5
N obs	376	30	185
Standard Error	0.1	0.4	0.2

DR RESPONDENTS CLAIMED THAT ENERGY EFFICIENCY WILL BE AN IMPORTANT FACTOR IN FUTURE DECISIONS ABOUT MEASURE REPLACEMENT. AS MIGHT BE EXPECTED, DR RESPONDENTS ATTRIBUTED FAIRLY HIGH IMPACT TO A \$250 HIGH-EFFICIENCY TAX CREDIT.

- Respondents were asked to rate the importance of energy efficiency to them when evaluating replacement of windows, lighting, and HVAC, and also products like refrigerators and dishwashers in the future. SFD respondents reported a high 8.6 mean rating on the 10-point importance scale. It is likely that some response inflation occurred at this question, because of the exaggerated “agency” and social factors referenced earlier, and also because of bias introduced by the preceding questions and discussions.
- Respondents then were asked to rate the impact that a \$250-per-installation Federal or state tax credit would have on their likelihood of investing in high-efficiency windows, lighting, HVAC, refrigerators, and dishwashers. On a 10-point scale the mean SFD rating was a relatively high 7.4.

DR RESPONDENT DEMOGRAPHICS ARE SUMMARIZED NEXT, AS THE FINAL ELEMENT OF THE SUMMARY OF DR RESPONDENT SURVEY RESPONSES.

**Exhibit 2-39**  
**Discretionary Retrofit Survey Results**  
**Respondent Demographics**

DE091. Year Current Home Purchased

	SFD	Condo	Rural	
N population	381	30	189	
1999	1	0	1	%
1998	1	0	0	%
1997	4	7	6	%
1996	7	17	5	%
1995	7	3	9	%
1990-1994	22	33	27	%
1985-1989	21	20	20	%
1980-1984	12	7	11	%
1970-1979	18	13	16	%
1960-1969	5	0	4	%
1950-1959	1	0	1	%
1940-1949	0	0	0	%
Refused	1	0	1	%
Don't Know	0	0	1	%
N obs	381	30	189	

DE095. Age

	SFD	Condo	Rural	
N population	381	30	189	
Under 25	1	3	1	%
25 to 34	9	17	9	%
35 to 44	36	23	36	%
45 to 54	35	20	26	%
55 to 64	13	17	18	%
65 or older	7	20	10	%
Don't Know	0	0	1	%
Refused	0	0	0	%
N obs	381	30	189	

DE092. Decade Current Home Built

	SFD	Condo	Rural	
N population	381	30	189	
90s	6	3	6	%
80s	17	20	17	%
70s	28	60	28	%
60s	22	13	14	%
50s	16	0	13	%
40s	5	0	10	%
Before 1940s	6	3	11	%
Refused	0	0	0	%
Don't Know	1	0	2	%
N obs	381	30	189	

DE096. 1998 Income

	SFD	Condo	Rural	
N population	381	30	189	
Under \$20,000	0	0	7	%
\$20,000 but under \$30,000	0	3	7	%
\$30,000 but under \$50,000	4	17	23	%
\$50,000 but under \$75,000	33	50	33	%
\$75,000 but under \$100,000	29	20	11	%
Over \$100,000	28	10	13	%
Refused	5	0	3	%
Don't Know	1	0	3	%
N obs	381	30	189	

DE097. Gender

	SFD	Condo	Rural	
N population	381	30	189	
Female	49	57	61	%
Male	51	43	39	%
N obs	381	30	189	

END-USER SEGMENTS VARIED DEMOGRAPHICALLY AS DESCRIBED BELOW, WITH SOME DIFFERENCES DRIVEN IN TURN BY DIFFERENCES IN SURVEY SCREENING, QUALIFICATION CRITERIA, AND POSSIBLE SELF-SELECTION BIAS FROM HAVING COMPLETED PG&E'S HOME ENERGY SURVEY.

Respondent demographics are summarized in table form on the facing page.

- SFD respondents were significantly more likely than condo respondents to have bought their homes since the mid-80s or earlier, while condo owners were significantly more likely to have bought in the 1990s.
- SFD respondents were significantly less likely than condo respondents to say their home was built in the 70s, and significantly more often than rural respondents to say it was built in the 60s.
- Condo and rural respondents were significantly less likely to be between the age of 45 and 54 when compared to SFD respondents.
- The end-user segments varied significantly in terms of household income, with SFD respondents reporting the highest incomes (as expected, given the \$50,000 income screening floor for that segment), and the rural population reporting the lowest incomes.

### 3. WINDOWS MARKET CHARACTERIZATION

IN THIS CHAPTER, THE WINDOWS RETROFIT MARKET IS PROFILED FROM A SUPPLY-SIDE PERSPECTIVE, DRAWING UPON BOTH SECONDARY DATA SOURCES AND THE RESULTS OF INTERVIEWS WITH KEY MARKET ACTORS WHO PARTICIPATE IN OR INFLUENCE THIS MARKET.

- The reader should keep in mind that the wide range of supply-side market actors surveyed for this market characterization limited sample sizes for specific actor segments; please see Exhibit 1-4 for the number of interviews by segment.
- Secondary data reviewed for the analysis of the windows market include D&B data, previous PG&E studies, other evaluations and planning documents, publications of national and regional trade associations, and government statistics, as detailed in the end notes to this chapter.
- Primary data sources, summarized previously in Exhibit 1-4 and described in detail in the data collection chapter, consisted of surveys/interviews with market actors involved in the windows market. These market actors included both groups specializing in windows (e.g., the National Fenestration Rating Council (NFRC), window contractors) and groups who are involved with windows as part of their broader participation in the market (e.g., the National Association of the Remodeling Industry (NARI), general contractors, CHEERS raters.)
- The remainder of this chapter is organized as follows:
  - The overall importance of windows in the context of the retrofit and renovation market is discussed
  - Next, the current state of the market is summarized in terms of available energy-efficient window technologies and the extent of their penetration of the market
  - Characteristics of major groups of market actors are then analyzed, and the implications of those characteristics for energy-efficient windows and whole-house solutions are discussed
  - Finally, barriers to energy efficiency for each market actor group, based on the results of primary data collection, are presented.

BASED ON THE RELATIVELY LOW EFFICIENCY OF EXISTING RESIDENTIAL WINDOWS,<sup>1</sup> THE WINDOWS RETROFIT MARKET IS ONE OF THE HIGHEST POTENTIAL MARKETS IN TERMS OF POTENTIAL ENERGY SAVINGS THAT CAN BE ACHIEVED THROUGH INSTALLATION OF STATE-OF-THE-MARKET WINDOWS TO REPLACE EXISTING RESIDENTIAL WINDOW STOCK.

- The California market accounts for about ten percent of U.S. national window sales, with PG&E's service territory accounting for approximately 15 million square feet of new windows sold for replacement or remodeling in 1997.<sup>2</sup>
  - This represents a very small share of the installed base of residential windows, which was estimated to exceed 2 billion square feet in California and 1.2 billion square feet in PG&E's territory in 1994.<sup>3</sup>
  - Opportunities for increasing the energy efficiency of this installed stock are tremendous. For example, as recently as 1992, existing California window stock was still dominated by single-pane (54 percent) and dual-pane (29 percent) aluminum frame windows.
- As illustrated in the facing exhibit, window replacements comprise the largest component (48 percent) of the discretionary retrofit market in PG&E's service territory.
  - About 60 percent of surveyed customers who replaced windows did so as part of a larger remodeling or addition project – often with the goal of increasing the value of their home.
  - According to the 10 window contractors interviewed for this study, more than 95 percent of window replacements were planned; the remainder represent emergency replacements of one or a few broken windows – for example, as a result of storm damage.
- Planned window retrofits are typically not undertaken at the time of sale; window contractors say they only occasionally install windows for customers who are planning to sell their home or buyers who have not yet moved in.

- CHEERS raters and energy-efficient mortgage (EEM) facilitators said that new windows are a sought-after measure among home buyers who have a CHEERS audit performed as part of the application process for an energy-efficient mortgage, although the direct energy savings attributable to a windows retrofit are rarely sufficient to meet the criteria for the EEM.
  - A number of CHEERS raters report that home owners or buyers who initiate a CHEERS audit hope that they will be able to use an EEM to finance the installation of new dual-pane windows throughout their house.
  - In reality, these same raters report, costs of a complete windows retrofit are usually too high relative to the realized energy savings (that is, the savings are not sufficient to generate a positive net cash flow after the EEM payments are made.) This is corroborated by windows contractors, who cite an average cost of \$8-10,000 for a whole-house windows replacement. Several CHEERS raters noted, however, that high-efficiency windows with a low solar heat gain coefficient can be cost-effectively installed in the south facing walls of homes in warmer climate zones.

VARIOUS ASPECTS OF THE WINDOW RETROFIT MARKET ARE DISCUSSED IN  
DETAIL ON THE FOLLOWING PAGES.



**Exhibit 3-2**  
**Incremental Costs for Residential Window Energy Efficiency Measures**

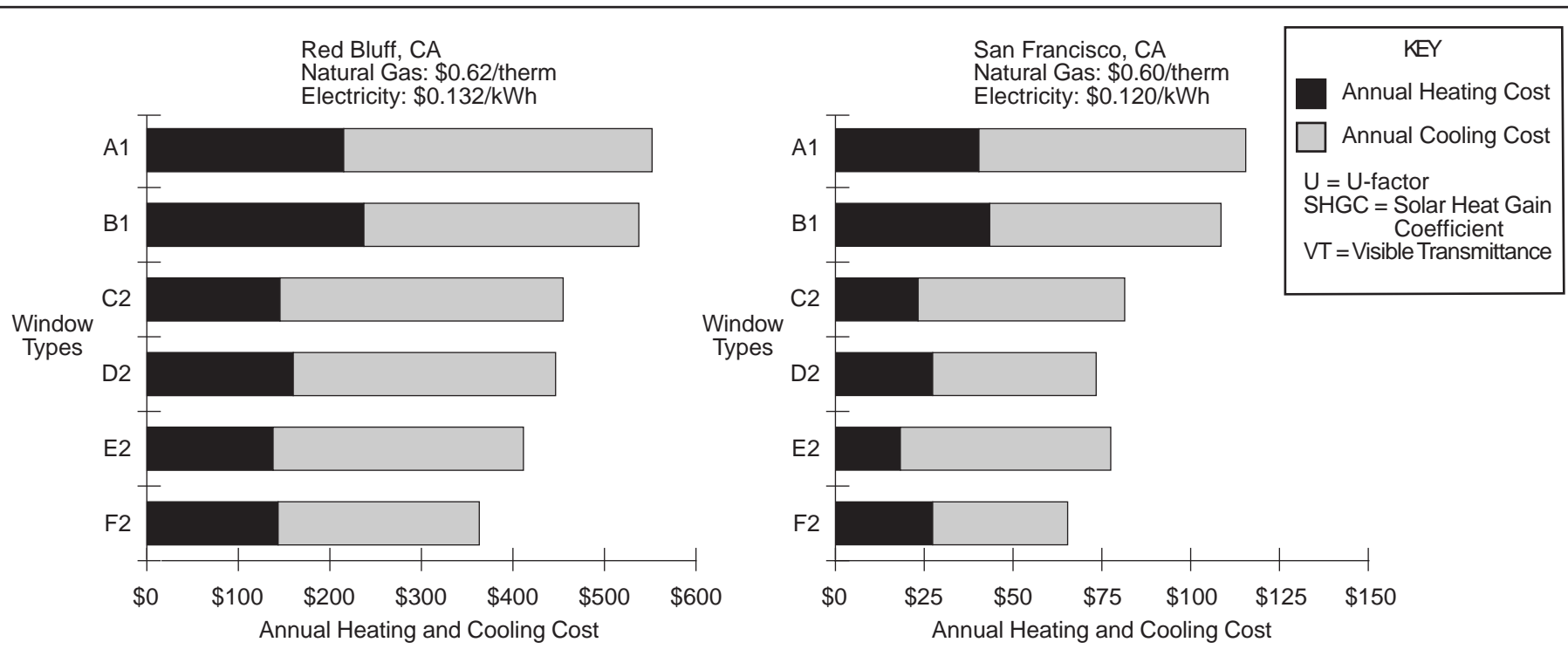
<b>Measure</b>	<b>Incremental Cost (\$/sq.ft.)</b>
Single-glazed to double-glazed	0.76
Aluminum frame to vinyl frame	1.45
Aluminum frame to thermally-broken aluminum frame	0.68
Clear to standard tint	1.4
Clear to high-performance tint	3.03
Clear to low-e	1.56
Air fill to argon fill	0.42
Clear to Heat Mirror (a thin polyester sheet with low-e coating stretched between IG panes)	10.35
Clear to Superglass (vinyl frame, two Heat Mirror films, insulating spacer, insulating gas mixture fill)	13.66

Source: California Measure Cost Study, Xenergy, 1996

**ADVANCES IN WINDOWS TECHNOLOGY, COMBINED WITH MORE STRINGENT CODES, HAVE LED TO CURRENT PRODUCT OFFERINGS THAT ARE FAR MORE EFFICIENT THAN THE CURRENT INSTALLED WINDOW STOCK.**

- Both insulating glazing and less thermally conductive frames have contributed to increase the efficiency of the typical window sold today. In addition to double glazing, common energy efficiency features of new windows include vinyl or thermally-broken aluminum frames, argon fill of the space between the window panes, and low-emissivity (low-e) coatings. These advances have served to dramatically improve both the solar heat gain coefficient (SHGC) and U-factor of new windows relative to the installed stock of single and dual-pane clear aluminum frame windows.
- According to evidence cited in the 1997 PG&E *Residential Windows Mini-Study*, the incremental cost of going from plain glass to hard low-e coatings declined from approximately \$3.50 per square foot in 1990 to approximately \$1.50 per square foot in 1996.<sup>4</sup> Incremental costs for other residential window energy-efficiency measures, taken from the *1996 California Measure Cost Study*, are shown in the facing exhibit.
- The California Energy Code (Title 24) has played a major role in raising the overall level of efficiency of windows sold in California. In fact, the high level of efficiency required by Title 24 exceeds the EPA Energy Star Windows standards, which means that coordination between the two standards will be required if the Energy Star label is to serve to maximum advantage as part of the R&R program.<sup>5</sup>

**Exhibit 3-3**  
**Comparison of Annual Energy Costs for Different Windows**  
**On a Typical House in Red Bluff and San Francisco**



**Window Types:**

Window A1  
 single glazing  
 clear glass  
 aluminum frame  
  
 U = 1.30  
 SHGC = 0.74  
 VT = 0.70

Window B1  
 single glazing  
 tinted glass  
 aluminum frame  
  
 U = 1.30  
 SHGC = 0.63  
 VT = 0.52

Window C2  
 double glazing  
 clear glass  
 vinyl/wood frame  
  
 U = 0.49  
 SHGC = 0.57  
 VT = 0.57

Window D2  
 double glazing  
 tinted glass  
 vinyl/wood frame  
  
 U = 0.49  
 SHGC = 0.46  
 VT = 0.43

Window E2  
 double glazing  
 low-E coating  
 argon gas fill  
 vinyl/wood frame  
  
 U = 0.33  
 SHGC = 0.52  
 VT = 0.52

Window F2  
 double glazing  
 spectrally selective  
 low-E coating  
 argon gas fill  
 vinyl/wood frame  
  
 U = 0.33  
 SHGC = 0.30  
 VT = 0.51

Source: Fact Sheet, "Selecting Windows for Homes in the West Region," Efficient Windows Collaborative, [www.efficientwindows.org](http://www.efficientwindows.org)

**THE COST-EFFECTIVENESS OF ENERGY-EFFICIENT WINDOWS VARIES WITHIN PG&E'S SERVICE TERRITORY, NECESSITATING CAREFUL TARGETING OF MARKET INTERVENTIONS AND MARKETING MESSAGES TO VARIOUS GEOGRAPHIC REGIONS AND CLIMATE ZONES.**

- From the previous exhibit (3-2), it can be seen that incremental costs of gas-filled dual pane, low e, vinyl or thermal break aluminum compared to single pane non-thermal break aluminum are about \$3.00-3.50 per square foot. These costs are balanced by energy savings from reduced heating as well as cooling, as shown in the facing exhibit.
  - In PG&E's territory, maximum impacts are achieved in areas with significant requirements for both heating and cooling (for example, Red Bluff in the facing exhibit), where savings are estimated at about \$180 per year for a 2,000 square foot house with 300 square feet of windows. With an incremental cost of \$900-1,000 for dual-pane, low-e, argon-filled windows, payback periods are in the 5-6 year range.
  - In contrast, savings in the San Francisco Bay area would be expected to be much more modest, at least in absolute terms, with the combined heating and cooling bill declining by just \$75, according to the Efficient Windows Collaborative fact sheet, *Selecting Efficient Windows for Homes in the West Region*, so that the payback period rises to 12+ years.
- Despite these relatively favorable incremental costs, the full cost of window replacement is much more difficult to recoup from an energy savings perspective. Window contractors estimate the average cost of whole-house window retrofits at \$8-10,000, so that even the higher \$180 annual savings described above yield a payback period in excess of 40 years based on energy savings alone.
- Several interview respondents, including a representative of the Architectural Aluminum Manufacturers Association (AAMA), noted that many of the energy-efficiency features of these windows also provide significant non-energy benefits, such as noise reduction attributable to dual panes and reduced infiltration, and reduced fabric fading attributable to low-e glass's screening out of UV light.

**Exhibit 3-4**  
**Share of Energy Efficient Windows, by Market Actor**

	% Energy Efficient	Energy Efficient Window Characteristics			
		Dual Pane	Low-E Glass	Vinyl, Wood, or Figerglass Frames	Gas Fill
Window Distributors	80-90	4	4	2	1
Window Retailers	85-95	4	2	2	1
Window Contractors	85-95	4	4	2	1
General Contractors	75-85	4	1	1	1
Architects	90-100	4	2	2	2

KEY
4 cited by all respondents
2 cited by more than half the respondents
1 cited by less than half the respondents

**ENERGY-EFFICIENT WINDOWS HAVE MADE SUBSTANTIAL GAINS IN MARKET SHARE, AS REPORTED BY A VARIETY OF MARKET ACTORS AND CONFIRMED BY SECONDARY DATA SOURCES.**

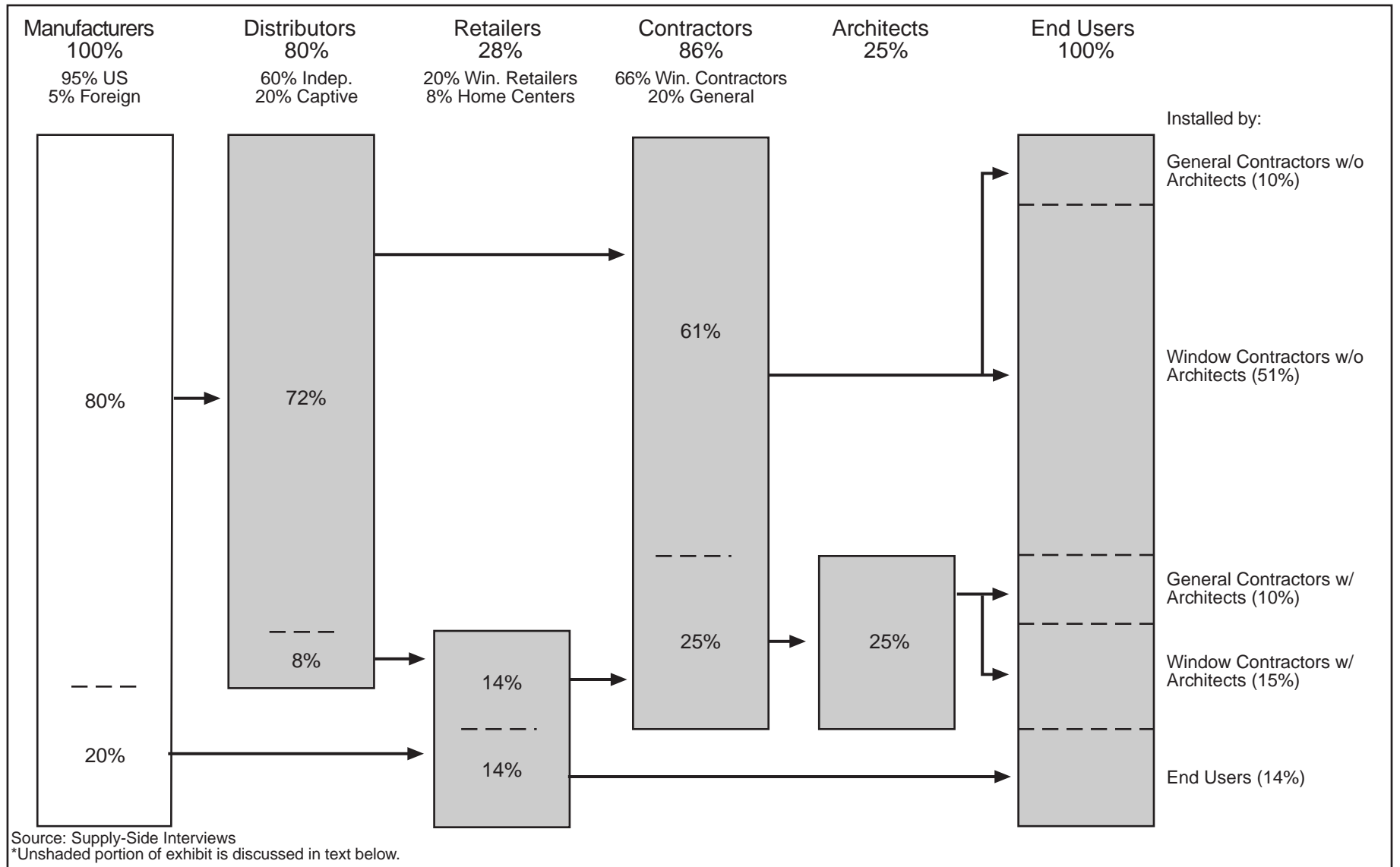
- As shown in the facing exhibit, window distributors, retailers, and contractors all report sales of energy-efficient windows in excess of 80 percent, with many reporting more than 90 percent of sales of EE windows. While architects do not sell windows, those who responded to the survey reported specifying high-efficiency windows in almost all their residential remodeling contracts.
- These relatively high numbers are supported by secondary data: at the national level, the AAMA notes that market penetration of sealed insulating glass has reached 90 percent. Within California, a 1996 Lawrence Berkeley National Laboratory study reported that the average U-value and solar heat gain coefficient (SHGC) for windows sold in 1994 were 0.55 and 0.61, respectively<sup>6</sup> – approximately the level required for the Central climate zone by the Energy Star Windows Program.
- Title 24 requirements and California Energy Commission (CEC)/NFRC labeling requirements have combined to contribute to the energy efficiency of windows currently being installed in retrofit application<sup>7</sup>.
  - Title 24 requirements, which are triggered on any retrofit/remodeling job that involves an addition of conditioned space, set minimum standards that, for most California climate zones, exceed the requirements for the Energy Star windows program.
  - NFRC labels, which are required to be left on every installed window until final inspection to ensure compliance, have provided a relatively easy means of verifying the thermal performance of specified and installed windows.
  - This ready availability of clearly rated energy-efficient windows has raised the average efficiency of retrofit windows far above that of the existing window stock.

**THE GENERALLY HIGH LEVEL OF ENERGY EFFICIENCY OF RETROFIT WINDOWS CURRENTLY BEING INSTALLED SUGGESTS THAT EFFICIENCY GAINS CAN BE ACHIEVED BY INCREASING THE SCOPE OF WINDOW RETROFITS - IF ENOUGH QUALIFIED INSTALLERS CAN BE FOUND OR TRAINED.**

- An acute shortage of qualified window installers is already limiting the amount of work window contractors can take on, and also appears to be contributing to a rash of installation-based quality problems that have led to callbacks, customer dissatisfaction, and even lawsuits.
- AAMA technical experts interviewed for this study point out that energy-efficient windows require greater care in installation (e.g., insulation around the frame, proper location and anchoring of flashing, maintenance of a thermal break) to ensure that promised energy benefits are achieved.
- With a boom in new construction as well as remodeling activity, installation personnel are in short supply. Eight of the 10 window contractors interviewed said they faced a shortage of qualified installers, and five of those eight said that shortage limited the amount of work they could take on.
- Not surprisingly, the combination of more stringent installation requirements and a shortage of skilled people has led to installation problems, particularly in new construction, but also in retrofit applications.<sup>8</sup> While the AAMA has a certification program for window installers, the AAMA respondent cited previously notes that it is obviously difficult for such a program to reach all the installers, especially when strong demand raises the opportunity cost of training.

**THE MANUFACTURERS, DISTRIBUTORS, RETAILERS, CONTRACTORS, AND OTHER MARKET ACTORS WHO SHAPE THE WINDOW RETROFIT MARKET ARE DISCUSSED ON THE FOLLOWING PAGES.**

Exhibit 3-5  
 Window Retrofit Market  
 Current Market Flow\*  
 (Percentage of Sales)





AVAILABILITY OF EFFICIENT WINDOWS FROM MANUFACTURERS IS NOT A PROBLEM, WITH BOTH GLASS SUPPLIERS AND MANUFACTURERS OF COMPLETE WINDOWS ABLE TO SUPPLY THE ENERGY-EFFICIENT FEATURES TARGETED BY THE ENERGY STAR WINDOWS PROGRAM, TITLE 24, AND PG&E.

### *Characteristics*

- While no manufacturers were interviewed for this study, representatives of trade associations say that the market for windows becomes increasingly concentrated farther up the supply chain, with flat glass production concentrated in a handful of national, capital-intensive manufacturing companies. The fabrication of layers of glass into insulated glass (often with coatings, gas fillings, and other energy-efficient properties) has somewhat lower capital requirements and is therefore somewhat less concentrated.
- Trade association respondents also say that the production of windows using extruded vinyl frames and purchased glass is comparatively simple, making it possible for a number of locally based manufacturers to sell directly to end users in their area.

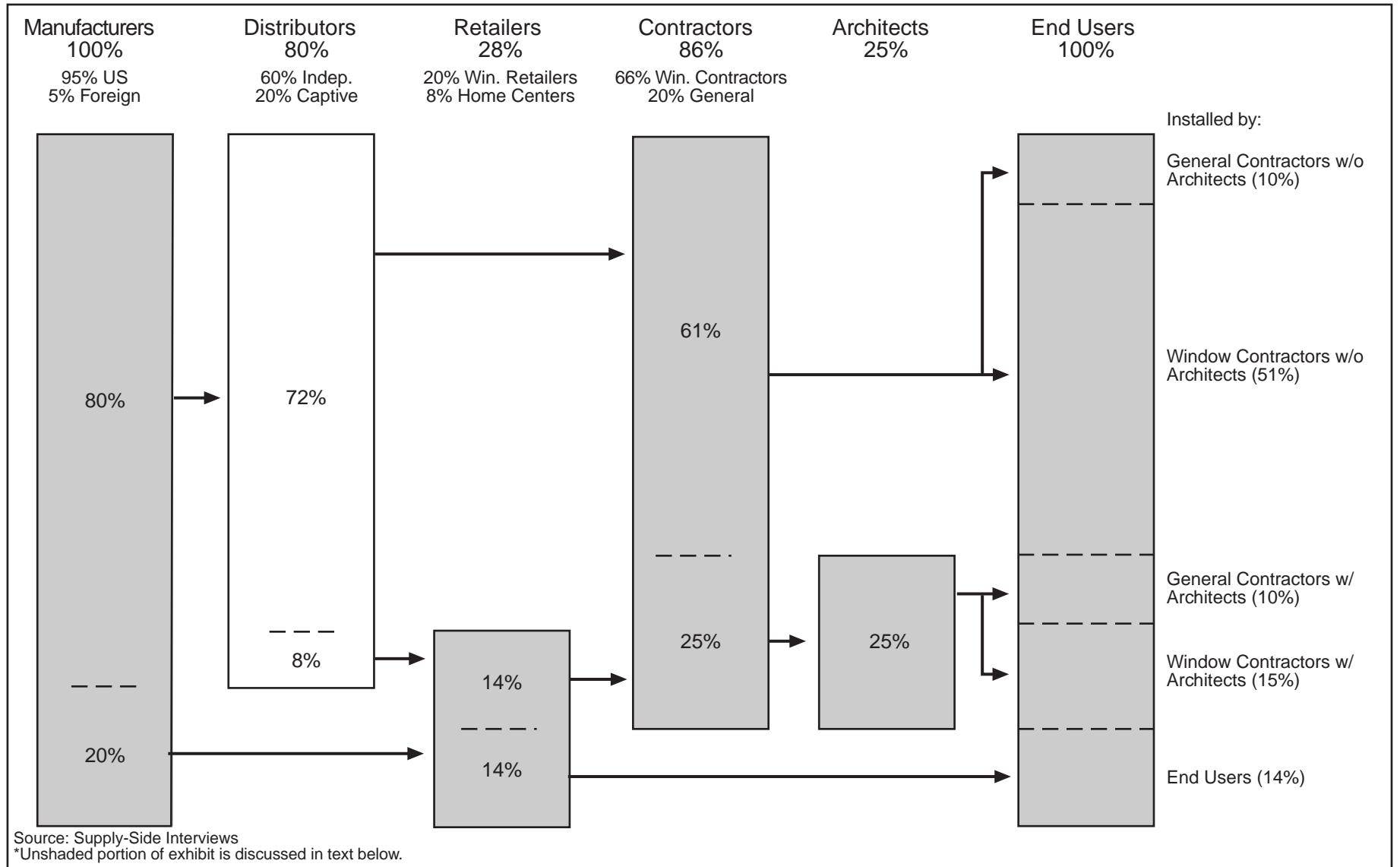
### *Distribution of Sales*

- The largest national windows manufacturers sell through distributors and are said to account for 30 percent of the overall market<sup>9</sup>. Almost all of the windows distributors interviewed listed such national brands as Andersen and Pella, that actively promote energy efficiency, among the brands they handle.
- Similarly, all the window contractors interviewed included Anderson or Pella in their list of brands, as did window retailers and home centers. Other frequently cited brands include California-based regional manufacturers such as Milgard, Biltbest of California, Summit, and Viking. These mid-sized regional firms are reported to capture nearly half of sales in California.<sup>10</sup>
- According to Eto et al., there are also a large number of small manufacturers with highly localized markets, who account for less than 20 percent of the market<sup>11</sup>. Distributors note that such firms often sell directly to end users and almost exclusively for retrofit applications.

*Role of Energy Efficiency*

- Trade association representative note that, despite a long planning horizon and high capital costs associated with investments in new glazing technologies, the glass manufacturers are large enough in size and market scope that they can afford to invest in R&D to bring to market advances in energy efficiency.
- Since window manufacturers can relatively quickly respond to the demands of the marketplace, and, in fact, custom-build much of their production to customer specifications, they can as easily produce energy-efficient windows as standard efficiency models.

Exhibit 3-6  
 Window Retrofit Market  
 Current Market Flow\*  
 (Percentage of Sales)



WINDOW DISTRIBUTORS - WHICH INCLUDES BOTH INDEPENDENTS WITH MULTIPLE LINES AND FIRMS THAT ARE CONTROLLED BY A SINGLE MANUFACTURER - REPORT THAT OVER 80 PERCENT OF THE WINDOWS THEY SELL MEET THEIR DEFINITION OF ENERGY EFFICIENCY.

### *Characteristics*

- Distribution of windows is handled by approximately 190 firms in California, including 100 in PG&E's territory.<sup>12</sup>
  - According to D&B data, half of the window distributors in PG&E's service territory have fewer than 5 employees. Eight distributors with more than 25 employees account for almost 60 percent of sales in PG&E's territory.
  - Window distributors tend to specialize in windows rather than a broad range of building products. Some window distributors interviewed do, however, sell doors and skylights.
  - The D&B data indicate that manufacturers who operate through captive distributors include Blomberg, Metal Industries, and Viking.

### *Distribution of Sales*

- Interviewed distributors say that contractors account for over 90 percent of their sales. Some distributors sell only to windows contractors, others sell as much as 20 percent to general contractors. The larger distributors are most likely to sell to retailers as well. None of the distributors surveyed sell directly to end users.

### *Role of Energy Efficiency*

- Asked to define high-efficiency windows, the five distributors interviewed said they defined energy-efficient windows as having dual panes and low-e glass, with the single largest distributor also specifying a gas-filled cavity. The percentage of windows sold that met this self-defined criterion for energy efficiency averaged about 85 percent (it was 80 percent for the distributor with the more stringent definition).
- Distributors reported discussing energy efficiency in most or all sales situations. Several respondents noted that they "make more money from energy-efficient windows."

**Exhibit 3-7**  
**Consumer Purchase Criteria, According to Market Actors\***

	Distributors	Window Retailers	Window Contractors	General Contractors**	Architect**
Price	4	2	4	4	4
Contractor Reputation	2	4	4	2	2
Energy Efficiency	2	2	2	2	2
Brand	4	1	4	2	1
Reliability	4	4	4	4	4
Style	4	4	4	4	2
Access to Financing	1	1	1	1	1
How Quickly You Can Install	2	2	1	1	1
Warranty	4	4	4	2	1

Source: Supply-Side Interviews

\* Unshaded portion of exhibit is discussed in text below.

\*\* General contractors and architects were asked to rank purchase criteria in general, not for specific measures.

Note: Market actors were asked to classify the consumer purchase criteria as either very important, moderately important, or not at all important. Values were then assigned to the responses, where very important=1, moderately important=2, and not at all important=3. Average values were then calculated for the criteria across market actor responses. Values of 1.0-1.5 were classified as most important, 1.6-2.0 as somewhat important, and 2.1-3.0 as less important.

KEY
4 most important
2 somewhat important
1 less important

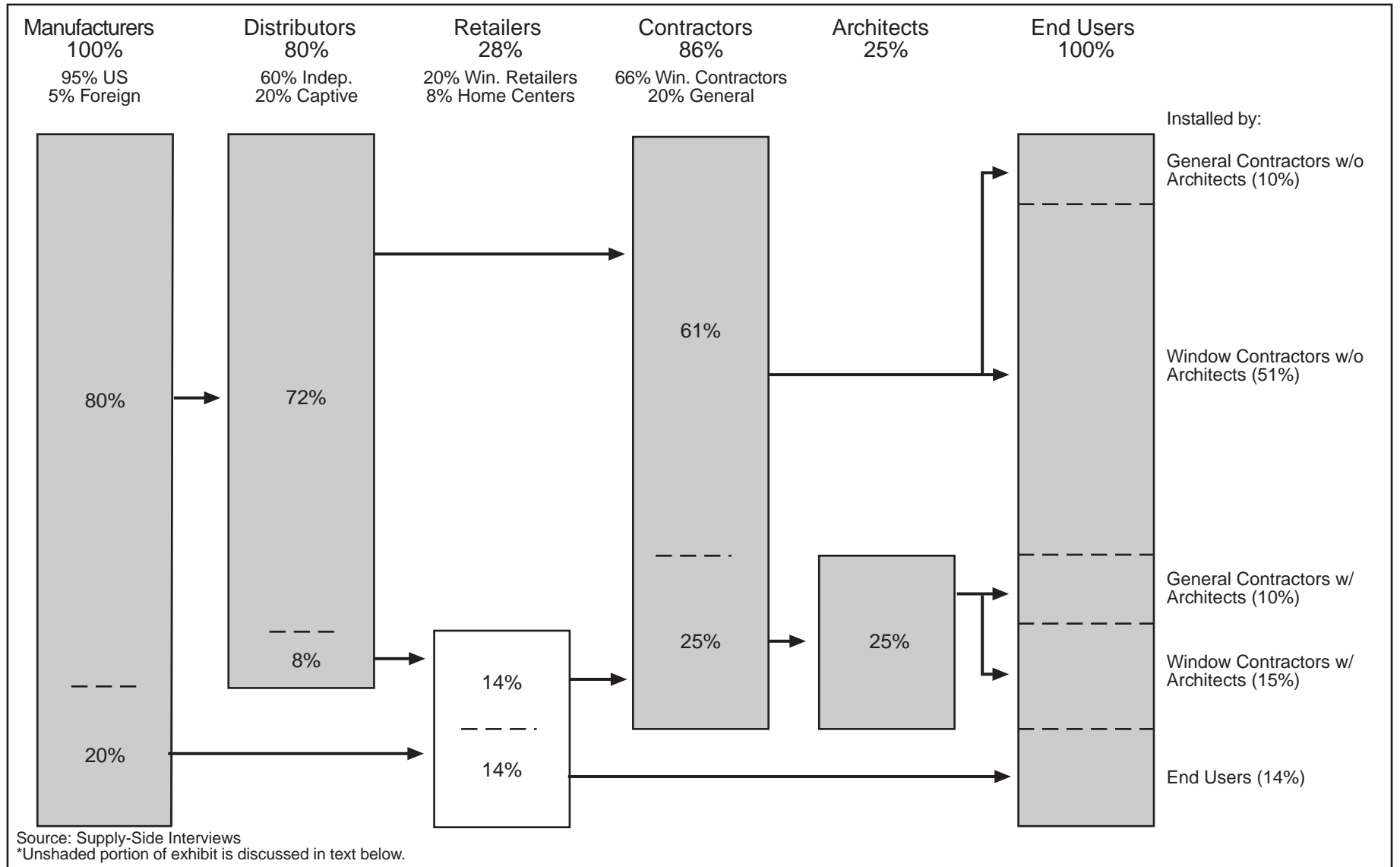
*Role of Energy Efficiency ...continued*

- According to distributors, energy-efficiency ranks with contractor reputation, brand, and speed of installation in importance among purchase drivers for consumers, below price, reliability, style, and warranty, but ahead of access to financing.

*Whole-house Approach*

- Window distributors generally have little or no interest in spearheading a whole-house approach to energy efficiency, citing their lack of experience as well as the added cost and risk involved in stocking items that they don't know about.

Exhibit 3-8  
 Window Retrofit Market  
 Current Market Flow\*  
 (Percentage of Sales)



**THE FIVE WINDOW RETAILERS INTERVIEWED FOR THIS STUDY SELL ABOUT EQUALLY TO CONTRACTORS AND INDIVIDUAL END USERS. MOST SALES ARE SPECIAL ORDERS, MADE TO THE REQUIRED SPECIFICATIONS BY THE MANUFACTURER.**

### *Characteristics*

- Window retailers include lumber yards, home centers, and specialty window retailers<sup>13</sup>. Interviews with five retailers indicate that the latter may include outlets for major manufacturers as well as local suppliers.
- There are a total of 85 specialized window retailers identified by D&B in PG&E's service territory.

### *Distribution of Sales*

- Interviewed retailers report selling to both contractors and end users, noting that in some cases the home owner makes the purchase even though a contractor will handle the installation.
- The interviewed retailers also note that stocking decisions are not a major concern to them, since retailers typically order windows from their suppliers rather than keeping an extensive inventory in stock. It takes an average of about 20 days to receive the order from the supplier – whether standard or high-efficiency windows are ordered. Home centers and lumber yards will, however, maintain a modest inventory of windows in the more popular, standard sizes.

### *Role of Energy Efficiency*

- All retailers reported discussing energy efficiency in most or all sales situations. On average, retailers said that customers rate energy efficiency – as well as price and how quickly windows can be installed – as somewhat important in driving customer purchase decisions. Warranty, contractor reputation, reliability, and style were considered most important; brand and access to financing were seen as less important.
- All retailers interviewed included dual panes as a required feature for a window to be energy efficient. Four of five cited low-e glass, two cited wood, vinyl, or fiberglass frames, and two cited a gas-filled cavity. The percentage of windows sold that met this self-defined criterion for energy efficiency averaged about 90 percent.



**Exhibit 3-9**  
**Consumer Purchase Criteria, According to Market Actors\***

	Distributors	Window Retailers	Window Contractors	General Contractors**	Architect**
Price	4	2	4	4	4
Contractor Reputation	2	4	4	2	2
Energy Efficiency	2	2	2	2	2
Brand	4	1	4	2	1
Reliability	4	4	4	4	4
Style	4	4	4	4	2
Access to Financing	1	1	1	1	1
How Quickly You Can Install	2	2	1	1	1
Warranty	4	4	4	2	1

Source: Supply-Side Interviews

\* Unshaded portion of exhibit is discussed in text below.

\*\* General contractors and architects were asked to rank purchase criteria in general, not for specific measures.

Note: Market actors were asked to classify the consumer purchase criteria as either very important, moderately important, or not at all important. Values were then assigned to the responses, where very important=1, moderately important=2, and not at all important=3. Average values were then calculated for the criteria across market actor responses. Values of 1.0-1.5 were classified as most important, 1.6-2.0 as somewhat important, and 2.1-3.0 as less important.

KEY
4 most important
2 somewhat important
1 less important

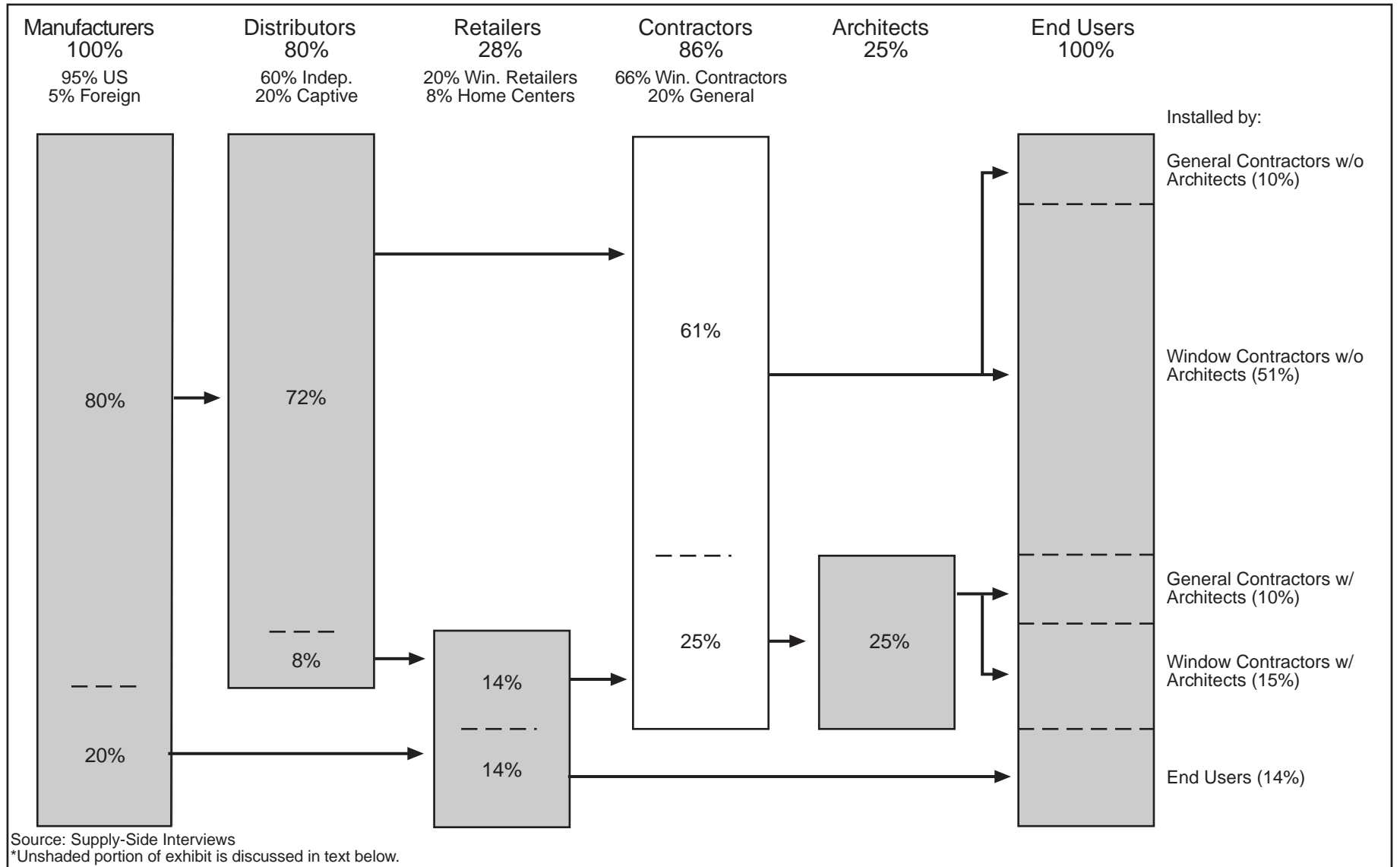
*Role of Energy Efficiency...continued*

- A concern, cited in the 1997 Residential Windows Mini-Study<sup>14</sup>, that the growth of home centers might lead to an emphasis on first cost at the expense energy efficiency to sell windows has generally not materialized; Home Depot and other home centers been very receptive to the efforts of the California Windows Initiative<sup>15</sup>. Moreover, these chains provide an excellent opportunity to leverage resources through access to centralized decision makers for whole sections of the state.

*Whole-house Approach*

- While specialized window retailers indicate that they are not in a position to advocate a whole-house approach, the large home centers and lumber yards provide a natural forum for promoting a whole house approach, since these retailers say they offer many other energy-efficiency measures that could be installed.

Exhibit 3-10  
 Window Retrofit Market  
 Current Market Flow\*  
 (Percentage of Sales)



SPECIALIZED WINDOWS CONTRACTORS, WHO ACCOUNT FOR MOST OF THE RETROFIT WINDOW INSTALLATIONS IN THE RESIDENTIAL MARKET, ARE MORE KNOWLEDGEABLE ABOUT WINDOW EFFICIENCY ISSUES THAN ARE GENERAL CONTRACTORS, BUT ARE UNWILLING TO TAKE THE LEAD IN WHOLE-HOUSE ENERGY PROJECTS.

### *Characteristics*

- Most windows contractors are small operations, with an average of 4.3 employees for surveyed companies and an average of 3 employees for all such contractors in PG&E's territory, based on D&B data.<sup>16</sup>
- As noted previously, distributors say they make most of their sales to windows contractors. The ten window contractors surveyed purchase exclusively from distributors, including both captive single-brand suppliers and multiple-line independents.
- The power of national brands is illustrated by the fact that 100 percent of surveyed contractors reported selling either Pella or Anderson windows. Among other brands, seven of 10 contractors reported offering Biltbest of California and 6 reported selling Milgard.
- Customer referrals and subcontracted work from general contractors were cited as sources of new business by all contractors surveyed. In addition, 7 of the 10 surveyed contractors use advertising. Interestingly, none reported using direct mail to seek out new business.

### *Distribution of Sales*

- Single-family detached homes account for over 90 percent of installations for these contractors; none reported doing any business with condominium owners. An average of about 7 percent of installations are in rural homes.
- Interviewed contractors said that a typical window retrofit involves from 15-20 percent of the windows in a house and costs from \$2,000 to \$2,500. Whole-house window retrofits are done "occasionally" by 60 percent of contractors; less frequently by the remaining 40 percent. Since the cost of a whole-house window retrofit averages almost \$10,000, it is not surprising that high cost was cited as an impediment to whole-house window retrofits by all contractors.

**Exhibit 3-11**  
**Consumer Purchase Criteria, According to Market Actors\***

	Distributors	Window Retailers	Window Contractors	General Contractors**	Architect**
Price	4	2	4	4	4
Contractor Reputation	2	4	4	2	2
Energy Efficiency	2	2	2	2	2
Brand	4	1	4	2	1
Reliability	4	4	4	4	4
Style	4	4	4	4	2
Access to Financing	1	1	1	1	1
How Quickly You Can Install	2	2	1	1	1
Warranty	4	4	4	2	1

Source: Supply-Side Interviews

\* Unshaded portion of exhibit is discussed in text below, and on pages 3-16 and 3-17.

\*\* General contractors and architects were asked to rank purchase criteria in general, not for specific measures.

Note: Market actors were asked to classify the consumer purchase criteria as either very important, moderately important, or not at all important. Values were then assigned to the responses, where very important=1, moderately important=2, and not at all important=3. Average values were then calculated for the criteria across market actor responses. Values of 1.0-1.5 were classified as most important, 1.6-2.0 as somewhat important, and 2.1-3.0 as less important.

<b>KEY</b>
4 most important
2 somewhat important
1 less important

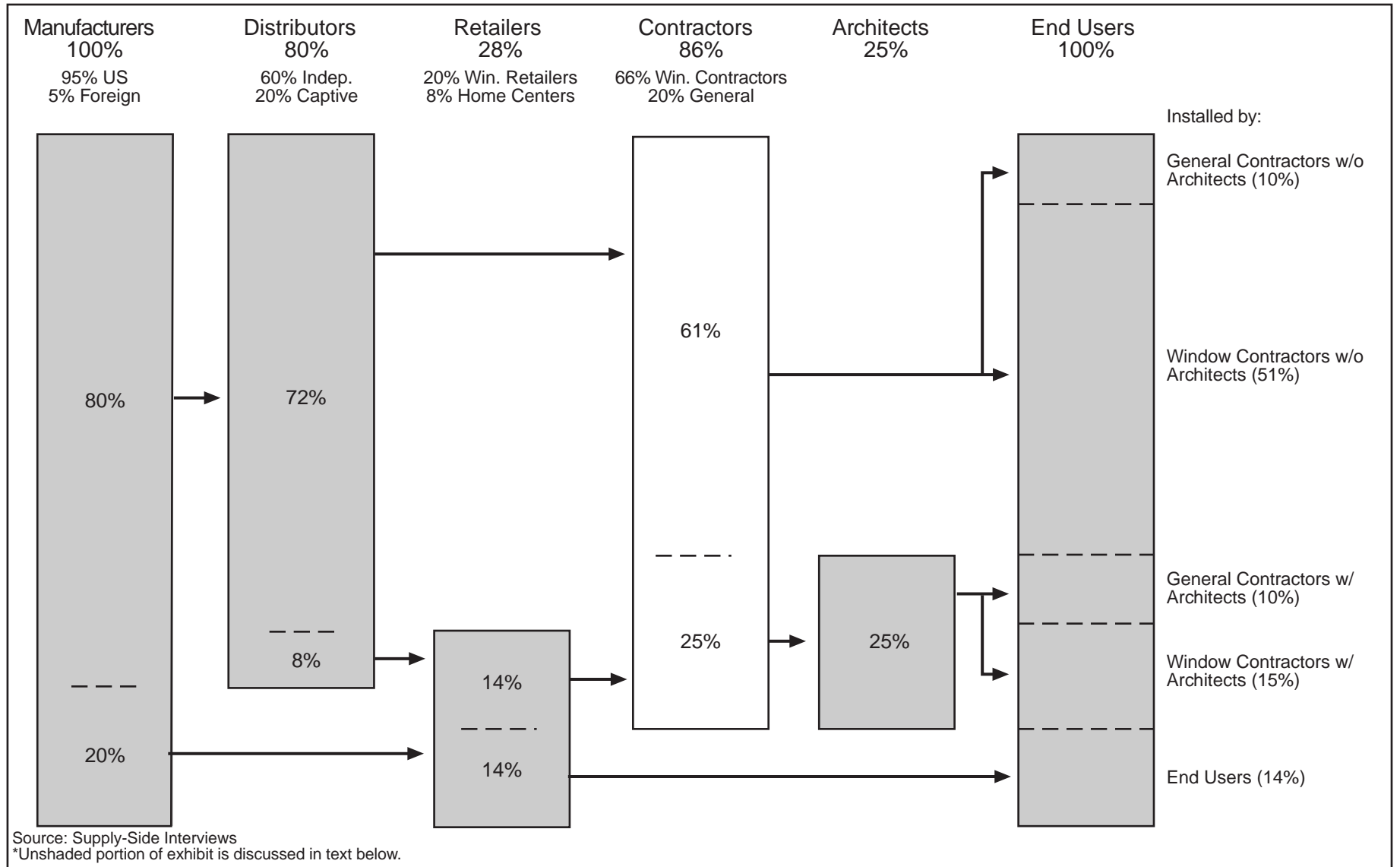
### *Role of Energy Efficiency*

- Like distributors, all of the interviewed windows contractors define energy-efficient windows as those with dual pane and low-e glass. In addition, six of the ten contractors interviewed included wood, vinyl, or fiberglass frames in their definition of energy efficiency, and four included a gas-filled space between the two panes. By this definition, contractors say, an average of 90 percent of the windows they install in retrofit applications are energy efficient.
- Energy efficiency was not perceived by contractors to be a prime criterion by which customers select windows.
  - Price, reliability, style, and warranty, were cited as most important purchase criteria by all contractors.
  - Contractor reputation and brand were ranked among the most important criteria by 7 of 10 contractors, while energy efficiency was rated most important by 4 respondents.
  - Access to financing and how quickly the windows could be installed were less important.

### *Whole-house Approach*

- The window contractors interviewed showed no interest in taking on the role of whole-house integrator or facilitator. None actively promoted the installation of other measures, and only two pointed out opportunities to install insulation to achieve energy savings.

Exhibit 3-12  
 Window Retrofit Market  
 Current Market Flow\*  
 (Percentage of Sales)



**GENERAL CONTRACTORS REPORTED A LOWER LEVEL OF EFFICIENT WINDOWS INSTALLED, BUT ARE MORE RECEPTIVE TO THE WHOLE-HOUSE APPROACH TO ENERGY EFFICIENCY.**

### *Characteristics*

- There are more than 2,000 general contractors in PG&E's service territory specializing in residential remodeling.<sup>17</sup> Most of these general contractors are small, averaging fewer than 5 employees.
- Window distributors say general contractors account for about one-fourth of their window sales.
- The general contractors interviewed say they usually handle the purchase and installation of windows as part of their remodeling jobs themselves; window installation is subcontracted about 30 percent of the time.

### *Role of Energy Efficiency*

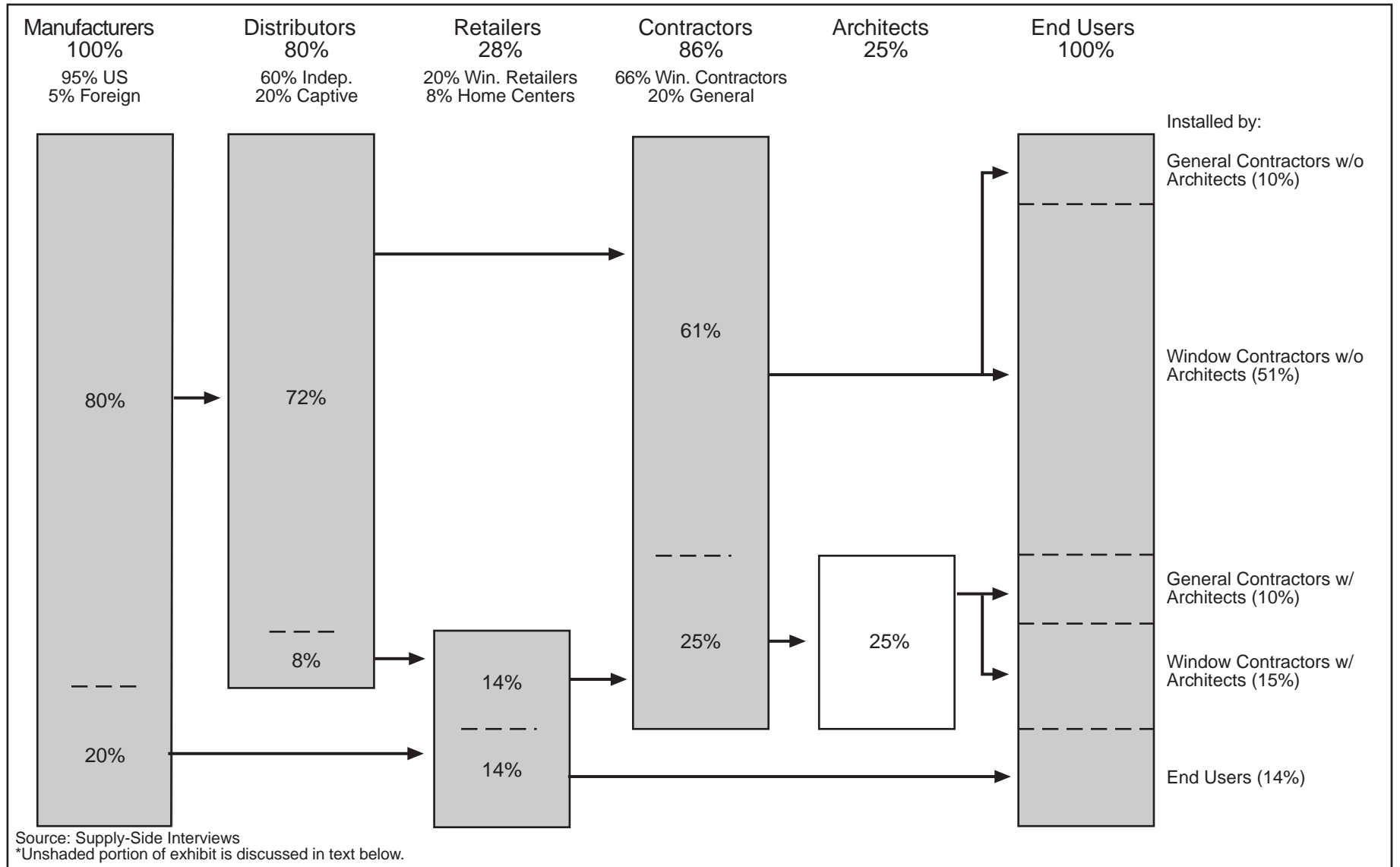
- Unlike specialized contractors and distributors, the general contractors interviewed have a less accurate understanding of energy efficiency characteristics of windows. Of the 17 interviewed, 8 consider windows energy efficient simply by virtue of dual pane glass and non-aluminum frames.
- General contractors were not asked about the importance of energy efficiency for windows specifically, they were asked about its overall importance relative to other decision criteria. As illustrated previously in Exhibit 3-11, energy efficiency was perceived to be somewhat important to customers, as were contractor reputation, brand, and warranty. Price and reliability were rated most important; access to financing and how quickly measures could be installed were rated less important.

### *Whole-house Approach*

- General contractors are, by definition, capable of a whole-house approach to energy efficiency, but none pursue energy efficiency opportunities beyond the immediate project for which they have been hired.
- Several respondents did report an interest in acting as facilitators for a whole-house energy efficiency approach, but admitted that they lack the information they need to pursue such opportunities.



Exhibit 3-13  
 Window Retrofit Market  
 Current Market Flow\*  
 (Percentage of Sales)



ALTHOUGH ARCHITECTS ARE INVOLVED IN ONLY ABOUT 25 PERCENT OF WINDOW RETROFITS, THEY PLAY AN IMPORTANT ROLE IN THE MARKET, SINCE THEY ACTIVELY PROMOTE ENERGY-EFFICIENT WINDOWS AS WELL AS A WHOLE-HOUSE APPROACH TO ENERGY EFFICIENCY.

### *Role of Energy Efficiency*

- All architects interviewed reported discussing energy efficiency in most or all of their specifications.
- As with general contractors, architects were not asked about the overall importance of energy efficiency for windows specifically, but were asked about its overall importance relative to other decision criteria. As shown in Exhibit 3-11, architects said that energy efficiency is somewhat important among purchase drivers for homeowners. Together with style and architect recommendation, it ranks below price and reliability, but ahead of warranty, brand, access to financing, and speed of installation.
- While all architects interviewed included dual panes as a required feature for a window to be energy efficient, only eight of ten cited low-e glass, seven cited wood, vinyl, or fiberglass frames, and five cited a gas-filled cavity. The percentage of windows specified that met this self-defined criterion for energy efficiency averaged about 95 percent

### *Whole-house Approach*

- Architects are involved in other aspects of whole-house energy-efficiency retrofits. All architects either actively promote (80 percent) or point out (20 percent) other opportunities for energy savings in the course of a specification.

THE ABOVE MARKET ACTORS, THE BARRIERS FACING THEM, AND BARRIER PREVALENCE AND IMPORTANCE ARE DISCUSSED NEXT.

**THE BARRIER ANALYSES PRIMARILY USED DATA COLLECTED THROUGH INTERVIEWS WITH EACH GROUP OF MARKET ACTORS.**

The intensity of individual barriers was assessed (and is shown in the exhibits as low, moderate or high) using both qualitative and quantitative results. Where quantitative data were available and appropriate, results were mapped to barrier levels using the following general algorithm:

- Barriers rated as Very Important by at least 2/3 of respondents were classified as High.
- Barriers rated as Very Important by at least 1/3 but less than 2/3 of respondents were classified as Moderate.
- Barriers rated as Not At All Important by at least 1/2 of respondents were not considered barriers.
- All other barriers were classified as Low (i.e., barriers rated as Very Important by less than 1/3 of respondents and rated as Not At All Important by less than 1/2 of respondents).

In addition to the above quantitative criteria, however, qualitative results from open-ended questions were used to adjust the quantitative results and to assess barriers where more structured results were not available.

- Given the small sample sizes for many of the groups contacted, it was felt that spontaneous explanations by market actors of the obstacles they encounter or perceive were particularly valuable in determining the truly important market barriers.
- In addition, qualitative results were critical for determining measure-specific barriers for such market actors as general contractors and architects, who rated barriers to energy efficient measures in general rather than for individual measures. An example is the classification of Hidden Costs for general contractors. Based on the above criteria, this barrier would have been classified as Low for energy efficient measures in general. A number of general contractors pointed out, however, that customers do not like the quality of light from CFLs, install them only to meet Title 24, and often change them out within a short time. As a result, the Hidden Cost barrier to efficient lighting was assigned a high rating for this group.

**Exhibit 3-14**  
**Existing Window Retrofit Market**  
**Barriers**

Measure-Specific Market Actors	Barriers											
	High Initial Cost	Info/Search Costs	Market Uncertainty	Transaction Costs	Performance Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Asymmetric Information	Svc./Product Unavailability	Access to Financing
Manufacturers			2	1	1							
Distributors	4	1	2	1								
Retailers	2											
Contractors	Measure-Specific	4	2	2		1	4		2	2		
	General	4	2			2						
Architects	4	1			1							
Building Inspectors		2					2					
Financiers	4											
Realtors				4								
Media		2	1									

**KEY**

Importance

4 High

2 Moderate

1 Low

Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.  
 Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.  
 Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.  
 All other barriers were classified as Low (i.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).

**MANUFACTURERS FACE VARIOUS DEGREES OF MARKET UNCERTAINTY, PERFORMANCE UNCERTAINTY, AND TRANSACTION COSTS, BUT THERE IS LITTLE EVIDENCE THAT THESE BARRIERS HAVE IMPEDED THE ACCESS OF DOWNSTREAM MARKET ACTORS TO EFFICIENT WINDOWS AND WINDOW TECHNOLOGIES.**

- For manufacturers, the degree of market uncertainty inherent in a commitment to high-efficiency windows depends on the complexity and capital intensity of the production process.
  - Glass manufactures face a market uncertainty barrier – defined here as the risk involved in investing significant resources in anticipation of a market demand that may or may not materialize -- in that they typically require a long lead time and a significant investment in research and development (R&D) and plant and equipment to bring new technologies to market.<sup>18</sup> On the other hand, no manufacturer wants to be left behind by rivals who more aggressively invest in and promote new technology. For that reason, world-class manufacturers such as PPG will generally invest to pursue R&D in leading-edge technologies despite the market risks.
  - As noted earlier, window manufacturers face less of a market uncertainty barrier to production of energy-efficient windows, since they assemble windows from components and can typically substitute one type of glass for another if demand for energy-efficient windows fails to materialize.
- According to trade association analysts, of somewhat greater concern to window manufacturers would be performance uncertainty regarding advanced glass technologies, since customers will blame the window manufacturer (not the glass producer) if the unit fails to meet expectations.
- Trade association respondents also noted that window manufacturers may face transaction costs associated with new lines of high performance windows, including promotion and marketing outlays as well as the costs associated with window testing and certification, whether for the NFRC label or for inclusion in the Energy Star windows program. These barriers are said to be minor, however.

**Exhibit 3-15**  
**Existing Window Retrofit Market**  
**Barriers\***

Measure-Specific Market Actors		Barriers											
		High Initial Cost	Info/Search Costs	Market Uncertainty	Transaction Costs	Performance Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Asymmetric Information	Svc./Product Unavailability	Access to Financing
<b>MANUFACTURERS</b>				2	1	1							
Distributors		4	1	2	1								
Retailers		2											
Contractors	Measure-Specific	4	2	2		1	4		2	2			
	General	4	2			2							
Architects		4	1			1							
Building Inspectors			2					2					
Financiers		4											
Realtors					4								
Media			2	1									

**KEY**

Importance

4 High

2 Moderate

1 Low

\* Barriers for text in **BOLD CAPS** are discussed in the text below.

Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.

Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.

Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.

All other barriers were classified as Low (I.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).

**DISTRIBUTORS AND RETAILERS FACE FEW BARRIERS TO SELLING EFFICIENT WINDOWS. BOTH GROUPS ARE GENERALLY WELL INFORMED ABOUT THE BENEFITS AND COSTS OF EFFICIENT WINDOWS, AND THEY ROUTINELY SELL SUCH WINDOWS FOR RETROFIT APPLICATIONS.**

- For window distributors, barriers to selling energy-efficient windows *per se* are minimal. Since Title 24-compliant windows account for the bulk of their sales, availability and uncertainty regarding performance are non-issues. In contrast, windows with efficiency levels *above* those required by the California Energy Code are highly unlikely to be stocked, because buyers who would install such windows are likely to require custom-built windows rather than standard window sizes.
- When asked to rate specific barriers as not at all important, somewhat important, or very important, distributors said that availability, performance, and installation requirements of energy-efficient windows were not at all important. Only the cost of energy-efficient windows was seen as a very important barrier, while market uncertainty -- as reflected in distributor perceptions that customers have concerns regarding the style of efficient windows, potential energy savings, and the difficulty of finding information (i.e., search costs) -- was considered somewhat important.
- Distributor barriers to promotion of energy-efficient windows for retrofit applications appear to be relatively minor, since this involves simply trying to increase the number of windows retrofit with energy-efficient models. The only barriers likely to be faced include a minor transaction cost barrier associated with such an effort, and the information search cost associated with selecting a target audience and marketing message for a promotional campaign.
- Like distributors, window retailers face few barriers to the sale of efficient windows other than higher first cost, which was considered moderately important by the five retailers interviewed. The practice of ordering windows from the manufacturer appears to help keep stocking-related barriers such as transaction costs and market uncertainty to a minimum.

**Exhibit 3-16**  
**Existing Window Retrofit Market**  
**Barriers\***

Measure-Specific Market Actors	Barriers											
	High Initial Cost	Info/Search Costs	Market Uncertainty	Transaction Costs	Performance Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Asymmetric Information	Svc./Product Unavailability	Access to Financing
Manufacturers			2	1	1							
<b>DISTRIBUTORS</b>	4	1	2	1								
<b>RETAILERS</b>	2											
Contractors	Measure-Specific	4	2	2	1	4		2	2			
	General	4	2		2							
Architects	4	1			1							
Building Inspectors		2					2					
Financiers	4											
Realtors				4								
Media		2	1									

**KEY**  
Importance  
4 High  
2 Moderate  
1 Low

\* Barriers for text in **BOLD CAPS** are discussed in the text below.

Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.

Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.

Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.

All other barriers were classified as Low (i.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).



**SINCE WINDOW CONTRACTORS ARE HIGHLY RESPONSIVE TO CUSTOMER NEEDS, THEIR BARRIERS TO BUYING AND SELLING EFFICIENT WINDOWS REFLECT THE CONCERNS OF CUSTOMERS.**

- For window contractors, purchase decisions are usually driven by customer requirements. As a result, barriers faced by this group of market actors largely reflect market uncertainty driven by the first cost, information search cost, and performance uncertainty concerns of end users.
  - Among the specific barriers to selling energy-efficient windows that contractors were asked to address, only the high initial cost of efficient windows and concerns about their style (which could be considered a hidden cost in that it is an unexpected cost associated with an efficient technology) were considered very important by more than half of respondents.
  - Somewhat important barriers included bounded rationality (e.g., when contractors focus primarily on matching existing windows rather than on performance characteristics) and information search costs.
  - Less important was the performance uncertainty barrier (as measured by the statements “efficient windows perform unreliably” and “doubts about energy savings from EE windows.”)
- When specifying windows in a competitive bid, contractors may face a market uncertainty barrier (defined as the risk involved in investing resources in anticipation of a market demand that may or may not materialize), since competitors may undercut them by offering lower priced standard efficiency windows.
- Promotion of energy-efficient windows may also be hampered by a misplaced incentive barrier. A trade association representative stated that contractors typically make more on labor than they do on product margins, so they have an incentive to encourage customers (or, more accurately, to reinforce the typical customer’s preference) to use their fixed budget to install more lower efficiency windows rather than fewer high-efficiency windows. It should be noted, however, that almost all the window contractors interviewed emphasized the benefit to the customer of more efficient windows.

**Exhibit 3-17**  
**Existing Window Retrofit Market**  
**Barriers\***

Measure-Specific Market Actors		Barriers											
		High Initial Cost	Info/Search Costs	Market Uncertainty	Transaction Costs	Performance Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Asymmetric Information	Svc./Product Unavailability	Access to Financing
Manufacturers				2	1	1							
Distributors		4	1	2	1								
Retailers		2											
<b>CONTRACTORS</b>	<b>MEASURE-SPECIFIC</b>	4	2	2		1	4		2	2			
	General	4	2			2							
Architects		4	1			1							
Building Inspectors			2					2					
Financiers		4											
Realtors					4								
Media			2	1									

**KEY**

Importance

4 High

2 Moderate

1 Low

\* Barriers for text in **BOLD CAPS** are discussed in the text below.

Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.

Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.

Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.

All other barriers were classified as Low (i.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).

**FOR GENERAL CONTRACTORS, LACK OF KNOWLEDGE APPEARS TO BE A BARRIER TO SPECIFYING AND PROMOTING ENERGY-EFFICIENT WINDOWS.**

- General contractors are less likely to be able to accurately define what constitutes an energy-efficient window, with fewer than half of the 17 general contractors interviewed defining energy efficiency as requiring both dual panes and low-e glass.
- While general contractors were not asked about barriers to energy-efficient windows specifically, they were asked about barriers to energy-efficient measures in general.
  - Among the barriers to energy-efficient equipment cited by general contractors, first cost was by far the most substantial, with all contractors considering it a most important barrier.
  - General contractors also reported, however, that they perceived moderate barriers in the difficulty of finding information on energy-efficient equipment and in their doubts about the savings potential from energy-efficient measures – both potentially the result of lack of knowledge regarding efficient windows, among other measures.

**Exhibit 3-18**  
**Existing Window Retrofit Market**  
**Barriers\***

Measure-Specific Market Actors	Barriers											
	High Initial Cost	Info/Search Costs	Market Uncertainty	Transaction Costs	Performance Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Asymmetric Information	Svc./Product Unavailability	Access to Financing
Manufacturers			2	1	1							
Distributors	4	1	2	1								
Retailers	2											
<b>CONTRACTORS</b>	Measure-Specific	4	2	2		1	4		2	2		
	<b>GENERAL</b>	4	2			2						
Architects	4	1			1							
Building Inspectors		2					2					
Financiers	4											
Realtors				4								
Media		2	1									

**KEY**

Importance

4 High

2 Moderate

1 Low

\* Barriers for text in **BOLD CAPS** are discussed in the text below.

Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.

Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.

Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.

All other barriers were classified as Low (i.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).

**ARCHITECTS AND OTHER MARKET ACTORS WHO ARE LESS DIRECTLY INVOLVED IN THE MARKET MAY NEVERTHELESS FACE BARRIERS THAT IMPEDE THEIR ABILITY TO FACILITATE THE ADOPTION OF HIGHER EFFICIENCY WINDOWS IN RETROFIT APPLICATIONS.**

- Architects face relatively few barriers to the specification of energy-efficient measures. As with general contractors, architects were asked about barriers to the specification of barriers to energy-efficient measures in general. Availability, performance, installation requirements, and concerns regarding style and aesthetics were not perceived to be problems by architects. Only cost is a significant barrier, while doubts about energy savings and lack of information on the benefits of energy-efficient measures were minor concerns.
- Barriers faced by other enabling market actors include the following.
  - Building inspectors play a significant role in ensuring that Title 24-compliant windows are specified and installed in major remodeling projects or additions. A training specialist interviewed for this study noted that standard practices may keep field inspectors from verifying NFRC labels, and that many inspectors lack the detailed knowledge to verify that efficient windows are installed properly.
  - Financiers are unlikely to provide energy-efficient financing for windows -- either in partial or whole-house applications -- primarily because their high cost relative to potential energy savings makes windows a poor candidate for meeting EEM requirements.
  - CHEERS raters and EEM facilitators say that realtors are reluctant to promote energy-efficient mortgages (for windows as well as other application) because of the associated transaction cost; i.e., the fear that the settlement process may be delayed.
  - Finally, media interviews suggest that the primary barrier to coverage of energy-efficiency topics is a lack of information, with minor concerns about the receptivity of readers to articles or other coverage.

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<sup>1</sup> Frost, K., Eto, J., Arasteh, D., and M. Yazdanian, *The National Energy Requirements of Residential Windows in the U.S.: Today and Tomorrow*. Lawrence Berkeley National Laboratory (LBNL)-39692, 1997

<sup>2</sup> National shipment data from Architectural Aluminum Manufacturers Association *Data Book*; California percentage from Frost et al, *op cit*; PG&E share based on share of residential customers.

<sup>3</sup> Frost et al., *The National Energy Requirements*

<sup>4</sup> PG&E Market Transformation Planning Project, Volume 3: Residential Windows Mini-Study, XENERGY, July 1997

<sup>5</sup> PG&E 1999 Residential Windows Strategic Plan, Energy Solutions, March 1999. p. 7

<sup>6</sup> Frost et al., *The National Energy Requirements*

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<sup>7</sup> Kulakowski, S., Rufo, M., and Schwab, S. “Residential Windows: Haven’t We Been Transforming Markets All Along?” In *Proceedings of the 1998 ACEEE Summer Study of Energy Efficiency in Buildings*, 10.49

<sup>8</sup> According to the American Architectural Manufacturers Association (AAMA), the use of “open frame” construction in California, where windows installation is initiated before the roof goes on the building but not finished (often by a different crew) until the exterior stucco is applied, is said to make proper window installation more difficult.

<sup>9</sup> Eto, J., Arasteh, D., and Selkowitz, E.O. “Transforming the Market for Residential Windows: Design Considerations for DOE’s Efficient Window Collaborative”. In *Proceedings of the ACEEE 1996 Summer Study on Energy Efficiency in Buildings*, 10-33

<sup>10</sup> Ibid.

<sup>11</sup> Ibid.

<sup>12</sup> Dun & Bradstreet, Marketplace CD, April-June 1999, iMarket inc.

<sup>13</sup> PG&E, Residential Windows Mini-Study.

<sup>14</sup> Ibid., p. 1-3

<sup>15</sup> PG&E 1999 Residential Windows Strategic Plan, Energy Solutions, March 1999. P. 4

<sup>16</sup> D&B, Marketplace.

<sup>17</sup> Ibid.

<sup>18</sup> PG&E 1999 Residential Windows Strategic Plan, p. 4

**Exhibit 4-1**  
**Current Residential Retrofit Market in PG&E's Service Territory**  
**Status of Integrated Discretionary Retrofit Actions**  
**Total 1998 Market Size = \$1.1 Billion**  
**(Percentage of Total Expenditures)**

Category	Action		Kitchen Equipment*		Lighting	TOTAL
	Windows	HVAC Replacement	Refrigerator	Dishwasher		
% of Total Sales	48%	30%	11%	4%	6%	100%
Individual Versus Multiple Actions						
% Individual Actions						61%
% Multiple Actions						39%
Whole House	4	4	4	4	4	2%
Windows+HVAC	4	4				6%
All Kitchen			4	4		5%
Windows+Refrigerator	4		4			3%
Windows+Lighting	4				4	3%
Windows+Dishwasher	4			4		3%
Other Combinations						17%

\*The kitchen remodel market, estimated at \$6.4 Million for 1998 in PG&E Service Territory, has not been included because it includes many non-energy-related items.

IN THIS SECTION, THE HVAC RETROFIT MARKET IS PROFILED FROM A SUPPLY-SIDE PERSPECTIVE, DRAWING UPON BOTH SECONDARY DATA SOURCES AND THE RESULTS OF WITH KEY MARKET ACTORS WHO PARTICIPATE IN OR INFLUENCE THIS MARKET.

- The reader should keep in mind that the wide range of supply-side market actors surveyed for this market characterization limited sample sizes for specific actor segments; please see Exhibit 1-4 for the number of interviews by segment.
- The main source used in the analysis of the HVAC market was the 1999 PG&E HVAC Market Transformation Report completed by Opinion Dynamics Corporation (ODC). Unless otherwise stated, the ODC report is the source for all information in this study.
- Other secondary data reviewed for this analysis include D&B data, other evaluations and planning documents, publications of national and regional trade associations, as detailed in the end notes to this section.
- Primary data sources, summarized previously in Exhibit 1-4 and described in detail in the data collection section, consisted of surveys/interviews with market actors involved in the HVAC market. These market actors included groups that were not part of the ODC report, including general contractors, architects, building inspectors, financiers, realtors, and the media.
- The remainder of this section is organized as follows:
  - The overall importance of HVAC in the context of the retrofit and renovation market is discussed
  - Next, the current state of the market is summarized in terms of available energy-efficient HVAC technologies and the extent of their penetration of the market
  - Characteristics of major groups of market actors are then analyzed, and the implications of those characteristics for energy-efficient HVAC equipment and whole-house solutions are discussed
  - Finally, barriers to energy efficiency for each market actor group, based on the results of both secondary and primary data collection, are presented.



**THE HVAC REPLACEMENT MARKET IS AN IMPORTANT COMPONENT OF THE RETROFIT MARKET IN PG&E'S SERVICE TERRITORY.**

- According to D&B, the California market accounts for about five percent of U.S. national HVAC sales at the wholesale level, with PG&E's service territory accounting for 40 percent of the HVAC work done in the state.
- Just over 200,000 HVAC units were estimated by ODC to have been installed in PG&E's service territory in 1998, with approximately 75 percent of these going into existing homes.
  - An estimated 84,352 central air conditioners were installed in single-family, owner-occupied homes within PG&E's service territory during 1998. This consists of 17,442 units installed in newly constructed homes, 28,965 emergency or breakdown replacements within existing homes, 19,498 planned replacements within existing homes, and 18,447 units installed in homes that did not previously have central air conditioning.
  - An estimated 116,677 forced air furnaces were installed in single-family, owner-occupied homes within PG&E's service territory during 1998. This consists of an estimated 36,543 units installed in newly constructed homes, 34,689 emergency or breakdown replacements within existing homes, 23,352 planned replacements within existing homes, and 22,093 units installed in existing homes that did not previously have a forced air furnace.
- As illustrated in the exhibit, HVAC replacement is one of the most important components of the retrofit market in PG&E's service territory.
  - According to contractors interviewed by ODC, more than 56 percent of HVAC replacements were planned; the remainder represent emergency or breakdown replacements.
  - This is relatively consistent with results obtained in ODC's end-user research, in which 40 percent of replacements were said to be planned.

**VARIOUS ASPECTS OF THE HVAC RETROFIT MARKET ARE DISCUSSED IN DETAIL ON THE FOLLOWING PAGES.**

**WHILE MANUFACTURERS AND DISTRIBUTORS SEE ENERGY-EFFICIENT HVAC EQUIPMENT AS PART OF A "NICHE MARKET" , THEY ACKNOWLEDGE THE POSSIBILITY OF HIGHER REVENUE AND PROFIT MARGINS .**

- Most manufacturers refer to their energy-efficient models as niche products. For some manufacturers it is only their highest efficiency products that are positioned as niche products. Intermediate efficiency products are part of their regular product line. For others, who place less strategic emphasis on energy-efficient premium products, all their efficient models are positioned as niche products.
- Manufacturers and distributors acknowledged greater gross revenues and the possibility of increased margins from energy-efficient products.
  - Some manufacturers noted the higher costs to produce energy-efficient products and the higher prices they charge for them.
  - As a "step-up" product, high-efficiency products offer opportunities for larger margins.
- Manufacturers offering a full line of residential HVAC models may strategically position their energy-efficient products as premium alternatives for key spots in their lines. Some manufacturers offer a builder step-up model for new construction. Most manufacturers offer one or more step-up models primarily for the replacement market.

AS WITH MANY INCREMENTAL INVESTMENTS IN ENERGY-EFFICIENT EQUIPMENT, THE PAYBACK ON HIGH-EFFICIENCY HVAC SYSTEMS IS RELATIVELY LONG. INTEGRATED ENERGY-EFFICIENCY SOLUTIONS IN WHICH DOWNSIZING OF THE HVAC EQUIPMENT IS POSSIBLE, INNOVATIVE FINANCING APPROACHES, AS WELL AS INFORMATIONAL MESSAGES IN WHICH ENERGY AND NON-ENERGY BENEFITS ARE HIGHLIGHTED, ARE THEREFORE RECOMMENDED.

- The incremental cost of installing an energy-efficient central air conditioning (CAC) unit, when compared to installing a standard efficiency unit, can be substantial, with 3 ton central air conditioners with 12, 13, and 14 SEER ratings cost an average of \$530, \$776, and \$1,078 more to install, respectively, than 10 SEER units.<sup>1</sup>
- Similarly, the incremental cost of installing an energy-efficient forced air furnace, when compared to installing a standard efficiency furnace, can also be substantial.<sup>2</sup>
  - Compared to standard efficiency forced air furnaces (i.e., 80 percent A.F.U.E.), forced air furnaces with 90 percent A.F.U.E. ratings cost customers an average of \$601 more to install.
  - Compared to standard efficiency forced air furnaces (i.e., 80 percent A.F.U.E.), forced air furnaces with 95 percent A.F.U.E. ratings cost customers an average of \$810 more to install.
- Contractors, distributors, and manufacturers generally agree that the increased (or incremental) cost of energy-efficient HVAC equipment is a major barrier to adoption. However, many of them pointed out that energy-efficient models also include many “premium” features and components that provide valuable additional benefits to customers. These benefits include reduced operating noise levels, increased reliability, better comfort, and better warranties.
- One distributor estimates payback in California at 5 to 6 years (going from a SEER 10 to a 12 or 13). Another says payback is longer than 10 years. And, another says flatly that investment return on higher SEER is not there, unless rebated. It is the opinion of most supply side market actors that high incremental costs, low energy costs, and mild weather combine to produce lengthy payback periods.

**Exhibit 4-2**  
**1998 Central Air Conditioning and Forced Air Furnace Sales for Existing Homes**  
**By Efficiency Level and Climate Zone\***  
**(Percentage of Population)**

	Desert/ Mountain	Valley	Coastal	Hill	PG&E Territory
Percentage of CAC Unit Sales					
10 SEER	47	44	67	59	<b>50</b>
11 SEER	4	4	15	8	<b>6</b>
12 SEER or higher	49	52	18	33	<b>44</b>
Percentage of Forced Air Furnace Unit Sales					
80-89% A.F.U.E.	68	83	87	83	<b>83</b>
90% A.F.U.E. or higher	32	17	13	17	<b>17</b>

\* Weighted by HVAC contractor survey respondents' existing home central air conditioner and forced air furnace unit sales volumes.

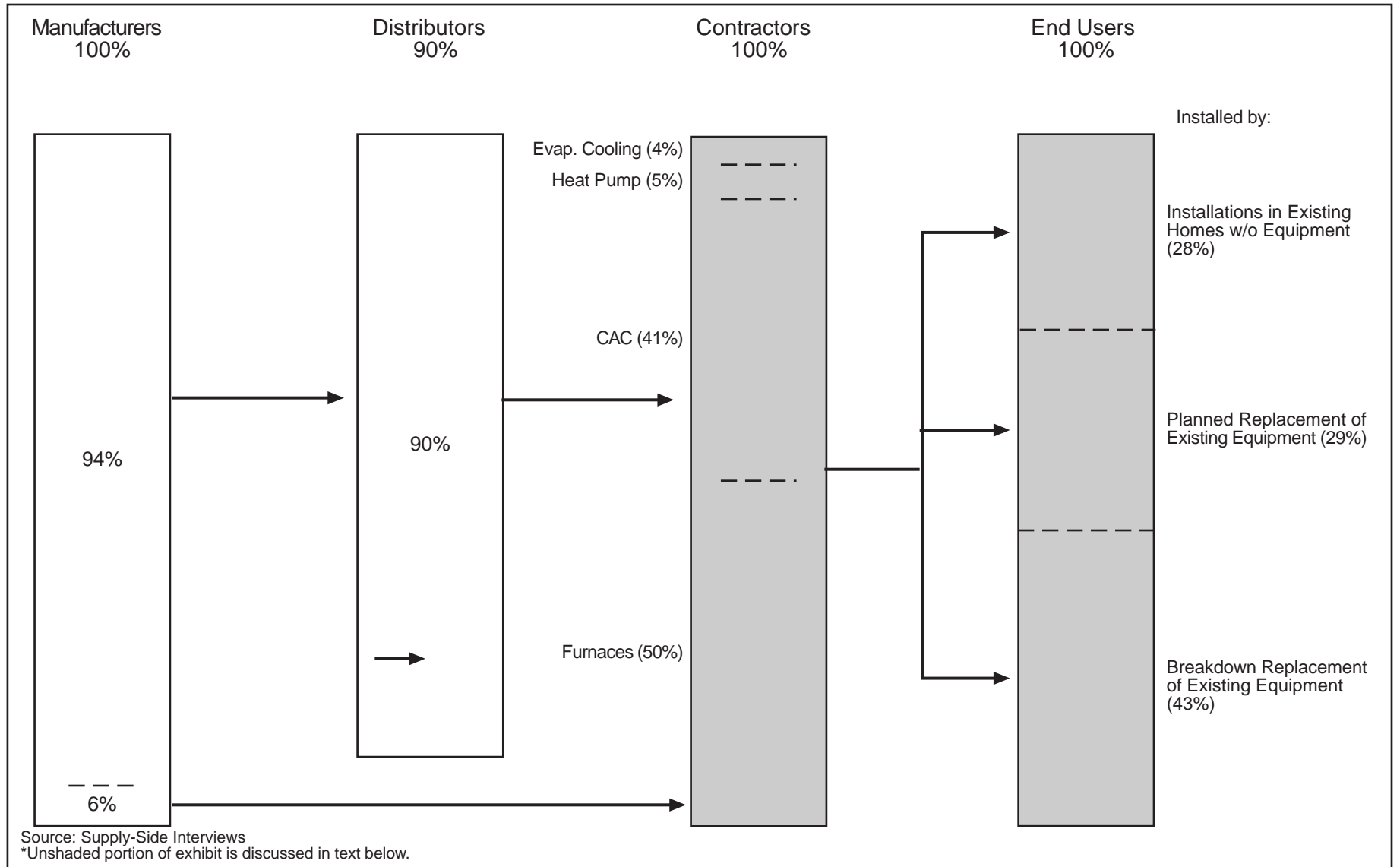
**WHILE SALES OF ENERGY-EFFICIENT HVAC EQUIPMENT IS ON THE RISE, A LARGE PORTION OF THE REPLACEMENT MARKET REMAINS AT THE STANDARD EFFICIENCY LEVEL, ESPECIALLY FOR FORCED AIR FURNACES.**<sup>3</sup>

- Although a larger portion of CAC replacements are considered energy efficient, the majority—approximately 60 percent—remain at the standard efficiency rating.<sup>4</sup>
  - Approximately 50 percent of 1998 existing-home central air conditioning sales just meet the minimum federal standard for energy efficiency—they have SEER ratings of 10.
  - Over 40 percent of 1998 existing home central air conditioning sales have SEER ratings of 12 or higher.
  - The Desert/Mountain, and Valley climate zones saw substantially higher market shares—approximately 50 percent—of high-efficiency CAC equipment (12+ SEER rating) as compared to the Coastal and Hill climate zones—18 percent and 33 percent, respectively.
- The majority—over 80 percent—of forced air furnace replacements have efficiency ratings that are considered to be standard.
  - Approximately 17 percent of 1998 existing home forced air furnace sales within PG&E's service territory have efficiency or A.F.U.E. ratings of 90 percent or higher. Only 2 percent of 1998 existing home forced air furnace unit sales have A.F.U.E. ratings of 95 percent or higher.
  - The market share of high-efficiency forced air furnaces is highest (approximately 32 percent) among ODC contractor survey respondents located in the Desert/Mountain climate zone.

ACCORDING TO ODC, MANUFACTURERS AND DISTRIBUTORS AGREE THAT ADVERTISING THE ADDED BENEFITS OF HIGH-EFFICIENCY HVAC EQUIPMENT NEEDS TO BE THE MOST IMPORTANT SALES TACTIC FOR THE FUTURE.

- Manufacturers and distributors identified a growing focus on comfort and health as a significant trend.
  - Some noted that with more people working at home, there was more emphasis on improved comfort.
  - Many noted the increasing attention to improved air filtration. Some mentioned increasing awareness of the benefits to allergy-sufferers of installing better filtration components. Others mentioned consumers generally increasing concerns for maintaining a healthier environment.
  - Concerns for indoor air quality and better filtration are driving demand for variable speed fan motors.
  - Demands for improved comfort are increasing interest in two-stage heating and cooling units.
- Distributors and contractors are in agreement that selling a better product creates greater customer satisfaction, and that, in turn, leads to future benefits. Among the secondary benefits are:
  - Better word-of-mouth and increased referrals to “their” dealers and contractors
  - Building brand image for efficiency, quality, and reliability
  - Growing demand for products that are more saleable.
- Very few distributors have plans for marketing efforts. Most marketing programs come from the manufacturers because they have high brand equity. Also, the dealers / contractors do some advertising.
- All manufacturers and distributors we interviewed said that they have higher efficiency units coming to market in the next few years. They expect minimum efficiency standards to rise and several manufacturers are introducing more air conditioner models in the 13 to 14 SEER range and top models in the 16, 17 and 18 SEER range.

Exhibit 4-3  
 HVAC Market to Existing Homes  
 Current Market Flow\*  
 (Percentage of Sales)



**THE RESIDENTIAL HVAC MARKET IS DOMINATED BY A FEW (ABOUT 8) LARGE MANUFACTURERS AND RELATIVELY FEW (PERHAPS AS FEW AS 10) LARGE LOCAL DISTRIBUTORS.**<sup>5</sup>

### *Characteristics*

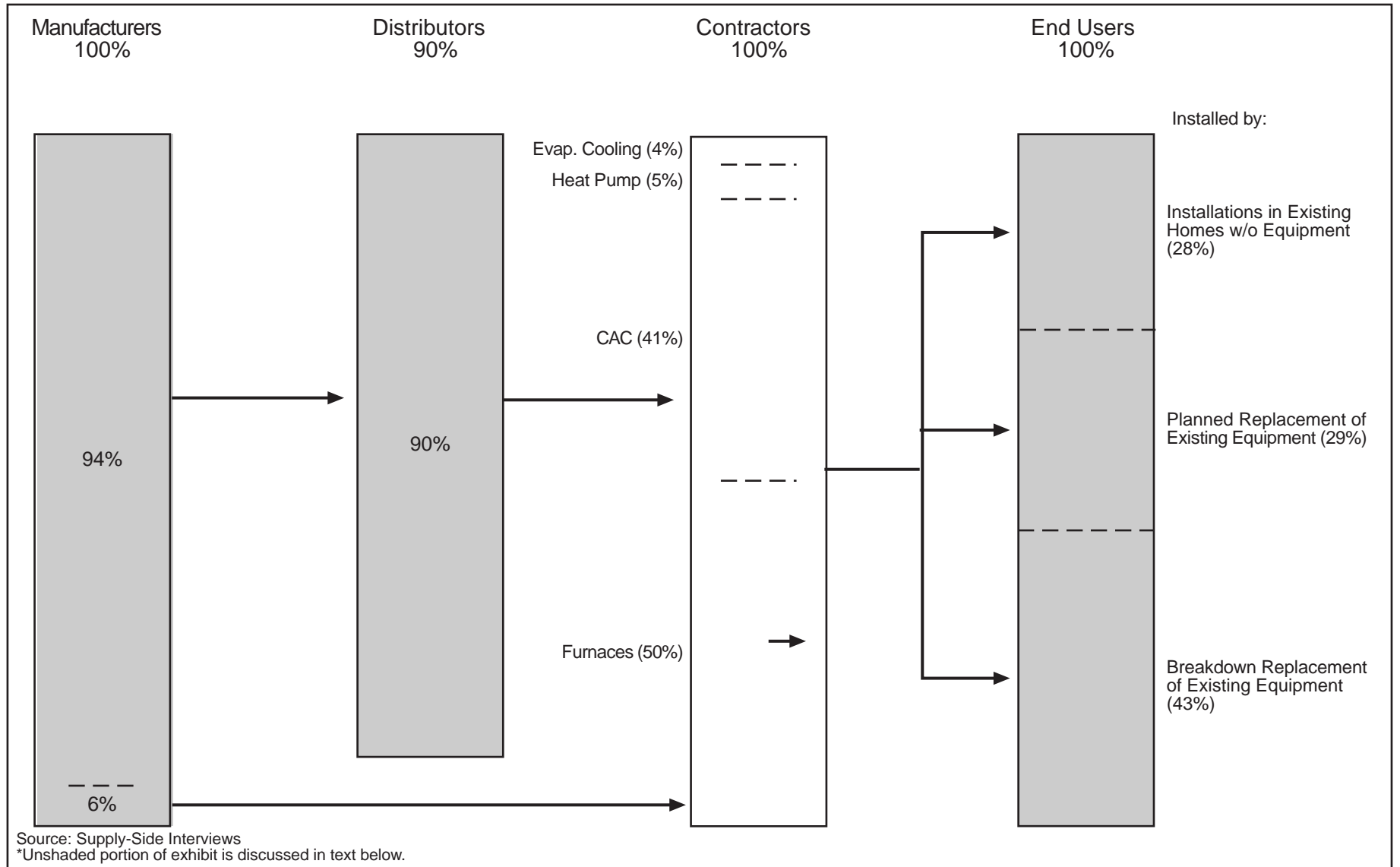
- Currently, manufacturers produce products for a nation-wide market. Distributors are typically independently owned (not manufacturer owned) although they often carry products for a single manufacturer.
- Both manufacturers and utilities are anticipating greater partnership opportunities in the future, according to *The Air Conditioning, Heating, and Refrigeration News* (The News). Two-thirds of the manufacturers surveyed by The News believe that relationships between equipment manufacturers and utilities will grow stronger in the future.<sup>6</sup>

### *Distribution of Sales*

- According to ARI, approximately 10 percent of national HVAC equipment sales (all equipment types) go to California, making it the third largest HVAC state market in the country, with only Florida and Texas larger in number of units shipped.
- While there is a broad range of HVAC equipment types in the market, the market is dominated by a few manufacturers. Of the HVAC manufacturers, Carrier has the largest market share at 22 percent, followed by Goodman, 14 percent; Rheem, 13 percent; Trane, 12 percent; York, 12 percent; ICP, 11 percent; and Lennox, 9 percent.<sup>7</sup>



Exhibit 4-4  
 HVAC Market to Existing Homes  
 Current Market Flow\*  
 (Percentage of Sales)



SMALL, INDEPENDENT HVAC CONTRACTORS, WHO ACCOUNT FOR MOST OF THE RETROFIT HVAC INSTALLATIONS IN THE RESIDENTIAL MARKET, ARE MORE KNOWLEDGEABLE ABOUT HVAC EFFICIENCY ISSUES THAN ARE GENERAL CONTRACTORS, HOWEVER THESE HVAC CONTRACTORS ARE UNWILLING TO TAKE THE LEAD IN WHOLE-HOUSE ENERGY PROJECTS.

### *Characteristics*

- The HVAC contractor segment of the market is highly fragmented. Most HVAC contractors serving the residential market are small, independent, local firms providing services only to residential and light commercial customers.<sup>8</sup>
  - The average respondent who participated in the ODC quantitative contractor survey has seven employees. Many HVAC contractors are one-person shops—they have no other employees.
  - Thus, most residential HVAC contractors have limited internal resources and limited access to external support. And, although smaller firms have the greatest needs for technical, sales and management training, they will be the least likely to be able to make time for such development activities.
- An acute shortage of qualified technicians and installers is already limiting the amount of work HVAC contractors can take on. With a boom in new construction as well as remodeling activity in Northern California, installation personnel are in short supply. Seventy-five percent of contractors interviewed said they faced a shortage of qualified installers, and 63 percent said that shortage limited the amount of work they could take on.

### *Distribution of Sales*

- An estimated 84,352 central air conditioners were installed in single-family, owner-occupied homes within PG&E's service territory during 1998. This consists of 17,442 units installed in newly constructed homes, 28,965 emergency or breakdown replacements within existing homes, 19,498 planned replacements within existing homes, and 18,447 units installed in homes that did not previously have central air conditioning.<sup>9</sup>
- An estimated 116,677 forced air furnaces were installed in single-family, owner-occupied homes within PG&E's service territory during 1998. This consists of an estimated 36,543 units installed in newly constructed homes, 34,689 emergency or breakdown replacements within existing homes, 23,352 planned replacements within existing homes, and 22,093 units installed in existing homes that did not

**Exhibit 4-5**  
**Consumer Purchase Criteria, According to Market Actors\***

	HVAC Contractors	General Contractors**	Architects**
Price	4	4	4
Lower Utility Bills	4	2	2
Contractor Reputation	4	2	2
Energy Efficiency	1	2	2
Brand	1	2	1
Reliability	4	4	4
Equipment Noise	2	4	2
Access to Financing	1	1	1
How Quickly You Can Install	2	1	1
Warranty	2	2	1

Source: Supply-Side Interviews

\* Exhibit is discussed in text below (HVAC Contractors), and on pages 4-13 (General Contractors) and 4-14 (Architects).

\*\* General contractors and architects were asked to rank purchase criteria in general, not for specific measures.

Note: Market actors were asked to classify the consumer purchase criteria as either very important, moderately important, or not at all important. Values were then assigned to the responses, where very important=1, moderately important=2, and not at all important=3. Average values were then calculated for the criteria across market actor responses. Values of 1.0-1.5 were classified as most important, 1.6-2.0 as somewhat important, and 2.1-3.0 as less important.

**KEY**

4 most important  
 2 somewhat important  
 1 less important

previously have a forced air furnace.

### *Role of Energy Efficiency*

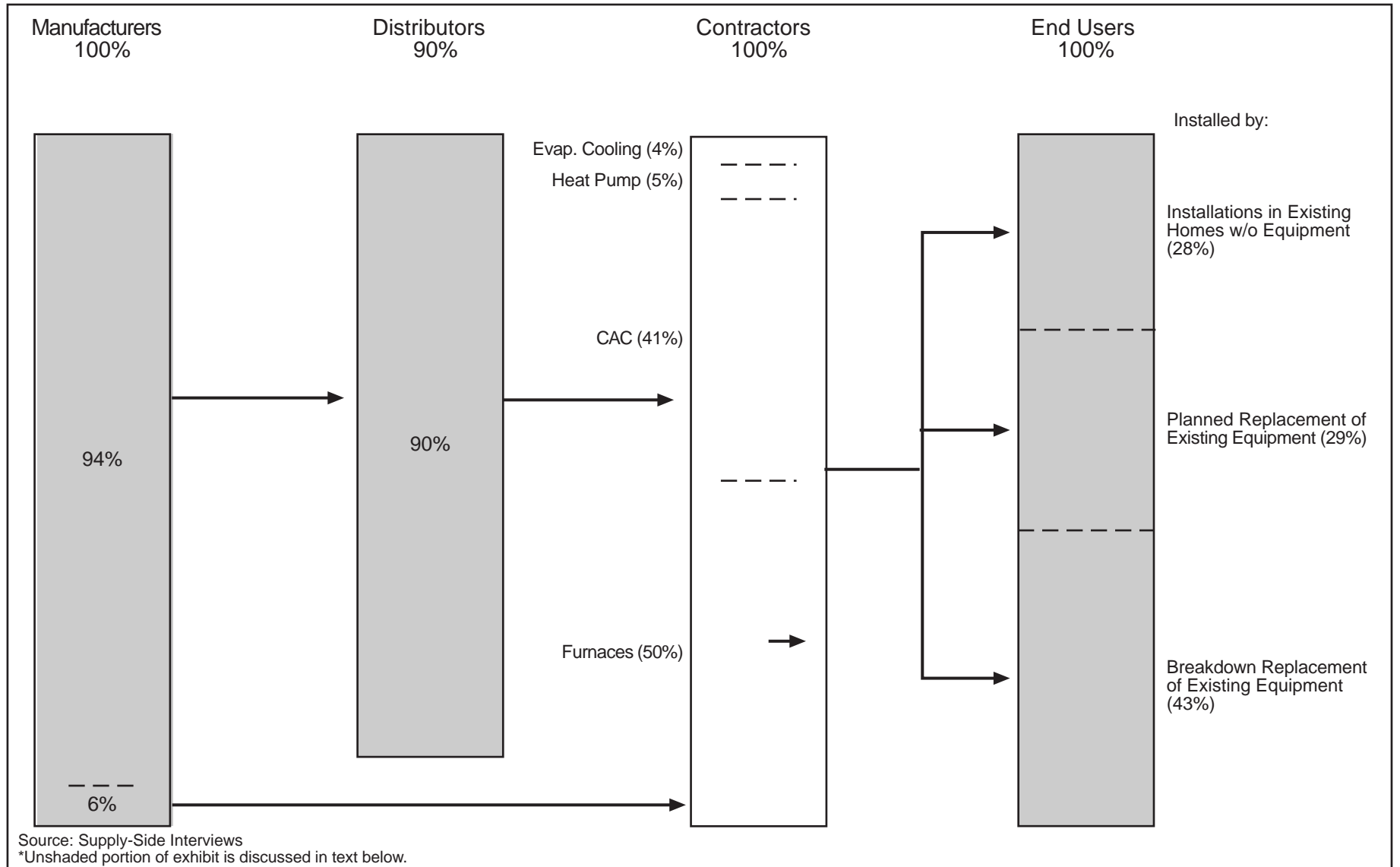
- The most frequently mentioned benefit that is emphasized by contractors when talking with customers about high-efficiency HVAC equipment is “low operating costs/lower utility bills.” Over eighty percent of respondents indicate that they mention “low operating costs/lower utility bills” when talking with customers about high-efficiency equipment.
- Contractors frequently provide cost comparisons between high and standard efficiency furnaces as well as between high- and standard-efficiency central air conditioners. Sixty-one percent of respondents ‘always’ or ‘most of the time’ provide cost comparisons for furnace purchases, and 67 percent of respondents ‘always’ or ‘most of the time’ provide cost comparisons for air conditioner purchases.
- Contractors indicate that “equipment reliability” and “contractor reputation” are the most important factors for customers making an HVAC purchase. Ninety-five percent of respondents rank “equipment reliability” as somewhat or very important to residential HVAC purchasers and 88 percent of respondents rank “contractor reputation” as a somewhat or very important to residential HVAC purchasers.
- “Energy efficiency” is ranked as the sixth most important factor in customer decision making when purchasing HVAC equipment. Fifty-six percent of contractors rank “energy efficiency” as somewhat or very important to residential HVAC purchasers.

### *Whole-house Approach*

- Remodeling projects rarely drive the purchase of HVAC equipment, whether it is a replacement or an addition. Only 8 percent of consumer survey respondents added or replaced equipment as part of a home-remodeling project.
- HVAC contractors, as surveyed by ODC, report they seldom coordinate their work with remodeling projects. They work on a job at the same time as a remodeler 29 percent of the time. Of those jobs, the remodeling project is improving energy efficiency 47 percent of the time.

- Those who work with remodelers say that the projects often include reducing heat losses and gains. Common energy-related measures are upgrading windows, reinsulating attics and floors and sealing “holes” in walls. One pointed out that most of this work affects only portions of the home—almost never is the whole house upgraded.

Exhibit 4-6  
 HVAC Market to Existing Homes  
 Current Market Flow\*  
 (Percentage of Sales)



**WHILE NOT AS KNOWLEDGEABLE ABOUT ENERGY EFFICIENCY AS HVAC CONTRACTORS, GENERAL CONTRACTORS ARE MORE RECEPTIVE TO THE WHOLE-HOUSE APPROACH TO ENERGY EFFICIENCY.**

### *Characteristics*

- According to Dun & Bradstreet, there are about 2,000 general contractors in PG&E's service territory that specialize in residential remodeling. Most remodeling contractors are small, averaging fewer than five employees.<sup>10</sup>
- General contractors interviewed for this study said that an average of 46 percent of their jobs in existing homes include replacement of HVAC equipment.

### *Role of Energy Efficiency*

- Unlike specialized contractors and distributors, the general contractors interviewed have a less accurate understanding of energy-efficiency characteristics of HVAC equipment. Of the 17 interviewed, only four could comment about energy efficiency. Three of the four defined CAC equipment with a SEER rating of 10 or 11 as energy efficient, with the other defining energy efficient as 12 SEER.

### *Whole-house Approach*

- While general contractors are, by definition, capable of providing a whole-house approach to energy efficiency, few currently pursue energy-efficiency opportunities beyond the immediate project for which they have been hired.
- Several respondents did report an interest in acting as facilitators for a whole-house energy-efficiency approach, but admitted that they lack the information they need to pursue such opportunities.



**BECAUSE ARCHITECTS ARE SOMETIMES INVOLVED IN HVAC RETROFITS, THEY PLAY AN IMPORTANT ROLE IN THE MARKET, SINCE THEY ACTIVELY PROMOTE ENERGY-EFFICIENT EQUIPMENT AS WELL AS A WHOLE-HOUSE APPROACH TO ENERGY EFFICIENCY.**

### *Role of Energy Efficiency*

- All architects interviewed reported discussing energy efficiency in most or all of their specifications. According to these architects, energy efficiency is moderately important among purchase drivers for homeowners, below price, reliability, style, and architect recommendations but ahead of warranty, brand, access to financing, and speed of installation.
- Architects said that an average of 85 percent of their designs for residential renovation and retrofit include replacement of HVAC equipment.
  - Seven of the 10 architects interviewed for this study specify the HVAC equipment themselves, with several mentioning involvement of Title 24.
  - While architects are knowledgeable about SEER levels, four of the 10 surveyed defined a SEER rating of 10 or 11 as energy efficient, with only three defining it as 12 SEER or above.

### *Whole-house Approach*

- Architects are involved in other aspects of whole-house energy-efficiency retrofits. All architects either actively promote (80 percent) or point out (20 percent) other opportunities for energy savings in the course of a specification.

**THE BARRIER ANALYSES PRIMARILY USED DATA COLLECTED THROUGH INTERVIEWS WITH EACH GROUP OF MARKET ACTORS.**

The intensity of individual barriers was assessed (and is shown in the exhibits as low, moderate or high) using both qualitative and quantitative results. Where quantitative data were available and appropriate, results were mapped to barrier levels using the following general algorithm:

- Barriers rated as Very Important by at least 2/3 of respondents were classified as High.
- Barriers rated as Very Important by at least 1/3 but less than 2/3 of respondents were classified as Moderate.
- Barriers rated as Not At All Important by at least 1/2 of respondents were not considered barriers.
- All other barriers were classified as Low (i.e., barriers rated as Very Important by less than 1/3 of respondents and rated as Not At All Important by less than 1/2 of respondents).

In addition to the above quantitative criteria, however, qualitative results from open-ended questions were used to adjust the quantitative results and to assess barriers where more structured results were not available.

- Given the small sample sizes for many of the groups contacted, it was felt that spontaneous explanations by market actors of the obstacles they encounter or perceive were particularly valuable in determining the truly important market barriers.
- In addition, qualitative results were critical for determining measure-specific barriers for such market actors as general contractors and architects, who rated barriers to energy efficient measures in general rather than for individual measures. An example is the classification of Hidden Costs for general contractors. Based on the above criteria, this barrier would have been classified as Low for energy efficient measures in general. A number of general contractors pointed out, however, that customers do not like the quality of light from CFLs, install them only to meet Title 24, and often change them out within a short time. As a result, the Hidden Cost barrier to efficient lighting was assigned a high rating for this group.

**Exhibit 4-7  
Existing HVAC Retrofit Market  
Barriers**

Measure-Specific Market Actors		Barriers											
		High Initial Cost	Info/Search Costs	Market Uncertainty	Transaction Costs	Performance Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Asymmetric Information	Svc./Product Unavailability	Access to Financing
Manufacturers		4	2	4				1					
Distributors		4	2	4				2	1	1			
Contractors	Measure-Specific	4	2									4	
	General	4	2	4									
Architects		4	1			1							
Building Inspectors			4					1					
Financiers		4	4			4							
Realtors					4								
Media			4	2									

**KEY**

Importance

4 High

2 Moderate

1 Low

Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.

Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.

Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.

All other barriers were classified as Low (i.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).

WHILE THERE IS LITTLE EVIDENCE OF SIGNIFICANT BARRIERS AT THE MANUFACTURING LEVEL, MANUFACTURERS DO FACE MARKET UNCERTAINTY IN LIGHT OF THEIR KNOWLEDGE OF BARRIERS THAT EXIST TO DOWNSTREAM MARKET ACTORS THAT CAN IMPEDE ACCESS TO EFFICIENT HVAC EQUIPMENT.

It should be noted that the ODC report—which was the source for the barriers section—did not rank barriers. The importance of each barrier was based on the narrative results from the ODC report.

- Almost all manufacturers believe the major barrier is the high incremental cost (market uncertainty) to the consumer of “stepping up” from equipment that just meets the Federal minimum requirements to more energy-efficient equipment (consumer willingness to “step up” SEER varies widely by climate zone). Several manufacturers state that customer awareness of benefits does exist, but savings are modest and paybacks are longer in California than in other parts of the country.
- Several manufacturers state that another major barrier is that overall consumer awareness of energy-efficient HVAC products is low (bounded rationality). Furthermore, there seems to be a discrepancy between customer attitudes and behaviors.
  - “Most people do not even maintain their furnaces or air conditioners until they have a problem . . . furnaces and air conditioners are out of sight and out of mind.”
  - “Consumers say they are interested in energy efficiency and reliability, but they do not buy energy-efficient products.”
- Manufacturers also believe, in general, that there is little knowledge of energy efficiency and how to sell energy-efficient units (information/search costs) among distributors’ and contractors’ sales staff, with some exceptions among larger companies.
- Contractor development (organizational practice) also appears to be a common barrier. Contractors are very independent and it is hard to get them to training and business development sessions. Some manufacturers are offering their dealers development support.

**Exhibit 4-8**  
**Existing HVAC Retrofit Market**  
**Barriers\***

Measure-Specific Market Actors	Barriers											
	High Initial Cost	Info/Search Costs	Market Uncertainty	Transaction Costs	Performance Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Asymmetric Information	Svc./Product Unavailability	Access to Financing
<b>MANUFACTURERS</b>	4	2	4				1					
Distributors	4	2	4				2	1	1			
Contractors	Measure-Specific	4	2								4	
	General	4	2	4								
Architects	4	1			1							
Building Inspectors		4					1					
Financiers	4	4			4							
Realtors				4								
Media		4	2									

**KEY**

Importance

4 High

2 Moderate

1 Low

\* Barriers for text in **BOLD CAPS** are discussed in the text below.

Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.

Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.

Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.

All other barriers were classified as Low (i.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).

**DISTRIBUTORS ARE GENERALLY WELL INFORMED ABOUT THE BENEFITS AND COSTS OF EFFICIENT HVAC PRODUCTS, BUT THEY, TOO, FACE THE MARKET UNCERTAINTY BARRIER.**

- Most distributors are in agreement with manufacturers that the major barrier is the high incremental cost (market uncertainty) of “stepping up” from equipment that just meets the Federal minimum requirements to more energy-efficient equipment.
  - One distributor estimates payback (to go from a SEER 10 to a 12 or 13) in California at 5 to 6 years. Another says payback is longer than 10 years, particularly in the more moderate Northern California climates.
  - Yet another distributor flatly says “investment return on higher SEER is not there unless the units are rebated.”
- Low consumer awareness (information/search cost was also cited by many distributors. One distributor indicates that customers rely on a contractor for information on the type of air conditioner to purchase. “It’s an intangible product, not a necessity. It is not a ‘fun purchase.’ The customer relies on a contractor for the information and ‘education’ they need to make a purchase.”
- Decisions regarding distributor stocking of high-efficiency HVAC equipment have been complicated by the influence of utility rebate programs. Since contractor demand for HE units has historically been created by such programs, changes in residential programs over the past several years have made ordering and stocking decisions more difficult.

- Organizational practices are a moderately important barrier in the HVAC market.
  - In general, distributors believe there is little knowledge of energy efficiency and how to sell energy-efficient units among the contractors' sales staff.
    - .. Contractors are entrenched in their old ways and reluctant to learn new things.
    - .. There is a lack of education and training on how to overcome the price objection.
    - .. There is a high turnover in staff because selling air conditioning equipment is seasonal in the Central Valley.
  - Contractor behavior also comes into play with distributors' barriers, in that they believe contractors have to sell with low bids and are wary of trying to "up-sell."
    - .. One distributor characterized contractors' sales practices: "Selling better value is too much of a challenge, especially when they are busy.
    - .. Thus, high-efficiency sales drop off during the peak seasons when they are busy, and when most units are replaced."
- Distributors also cite misplaced incentives barriers created by the mobility of the California population, and the lack of sales approaches that address that problem.
  - Because of the high mobility—and short average tenure in one home—of California homeowners, consumers are reluctant to invest extra money when they are unsure if they will be in that home long enough to reap the energy savings.
  - Several distributors cited the lack of specific sales and marketing approaches that can be used to show which benefits can be realized, depending on how long the owner expects to remain in the home.

- Bounded rationality barriers appear to exist in this market in that several distributors identified the common “piece-by-piece” approach to replacement and installation of HVAC equipment as a major barrier to achieving “true” energy efficiency.
  - “Consumers are paying for energy-efficient equipment, but usually are only replacing the outdoor unit—not the indoor coil.”
  - “Duct leakage is also a big problem that is not addressed.” This distributor also added that one manufacturer was addressing air leakage by tightening up the seals on furnace doors. This will have noticeable effects wherever furnaces are installed in unheated parts of a home—such as in California.



**Exhibit 4-9**  
**Existing HVAC Retrofit Market**  
**Barriers\***

Measure-Specific Market Actors	Barriers											
	High Initial Cost	Info/Search Costs	Market Uncertainty	Transaction Costs	Performance Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Asymmetric Information	Svc./Product Unavailability	Access to Financing
Manufacturers	4	2	4				1	4				
<b>DISTRIBUTORS</b>	4	2	4				2	1	1			
Contractors	Measure-Specific	4	2								4	
	General	4	2	4								
Architects	4	1			1							
Building Inspectors		4					1					
Financiers	4	4			4							
Realtors				4								
Media		4	2									

**KEY**

Importance

4 High

2 Moderate

1 Low

\* Barriers for text in **BOLD CAPS** are discussed in the text below.

Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.

Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.

Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.

All other barriers were classified as Low (i.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).

IN ADDITION TO THE HIGH INCREMENTAL COST OF ENERGY-EFFICIENT EQUIPMENT, A SHORTAGE OF QUALIFIED, WELL-TRAINED TECHNICIANS WAS IDENTIFIED AS A SERIOUS BARRIER TO INCREASING THE MARKET SHARE OF ENERGY-EFFICIENT HVAC EQUIPMENT.

- A serious barrier to improving energy efficiency is the shortage of qualified, well-trained personnel across the HVAC industry (service unavailability). The shortage of technicians affects the quality of service and repair work and limits some contractors from offering maintenance services.
  - The use of inadequately trained installers results in lower efficiency of completed systems, even if energy-efficient equipment is purchased.
  - Connecting good equipment to old, leaky ducts; not charging air conditioning systems with the proper quantity of refrigerant; not ensuring proper airflow and temperature drop across the indoor coil and other mistakes result in serious loss of efficiency.
- Information/search cost barriers exist in that owners and sales people with inadequate training in efficiency improvement options do not offer customers the best options for their circumstances. Nor do they present all of the benefits of some options, thus keeping customers from making fully informed choices.

**Exhibit 4-10**  
**Existing HVAC Retrofit Market**  
**Barriers\***

Measure-Specific Market Actors		Barriers											
		High Initial Cost	Info/Search Costs	Market Uncertainty	Transaction Costs	Performance Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Asymmetric Information	Svc./Product Unavailability	Access to Financing
Manufacturers		4	2	4				1	4				
Distributors		4	2	4				2	1	1			
<b>CONTRACTORS</b>	<b>MEASURE-SPECIFIC</b>	4	2									4	
	General	4	2	4									
Architects		4	1			1							
Building Inspectors			4					1					
Financiers		4	4			4							
Realtors					4								
Media			4	2									

**KEY**

Importance

4 High

2 Moderate

1 Low

\* Barriers for text in **BOLD CAPS** are discussed in the text below.

Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.

Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.

Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.

All other barriers were classified as Low (i.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).

FOR GENERAL CONTRACTORS, LACK OF KNOWLEDGE APPEARS TO BE A BARRIER BOTH TO SPECIFYING AND PROMOTING ENERGY-EFFICIENT HVAC EQUIPMENT.

- The most common barrier to energy-efficient equipment cited by this group of market actors was first cost.
- While general contractors are, by definition, capable of providing a whole-house approach to energy efficiency, few actively promote efficient HVAC equipment, and even fewer pursue energy-efficiency opportunities beyond the immediate project for which they have been hired. Market uncertainty, in the form of perceptions regarding the importance of energy efficiency to home owners who are undertaking retrofit project, appears to be the primary barrier.
- General contractors are less likely to be able to accurately define what constitutes energy-efficient HVAC equipment (information/search cost), with only four of the 17 general contractors interviewed having knowledge of SEER ratings. Three of the four defined energy efficient as 10 or 11 SEER and only one defined it as 12 SEER.

**Exhibit 4-11**  
**Existing HVAC Retrofit Market**  
**Barriers\***

Measure-Specific Market Actors	Barriers											
	High Initial Cost	Info/Search Costs	Market Uncertainty	Transaction Costs	Performance Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Asymmetric Information	Svc./Product Unavailability	Access to Financing
Manufacturers	4	2	4				1	4				
Distributors	4	2	4				2	1	1			
<b>CONTRACTORS</b>	Measure-Specific	4	2								4	
	<b>GENERAL</b>	4	2	4								
Architects	4	1			1							
Building Inspectors		4					1					
Financiers	4	4			4							
Realtors				4								
Media		4	2									

**KEY**

Importance

4 High

2 Moderate

1 Low

\* Barriers for text in **BOLD CAPS** are discussed in the text below.

Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.

Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.

Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.

All other barriers were classified as Low (i.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).

**ARCHITECTS AND OTHER MARKET ACTORS WHO ARE LESS DIRECTLY INVOLVED IN THE MARKET MAY NEVERTHELESS FACE BARRIERS THAT IMPEDE THEIR ABILITY TO FACILITATE THE ADOPTION OF HIGHER EFFICIENCY HVAC PRODUCTS IN RETROFIT APPLICATIONS.<sup>11</sup>**

- Architects face relatively few barriers to the specification of energy-efficient models. Availability, performance, and installation requirements were not perceived to be problems by architects. Only cost was seen as a significant barrier, while doubts about energy savings and lack of information on the benefits of energy-efficient equipment were a minor concern.
- Barriers faced by other enabling market actors include the following.
  - Building inspectors play a significant role in ensuring that Title 24-compliant HVAC equipment is specified and installed in major remodeling projects or additions. In the past, some inspectors say, they frequently found lower than specified efficiency equipment installed, but this problem has largely disappeared.
  - Financiers sometimes provide energy-efficient financing for HVAC equipment as part of an EEM, but are often unable to do so because the high cost of the equipment makes it difficult to meet the requirement of positive cash flow from savings. Central air conditioners and furnaces are, however, sometimes incorporated into a loan package in combination with low cost, high impact measures such as duct sealing, insulation, and compact fluorescent lighting.
  - Realtors are reluctant to promote energy-efficient mortgages for HVAC equipment (or any other application) because of the associated transaction cost; i.e., the fear that the settlement process may be delayed.
  - Finally, the most significant barriers to media promotion of energy-efficient HVAC equipment include lack of information and concerns about the receptivity of readers/viewers to articles or other coverage, since there have been few “newsworthy” advances in energy-efficient HVAC technology recently.

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<sup>1</sup> Opinion Dynamics Corp., *PG&E HVAC Market Transformation Report*, May 1999, pp. 18-21.

<sup>2</sup> Ibid.

<sup>3</sup> Opinion Dynamics Corp., *PG&E HVAC Market Transformation Report*, pp. 13-18.

<sup>4</sup> The market share of high-efficiency equipment varies by climate zone, as can be seen in Exhibit 4-2.

<sup>5</sup> E-Source, *Space Cooling and Air Handling Technology Atlas*, 1997.

<sup>6</sup> *The Air Conditioning, Heating, and Refrigeration News (The News)*, Business News Publishing, Co., 1998.

<sup>7</sup> E-Source, *Space Cooling and Air Handling Technology Atlas*.

<sup>8</sup> Opinion Dynamics Corp., *PG&E Residential HVAC Contractor Report*, pp. 7-12.

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<sup>9</sup> Ibid.

<sup>10</sup> Dun and Bradstreet's MarketPlace CD-ROM, April-June 1999, iMarket, Inc.

<sup>11</sup> It should be noted that the barriers for enabling market actors are the same for all measures.

**Exhibit 5-1**  
**Current Residential Retrofit Market in PG&E's Service Territory**  
**Status of Integrated Discretionary Retrofit Actions**  
**Total 1998 Market Size = \$1.1 Billion**  
**(Percentage of Total Expenditures)**

Category	Action		Kitchen Equipment*		Lighting	TOTAL
	Windows	HVAC Replacement	Refrigerator	Dishwasher		
% of Total Sales	48%	30%	11%	4%	6%	100%
Individual Versus Multiple Actions						
% Individual Actions						61%
% Multiple Actions						39%
Whole House	4	4	4	4	4	2%
Windows+HVAC	4	4				6%
All Kitchen			4	4		5%
Windows+Refrigerator	4		4			3%
Windows+Lighting	4				4	3%
Windows+Dishwasher	4			4		3%
Other Combinations						17%

\*The kitchen remodel market, estimated at \$6.4 Million for 1998 in PG&E Service Territory, has not been included because it includes many non-energy-related items.



THE KITCHEN REMODELING MARKET IS PROFILED FROM A SUPPLY-SIDE PERSPECTIVE IN THIS SECTION, DRAWING UPON BOTH SECONDARY DATA SOURCES AND THE RESULTS OF INTERVIEWS WITH KEY MARKET ACTORS WHO PARTICIPATE IN OR INFLUENCE THIS MARKET.

- The reader should keep in mind that the wide range of supply-side market actors surveyed for this market characterization limited sample sizes for specific actor segments; please see Exhibit 1-4 for the number of interviews by segment.
- Secondary data reviewed for the analysis of the kitchen appliance market include Dun & Bradstreet (D&B) data, PG&E data, other evaluations and planning documents, publications of national and regional trade associations, and government statistics, as detailed in the end notes to this section.
- Primary data sources, summarized previously in Exhibit 1-4 and described in detail in the data collection section, consisted of surveys/interviews with market actors involved in the kitchen appliance market. These market actors included both groups specializing in kitchen appliances and remodeling, and groups who are involved with kitchen appliances and remodeling as part of their broader participation in the market.
- The remainder of this section is organized as follows:
  - The overall importance to the retrofit and renovation market of the kitchen appliances with the highest levels of energy usage (refrigerators and dishwashers) is discussed. The potential for enhancements in energy efficiency in these two major kitchen appliances is also discussed.
  - Characteristics of major groups of market actors in the kitchen retrofit market are then analyzed, and the implications of those characteristics for energy-efficient kitchen renovations and whole-house solutions are discussed.
  - Finally, barriers to energy efficiency for each market actor group, based on the results of primary data collection, are presented.

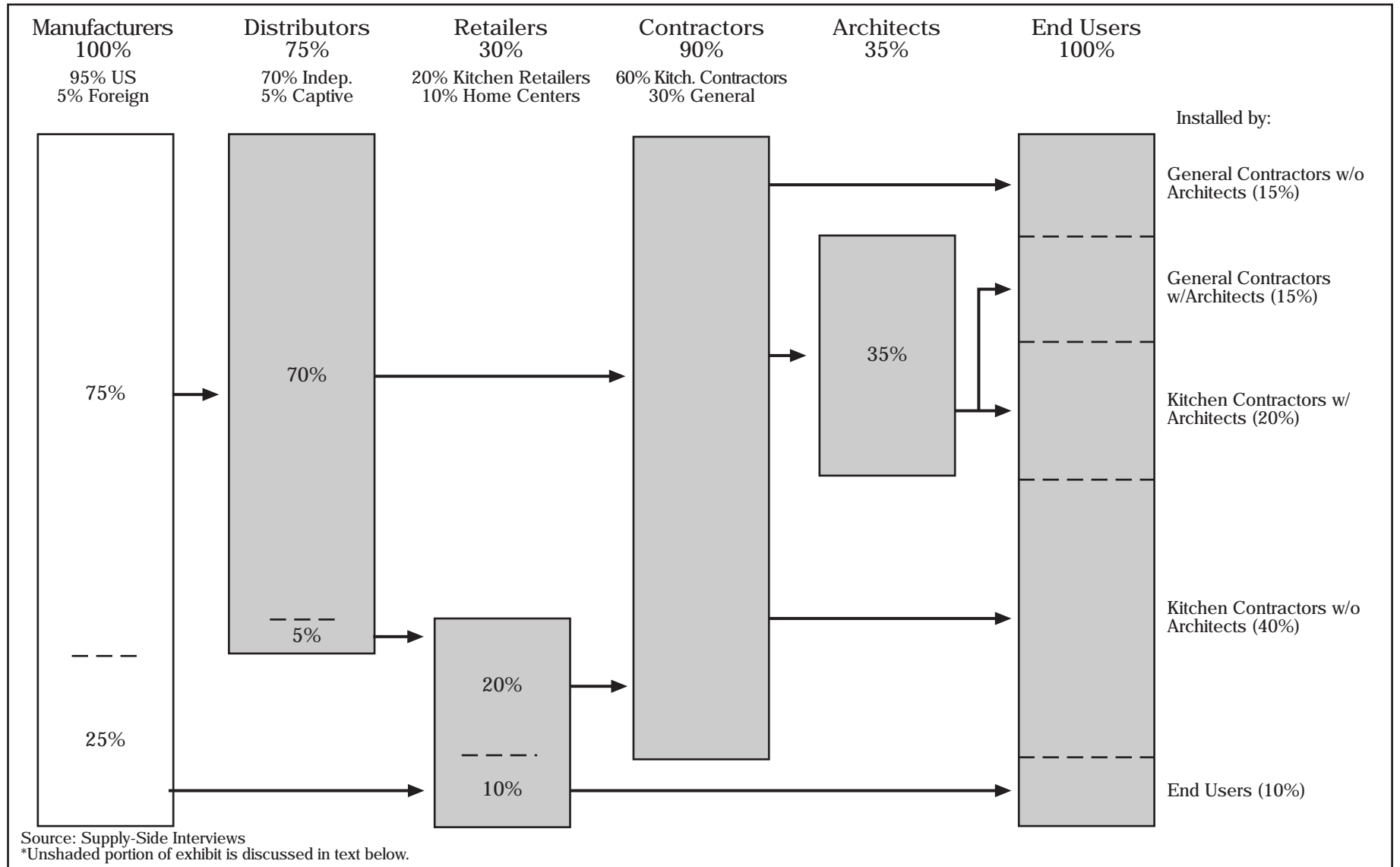
ALTHOUGH REFRIGERATORS AND DISHWASHERS ARE LESS IMPORTANT—IN TERMS OF TOTAL ANNUAL SALES REVENUE IN PG&E'S SERVICE TERRITORY—THAN WINDOWS AND HVAC IN THE RETROFIT AND RENOVATION MARKET, THERE ARE STILL SUBSTANTIAL OPPORTUNITIES AVAILABLE FOR INCREASES IN ENERGY EFFICIENCY.

- As illustrated in the facing exhibit, analysis of end-user Baseline survey data reveals that 15 percent of the discretionary retrofit market in PG&E's service territory is made up of refrigerator (11 percent) and dishwasher (4 percent) replacements.
  - According to the 10 kitchen contractors surveyed, the refrigerator, dishwasher, and range or oven is replaced during the remodeling projects in over 90 percent of their kitchen remodeling projects.
  - Even over all remodeling efforts by general contractors and architects, refrigerators and dishwashers are replaced in over half of their projects.
- Three percent of the respondents to the end-user Baseline survey indicated that they have remodeled their kitchens in the past year, spending an average of \$9,250 on the remodeling. The purchase of specific replacement appliances is also a significant investment for the customer. Kitchen contractors report that customers spend \$500 on average per appliance and \$3,500 for all the appliances in the kitchen.

- There are opportunities for significant increases in the efficiency of kitchen appliances. Regarding the two highest usage kitchen appliances, refrigerators and dishwashers:
  - The refrigerator uses the most electricity of all kitchen appliances, accounting for as much as 15 percent of a home's total energy usage.<sup>1</sup> ENERGY STAR® refrigerators exceed minimum federal standards by 20 percent.<sup>2</sup> Replacing a ten-year old 19 cubic foot refrigerator with an energy-efficient refrigerator of the same size can save \$100 a year in energy costs in PG&E's service territory.<sup>3</sup>
  - Dishwashers use 1.4 percent of total residential energy.<sup>4</sup> The average dishwasher costs around nine cents per load plus 37 cents per load for hot water from an electric water heater or 10 cents per load for hot water from a natural gas water heater.<sup>5</sup> An ENERGY STAR® dishwasher exceeds the minimum federal standards by at least 13 percent.<sup>6</sup>

THE MANUFACTURERS, DISTRIBUTORS, RETAILERS, CONTRACTORS AND OTHER MARKET ACTORS WHO SHAPE THE KITCHEN REMODELING MARKET ARE DISCUSSED ON THE FOLLOWING PAGES.

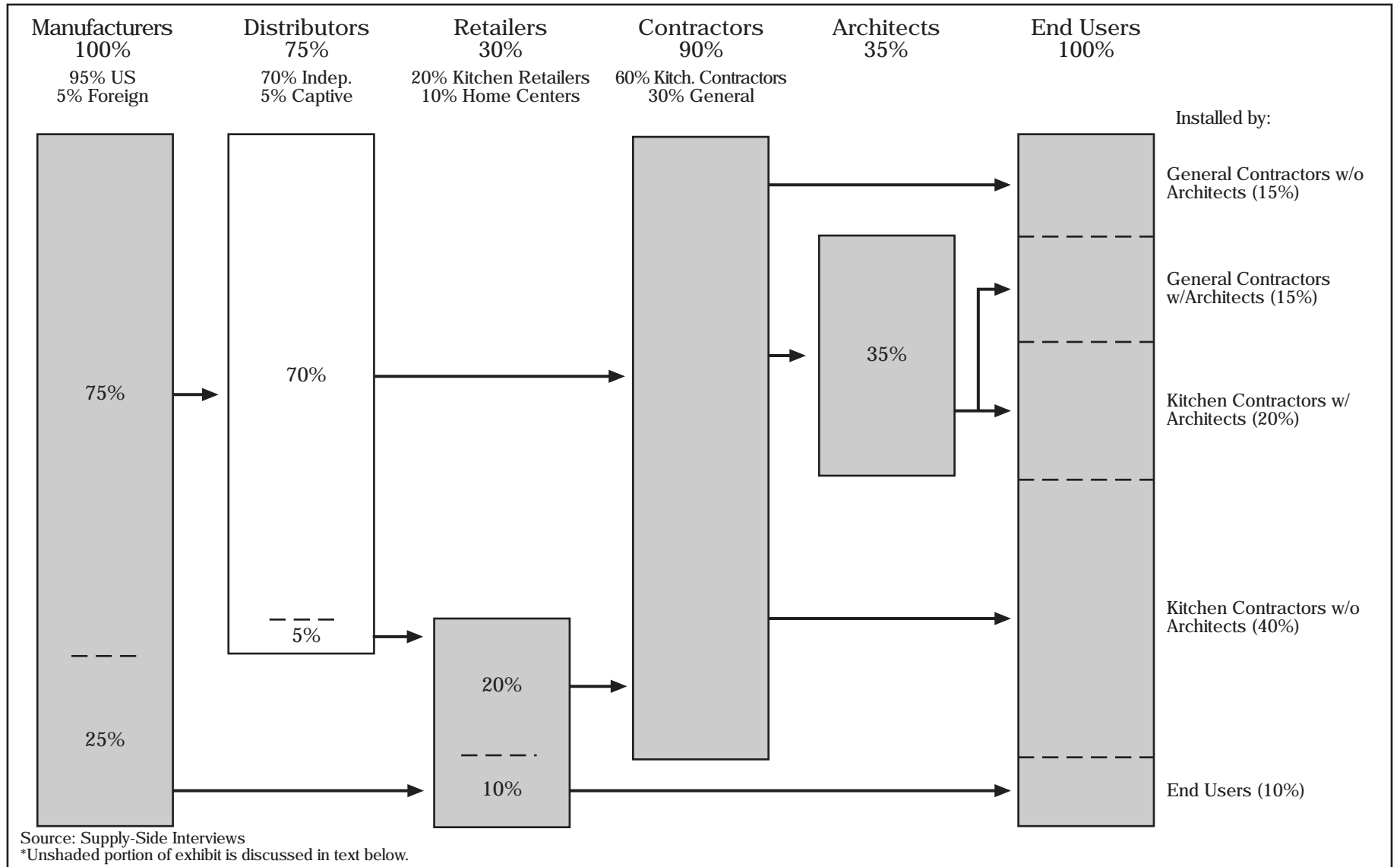
**Exhibit 5-2  
Kitchen Retrofit Market  
Current Market Flow\*  
(Percentage of Sales)**



A LARGE NUMBER OF MARKET ACTORS CAN BE INVOLVED IN THE KITCHEN REMODELING MARKET. THESE INCLUDE MANUFACTURERS, DISTRIBUTORS, AND RETAILERS IN THE WINDOW, LIGHTING, INSULATION, CABINET, FLOORING, AND APPLIANCE MARKETS—AS WELL AS CONTRACTORS, ARCHITECTS, INSPECTORS, AND FINANCIERS. THIS SECTION FOCUSES ON THE APPLIANCE MARKET—THE ENERGY USAGE ITEMS NOT COVERED IN OTHER AREAS OF THIS REPORT.

- The appliance market itself is a market with many market actors. According to D&B,<sup>7</sup> there are 40 appliance manufacturers, 300 distributors, and 1,400 appliance retailers nationwide. D&B lists 15 manufacturers, 22 distributors and 155 appliance retailers in PG&E's service territory.<sup>8</sup>
- Kitchen appliance manufacturers were not interviewed in conjunction with this study. Surveys from kitchen appliance distributors, retailers, and remodeling contractors were used to assess purchases from manufacturers.
  - Based on an analysis of survey information across market actors, it is estimated that manufacturers sell 75 percent of the appliances that are used in kitchen remodeling applications to distributors and 25 percent to kitchen appliance retailers.
  - The interviewed kitchen appliance distributors purchase their entire product from manufacturers, with 95% from US manufacturers and 5% from foreign manufacturers. Kitchen appliance retailers stated that they purchase 85% of their merchandise directly from manufacturers.

**Exhibit 5-3**  
**Kitchen Retrofit Market**  
**Current Market Flow\***  
**(Percentage of Sales)**



**DISTRIBUTORS OF KITCHEN APPLIANCES SELL ALMOST ALL THEIR PRODUCT TO CONTRACTORS.**

*Characteristics*

- Five of the 22 kitchen appliance distributors listed in PG&E's service territory by D&B were interviewed. The interviewed distributors are generally small businesses with an average on six employees. These kitchen distributors obtain 85 percent of their business from the sale of residential kitchen appliances.
- Most (4 of the 5) of the interviewed appliance distributors sell water heaters and bathroom fixtures as well as kitchen appliances.
  - All the appliance distributors offer refrigerators, dishwashers, ranges, and ovens. Most (three of the five interviewed) also offer sinks/disposals, microwaves and cabinets.
  - None of the appliance distributors promoted other products in the residential renovation markets (windows, lighting, HVAC, ducts, etc.).

*Distribution of Purchases and Sales*

- Appliance distributors stated they sell 90 percent of their kitchen appliances to contractors, with 60 percent going to kitchen remodeling contractors and 30 percent going to general contractors. Retailers, according to the surveys, purchase the remainder of distributors' sales with 20 percent sold to kitchen appliance retailers and 10 percent to home centers.

**Exhibit 5-4**  
**Customer Purchase Criteria, According to Market Actors\***

	Kitchen Appliance Distributors	Kitchen Appliance Retailers	Kitchen Remodeling Contractors	General Contractors**	Architects**
Price	2	2	4	4	4
Contractor Reputation	2	4	1	2	2
Energy Efficiency	2	2	2	2	2
Brand	4	2	4	2	1
Reliability	4	4	4	4	4
Style	2	4	4	4	2
Access to Financing	1	1	2	1	1
How Quickly You Can Install	1	1	1	1	1
Warranty	4	1	2	2	1

Source: Supply-Side Interviews

\* Unshaded portion of exhibits is discussed in text below.

\*\* General contractors and architects were asked to rank purchase criteria in general, not for specific measures.

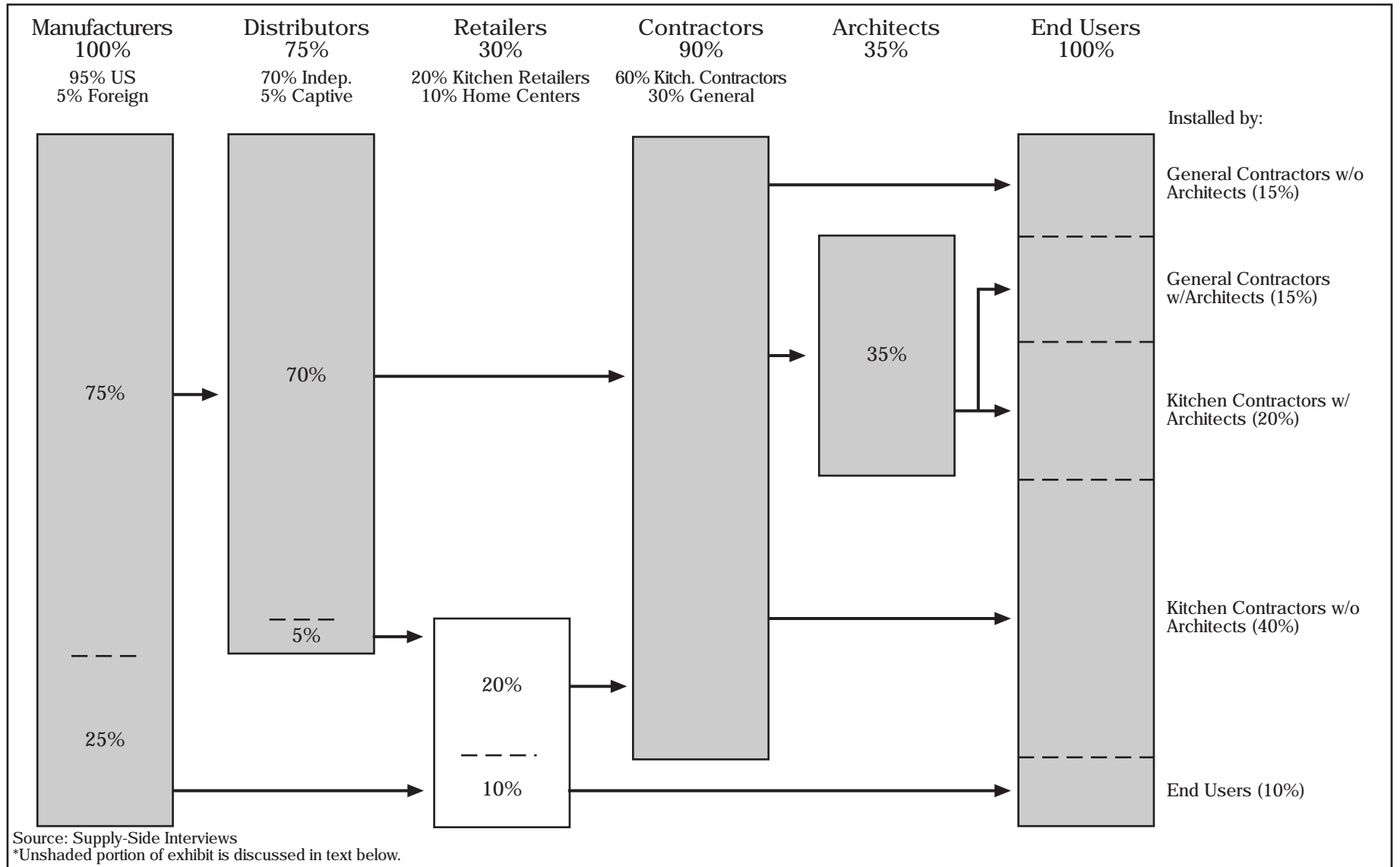
<b>KEY</b>
4 most important
2 somewhat important
1 less important



*Role of Energy Efficiency*

- Distributors surveyed claim that, on average, just over 70 percent of refrigerators are energy efficient. However, when asked how they define energy efficient only two of the five mentioned ENERGY STAR®. The two distributors reporting ENERGY STAR® as their criteria reported a lower percentage of energy-efficient refrigerator sales, with energy-efficient refrigerators being 50-60 percent of sales. The other three distributors use California Standards or the existence of Department of Energy labels as indicative of energy efficiency.
- One distributor claims to discuss energy-efficient equipment options in all sales situations. Three say they discuss it in most sales situations and the remaining distributor discusses it in some sales. Three of the five kitchen appliance distributors say their company receives no benefits from promoting or selling energy-efficient equipment.
- Energy efficiency was not perceived to be among the most important criteria by which customers select kitchen appliances.
  - All of the interviewed kitchen appliance distributors cited brand, reliability, and warranty as very important purchase criteria for customers.
  - Energy efficiency was rated very important by 2 respondents and received the mid-rating of somewhat important by the other 3 distributors.
  - Access to financing and how quickly the appliances could be installed were significantly less important.

**Exhibit 5-5**  
**Kitchen Retrofit Market**  
**Current Market Flow\***  
**(Percentage of Sales)**



KITCHEN APPLIANCE RETAILERS ARE A SMALL PORTION OF THE MARKET, SELLING APPLIANCES TO BOTH CONTRACTORS AND DIRECTLY TO END-USERS.

### *Characteristics*

- The five kitchen appliance retailers interviewed are small businesses employing from 5-21 employees. These retailers only offer kitchen appliances, water heaters, and clothes washers and dryers. Representatives of larger chain stores were not interviewed as part of this characterization.
- The appliance retailers interviewed sold only kitchen appliances and water heaters.
  - All of the interviewed the appliance retailers offer refrigerators, dishwashers, microwaves, disposals, ranges, and clothes washers and dryers. Most (three or four of the five interviewed) also offer sinks, ovens, and water heaters.
  - None of the appliance retailers were in the other residential renovation product markets nor promoted any of them (windows, doors, siding, lighting, HVAC, roofing, ducts, etc.).

### *Distribution of Purchases and Sales*

- Kitchen appliance retailers purchase 85 percent of their merchandise directly from manufacturers and the remaining 15 percent from multi-line distributors. Their purchases from manufacturers constitute 25 percent of manufacturers' sales in this market.
- Kitchen appliance retailers sell to contractors and directly to end-users.

**Exhibit 5-6**  
**Customer Purchase Criteria, According to Market Actors**

	Kitchen Appliance Distributors	Kitchen Appliance Retailers	Kitchen Remodeling Contractors	General Contractors**	Architects**
Price	2	2	4	4	4
Contractor Reputation	2	4	1	2	2
Energy Efficiency	2	2	2	2	2
Brand	4	2	4	2	1
Reliability	4	4	4	4	4
Style	2	4	4	4	2
Access to Financing	1	1	2	1	1
How Quickly You Can Install	1	1	1	1	1
Warranty	4	1	2	2	1

Source: Supply-Side Interviews

\* Unshaded portion of exhibits is discussed in text below.

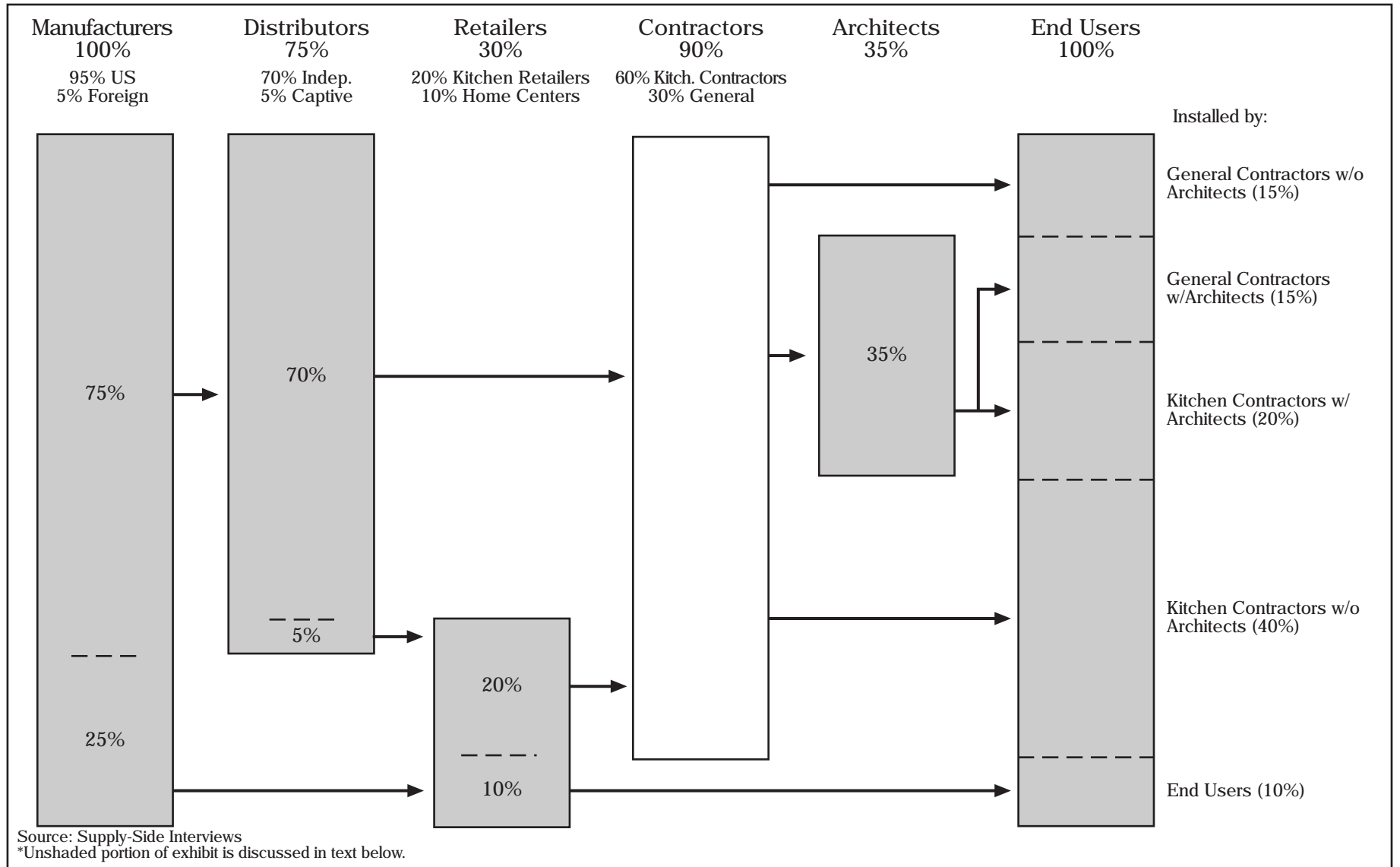
\*\* General contractors and architects were asked to rank purchase criteria in general, not for specific measures.

<b>KEY</b>
4 most important
2 somewhat important
1 less important

*Role of Energy Efficiency*

- When asked their criteria for determining whether refrigerators are energy efficient, two of the five interviewed retailers stated that ENERGY STAR® was the criteria used, while the others mentioned the PG&E guide, the Department of Energy Cost Labels, and manufacturer stickers.
- Two kitchen contractors claim to discuss energy-efficient equipment options in all sales situations while two said they mentioned energy efficiency in very few sales situations. On average, three-fourths of sales discussions are said to include energy-efficiency discussions. Recall, however, that only two of the retailers mentioned ENERGY STAR® during the survey.
- Benefits from promoting or selling energy-efficient equipment ranged from none to saving the planet with the customer getting a better deal. In between responses included: the benefit of the sale, customer satisfaction, and higher profit margins because customer may be willing to spend more.
- Similar to distributors, retailers did not list energy efficiency among the most important criteria by which customers select kitchen appliances.
  - The most important criteria were reliability, style and contractor reputation.
  - Energy efficiency, along with price and brand, were thought to be somewhat important.
  - Purchase criteria perceived as less important to customers included access to financing, time required for installation, and availability of warranties.

**Exhibit 5-7  
Kitchen Retrofit Market  
Current Market Flow\*  
(Percentage of Sales)**



**KITCHEN REMODELING CONTRACTORS ARE INVOLVED IN APPROXIMATELY 60 PERCENT OF KITCHEN RETROFITS.**

*Characteristics*

- The 10 kitchen remodelers interviewed only work on kitchens or kitchens and baths. These are small businesses with, on average, four employees. They primarily serve single-family detached urban markets where the customers are remodeling to modernize their kitchens.
- Kitchen remodeling contractors interviewed focus either on kitchen remodeling solely or on kitchen and bath remodeling. The focus on kitchen remodeling only by kitchen remodeling contractors is seen in the appliances' replaced in their jobs and their interaction with other types of opportunities.
  - Kitchen remodeling contractors replace refrigerators, dishwashers, and ovens/ranges in over 90 percent of their jobs (compared to just over half of the general contractor and architects' projects).
  - In contrast, kitchen remodeling contractors only see replacement of cooling and/or heating equipment in 10 percent of their jobs as compared to 85 percent of general contractors' jobs or 50 percent of architects' jobs.
  - Kitchen remodeling contractors see 50 percent of the jobs including replacing lighting versus 80 percent for architects and 90 percent for general contractors and 80 percent for architects.
  - Approximately 40 percent of kitchen remodelers' jobs have window replacements, less than half the proportion seen by general contractors (80 percent) or architects (90 percent).

**Exhibit 5-8**  
**Customer Purchase Criteria, According to Market Actors**

	Kitchen Appliance Distributors	Kitchen Appliance Retailers	Kitchen Remodeling Contractors	General Contractors**	Architects**
Price	2	2	4	4	4
Contractor Reputation	2	4	1	2	2
Energy Efficiency	2	2	2	2	2
Brand	4	2	4	2	1
Reliability	4	4	4	4	4
Style	2	4	4	4	2
Access to Financing	1	1	2	1	1
How Quickly You Can Install	1	1	1	1	1
Warranty	4	1	2	2	1

Source: Supply-Side Interviews

\* Unshaded portion of exhibits is discussed in text below.

\*\* General contractors and architects were asked to rank purchase criteria in general, not for specific measures.

Note: Market actors were asked to classify the consumer purchase criteria as either very important, moderately important, or not at all important. Values were then assigned to the responses, where very important=1, moderately important=2, and not at all important=3. Average values were then calculated for the criteria across market actor responses. Values of 1.0-1.5 were classified as most important, 1.6-2.0 as somewhat important, and 2.1-3.0 as less important.

<b>KEY</b>
4 most important
2 somewhat important
1 less important



### *Distribution of Purchases and Sales*

- According to the surveys, kitchen appliance contractors provide 60 percent of the kitchen appliances ultimately provided to consumers through kitchen remodeling projects.
- Kitchen remodeling contractors report working on jobs with specifications developed by an independent architect or designer approximately one-third of the time. For the other two-thirds, specifications are by their firm with specifications by the customer or general contractor about one-fifth of the time.
- All the kitchen remodelers work occasionally on residential jobs where someone is getting ready to sell their home or is a new buyer.

### *Role of Energy Efficiency*

- When asked what their criterion was to determine energy-efficient refrigerators, half of the kitchen remodeling contractors cited the Department of Energy Cost Labels and the other half said it was California Standards, with none citing ENERGY STAR®. This indicates limited awareness of energy efficiency among kitchen remodeling contractors. Yet, at least half they think are knowledgeable, as two stated they discuss energy efficiency in all sales situations and four claim to discuss it in some sales.
- Eight of the 10 kitchen remodeling contractors say their company receives no benefits from promoting or selling energy-efficient equipment. The other two claimed limited benefits.
- Energy efficiency was not perceived to be a prime criterion by which customers select kitchen appliances.
  - Style, brand, reliability, and price are very important to customers according to the interviewed kitchen remodeling contractors.
  - Energy efficiency, access to financing, and warranty are believed to be somewhat important.
  - Kitchen remodeling contractors believe that warranty and contractor reputation are the least important criteria to customers when they select kitchen appliances.

**Exhibit 5-9**  
**Customer Purchase Criteria, According to Market Actors**

	Kitchen Appliance Distributors	Kitchen Appliance Retailers	Kitchen Remodeling Contractors	General Contractors**	Architects**
Price	2	2	4	4	4
Contractor Reputation	2	4	1	2	2
Energy Efficiency	2	2	2	2	2
Brand	4	2	4	2	1
Reliability	4	4	4	4	4
Style	2	4	4	4	2
Access to Financing	1	1	2	1	1
How Quickly You Can Install	1	1	1	1	1
Warranty	4	1	2	2	1

Source: Supply-Side Interviews

\* Unshaded portion of exhibits is discussed in text below (General Contractors), and on page 5-13 (Architects).

\*\* General contractors and architects were asked to rank purchase criteria in general, not for specific measures.

Note: Market actors were asked to classify the consumer purchase criteria as either very important, moderately important, or not at all important. Values were then assigned to the responses, where very important=1, moderately important=2, and not at all important=3. Average values were then calculated for the criteria across market actor responses. Values of 1.0-1.5 were classified as most important, 1.6-2.0 as somewhat important, and 2.1-3.0 as less important.

<b>KEY</b>
4 most important
2 somewhat important
1 less important

**GENERAL CONTRACTORS ACCOUNT FOR ABOUT 30 PERCENT OF THE KITCHEN APPLIANCES ULTIMATELY SOLD TO CONSUMERS IN THE REMODELING MARKET.**

*Characteristics*

- There are more than 2,000 general contractors in PG&E's service territory that specialize in residential remodeling.<sup>9</sup> Most general contractors who specialize in remodeling are small, averaging fewer than 5 employees.
- General contractors account for about one-third of the kitchen appliances ultimately sold to consumers in the remodeling market.

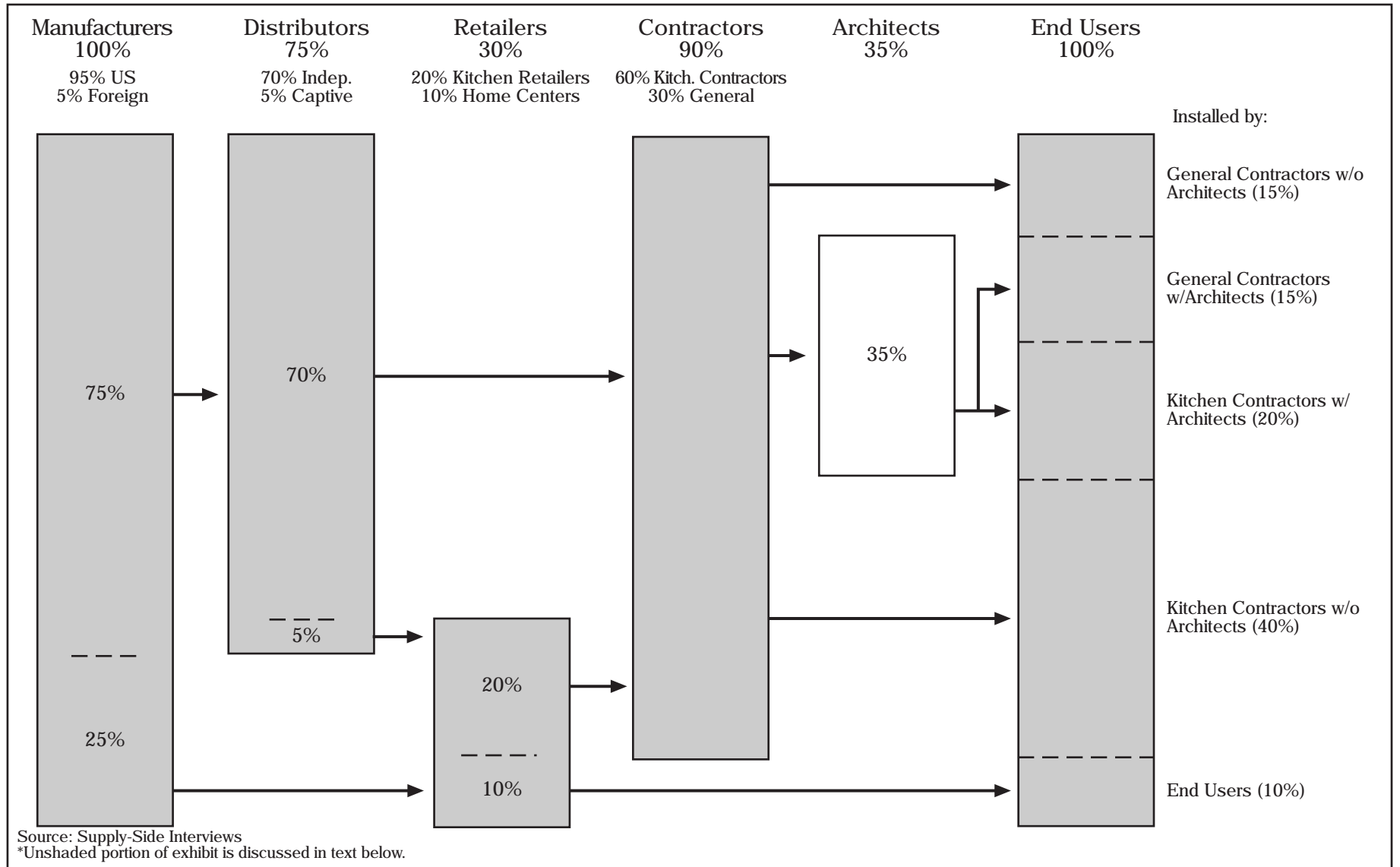
*Role of Energy Efficiency*

- General contractors do not perceive that energy efficiency is important to customers for remodeling projects.
  - Style, reliability, and price are very important to customers according to the interviewed general contractors.
  - Contractor reputation, energy efficiency, brand, and warranty are believed to be somewhat important.
  - These contractors believe that access to financing and ability for quick installation are the least important criteria to customers.

*Whole House Approach*

- According to the general contractors and architects interviewed, replacing appliances occur in most remodeling projects. Yet, these actors in the broader renovation market are less likely to point out or promote kitchen appliance changes, being only reactive to customer requests rather than proactive.
  - Refrigerators and dishwashers were replaced in approximately half of the jobs performed by both general contractors and architects.
  - However, only two of the 17 general contractors interviewed, and one of the 10 architects interviewed, point out kitchen appliance replacement possibilities.

**Exhibit 5-10**  
**Kitchen Retrofit Market**  
**Current Market Flow\***  
**(Percentage of Sales)**



ARCHITECTS ARE INVOLVED IN OVER ONE-THIRD OF THE KITCHEN APPLIANCES SOLD TO CONSUMERS IN THE REMODELING MARKET.

### *Characteristics*

- Most architectural firms who specialize in remodeling are small, averaging five employees.

### *Distribution of Purchases and Sales*

- Architects are involved in slightly over one-third of the kitchen appliances ultimately sold to consumers in the remodeling market. When end-users purchase kitchen appliances as they remodel their homes, 15 percent of the jobs are with general contractors and architects and 20 percent are with kitchen contractors that are using architects.

### *Role of Energy Efficiency*

- Architects do not perceive that energy efficiency is important to customers for remodeling projects.
  - Reliability and price are very important to customers according to the architects interviewed.
  - Energy efficiency, style, and contractor reputation are believed to be somewhat important.
  - Kitchen remodeling contractors believe that brand, warranty, quick installation, and access to financing are least important criteria to customers.

MARKET BARRIERS FACING KITCHEN APPLIANCE-SPECIFIC MARKET ACTORS (KITCHEN APPLIANCE DISTRIBUTORS, RETAILERS AND KITCHEN REMODELING CONTRACTORS) AND BARRIER PREVALENCE AND IMPORTANCE ARE DISCUSSED NEXT.

THE BARRIER ANALYSES PRIMARILY USED DATA COLLECTED THROUGH INTERVIEWS WITH EACH GROUP OF MARKET ACTORS.

The intensity of individual barriers was assessed (and is shown in the exhibits as low, moderate or high) using both qualitative and quantitative results. Where quantitative data were available and appropriate, results were mapped to barrier levels using the following general algorithm:

- Barriers rated as Very Important by at least 2/3 of respondents were classified as High.
- Barriers rated as Very Important by at least 1/3 but less than 2/3 of respondents were classified as Moderate.
- Barriers rated as Not At All Important by at least 1/2 of respondents were not considered barriers.
- All other barriers were classified as Low (i.e., barriers rated as Very Important by less than 1/3 of respondents and rated as Not At All Important by less than 1/2 of respondents).

In addition to the above quantitative criteria, however, qualitative results from open-ended questions were used to adjust the quantitative results and to assess barriers where more structured results were not available.

- Given the small sample sizes for many of the groups contacted, it was felt that spontaneous explanations by market actors of the obstacles they encounter or perceive were particularly valuable in determining the truly important market barriers.
- In addition, qualitative results were critical for determining measure-specific barriers for such market actors as general contractors and architects, who rated barriers to energy efficient measures in general rather than for individual measures. An example is the classification of Hidden Costs for general contractors. Based on the above criteria, this barrier would have been classified as Low for energy efficient measures in general. A number of general contractors pointed out, however, that customers do not like the quality of light from CFLs, install them only to meet Title 24, and often change them out within a short time. As a result, the Hidden Cost barrier to efficient lighting was assigned a high rating for this group.

**Exhibit 5-11**  
**Existing Kitchen Remodeling Market**  
**Barriers**

Measure-Specific Market Actors	Barriers							
	Value versus initial costs	Performance Uncertainty	Unseparable features/ Style	Information Search Costs	Access to Financing	Hassle/ Transaction Costs	Svc./Product Unavailability	Organizational Practices (Asymmetric Info. fo
Kitchen Appliance Distributors	4							
		4						
			2					
						2		
Kitchen Appliance Retailer				1				
			4			4		
		2						
				2				
Kitchen Remodeling Contractor							2	
	4							
		4						
			2					
			2					

**KEY**

Importance

4 High

2 Moderate

1 Low

Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.  
 Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.  
 Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.  
 All other barriers were classified as Low (i.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).

KITCHEN APPLIANCE DISTRIBUTORS SEE THEIR LARGEST BARRIER FOR SELLING ENERGY-EFFICIENCY EQUIPMENT IS THAT THE PERCEIVED VALUE IS NOT HIGH ENOUGH TO JUSTIFY THE INITIAL COSTS.

- Kitchen appliance distributors felt their biggest hurdle to selling energy-efficient equipment was that the equipment cost too much. This was followed by the fact that they have doubts as to the energy savings from energy-efficiency equipment (performance uncertainty). This translates into a barrier that the perceived value is not high enough to justify the initial costs.
- Distributors see the barrier of inseparability of features as a moderate barrier as there are concerns about the style of available energy-efficient appliances.
- Another moderate barrier seen by kitchen appliance distributors is hassle or transaction costs given they do not see enough demand to justify stocking. Distributors also indicated that they find energy-efficiency information somewhat difficult to find, resulting in information/search costs being listed as a barrier with relatively low importance.



**Exhibit 5-12**  
**Existing Kitchen Remodeling Market**  
**Barriers\***

Measure-Specific Market Actors	Barriers							
	Value versus initial costs	Performance Uncertainty	Unseparable features/ Style	Information Search Costs	Access to Financing	Hassle/ Transaction Costs	Svc./Product Unavailability	Organizational Practices (Asymmetric Info. for
<b>KITCHEN APPLIANCE DISTRIBUTORS</b>	4							
		4						
			2					
				1		2		
Kitchen Appliance Retailer			4			4		
		2						
				2				
							2	
Kitchen Remodeling Contractor	4							
		4						
			2					
				2				

**KEY**  
Importance  
4 High  
2 Moderate  
1 Low

\* Barriers for text in **BOLD CAPS** are discussed in the text below.

Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.

Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.

Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.

All other barriers were classified as Low (i.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).

THE MOST IMPORTANT UNDERLYING BARRIERS BEING SEEN BY APPLIANCE RETAILERS ARE HASSLE COSTS FOR INSTALLING HIGH-EFFICIENCY EQUIPMENT AND THE LACK OF AVAILABILITY OF ENERGY-EFFICIENT OPTIONS IN STYLES PREFERRED BY END USERS.

- Kitchen appliance retailers stated that the biggest obstacle facing energy-efficient kitchen appliances is that it is hard to install (resulting in high hassle/transaction costs to the installer). Yet, both distributors and kitchen contractors indicated no perceived difficulty in installing the equipment. Since retailers sell approximately one-third of their kitchen equipment directly to end users, the difficulty in installation could be a reaction to consumer frustration
- Another important barrier seen by appliance retailers is style. That is, energy-efficient appliances are not available in all styles demanded by consumers. It is the unseparable features of the appliances where a choice in style might preclude the ability to choose energy efficiency that is the problem. If all styles were available with energy-efficiency models, then style would not create a market barrier.
- Moderate barriers recognized by retailers include performance uncertainty, information costs, and unavailability. This includes the fact that retailers expressed some concerns about the reliability of energy-efficient appliances, doubt about energy savings, that information on energy efficiency is hard to find, and availability or supply of the equipment is a barrier.

**Exhibit 5-13**  
**Existing Kitchen Remodeling Market**  
**Barriers\***

Measure-Specific Market Actors	Barriers							
	Value versus initial costs	Performance Uncertainty	Unseparable features/ Style	Information Search Costs	Access to Financing	Hassle/ Transaction Costs	Svc./Product Unavailability	Organizational Practices (Asymmetric Info. fo
Kitchen Appliance Distributors	4							
		4						
			2					
				1		2		
<b>KITCHEN APPLIANCE RETAILER</b>			4			4		
		2						
				2				
							2	
Kitchen Remodeling Contractor	4							
		4						
			2					
				2				

**KEY**  
Importance  
4 High  
2 Moderate  
1 Low

\* Barriers for text in **BOLD CAPS** are discussed in the text below.  
Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.  
Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.  
Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.  
All other barriers were classified as Low (i.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).

**PERCEIVED VALUE VERSUS THE HIGHER INITIAL COST IS THE LARGEST BARRIER FOR KITCHEN REMODELING CONTRACTORS FACE WHEN SELLING ENERGY-EFFICIENT APPLIANCES.**

- As with distributors, kitchen remodeling contractors feel that energy-efficient equipment costs too much. Furthermore, they have doubts about its energy savings. There, perceived value versus the higher initial cost is the largest barrier seen by contractors. The uncertainty about energy savings also means that performance uncertainty is an important barrier. The moderate barrier of information search costs also contributes to their uncertainties about energy savings.
- Although not as important as it was to retailers, the limited features available on energy-efficient kitchen appliances is seen as a moderately important barrier by kitchen contractors.

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<sup>1</sup> Department of Energy Office of Codes and Standards, *Why Buy an Energy Efficient Refrigerator?* [www.eren.doe.gov/buildings/consumer\\_information/refrig/refwhy.html](http://www.eren.doe.gov/buildings/consumer_information/refrig/refwhy.html), June 1999

<sup>2</sup> Department of Energy and US Environmental Protection Agency, *EnergyStar Refrigerators*, [www.energystar.gov/products/refrigerators/](http://www.energystar.gov/products/refrigerators/), June, 1999.

<sup>3</sup> PG&E, *Major Appliance Energy Guide*, [www.pge.com/customer\\_services/residential/appliance/](http://www.pge.com/customer_services/residential/appliance/), June, 1999.

<sup>4</sup> Biermayer, Peter J. "Energy and Water Saving Potential of Dishwashers and Clothes Washers: An Update," *Proceedings of the 1996 ACEEE Summer Study for Energy Efficiency in Buildings*, 1996, p. 2.1.

<sup>5</sup> PG&E, *Major Appliance Energy Guide*.

<sup>6</sup> Department of Energy and US Environmental Protection Agency, *EnergyStar Dishwashers*, [www.energystar.gov/products/dishwashers/](http://www.energystar.gov/products/dishwashers/), June, 1999.

<sup>7</sup> Dun & Bradstreet, Marketplace CD, April-June 1999, iMarket Inc.

<sup>8</sup> The appliance manufacturers, distributors and retailers listed sell "major" kitchen appliances, that is, refrigerators, dishwashers and ranges.

<sup>9</sup> D&B, Marketplace CD.

**Exhibit 6-1**  
**Current Residential Retrofit Market in PG&E's Service Territory**  
**Status of Integrated Discretionary Retrofit Actions**  
**Total 1998 Market Size = \$1.1 Billion**  
**(Percentage of Total Expenditures)**

Category	Action		Kitchen Equipment*		Lighting	TOTAL
	Windows	HVAC Replacement	Refrigerator	Dishwasher		
% of Total Sales	48%	30%	11%	4%	6%	100%
Individual Versus Multiple Actions						
% Individual Actions						61%
% Multiple Actions						39%
Whole House	4	4	4	4	4	2%
Windows+HVAC	4	4				6%
All Kitchen			4	4		5%
Windows+Refrigerator	4		4			3%
Windows+Lighting	4				4	3%
Windows+Dishwasher	4			4		3%
Other Combinations						17%

\*The kitchen remodel market, estimated at \$6.4 Million for 1998 in PG&E Service Territory, has not been included because it includes many non-energy-related items.

IN THIS SECTION, THE LIGHTING RETROFIT MARKET IS PROFILED FROM A SUPPLY-SIDE PERSPECTIVE, DRAWING UPON BOTH SECONDARY DATA SOURCES AND THE RESULTS OF INTERVIEWS WITH KEY MARKET ACTORS WHO PARTICIPATE IN OR INFLUENCE THIS MARKET.

- The reader should keep in mind that the wide range of supply-side market actors surveyed for this market characterization limited sample sizes for specific actor segments; please see Exhibit 1-4 for the number of interviews by segment.
- Secondary data reviewed for the analysis of the lighting market include previous PG&E studies, other evaluations and planning documents, publications of national and regional trade associations, and government statistics, as detailed in the end notes to this section.
- Primary data sources, summarized previously in Exhibit 1-4 and described in detail in the data collection section, consisted of surveys/interviews with market actors involved in the lighting market. These market actors included both groups specializing in lighting (e.g., lighting manufacturers, distributors, retailers, and contractors) and groups who are involved with lighting as part of their broader participation in the market (e.g., general contractors, general retailers, EEM facilitators, and CHEERS raters.)
- The remainder of this section is organized as follows:
  - The overall importance of lighting in the context of the retrofit and renovation market is discussed.
  - Next, the current state of the market is summarized in terms of available energy efficient lighting technologies and the extent of their penetration of the market.
  - Characteristics of major groups of market actors are then analyzed, and the implications of those characteristics for energy efficient lighting and whole-house solutions are discussed.
  - Finally, barriers to energy efficiency for each market actor group, based on the results of primary data collection, are presented.

THE LIGHTING RETROFIT MARKET HAS THE POTENTIAL TO ACHIEVE ENERGY SAVINGS PRIMARILY THROUGH THE INSTALLATION OF FLUORESCENT LIGHTING TO REPLACE EXISTING INCANDESCENT LIGHTING STOCK.

- Nationwide, lighting represents about 9 percent of residential electricity use in the US.<sup>1</sup>
- As illustrated in the facing exhibit, lighting replacements are not a major component (6 percent) of the discretionary retrofit market in PG&E's service territory.
- According to contractors, over 90 percent of lighting replacements were planned; the remainder represents replacements of broken lighting equipment. Planned lighting retrofits are typically not undertaken at the time of sale; contractors say they only occasionally install lighting for customers who are planning to sell their home or buyers who have not yet moved in.
- According to EEM facilitators and CHEERS raters, while new lighting is not a sought-after measure among home buyers who have an audit performed as part of the application process for an EEM, the direct energy savings attributable to a lighting retrofit are generally sufficient to meet the criteria for the EEM.
  - One CHEERS rater said that home buyers are still reluctant to have compact fluorescent lamps (CFLs) installed outside of the kitchen. The main concern is that the light from CFLs is not as bright as the light from incandescent lamps.
  - Several EEM facilitators noted, however, that some home buyers are willing to have the lighting installed because it is a cost-effective measure that can allow for the installation of less cost-effective HVAC systems or windows as part of an overall package that meets the EEM requirements.

VARIOUS ASPECTS OF THE LIGHTING RETROFIT MARKET ARE DISCUSSED IN DETAIL ON THE FOLLOWING PAGES.

**CFL TECHNOLOGIES HAVE RECENTLY BEEN DEVELOPED TO ADDRESS CUSTOMER CONCERNS ABOUT THE APPEARANCE AND LIGHT QUALITY OF CFLS.**

- According to representatives of leading manufacturers interviewed at Lightfair 99, lighting manufacturers are most concerned about end-user opinions on the style and aesthetic qualities of CFLs. To address these concerns, manufacturers have recently introduced new CFL models for a wide variety of incandescent applications. Recent developments include:
  - CFLs that have the shape of incandescent lamps, offering a more familiar look to the end-user
  - CFLs that operate on standard 3-way sockets, equivalent to 3-way incandescent lamps
  - CFLs that operate on standard incandescent dimmers that are dimmable to 10 percent
  - CFL alternatives to halogen torchieres.
- Disappointment with the light output and quality from CFLs have been a big problem in residential applications, and continue to underlie negative perceptions of this technology.
  - According to contractors and architects, residential customers who are dissatisfied with CFLs typically cite insufficient brightness.
  - Wanda Jankowski (Contributing Editor), writing in *Architectural Lighting Magazine*, notes that “though color temperature and dimming capabilities have improved and electronic ballasts enable quieter operation, many homeowners still have doubts about the quality of light they will receive from fluorescents.”<sup>2</sup>
  - Some general contractors cited that homeowners eventually replace fluorescent lighting that was installed to meet Title 24 with incandescent lighting, especially in the bathroom, because they do not like the quality of light provided by the fluorescent lighting.



- According to E-Source, negative perceptions regarding CFL light output may be attributable to somewhat exaggerated performance claims made by CFL advocates and manufacturers that a 20 W CFL is equivalent to a 75 W incandescent lamp in light output. A 3-to-1 wattage equivalence between CFL and incandescent lamps, therefore, may be more appropriate for most applications than the 4-to-1 ratio typically claimed. In other words, rather than claiming that a 20 W CFL is equivalent to a 75 W incandescent lamp, a 20 W CFL should be recommended to replace a 60 W incandescent.<sup>3</sup>
  - Marketing literature distributed by leading manufacturers at Lightfair 99, however, continue to use a 4-to-1 ratio, recommending that a 15 W CFL replace a 60 W incandescent lamp, a 20 W CFL replace a 75 W incandescent lamp, and a 28 W CFL replace a 100 W incandescent lamp.
  - PG&E's *Energy Calculator* goes even further, comparing energy costs of a 22 W CFL with a 100 W incandescent lamp.<sup>4</sup>
- According to E-Source, CFLs take time to reach full light output, which may also contribute to dissatisfaction regarding light quality.<sup>5</sup>
  - Unlike incandescent lamps, which reach full light output immediately, CFLs reach peak light output after a few minutes, then descend again before reaching a peak after several hours.
  - CFLs installed in applications where lighting will only be used for brief periods, therefore, will not have time to reach their full output.

ALTHOUGH THE FIRST COST OF CFLS ARE HIGH COMPARED TO INCANDESCENT LAMPS, THE ENERGY SAVINGS AND LONGER LIFE OF CFLS YIELD REASONABLE PAYBACKS OVER THE LIFE OF THE CFL.

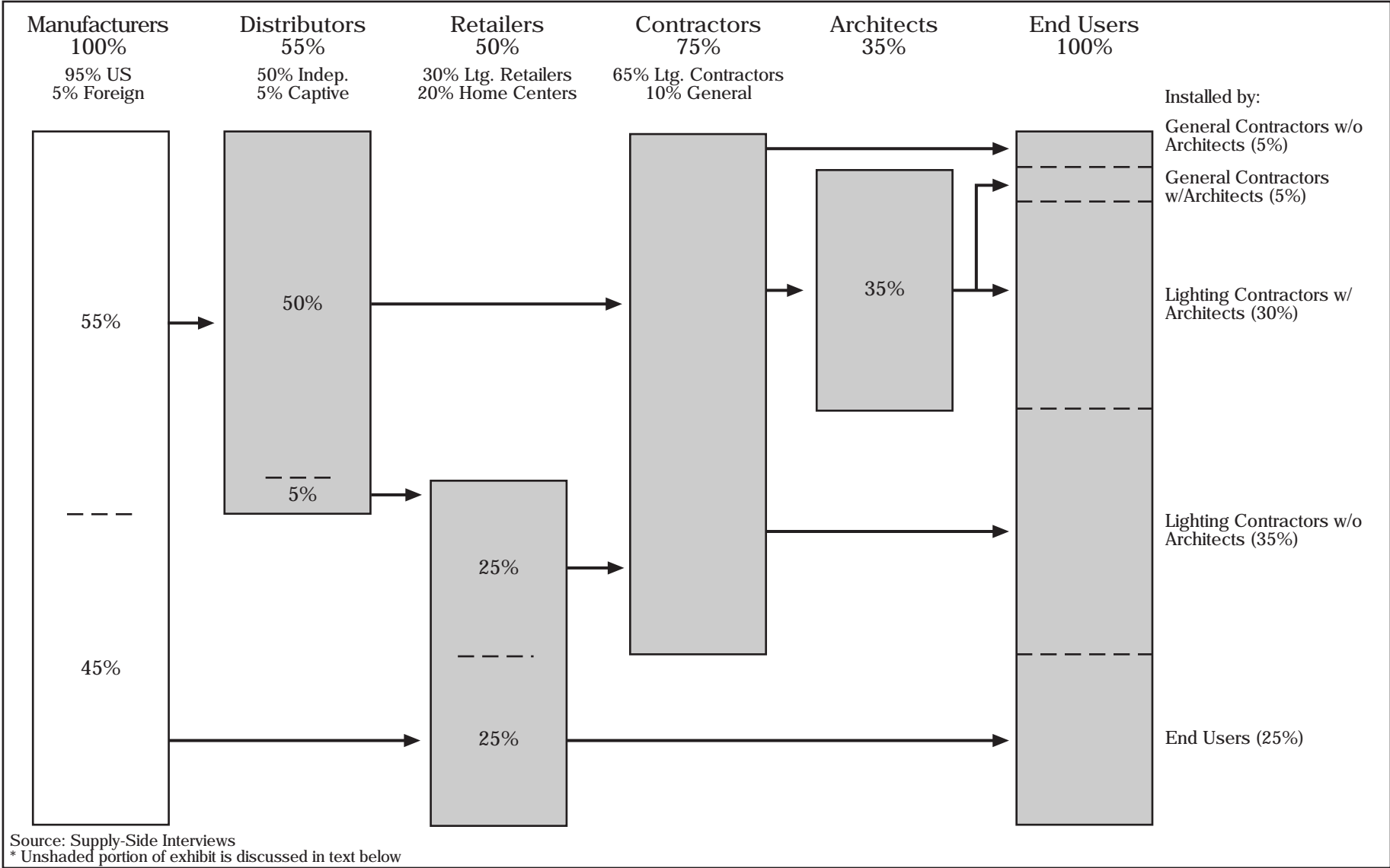
- Depending on the hours of operation, CFLs have a payback in the range of 1-5 years.
- Incremental costs of CFLs compared to incandescent lamps range from \$10-20 per lamp.<sup>6</sup>
  - Despite the relatively higher costs, CFLs can save 60-70 percent in energy costs compared to incandescent lamps – or about \$2 per year for each hour of daily operation when a 25 watt CFL replaces a 75 watt incandescent.<sup>7</sup>
- In addition, the typical lamp life for CFL is significantly higher than that for incandescent lamps, at 6,000-10,000 hours and 500-1,500 hours, respectively.<sup>8</sup>

**ALTHOUGH THE INSTALLATION OF CFLS HAS INCREASED, THE MARKET SHARE OF ENERGY-EFFICIENT LIGHTING IS STILL RELATIVELY LOW.**

- Title 24 requirements have contributed to the energy efficiency of lighting currently being installed in retrofit applications. Title 24 requirements, which are triggered on any retrofit/remodeling job that involves an addition of conditioned space, set minimum standards that require the installation of fluorescent lighting as the primary lighting source in kitchens and bathrooms.
- Lighting contractors, distributors, and retailers report sales of energy efficient lighting at 24 percent, 10 percent, and 5 percent of residential sales, respectively.
- According to E-Source, only about 15 percent of residential lighting fixtures in the US are fluorescent.<sup>9</sup>
- According to PG&E's Residential Energy Survey conducted in 1994, only 30 percent of PG&E's 4.3 million households have CFLs installed. The average number of CFLs per household is two, yielding approximately 2.6 million CFLs used in residential applications within PG&E's service territory.<sup>10</sup>

**THE MANUFACTURERS, DISTRIBUTORS, RETAILERS, CONTRACTORS, AND OTHER MARKET ACTORS WHO SHAPE THE LIGHTING RETROFIT MARKET ARE DISCUSSED ON THE FOLLOWING PAGES.**

**Exhibit 6-2**  
**Lighting Retrofit Market**  
**Current Market Flow\***  
**(Percentage of Sales)**



AVAILABILITY OF EFFICIENT LIGHTING FROM MANUFACTURERS IS NOT A PROBLEM, WITH LAMP MANUFACTURERS READILY ABLE TO SUPPLY A BROAD RANGE OF ENERGY EFFICIENT LIGHTING PRODUCTS.

### *Characteristics*

- As with most other building products, the market for lighting becomes increasingly concentrated farther up the supply chain, with lamp and ballast production concentrated in 5 to 10 national, capital-intensive manufacturing companies. These manufacturers are discussed below.<sup>11</sup>
  - Osram Sylvania, GE Lighting, and Philips are the three major lamp manufacturers, producing both full-sized and compact fluorescent technologies for commercial and residential applications. Major manufacturers of ballasts for these technologies include: Advance, Magnetek, Motorola, and SLI Lighting.
  - Smaller lamp manufacturers who are prevalent in the lighting market include: Cooper Lighting, Lightolier, Lithonia Lighting, Lumatech, and Prescolite. There are also a number of smaller manufacturers of residential specialty lighting. Some of these firms include: Alfa Lighting, Brownlee Lighting Dabmar, Elco Lighting, Juno Lighting, and Translite.

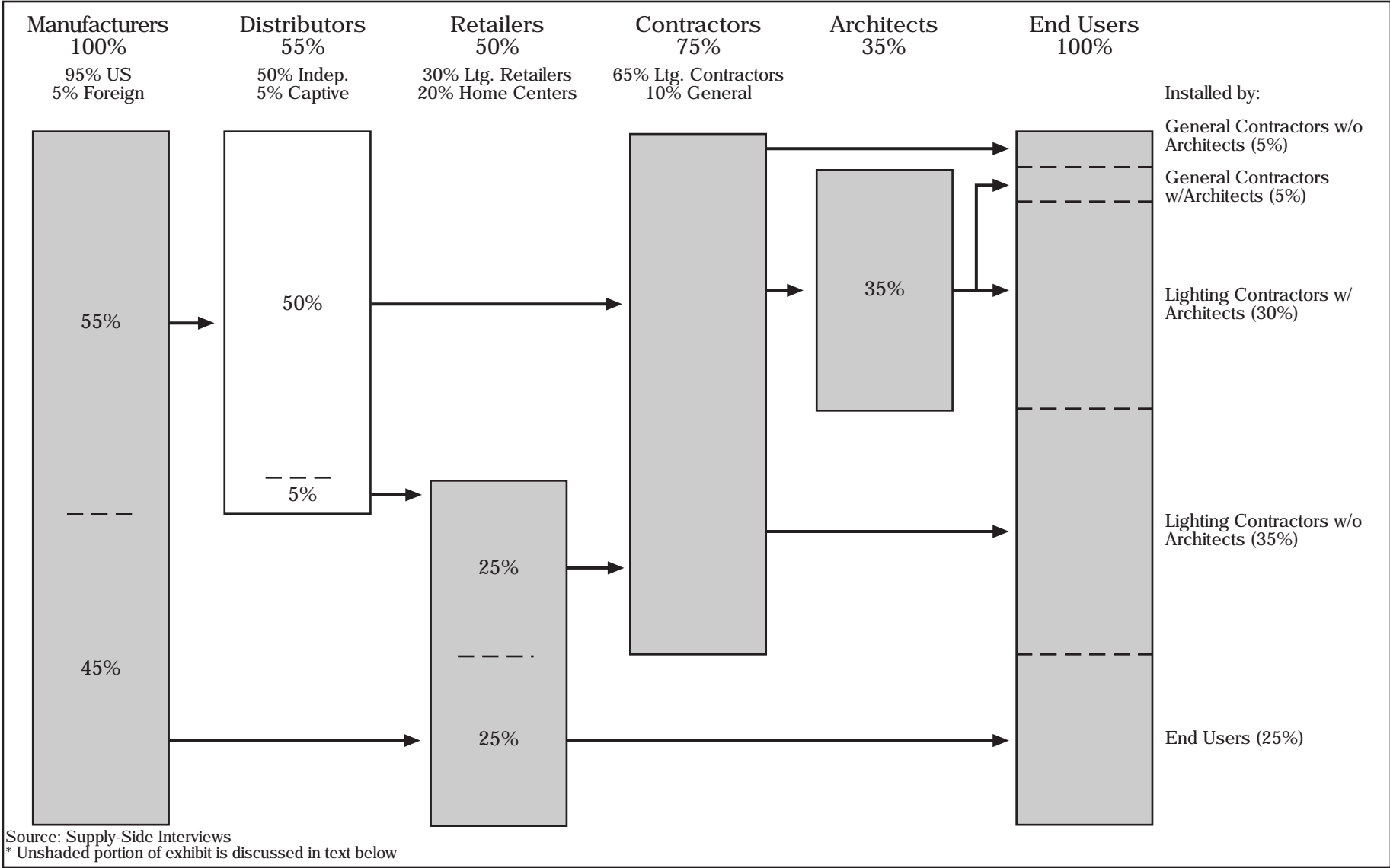
### *Distribution of Sales*

- The largest national lighting manufacturers sell through distributors and account for the vast majority of the overall market.<sup>12</sup>
- All lighting contractors interviewed included the three major lighting manufacturers in their list of brands, as did lighting retailers and home centers. According to interviews with manufacturers, distributors, and retailers, 55 percent of manufacturer sales go to distributors while the remaining 45 percent go to retailers.

*Role of Energy Efficiency*

- As referenced earlier, lighting manufacturers are most concerned about end-user opinions on the style and aesthetic qualities of CFLs. To address these concerns, manufacturers have recently introduced energy efficient CFL replacements for a wide variety of incandescent applications.
- Lighting manufacturers are also addressing customer concerns about the higher incremental costs of CFLs. According to the DOE *Energy Star CFL Specification*, some manufacturers are marketing high quality CFLs that have an average rated life of 6,000 hours (40 percent less than the typical 10,000 hour-life CFL). These CFLs generally are lower in price while achieving the same energy savings. These lower prices may provide an added incentive for a consumer to be a first-time user of a CFL.<sup>13</sup>
- Representatives of leading manufacturers at Lightfair 99 indicated that they are interested in increasing the penetration of CFLs in the market. A brochure distributed at Lightfair 99 by a major manufacturer cited that “if US consumers replace just half of their 60 W incandescent lamps with 15 W CFLs, they would save the country over \$9.8 billion per year in energy costs.”

**Exhibit 6-3**  
**Lighting Retrofit Market**  
**Current Market Flow\***  
**(Percentage of Sales)**



LIGHTING DISTRIBUTORS—WHICH INCLUDE MOSTLY INDEPENDENTS WITH MULTIPLE LINES—REPORT THAT ABOUT 10 PERCENT OF THE LIGHTING THEY SELL MEETS THEIR DEFINITION OF ENERGY EFFICIENCY.

*Characteristics*

- Distribution of lighting is handled by approximately 500 firms in California, including 175 in PG&E's territory.<sup>14</sup>
  - According to D&B, most distributors focus on the larger commercial lighting market. About two-thirds of the lighting distributors identified by D&B in PG&E's service territory have fewer than 5 employees. In addition, five distributors with more than 25 employees account for almost 20 percent of sales in PG&E's territory.
  - Lighting distributors interviewed tend to specialize in lighting rather than a broad range of products.

*Distribution of Sales*

- According to surveys with distributors, retailers, and contractors, contractors account for over 90 percent of the sales that distributors make, selling both to lighting/electrical and general contractors. The remaining 10 percent of distributor sales are to retailers. None of the distributors surveyed sell directly to end users.



**Exhibit 6-4**  
**Consumer Purchase Criteria, According to Market Actors\***

	Distributors	Lighting Retailers	Lighting Contractors	General Contractors**	Architects**
Price	4	4	4	4	4
Contractor Reputation	2	1	4	2	2
Energy Efficiency	1	1	1	2	2
Brand	1	1	1	2	1
Reliability	4	4	4	4	4
Light Quality	4	4	4	4	2
Access to Financing	1	1	1	1	1
How Quickly You Can Install	1	1	1	1	1
Warranty	2	1	2	2	1

Source: Supply-Side Interviews

\* Unshaded portion of exhibit is discussed in text below.

\*\* General contractors and architects were asked to rank purchase criteria in general, not for specific measures.

<b>KEY</b>
4 most important
2 somewhat important
1 less important

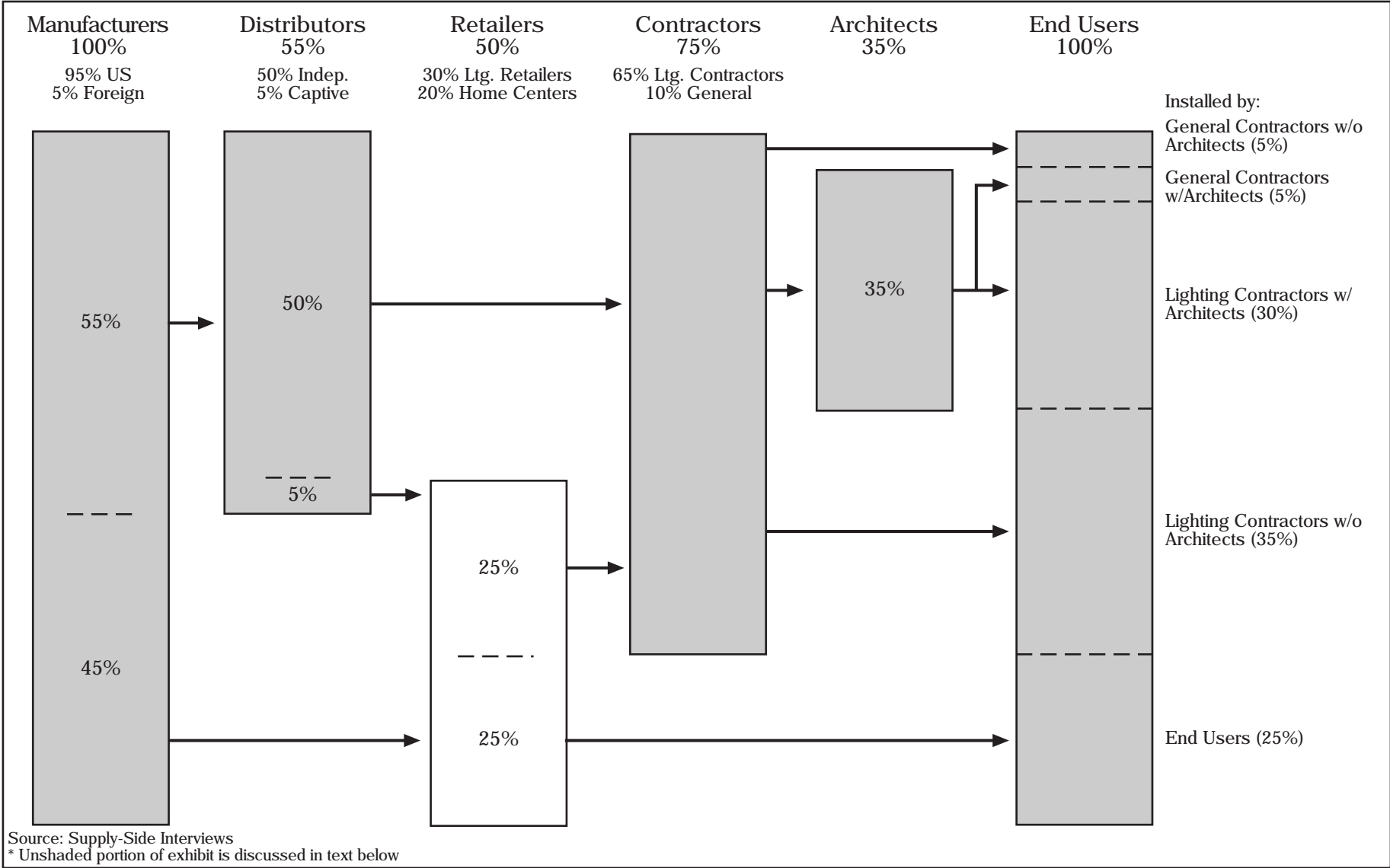
### *Role of Energy Efficiency*

- All distributors interviewed define high efficiency residential lighting as compact fluorescent. Forty percent also included lighting controls as a requirement for residential lighting to be energy efficient. The percentage of lighting sold that met this self-defined criterion for energy efficiency averaged about 10 percent.
- The majority of distributors reported discussing energy efficiency in some or very few sales situations. Higher costs and concerns regarding light quality were seen as significant barriers to the sale of energy efficient lighting.
- According to distributors, energy efficiency is less important among purchase drivers for consumers, along with brand, access to financing, and speed of installation. Price, reliability, and light quality were rated as the most important purchase drivers for consumers, while contractor reputation and warranty were rated as somewhat important.

### *Whole-house Approach*

- Lighting distributors generally have little or no interest in spearheading a whole-house approach to energy efficiency, citing lack of experience and opportunity.

**Exhibit 6-5**  
**Lighting Retrofit Market**  
**Current Market Flow\***  
**(Percentage of Sales)**



## INTERVIEWED RETAILERS SELL BOTH TO CONTRACTORS AND INDIVIDUAL END USERS.

### *Characteristics*

- Lighting retailers include home centers and specialized lighting retailers.
- There are about 170 specialized lighting retailers identified by D&B in PG&E's service territory. About 60 percent of these retailers have less than five employees.<sup>15</sup>

### *Distribution of Sales*

- Interviewed retailers report selling to both contractors and do-it-yourself homeowners in equal proportions.
- All interviewed retailers have a customer's lighting order in stock most or all of the time. When ordering from suppliers, it takes about 3-7 days to receive the order from the supplier—whether standard or high efficiency lighting equipment is ordered.

### *Role of Energy Efficiency*

- All retailers reported discussing energy efficiency in only some or very few sales situations.
- According to retailers, energy efficiency is less important among purchase drivers for consumers, along with contractor reputation, brand, access to financing, speed of installation, and warranty. Price, reliability, and light quality were rated as the most important purchase drivers for consumers. None of the criteria were rated as somewhat important.
- All retailers interviewed included fluorescent lighting or controls as a requirement for lighting to be energy efficient. The percentage of lighting sold that met this self-defined criterion for energy efficiency averaged about 5 percent.

### *Whole-house Approach*

- While specialized lighting retailers cited they are not in a position to advocate a whole-house approach, large home centers provide a natural forum for promoting a whole house approach, since these retailers will offer many of the other energy-efficiency measures that could be installed.

**Exhibit 6-6**  
**Consumer Purchase Criteria, According to Market Actors\***

	Distributors	Lighting Retailers	Lighting Contractors	General Contractors**	Architects**
Price	4	4	4	4	4
Contractor Reputation	2	1	4	2	2
Energy Efficiency	1	1	1	2	2
Brand	1	1	1	2	1
Reliability	4	4	4	4	4
Light Quality	4	4	4	4	2
Access to Financing	1	1	1	1	1
How Quickly You Can Install	1	1	1	1	1
Warranty	2	1	2	2	1

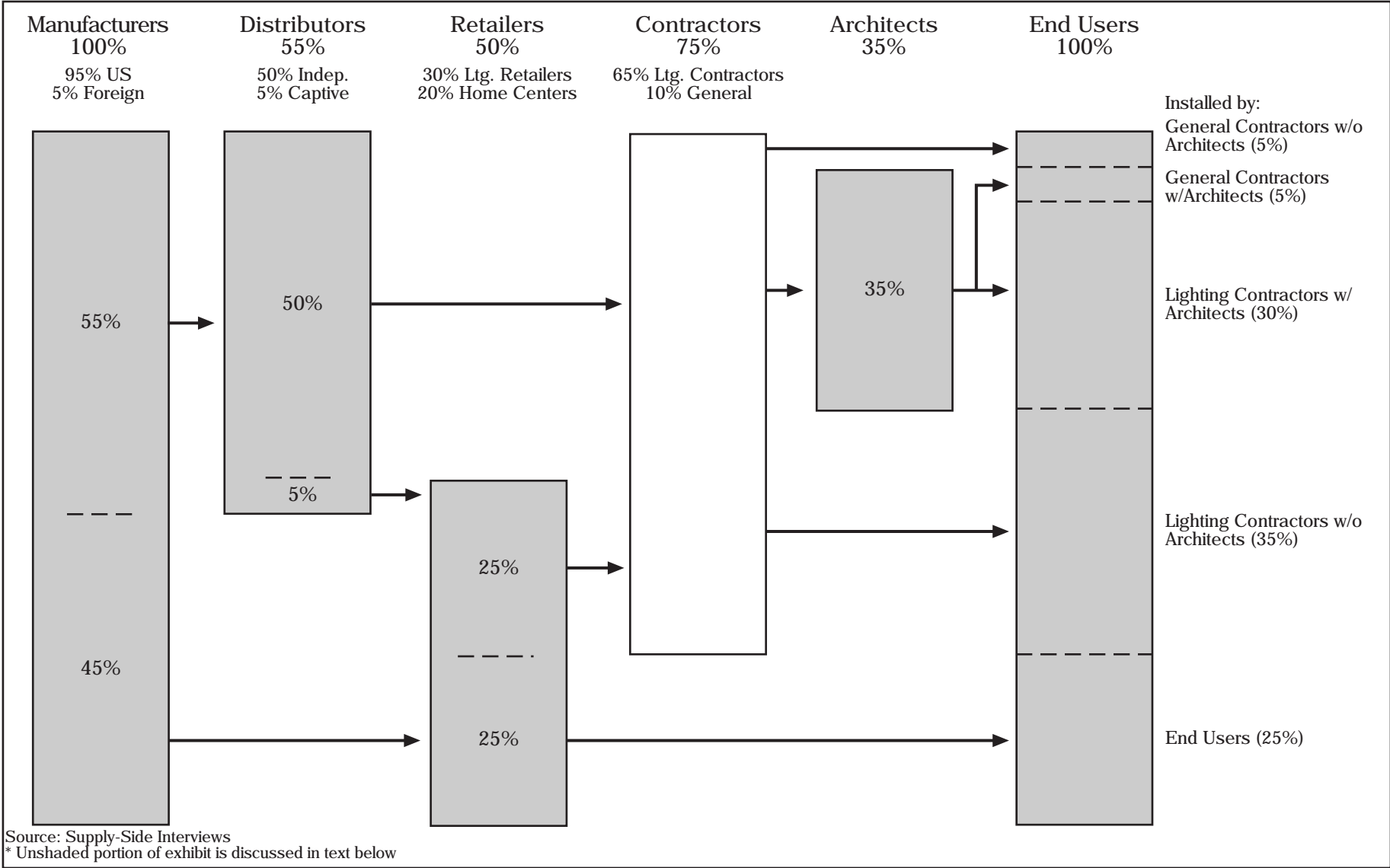
Source: Supply-Side Interviews

\* Unshaded portion of exhibit is discussed in text below.

\*\* General contractors and architects were asked to rank purchase criteria in general, not for specific measures.

<b>KEY</b>
4 most important
2 somewhat important
1 less important

**Exhibit 6-7**  
**Lighting Retrofit Market**  
**Current Market Flow\***  
**(Percentage of Sales)**



ACCORDING TO CONTRACTORS, HOMEOWNERS ARE PRIMARILY CONCERNED WITH LIGHT QUALITY, STYLE AND AESTHETICS, NOT ENERGY EFFICIENCY, WHEN SELECTING LIGHTING EQUIPMENT. THIS HAS LED TO A GENERALLY LOW LEVEL OF ENERGY EFFICIENCY IN RETROFIT LIGHTING BEING INSTALLED.

### *Characteristics*

- According to contractor interviews, electrical contractors account for the majority of the retrofit lighting installations in the residential market, although general contractors sometimes handle lighting installations.
- Most residential lighting contractors are small electrical contractors with fewer than 5 employees.<sup>16</sup>
  - According to interviewed contractors, most specialized lighting contractors tend to concentrate on commercial installations—which tend to be more profitable—while many of the residential contractors are “a couple of people with a truck.”
  - According to contractor interviews, residential installers are paid at a lower hourly rate—due to lower profits in the residential market—when compared to commercial installers, and often have not completed apprenticeships or have not been technically trained.
- As noted previously, distributors make most of their sales to lighting contractors. Surveyed lighting contractors purchase almost exclusively from multiple-line independent distributors.
- Subcontracted work from general contractors was cited by 80 percent of surveyed contractors as a source of new business. In addition, 40 percent of surveyed contractors get new work from customer referrals and 30 percent use advertising. None reported using direct mail to seek out new business.

### *Distribution of Sales*

- Single-family detached homes account for over 95 percent of installations for surveyed contractors; none reported doing any business with condominium owners. An average of about 7 percent of installations is in rural homes.

**Exhibit 6-8**  
**Consumer Purchase Criteria, According to Market Actors\***

	Distributors	Lighting Retailers	Lighting Contractors	General Contractors**	Architects**
Price	4	4	4	4	4
Contractor Reputation	2	1	4	2	2
Energy Efficiency	1	1	1	2	2
Brand	1	1	1	2	1
Reliability	4	4	4	4	4
Light Quality	4	4	4	4	2
Access to Financing	1	1	1	1	1
How Quickly You Can Install	1	1	1	1	1
Warranty	2	1	2	2	1

Source: Supply-Side Interviews

\* Unshaded portion of exhibit is discussed in text below (Lighting Contractors), and on pages 6-16 (General Contractors) and 6-18 (Architects).

\*\* General contractors and architects were asked to rank purchase criteria in general, not for specific measures.

KEY
4 most important
2 somewhat important
1 less important



- According to surveyed contractors, a typical lighting retrofit involves from 20-25 percent of the lighting in a house and costs from \$400-500. Whole-house retrofits are never done by 60 percent of surveyed contractors and only occasionally by the remaining 40 percent. Given that lighting contractors reported the cost of a whole-house lighting retrofit averages almost \$2,000, it is not surprising that high cost was cited as an impediment to whole-house lighting retrofits by all respondents.

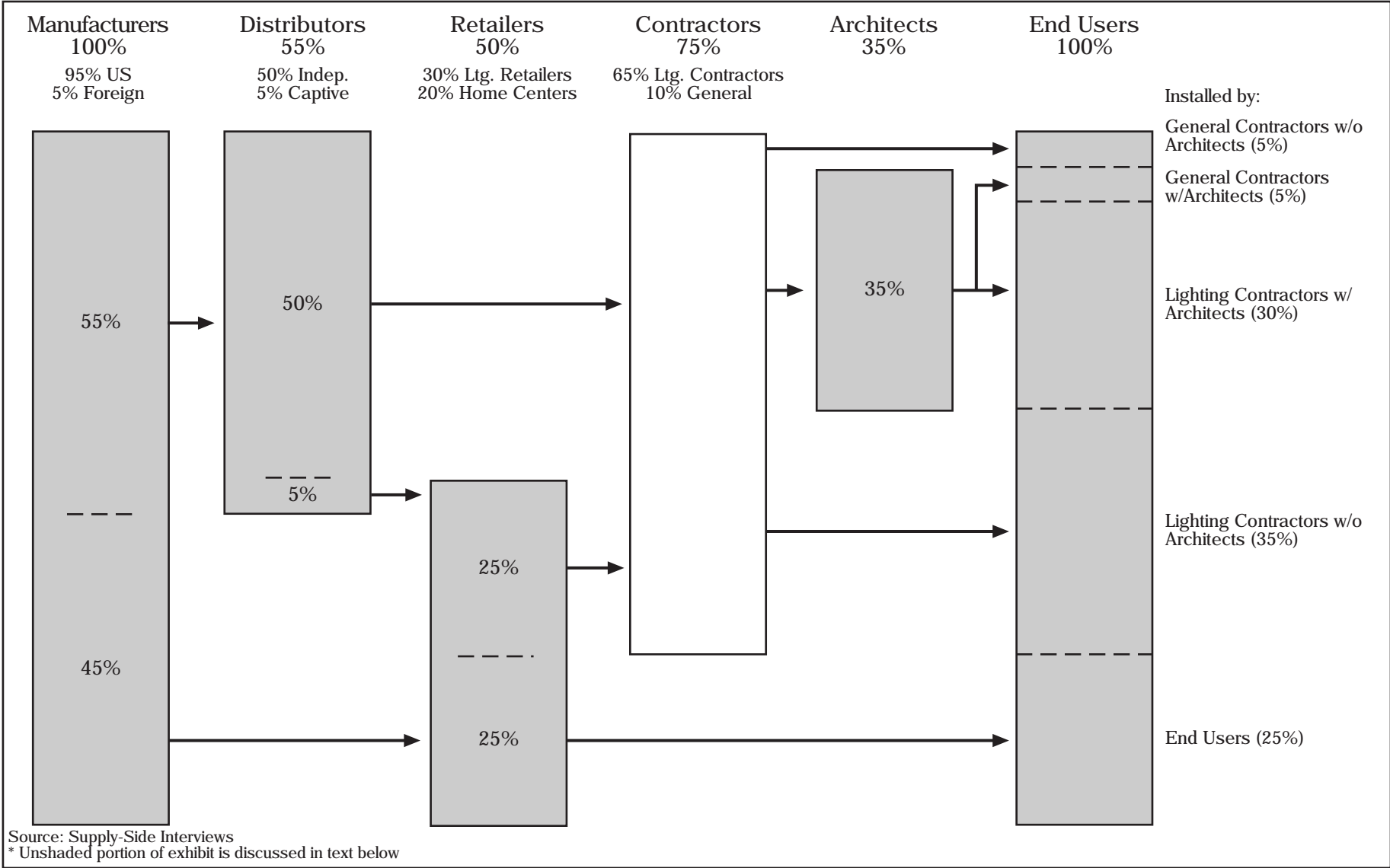
#### *Role of Energy Efficiency*

- Unlike distributors, 40 percent of contractors said that they have no criteria for defining energy efficient lighting. Of those with energy efficient criteria, compact fluorescent and controls were cited as the primary requirements for energy efficiency. By this definition, contractors say, an average of about 25 percent of the lighting they install in retrofit applications are energy efficient.
- The majority of lighting contractors who perform residential work do not heavily promote efficient lighting technologies. They feel that the residential market does not have much interest in efficient lighting and is primarily concerned with aesthetics.
- According to lighting contractors, energy efficiency is less important among purchase drivers for consumers, along with brand, access to financing, and speed of installation. Price, contractor reputation, reliability, and light quality were rated as the most important purchase drivers for consumers, while warranty was rated as somewhat important.

#### *Whole-house Approach*

- Surveyed lighting contractors currently show no inclination to become involved in other aspects of whole-house energy efficiency retrofits. Only 30 percent of interviewed contractors even point out other opportunities for energy savings in the course of a lighting retrofit, and these contractors indicated only a limited interest in addressing those opportunities, either on their own or through the use of a subcontractor.

**Exhibit 6-9**  
**Lighting Retrofit Market**  
**Current Market Flow\***  
**(Percentage of Sales)**



BECAUSE GENERAL CONTRACTORS TYPICALLY DO NOT PARTICIPATE DIRECTLY IN THE SELECTION AND INSTALLATION OF LIGHTING EQUIPMENT THEY ARE NOT AS SUITABLE AS LIGHTING CONTRACTORS TO PROMOTE ENERGY EFFICIENT LIGHTING. THEY ARE, HOWEVER, MORE RECEPTIVE TO THE WHOLE-HOUSE APPROACH TO ENERGY EFFICIENCY THAN LIGHTING CONTRACTORS.

### *Characteristics*

- There are about 2,000 general contractors who perform residential remodeling work in PG&E's service territory. Most remodeling contractors are small, averaging fewer than 5 employees.<sup>17</sup>
- Surveyed general contractors typically subcontract lighting installations to electrical contractors.

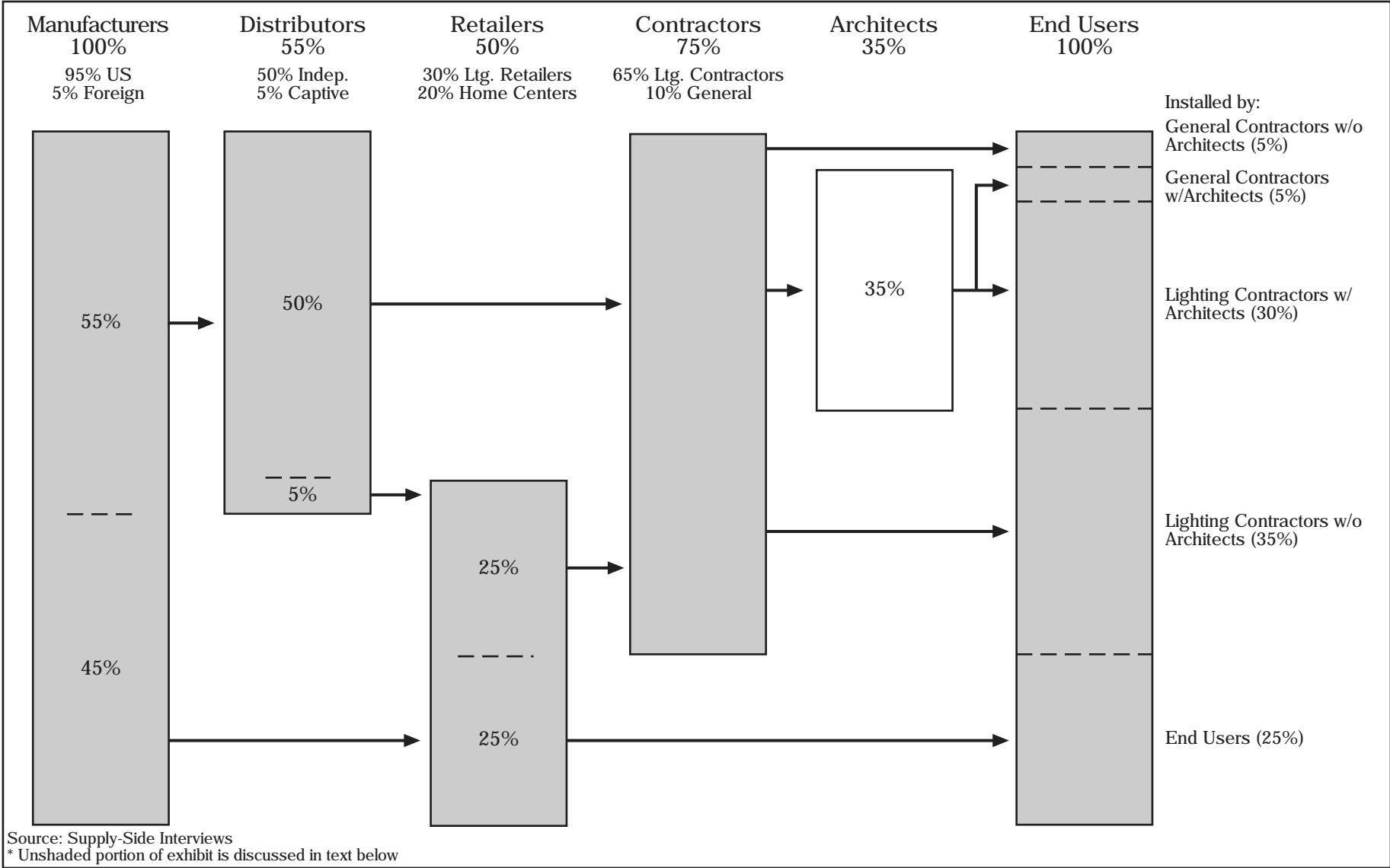
### *Role of Energy Efficiency*

- Most surveyed general contractors rely on the electrical subcontractor in the selection of lighting equipment and believe that energy efficiency is only an issue when it comes to installing fluorescent lighting in kitchens and bathrooms to meet Title 24 requirements.
- Some surveyed general contractors cited that homeowners eventually replace this fluorescent lighting with incandescent lighting, especially in the bathroom, because they do not like the quality of light provided by the fluorescent lighting.
- According to general contractors, energy efficiency is somewhat important among purchase drivers for consumers, along with contractor reputation, brand, and warranty. Price, reliability, and light quality were rated as the most important purchase drivers for consumers, while access to financing and speed of installation were rated as less important. These results are presented in Exhibit 6-8.

### *Whole-house Approach*

- While general contractors are, by definition, capable of providing a whole-house approach to energy efficiency, few surveyed general contractors currently pursue energy efficiency opportunities beyond the immediate project for which they have been hired.
- Several respondents did report an interest in acting as facilitators for a whole-house energy efficiency approach, but admitted that they lack the information they need to pursue such opportunities.

**Exhibit 6-10**  
**Lighting Retrofit Market**  
**Current Market Flow\***  
**(Percentage of Sales)**



ALTHOUGH ARCHITECTS ARE INVOLVED IN ONLY ABOUT 35 PERCENT OF LIGHTING RETROFITS, THEY PLAY AN IMPORTANT ROLE IN THE MARKET, SINCE THEY ACTIVELY PROMOTE ENERGY-EFFICIENT LIGHTING AS WELL AS A WHOLE-HOUSE APPROACH TO ENERGY EFFICIENCY.

*Role of Energy Efficiency*

- All architects interviewed reported discussing energy efficiency in most or all of their specifications.
- According to architects, energy efficiency is somewhat important among purchase drivers for consumers, along with contractor reputation and light quality. Price and reliability were rated as the most important purchase drivers for consumers, while brand, access to financing, speed of installation, and warranty were rated as less important. These results are presented in Exhibit 6-8.
- All surveyed architects are knowledgeable about energy efficient lighting, citing fluorescent lighting and controls as a required feature for lighting to be energy efficient. All surveyed architects said that they include fluorescent lighting in their specifications to meet Title 24 requirements.

*Whole-house Approach*

- Architects are involved in other aspects of whole-house energy efficiency retrofits. All surveyed architects either actively promote (80 percent) or point out (20 percent) other opportunities for energy savings in the course of a specification.

THE ABOVE MARKET ACTORS, THE BARRIERS FACING THEM, AND BARRIER PREVALENCE AND IMPORTANCE ARE DISCUSSED NEXT.

THE BARRIER ANALYSES PRIMARILY USED DATA COLLECTED THROUGH INTERVIEWS WITH EACH GROUP OF MARKET ACTORS.

The intensity of individual barriers was assessed (and is shown in the exhibits as low, moderate or high) using both qualitative and quantitative results. Where quantitative data were available and appropriate, results were mapped to barrier levels using the following general algorithm:

- Barriers rated as Very Important by at least 2/3 of respondents were classified as High.
- Barriers rated as Very Important by at least 1/3 but less than 2/3 of respondents were classified as Moderate.
- Barriers rated as Not At All Important by at least 1/2 of respondents were not considered barriers.
- All other barriers were classified as Low (i.e., barriers rated as Very Important by less than 1/3 of respondents and rated as Not At All Important by less than 1/2 of respondents).

In addition to the above quantitative criteria, however, qualitative results from open-ended questions were used to adjust the quantitative results and to assess barriers where more structured results were not available.

- Given the small sample sizes for many of the groups contacted, it was felt that spontaneous explanations by market actors of the obstacles they encounter or perceive were particularly valuable in determining the truly important market barriers.
- In addition, qualitative results were critical for determining measure-specific barriers for such market actors as general contractors and architects, who rated barriers to energy efficient measures in general rather than for individual measures. An example is the classification of Hidden Costs for general contractors. Based on the above criteria, this barrier would have been classified as Low for energy efficient measures in general. A number of general contractors pointed out, however, that customers do not like the quality of light from CFLs, install them only to meet Title 24, and often change them out within a short time. As a result, the Hidden Cost barrier to efficient lighting was assigned a high rating for this group.

**Exhibit 6-11**  
**Existing Lighting Retrofit Market**  
**Barriers**

Measure-Specific Market Actors		Barriers											
		High Initial Cost	Info/Search Costs	Market Uncertainty	Transaction Costs	Performance Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Asymmetric Information	Svc./Product Unavailability	Access to Financing
Manufacturers													
Distributors and Retailers		4	1			1	4						
Contractors	Measure-Specific	4	2			2	4						
	General	4	2			2	4						
Architects		4	1			1							
Building Inspectors													
Financiers													
Realtors					4								
Media			4	4									

**KEY**

Importance

4 High

2 Moderate

1 Low

Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.  
 Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.  
 Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.  
 All other barriers were classified as Low (i.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).



FOR MANUFACTURERS, THERE IS NO EVIDENCE THAT THERE ARE SIGNIFICANT BARRIERS TO IMPEDE THE ACCESS OF DOWNSTREAM MARKET ACTORS TO EFFICIENT LIGHTING AND LIGHTING TECHNOLOGIES.

- All of the leading lamp manufacturers offer a complete line of CFL fixtures. In addition to residential applications, CFLs are used in many commercial applications, increasing the overall availability and production of CFLs in the market and minimizing the role of market uncertainty.
- According to representatives of leading manufacturers interviewed at Lightfair 99, lighting manufacturers are most concerned about end-user opinions on the style and aesthetic qualities of CFLs. To address these concerns, manufacturers have recently introduced energy efficient CFL replacements for a wide variety of incandescent applications. Recent developments include:
  - CFLs that have the shape of incandescent lamps, offering a more familiar look to the end user
  - CFLs that operate on standard 3-way sockets, equivalent to 3-way incandescent lamps
  - CFLs that operate on standard incandescent dimmers that are dimmable to 10 percent.
  - CFL alternatives to halogen torchieres.
- Lighting manufacturers are also addressing customer concerns about the higher incremental costs of CFLs. According to the DOE *Energy Star CFL Specification*, some manufacturers are marketing high quality CFLs that have an average rated life of 6,000 hours (40 percent less than the typical 10,000 hour-life CFL). These CFLs generally are lower in price while achieving the same energy savings. These lower prices may provide an added incentive for a consumer to be a first-time user of a CFL.<sup>18</sup>

THE ABOVE RESULTS OFFER EVIDENCE THAT MANUFACTURERS ARE TAKING A PROACTIVE ROLE IN INCREASING THE PENETRATION OF CFL TECHNOLOGIES IN THE MARKETPLACE.

**Exhibit 6-12**  
**Existing Lighting Retrofit Market**  
**Barriers\***

Measure-Specific Market Actors	Barriers											
	High Initial Cost	Info/Search Costs	Market Uncertainty	Transaction Costs	Performance Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Asymmetric Information	Svc./Product Unavailability	Access to Financing
<b>MANUFACTURERS</b>												
Distributors and Retailers	4	1			1	4						
Contractors	Measure-Specific	4	2		2	4						
	General	4	2		2	4						
Architects	4	1			1							
Building Inspectors												
Financiers												
Realtors				4								
Media		4	4									

**KEY**

Importance

4 High

2 Moderate

1 Low

\* Barriers for text in **BOLD CAPS** are discussed in the text below.

Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.

Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.

Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.

All other barriers were classified as Low (i.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).

ALTHOUGH DISTRIBUTORS AND RETAILERS ARE GENERALLY INFORMED ABOUT THE BENEFITS AND COSTS OF EFFICIENT LIGHTING, THEY DO NOT ROUTINELY SELL SUCH LIGHTING FOR RETROFIT APPLICATIONS.

- The cost of energy efficient lighting (High Initial Cost) was seen as a significant barrier to selling and promoting energy efficient lighting.
- Concerns regarding light quality and style (which could be categorized as Hidden Cost due to the unexpected cost associated with having to replace efficient lighting with lighting that provides better light quality and style) was also seen as a significant barrier to selling and promoting energy efficient lighting.
- Doubts about energy savings (Performance Uncertainty) and difficulty in finding information on energy efficient lighting (Information/Search Costs) were minor concerns.

**Exhibit 6-13**  
**Existing Lighting Retrofit Market**  
**Barriers\***

Measure-Specific Market Actors	Barriers											
	High Initial Cost	Info/Search Costs	Market Uncertainty	Transaction Costs	Performance Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Asymmetric Information	Svc./Product Unavailability	Access to Financing
Manufacturers												
<b>DISTRIBUTORS AND RETAILERS</b>	4	1			1	4						
Contractors	Measure-Specific	4	2		2	4						
	General	4	2		2	4						
Architects	4	1			1							
Building Inspectors												
Financiers												
Realtors				4								
Media		4	4									

**KEY**

Importance

4 High

2 Moderate

1 Low

\* Barriers for text in **BOLD CAPS** are discussed in the text below.

Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.

Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.

Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.

All other barriers were classified as Low (i.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).

SINCE LIGHTING AND GENERAL CONTRACTORS ARE HIGHLY RESPONSIVE TO CUSTOMER NEEDS, THEIR BARRIERS TO BUYING AND SELLING EFFICIENT LIGHTING REFLECT THE CONCERNS OF CUSTOMERS.

- Among the specific barriers to selling and promoting energy efficient lighting that lighting and general contractors were asked to address, only the cost of energy efficient lighting (High Initial Cost) and concerns regarding the light quality and style of efficient lighting (Hidden Cost) were considered very important.
- Lack of information (Information/Search Costs) and doubts about energy savings (Performance Uncertainty) were rated as moderately important barriers by lighting and general contractors.

**Exhibit 6-14**  
**Existing Lighting Retrofit Market**  
**Barriers\***

Measure-Specific Market Actors		Barriers											
		High Initial Cost	Info/Search Costs	Market Uncertainty	Transaction Costs	Performance Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Asymmetric Information	Svc./Product Unavailability	Access to Financing
Manufacturers													
Distributors and Retailers		4	1			1	4						
<b>CONTRACTORS</b>	<b>MEASURE-SPECIFIC</b>	4	2			2	4						
	<b>GENERAL</b>	4	2			2	4						
Architects		4	1			1							
Building Inspectors													
Financiers													
Realtors					4								
Media			4	4									

**KEY**

Importance

4 High

2 Moderate

1 Low

\* Barriers for text in **BOLD CAPS** are discussed in the text below.

Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.

Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.

Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.

All other barriers were classified as Low (i.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).

**ARCHITECTS AND OTHER MARKET ACTORS WHO ARE LESS DIRECTLY INVOLVED IN THE LIGHTING MARKET MAY NEVERTHELESS FACE BARRIERS THAT IMPEDE THEIR ABILITY TO FACILITATE THE ADOPTION OF HIGHER EFFICIENCY LIGHTING IN RETROFIT APPLICATIONS.**

- Architects face relatively few barriers to the specification of energy efficient models. Only cost (High Initial Cost) was seen as a significant barrier, while doubts about energy savings (Performance Uncertainty) and lack of information on the benefits of energy efficient models (Information/Search Costs) were a minor concern.
- Barriers faced by other enabling market actors include the following.
  - Since surveyed lighting contractors reported that retrofits typically cost \$400-500, financing typically would not be required for most lighting retrofits.
  - According to surveys with realtors and EEM facilitators, realtors are reluctant to promote energy efficient mortgages for lighting or any other application because of the fear that the settlement process may be delayed (Transaction Costs).
  - Finally, the most significant barriers to media promotion of energy-efficient lighting include lack of information (Information/Search Costs) and concerns about the receptivity of readers/viewers to articles or other coverage (Market Uncertainty).

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<sup>1</sup> E-Source, *Lighting Technology Atlas*, 1997, p. 76.

<sup>2</sup> Wanda Jankowski, "Creating an Inviting, Functional Home Environment", *Architectural Lighting Magazine*,

[www.qualitylight.com/techniques/home.html](http://www.qualitylight.com/techniques/home.html).

<sup>3</sup> E-Source, *Lighting Technology Atlas*, p. 166.

<sup>4</sup> PG&E's *Energy Calculator*, [www.pge.com/customer\\_services/residential/ecalc](http://www.pge.com/customer_services/residential/ecalc).

<sup>5</sup> E-Source, *Lighting Technology Atlas*, p. 167.

<sup>6</sup> DOE, *EnergyStar CFL Program Specification*, p. 6, [www.energystar.gov/lighting](http://www.energystar.gov/lighting).

<sup>7</sup> 60-70 percent savings in energy costs based on PG&E's claims at [www.pge.com/customer\\_services/business/energy/smart/html/res\\_light\\_guide.html](http://www.pge.com/customer_services/business/energy/smart/html/res_light_guide.html). \$2 per year for each hour of daily operation assumes \$0.11/kWh as claimed by PG&E's *Energy Calculator*.

<sup>8</sup> DOE, *EnergyStar CFL Program Specification*, p. 6.

<sup>9</sup> E-Source, *Lighting Technology Atlas*, p. 77.

<sup>10</sup> PG&E, *Residential Energy Survey Report*, 1994, p. C-12, [www.pge.com/customer\\_services/other/res/res.pdf](http://www.pge.com/customer_services/other/res/res.pdf).

<sup>11</sup> *PG&E and SDG&E Commercial Lighting Market Effects Study*, 1998, pp. 3-11, 3-15, and 3-20.

<sup>12</sup> *PG&E and SDG&E Commercial Lighting Market Effects Study*, p. 3-7.

<sup>13</sup> DOE, *EnergyStar CFL Program Specification*, p. 6.

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<sup>14</sup> iMarket Inc., *Dun and Bradstreet MarketPlace CD-Rom*, April-June 1999.

<sup>15</sup> Ibid.

<sup>16</sup> Ibid.

<sup>17</sup> Ibid.

<sup>18</sup> DOE, *EnergyStar CFL Program Specification*, p. 6.



**Exhibit 7-1**  
**Current Residential Retrofit Market in PG&E's Service Territory**  
**Status of Integrated Discretionary Retrofit Actions**  
**Total 1998 Market Size = \$1.1 Billion**  
**(Percentage of Total Expenditures)**

Category	Action		Kitchen Equipment*		Lighting	TOTAL
	Windows	HVAC Replacement	Refrigerator	Dishwasher		
% of Total Sales	48%	30%	11%	4%	6%	100%
Individual Versus Multiple Actions						
% Individual Actions						61%
% Multiple Actions						39%
Whole House	4	4	4	4	4	2%
Windows+HVAC	4	4				6%
All Kitchen			4	4		5%
Windows+Refrigerator	4		4			3%
Windows+Lighting	4				4	3%
Windows+Dishwasher	4			4		3%
Other Combinations						17%

\*The kitchen remodel market, estimated at \$6.4 Million for 1998 in PG&E Service Territory, has not been included because it includes many non-energy-related items.

**WHOLE-HOUSE ENERGY-EFFICIENCY RETROFITS CURRENTLY REPRESENT JUST A SMALL FRACTION OF THE RETROFIT AND RENOVATION MARKET.**

- Primary data sources, summarized previously in Exhibit 1-4 and described in detail in the data collection chapter, consisted of surveys/interviews with a variety of market actors. Particular emphasis was placed on the responses of general contractors, service integrators/facilitators, CHEERS raters and financiers in this assessment of the whole-house approach to energy efficient investments.
- As shown in the facing exhibit, only a small portion of the retrofit actions in PG&E 's service territory comprise all the catalyzing measures included in this study in a whole-house approach.
- According to the market actors surveyed, the whole-house approach is currently being applied primarily in the context of energy efficient mortgages (EEMs) for HUD, VA, and FHA homes.
  - Interviews with most of the major EEM facilitators identified by the Energy Aware Housing Agent Program (EAHAP) program lead us to estimate the number of energy efficient mortgages currently being written at about 2,000 annually.
  - With an average cost of energy efficiency improvements of \$5,000 reported by these same respondents, this would mean that the whole-house approach is currently a \$10 million market within PG&E territory. This would represent about half the overall whole-house market estimated from supply-side and end user survey responses.
- In the remainder of this section, the current level of whole-house energy retrofit activity among each group of relevant market actors is discussed, along with current market barriers and the prospects for expanded activity, as indicated by interviews with each group of market actors.

**INTEREST IN AND POTENTIAL FOR ENERGY EFFICIENT SOLUTIONS – BOTH STAND-ALONE AND INTEGRATED – AMONG EACH GROUP OF MARKET ACTORS ARE DISCUSSED ON THE FOLLOWING PAGES.**

**Exhibit 7-2**  
**Market Actor Interest in and Potential for Energy Efficient Investments**  
**Individual Measures and Integrated Solutions**

Market Actors		Individual High Efficiency Measures	Whole-House Solutions	
			Standard Efficiency	High Efficiency
Manufacturers		4	1	1
Distributors		4	1	1
Retailers	Specialty	4	1	1
	Home Center	4	4	2
Contractors	Measure-specific	4	1	1
	General	1	2	2
	Facilitators	2	4	4
Architects		1	2	1
Home Inspectors	Mainstream	1	1	1
	HERS	2	1	2
Financiers	Mainstream	1	1	1
	EEM	1	1	2
Realtors		1	1	1
End Users	Subject to Title 24	4	1	4
	Other	1	1	1

Note: The degree of "interest in and potential for" individual and whole-house solutions is based upon QC's analysis and integration of all primary and secondary research conducted.

KEY	
Interest and Potential	
4	High
2	Moderate
1	Low

IN INTERVIEWS WITH MARKET ACTORS, THE STRONGEST EVIDENCE OF AN ACTIVE WHOLE-HOUSE APPROACH TO ENERGY EFFICIENCY WAS FOUND AMONG EEM FACILITATORS AND, TO A LESSER EXTENT, AMONG RETAIL HOME CENTERS.

- The facing exhibit summarizes findings regarding the potential for the integrated, whole-house approach to energy efficiency that the R&R program hopes to encourage – both for individual measures and for integrated solutions.
- The President of the Building Performance Contractors Association (BPCA, a New York-based association that promotes building diagnostics in support of high-performance homes) noted that a whole-house energy efficiency industry sometimes evolves from a small number of market actors<sup>1</sup>.
  - While the populations from which samples of interviewed market actors were drawn might include individual players who are, in fact, actively pursuing such an approach, we were not able to identify such players among our interviewed specialty or general contractors.
  - We did, however, take pains to conduct interviews with most of the EEM facilitators who currently appear to be driving the whole-house market.

INTEREST IN AND BARRIERS TO WHOLE-HOUSE ENERGY EFFICIENCY SOLUTIONS AMONG EACH GROUP OF MARKET ACTORS ARE DISCUSSED ON THE FOLLOWING PAGES.

**Exhibit 7-3  
Whole-House Market Barriers**

Measure-Specific Market Actors	Barriers											
	High Initial Cost	Info/Search Costs	Performance Uncertainty	Transaction Costs	Market Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Asymmetric Information	Svc./Product Unavailability	Access to Financing
Distributors				4								
Retailers					4							
Contractors	Measure-Specific	2		4	4							
	General	4	2									
Facilitators	2											2
Architects		2			4							
Building Inspectors							4					
Financiers		4	4	1								
Realtors				4								
Media		4			2							

**KEY**

Importance

4 High

2 Moderate

1 Low

Note: Barriers rated as very important by at least 2/3 of respondents were classified as High.  
 Barriers rated as very important by at least 1/3, but less than 2/3 of respondents were classified as Moderate.  
 Barriers rated as not at all important by at least 1/2 of respondents were not considered barriers.  
 All other barriers were classified as Low (i.e., barriers rated as very important by less than 1/3 of respondents and rated as not at all important by less than 1/2 of respondents).

DISTRIBUTORS AND SPECIALIZED RETAILERS FACE FEW BARRIERS TO SALES OF INDIVIDUAL EFFICIENT MEASURES, BUT HAVE LITTLE INTEREST IN AN INTEGRATED APPROACH. IN CONTRAST, HOME CENTER RETAILERS HAVE THE POTENTIAL TO ENCOURAGE A WHOLE-HOUSE APPROACH AMONG HOME OWNERS AND APPEAR TO BE INTERESTED IN DOING SO.

- While product-specific distributors generally did not report serious barriers to stocking and selling high efficiency products, they see significant hassles and few benefits to entering unfamiliar new markets, reflecting concerns regarding transaction costs. In some smaller, more rural markets, both general and specialty contractors might order their supplies from a single lumber yard or builder supply warehouse, but such outlets typically operate more like retailers than wholesalers.
- Retailers comprise both specialty outlets who handle only windows or lighting and the larger home center stores.<sup>2</sup> Both groups generally indicate that they face few upstream barriers in getting access to or information about energy efficient products. They differ, however, in their receptivity to an integrated approach:
  - Specialty retailers interviewed said they have little interest in encouraging customers to pursue other, integrated solutions (whether standard or energy efficient) that might lead them to spend their money elsewhere—an indication of a powerful market uncertainty barrier.
  - Home centers and other retailers with broader product lines (such as the lumber yard, builder supply outlets described above) see integrated solutions as playing to their strength. They said they actively encourage customers to take a whole-house approach, and they generally offer energy-efficient options for most of the products they sell. Home centers have, to date, been receptive to training and information-based interventions that seek to inform and influence customers at the point of sale.<sup>3</sup>

MEASURE-SPECIFIC CONTRACTORS ARE KNOWLEDGEABLE ABOUT THEIR OWN HIGH EFFICIENCY MEASURES, BUT FACE SIGNIFICANT BARRIERS TO AN INTEGRATED APPROACH. IN DIRECT CONTRAST, GENERAL CONTRACTORS ARE ACCUSTOMED TO THE WHOLE-HOUSE APPROACH, BUT DO NOT ACTIVELY PROMOTE ENERGY EFFICIENCY.

- Most measure-specific contractors have a good understanding of the features and benefits of energy-efficient measures; most window, lighting, and kitchen contractors said they regularly discuss energy efficiency as part of the sale.
  - Their approach to energy efficiency is ordinarily reactive rather than proactive, however, and they are understandably responsive to the higher importance customers place on other measure attributes. As a result they typically focus on selling more window area or more light fixtures rather than more efficient windows or lighting.
  - While a few of the specialty contractors interviewed said they would point out opportunities for energy savings elsewhere in the house (for example, a window contractor might point out the benefits of weather-stripping or added insulation), none expressed any interest in pursuing such opportunities.
  - Specific barriers perceived by these contractors include high transaction costs and market uncertainty associated with entering a new line of business. A moderate information search cost barrier was also evident from contractor responses.
- General contractors, including those who specialize in kitchen and other remodeling projects, routinely manage subcontractors to complete a project that may involve the whole house.
  - Some national firms are using their own brand recognition specifically for that purpose: a review of several general-interest publications reveals that Century 21, Sears, and American Home Services all offer home owners one-stop shopping for HVAC replacement, siding, roofing, windows, additions, and more, with much of the work evidently done by independent subcontractors<sup>4</sup>.

- While whole-house general contractors may market individual measures (e.g., air conditioning, windows) using energy savings benefits, there does not appear to be an integrated whole-house energy efficiency message in any of these offerings.
- Barriers to a whole-house energy efficiency approach for general contractors include the perception that high first cost makes energy efficiency hard to sell and moderate information/search costs associated with becoming knowledgeable about efficient technologies.
- There may be some contractors in PG&E's service territory who have the interest and knowledge to pursue integrated whole-house energy efficiency solutions, but they will be difficult to identify.
  - The President of the BPCA says that his organization has made headway in New York and other states by identifying a small number of progressive contractors who have this interest and knowledge, and working with them to form a local organization. It is his belief, however, that the recent (and current) history of financial incentives in the California market makes it difficult to create a self-sustaining whole-house market here.
  - Some of the success the BPCA has achieved has been attributable to an integrated approach that does not necessarily address the whole house; an insulation contractor who does building pressure testing and diagnostics, for example, has formed a marketing alliance with an HVAC contractor. Using a sales approach that emphasizes non-energy benefits, this team has been very successful in encouraging home owners to start with diagnostics and then perform a package of improvement measures that includes insulation, duct repair, and HVAC downsizing. More broadly, their approach has been to emphasize non-energy benefits, then position energy benefits as "icing on the cake" that helps pay for the other benefits.

THE GREATEST WHOLE-HOUSE ACTIVITY IS CURRENTLY BEING GENERATED BY GENERAL CONTRACTORS WHO ACT AS FACILITATORS OF ENERGY EFFICIENT MORTGAGES (EEMS). THIS PROMISING MARKET SEGMENT IS DISCUSSED ON THE FOLLOWING PAGES.



THE WHOLE-HOUSE APPROACH TO ENERGY EFFICIENCY IS BEING APPLIED PRIMARILY BY ABOUT A DOZEN "FACILITATORS" OF EEMS FOR HUD, VA, AND FHA HOMES. WHILE THE NUMBER OF EEMS IS STILL LOW, IT IS GROWING, IN PART BECAUSE OF THE EXPANDED ACTIVITY OF FACILITATORS.

- According to a number of the CHEERS raters interviewed, facilitators are crucial to the success of the Energy Efficient Mortgage market, since they offer lenders and realtors a single point of contact for the development of ratings, preparation of firm cost estimates, and general paperwork processing for an EEM in a time frame that doesn't delay the real estate transaction.
- According to HUD data presented in the Energy Aware Housing Agent Program (EAHAP) Market Effects Study, the number of EEMs written in the Fresno, Sacramento, and San Francisco HUD regions increased from 541 in FY 1997 (10/96 through 9/97) to 1,310 in FY 1998 – evidently as a result of the EAHAP program.
- Interviews with most of the major EEM facilitators identified by the EAHAP program and with a number of CHEERS (and other HERS) raters, lead us to estimate the number of energy efficient mortgages currently being written at about 2,000 annually. With an average cost of energy efficiency improvements of \$5,000, this would mean that the whole-house approach is currently a \$10 million market within PG&E territory.
- All but 200 of the 1,310 FY 1998 EEMs were written in the Fresno and Sacramento regions. Several CHEERS raters who work in the coastal regions of the state note that there is relatively little demand for their services, partly because the mild climate makes it difficult to identify a package of improvements that meets the EEM criteria, and partly because home prices in the San Francisco region typically exceed FHA and HUD financing limits.

IN MARKETING ENERGY EFFICIENT INTEGRATED SOLUTIONS, THE MOST SUCCESSFUL FACILITATORS USE THEIR KNOWLEDGE OF THE HOME ENERGY RATING SYSTEM (HERS) SOFTWARE TO PUT TOGETHER A PACKAGE OF MEASURES THAT IS ATTRACTIVE TO CUSTOMERS WHILE STILL MEETING THE “POSITIVE CASH FLOW” CRITERION OF THE EEM.

- Facilitators use either CHEERS or Rated Energy Plus to analyze and present results, choosing one or the other based on their personal preference and their perception of the ratings as a marketing tool. One facilitator, for example finds Rated Energy Plus a more useful selling tool because “CHEERS stresses weatherization and insulation measures too much.”
- Measures such as insulation and duct repair may show up as the most cost-effective, say facilitators, but they are rarely what customers want. “Only 1 out of every 200 homebuyers is a purist and wants the measures that will save them the most. The rest have a specific measure in mind that they want to install, regardless of the energy savings.”
  - What customers want is dual-pane windows and a new AC or furnace, but these are rarely justified by the results.<sup>1</sup> The most positive energy impacts usually come from insulation, reduced infiltration, duct sealing, low flow showerheads, set-back thermostats and CFLs.
  - Lower-cost, higher-impact measures sometimes enable the buyer to include windows or a new AC, but they can rarely if ever do both because of the cost limitations on the EEM. One facilitator provided as an example a \$7,000 package that includes a furnace retrofit, duct repair, attic and wall insulation, and sunscreens. This package added \$42 to the monthly payment but saved \$54 a month in energy costs.

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<sup>1</sup> One respondent cited the example of a CHEERS-modeled whole-house efficient window installation that would have had a simple payback of 440 years.

A SIGNIFICANT BARRIER TO FACILITATORS' ABILITY TO EXPAND EEMS AND THE WHOLE-HOUSE APPROACH HAS BEEN THE DIFFICULTY OF OBTAINING EEMS IN CONVENTIONALLY FINANCED HOMES, BUT THIS BARRIER COULD BE REDUCED OR ELIMINATED BY A PROPOSED NEW EEM.

- The ability of facilitators to obtain financing for whole-house energy efficiency retrofits is limited by the requirements of the lending institution. Conventional (Fannie Mae and Freddie Mac) mortgages, which account for about 80 percent of California mortgages, currently have an EEM provision, but they require an added down payment and require that the cost of energy efficient improvements be added to the loan amount for which the buyer must qualify. According to one facilitator, "this restriction knocks out 95 percent of applicants for conventional EEMs."
- According to a Fannie Mae official interviewed, a new EEM to be offered in a Fannie Mae pilot program could dramatically expand the number of EEMs and the application of the whole-house approach by applying the features of HUD/FHA EEMs to conventional mortgages. Specifically:
  - In determining borrower qualifications, the lender can now subtract savings attributable to energy efficiency improvements from the PITI (Principal, Interest, Taxes, Insurance) requirements. In addition, lenders will now be able to add the value of the EE improvements to the value of the home in calculating loan-to-value ratios.
  - The maximum dollar value of improvements as a percentage of the appraised value will also be increased well above 5 percent. While a final decision has not yet been made, the percentage is expected to be in the 12-15 percent range.
- Fannie Mae is expecting to launch this nationwide pilot in the next 4-6 weeks, but it limiting its availability to lenders who have previous experience with EEMs, such as Countrywide, GMAC, and North American.

GIVEN THE RATIO OF CONVENTIONAL TO HUD/FHA MORTGAGES, THE NEW PROGRAM WOULD EFFECTIVELY MEAN A FIVE-FOLD INCREASE IN THE NUMBER OF HOME BUYERS ELIGIBLE FOR AN EEM.

EVIDENCE OF GROWING INTEREST IN THE WHOLE-HOUSE ENERGY EFFICIENCY MARKET IS INDICATED BY THE NUMBER OF NEW ENTRANTS EITHER HAVE ENTERED THE MARKET OR ARE POISED TO DO SO.

- Several of the CHEERS raters interviewed said they are considering becoming facilitators, both in response to growing demand and in response to a widespread perception that facilitators currently in the market are inflating the cost of energy efficient renovations.
- These CHEERS raters say that while facilitators speed up the EEM process, they also remove an element of competition from the cost of energy efficient upgrades. Rightly or wrongly, there is a perception that some facilitators are taking advantage of the customer relationship and the financing source to artificially raise the price of corrective actions taken under the EEM.
- The cost of upgrades financed by the most widely used EEM is capped at 5 percent of the home cost or \$8,000, the only other requirement being that the increased loan service payments attributable to the upgrades be more than offset by the aggregate monthly energy savings. In some case, it is said, this has led facilitators to price the cost of repairs up to the maximum threshold supported by the energy savings rather than at their true cost.
- On the other hand, several facilitators noted that the ceiling imposed on repair/retrofit costs cuts into profit margins and makes some contractors reluctant to participate in EEM projects, especially since all work must be done at the fixed price that is bid and put into escrow. One facilitator did point out that being paid out of escrowed funds eliminates the collection costs and bad debt problems that often plague contractors.
- In response to the perceptions of overcharging, the President of the BPCA notes that higher costs charged by facilitators may also represent actual value added by this function, particularly since many of these energy efficient renovations would not be undertaken otherwise. Several of the facilitators interviewed noted that it takes “4 or 5 hours” for the facilitator to put together the paperwork for an EEM.

- Actual or perceived problems with facilitators are having two contradictory effects on the market for EEM-funded TOS renovations.
  - While most lenders and realtors are said to be satisfied with the facilitators that they work with, one respondent says that some lenders and realtors stopped dealing in energy efficient mortgages because of customer dissatisfaction with facilitators and their work.
  - Several current or former CHEERS raters interviewed are planning to enter the market as facilitators, believing that they can provide better service and prices and still make a profit. One of these new facilitators also believes he can offer similar services to existing home owners without using energy efficient financing.

**FACILITATORS BELIEVE THAT INCREASED INTEREST IN AND PROMOTION OF EEMS BY LENDING INSTITUTIONS IS A KEY TO BUILDING AWARENESS AND USE OF WHOLE-HOUSE ENERGY EFFICIENCY SOLUTIONS.**

- According to CHEERS raters and facilitators interviewed, a few lenders account for most of the EEMs being written today. While these lenders have done EEMs for the last few years and are now comfortable with the concept and the process, they – like other mortgage lenders – face high turnover, leading to a significant information/search cost barrier. Most of the facilitators interviewed expressed frustration at having “educated” individual loan officers over time – only to have them move on to other positions or companies.
- Transaction costs are only a low barrier to getting lenders involved in EEMs. While a high volume of business due to home sales as well as refinancing activity over the past several years has given loan officers the luxury of avoiding hassles, facilitators make it possible to minimize the paperwork demands on lenders.
- Lender say that barriers to loans for whole-house energy efficiency retrofits outside the EEM framework are much more significant, since such loans would require extensive research and lack the performance assurance of a completed home energy rating.

REALTORS ARE SAID BY FACILITATORS TO POSE A SIGNIFICANT TRANSACTION COST BARRIER TO EEMS, SINCE THEY FEAR ANY COMPLICATION THAT COULD HAMPER OR DELAY COMPLETION OF THE HOME SALE.

- In words that were echoed by other facilitators, one noted that, “Realtors hate the EEM program because they are afraid if it is found that the home needs improvements, the customers will not be as willing to buy.” Other facilitators pointed out that realtors, unlike lenders, usually concentrate on one deal at a time, making them more anxious to close a deal and more suspicious of anything that might derail it.
- In the current California real estate market, many realtors are making enough money that the possibility of bringing in extra customers with EEMs simply does not offer that much of an incentive.
- According to several facilitators, the antipathy toward EEMs among some realtors is evidently quite strong; a few realtors are said to have stopped referring customers to lenders who promote EEMs, while others reportedly try to convince homebuyers not to do EEMs.
- More typical, however, is the tendency among realtors to discuss EEMs only if necessary to close a sale. For instance, if a homebuyer likes a house but wishes it had a new CAC, the realtor will mention that EEM could be a way to make it happen. But if the customer does not bring it up, neither will the realtor.
- Despite realtor concerns, facilitators say, the typical EEM in no way affects the closing schedule. Facilitators believe that greater customer demand for EEMs as they become more mainstream will erode realtor opposition over time.

**ARCHITECTS FREQUENTLY SPECIFY HIGH EFFICIENCY MEASURES, BUT THEY ADOPT AN INTEGRATED APPROACH TO ENERGY EFFICIENCY ONLY WHEN NECESSARY TO MEET TITLE 24 REQUIREMENTS.**

- Interviewed architects reported that they often include energy efficient measures in their specifications for major remodeling and renovation jobs, in part because they tend to be involved in the more upscale remodeling projects where premium materials include energy efficient attributes as a matter of course.
- Working with Title 24 consultants, architects take a *de facto* integrated approach when they must compensate for aspects of an addition that fails to meet Title 24 standards. Several architects described how customer concerns for aesthetics in one aspect of the design necessitate such an approach:
  - “Many remodeling projects are pushing the limits of allowed window area, so they have to install other energy efficiency options to justify the extra windows and meet Title 24.”
  - “People are interested in putting in as much glass as possible to increase natural lighting in the space they’re adding, so they need to install extra insulation, energy efficient HVAC, and low-E glass to meet Title 24.”
- While architects have the knowledge to take on whole-house projects, their reliance on Title 24 consultants for energy efficiency expertise implies a significant information/search cost barrier to an integrated energy efficiency approach.
- Architects also face a market uncertainty barrier to the whole-house approach in that the cost of their services makes it uncertain whether they will be able to play a major role in renovations under the constraints of an EEM.



AS NOTED PREVIOUSLY, SOME CHEERS INSPECTORS ARE CONSIDERING A MORE ACTIVE PURSUIT OF THE WHOLE-HOUSE EEM MARKET. IN CONTRAST, HOME INSPECTORS CAREFULLY AVOID ANY ROLE THAT WOULD JEOPARDIZE THEIR IMPARTIALITY.

- While CHEERS inspectors are prohibited from selling any repair or renovation services to the owner of any home they rate for a period of two weeks after the audit, they are free to contact the owner after that time. In addition, CHEERS raters often develop their recommendations based on the home owners preferences and requirements, so that the transition from inspector to facilitator is relatively easy.
- A strong organizational practice barrier to greater involvement in the whole-house retrofit exists because home inspectors see their role as one of strictly providing unbiased information. While inspectors may on occasion make generic recommendations regarding the kind of repair work required to correct a deficiency, they would never provide even a list of contractors.
  - Both the California Real Estate Inspector Association (CREIA) and American Society of Home Inspectors have a formal code of ethics that dictates the nature of the relationship and prohibits any selling of services for the inspected home.
  - The Executive Director of CREIA said that his 750-member organization would probably be willing to promote energy efficiency by, for example, having their members hand out a PG&E-provided publication, but a more active role as facilitators or service integrators for this group seems highly unlikely.
- The role of print and broadcast media in promoting a whole-house approach to energy efficiency faces similar barriers to those found for individual measures: a high information/search cost barrier to identify and analyze needed information, and a moderate market uncertainty barrier regarding reader acceptance of the subject matter.

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<sup>1</sup> Interview with Gregory Thomas, Building Performance Contractors Association

<sup>2</sup> D&B Marketplace CD, iMarket, Inc. April-June 1999

<sup>3</sup> PG&E 1999 Residential Windows Strategic Plan, Energy Solutions, March 1999. P. 4

<sup>4</sup> Interview with National Association of the Remodeling Industry (NARI) member

IN THIS SECTION, INTERVENTIONS THAT CAN HELP ADDRESS THE BARRIERS DESCRIBED PREVIOUSLY – BOTH FOR INDIVIDUAL MEASURES AND FOR THE WHOLE-HOUSE APPROACH – ARE DISCUSSED.

- A combination of primary data, secondary data, and analytical judgement was used to map potential market interventions to significant barriers described in previous sections.
  - As with the measure-specific sections, secondary data reviewed for the analysis include previous PG&E studies, other evaluations and planning documents, publications of national and regional trade associations, and government statistics, as detailed in the end notes to of the previous sections.
  - Primary data sources, summarized previously in Exhibit 1-4 and described in detail in the data collection section, consisted of surveys/interviews with market actors involved in the windows market. A number of the market actors were directly asked how PG&E might help overcome barriers to energy efficiency; others provided more general information on the needs and interests of various market actor groups.
  - The results of interviews and the secondary data analysis were interpreted and mapped to specific market barriers using the experience and judgment of senior QC staff.
- Potential interventions were rated in importance using a screening rule that no intervention could be more important than the barrier it is expected to address; in other words, an intervention is considered very important, or high-potential, only if it addresses one of the “most important” barriers identified in the measure-specific or whole-house discussions.

- End-user perceptions and needs generally are much less variable than those of the various supply-side market actors. A key constraint on end-user TOS and DR activity, particularly whole-house activity, is simply the situational aspect – home purchases drive TOS events, and often gradual decisions about non-urgent replacement of energy-consuming measures, frequently for non-energy reasons, drive DR events.
  - Beyond those situational constraints and the fairly predictable first-cost uncertainties, end users surveyed in this study generally were open to DR and TOS applications, including whole-house applications.
  - In contrast, among some supply-side market actors there are more structural barriers to development of TOS applications, and particularly both DR and TOS whole-house applications. As discussed in the preceding chapters, these stem from a range of factors, including lack of knowledge, lack of interest in new opportunities, risk-aversion, mistrust toward other market actors in the process, and even antipathy toward the concept of whole-house applications itself. As a result, the majority of this intervention chapter focuses on the supply side, and how the main elements of an R&R intervention portfolio can impact different market actors in different, often complementary ways.
  - The chapter ends with a targeted summary of proposed interventions viewed from the end user perspective, where possible based on survey data among end users, and also frequently based on broader analysis of the issues involved and QC's experience in the industry.



TO ORGANIZE THE ANALYSIS IN THIS CHAPTER, INDIVIDUAL MARKET INTERVENTIONS WERE GROUPED INTO SEVEN CATEGORIES, AS SHOWN IN THE FACING EXHIBIT AND DISCUSSED BELOW. PROPOSED R&R PROGRAM ELEMENTS ARE INCLUDED AMONG THESE INDIVIDUAL INTERVENTIONS, BUT ARE SHOWN IN BOLD TYPE.

- The broad heading of information-related interventions encompasses several key elements of the R&R Program that are relevant to the supply side, including both targeted and diversified information.
  - In this analysis of interventions, we have generally considered targeted information as being tailored to specific market actors, while diversified information is defined as comprising the range of information dissemination tools that are designed to raise the overall level of awareness of efficient windows and to ensure that the information needed to make a purchase decision is readily available.
  - Among the specific information dissemination methods cited by supply-side actors were:
    - .. 800 numbers
    - .. print and broadcast media
    - .. web-based information
    - .. brochures and fact sheets
    - .. point-of-sale displays
- Promotional interventions differ from diversified information in that they actively encourage the adoption of efficient technologies by, for example, emphasizing the energy and non-energy benefits that these measures can provide. The EPA ENERGYSTAR® Program is classified as a promotional intervention.
- Education and training interventions include interventions designed to meet the need for detailed technical knowledge that can best be conveyed in a more structured setting. Proposed R&R program elements in this category include Home Center Training, Building Inspector Training, and Energy Centers.

- Testing and certification comprises all those interventions that help address concerns about the performance of the efficient technologies themselves as well as about the quality of the individual or company selling or installing the measure.
- Interventions that are designed to bring buyers and sellers together include both direct referrals and the facilitation of contact using the Internet or other means.
- Financial measures comprise both incentives (to buyers or sellers) and financing.
- Finally, institutional changes are those interventions that attempt to introduce new market actors or new business models into the residential retrofit market, such as the R&R program effort to institutionalize home energy rating systems (HERS) and energy-efficient mortgages (EEMs).
- Note that this list of interventions is not necessarily comprehensive, but it does include all the specific interventions identified by interview respondents, included in the R&R program design filing, or reported in secondary data sources.
- In the remainder of this section, high- and moderate-potential market interventions in the above categories are discussed in order of the importance of individual barriers, as shown in the facing exhibit.
  - In a given row, the industries and market actor(s) for which the barrier applies are indicated with an “X” in the first two sets of columns.
  - The specific barrier and its level of importance are indicated in the third set of columns.
  - All of the interventions that address that single barrier are indicated, with their level of importance/effectiveness, in the remaining columns. The high and moderate-potential interventions are discussed in the text; low-potential interventions are only shown on the exhibit.

**FINALLY, ALL THE HIGHEST POTENTIAL INTERVENTIONS ARE SUMMARIZED, BY CATEGORY, TO HELP IDENTIFY THE MOST PROMISING PROGRAM ELEMENTS FOR THE R&R PROGRAM.**

## Exhibit 8-2 Recommended Supply-side Interventions High Initial Cost

Industry					Market Actors										Barriers										Supply-Side Interventions																																	
																									Information				Promotion		Education and Training				Testing/Certification		Bring B & S Together		Financial Measures		Institutional Changes																	
Windows	HVAC	Kitchen	Lighting	Whole House	Manufacturers	Distributors	Retailers	Measure-Specific Contractors	General Contractors	Architects	Building Inspectors	Financiers	Realtors	Media	High Initial Cost vs Value	Info/Search Costs	Performance Uncertainty	Transaction Costs	Market Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Svc./Product Unavailability	Unseparable Features/Style	Targeted Information	Diversified Information	Brochures and Fact Sheets	Energy Surveys	Demonstrations	Advertising, PR	Energy Star Program Label	3P Home Center Training	Home Insp./Bldg Official Training	Energy Center	Training	Testing	Certification	3P verification	Internet Commerce	Referrals	Incentives	Financing	3P HERS/SEEM Institutionalized	Systems Approach													
X	X		X					X	X	X						4												4																														
	X															4												4																														
		X														4																																										
			X													4																																										
				X												4																																										
					X	X		X								4																																										
					X	X		X								4																																										
					X	X		X								4																																										

**KEY**  
 4 Importance  
 4 High  
 2 Moderate  
 1 Low

THE SINGLE BARRIER MOST CONSISTENTLY IDENTIFIED AS VERY IMPORTANT— HIGH INITIAL COST RELATIVE TO PERCEIVED VALUE — APPEARS TO BE BEST ADDRESSED BY IMPROVING THE LEVEL OF UNDERSTANDING OF AFFECTED MARKET ACTORS THROUGH A VARIETY OF INFORMATION, PROMOTION, AND EDUCATION AND TRAINING INTERVENTIONS.

- Architects believe that the first cost barrier for windows, HVAC, and lighting can be effectively addressed with a combination of targeted information for architects and contractors and more diversified information (for homeowners).
  - Architects also affirmed the value of seminars and other training in making them more knowledgeable about energy-efficient windows, but noted that those who would most benefit from the training are the least likely to know or care enough to attend.
  - One architect who has attended a number of energy efficiency related seminars noted that he was always the only architect in attendance.
- Both general contractors and specialized contractors for windows, HVAC, and lighting assign high importance to targeted information regarding benefits that offset higher first cost, which they can then use to develop an appropriate marketing message.
  - Advertising and PR promoting energy efficiency could play a moderately important supporting role in highlighting the benefits of individual energy-efficient measures.
  - While financial incentives were downplayed during interviews with supply-side market actors, a number of contractors nevertheless suggested them as highly effective ways to overcome the first-cost barrier to energy-efficiency measures.
- For financiers, the high cost relative to value barrier for both individual energy-efficiency measures such as windows and the whole-house approach can only be overcome through the institutionalization of home energy ratings as part of a seamless EEM process. This intervention is moderately important for individual measures but very important for the whole-house approach.



- General contractors believe that large-scale advertising/PR efforts would be highly effective in addressing the first cost barrier by raising awareness of the benefits of a whole-house approach. These same market actors perceive financial incentives as having moderate potential to overcome initial cost concerns.
- Kitchen distributors and contractors perceive targeted information as moderately effective in addressing the very important first-cost barrier, and they also believe that promotional interventions – notably the ENERGYSTAR® label – can be moderately effective. In addition, education and training interventions -- including home center training – are thought to provide a good background for market actors to learn the value of energy-efficient technologies relative to their higher first cost.
- Distributors and retailers of windows, HVAC, and lighting all support both training in general and home center training for customers as interventions that can be moderately effective in overcoming concerns regarding high initial cost.



INFORMATION AND SEARCH COST BARRIERS ARE, NOT SURPRISEINGLY, MOST EFFECTIVELY ADDRESSED BY INFORMATION-RELATED INTERVENTIONS, ALTHOUGH OTHER INTERVENTIONS MAY BE APPROPRIATE TO ADDRESS THE NEED FOR SPECIALIZED KNOWLEDGE.

*High Information and Search Cost Barrier*

- Information targeted to the needs of reporters and editors can help overcome barriers to enlist media support in disseminating information about efficient windows, HVAC system, lighting, or the whole-house efficiency approach. Providing a tie-in to the national ENERGYSTAR® campaign should help in this process.
- High information search costs among building inspectors area best addressed by training tailored to their specific needs for detailed technical information on the characteristics and installation of high-efficiency windows and HVAC systems.
- The high information search cost for financiers reflects a lack of knowledge among lending institutions regarding energy-efficient loans (for windows and HVAC) and mortgages (for whole-house retrofits). Information targeted to this sector is perceived to be moderately effective, but the most effective strategy appears to be the institutionalization of home energy rating systems, EELs, and EEMs so that all financiers have ready access to the needed information.

*Moderate Information and Search Cost Barrier*

- For kitchen contractors, a moderately important information/search cost barriers can be countered with targeted information on how to market efficient appliances. In addition, Internet listings or other forms of referrals could give contractors ready access to information on suppliers of efficient appliances.
- An equally important search cost barrier for kitchen retailers can also be addressed with information targeted to this group.
- For specialized windows, HVAC, and lighting contractors as well as general contractors, the information barrier can be reduced by raising customer awareness of energy efficiency through provision of brochures and fact sheets. This barrier can also be addressed through consumer-oriented training at the point of purchase, such as home center training.

- Information barriers to whole-house energy-efficiency retrofits (for measure-specific contractors, general contractors, and architects) are effectively addressed through the provision of targeted information, in this case information on the benefits of whole-house retrofits targeted to home buyers and home owners shopping for remodeling products and services.

## Exhibit 8-4 Recommended Supply-side Interventions Performance Uncertainty

Industry					Market Actors											Barriers											Supply-Side Interventions																							
																											Information					Promotion	Education and Training			Testing/ Certification		Bring B & S Together		Financial Measures		Institutional Changes								
Windows	HVAC	Kitchen	Lighting	Whole House	Manufacturers	Distributors	Retailers	Measure-Specific Contractors	General Contractors	Architects	Building Inspectors	Financiers	Realtors	Media	High Initial Cost vs Value	Info/Search Costs	Performance Uncertainty	Transaction Costs	Market Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Svc./Product Unavailability	Unseparable Features/Style	Targeted Information	Diversified Information	Brochures and Fact Sheets	Energy Surveys	Demonstrations	Advertising, PR	Energy Star Program Label	SP Home Center Training	Home Insp./Bldg Official Training	Energy Center	Training	Testing	Certification	SP verification	Internet Commerce	Referrals	Incentives	Financing	SP HERS/EEM Institutionalized	Systems Approach					
X	X											X					4																																	
				X		X											4											1																						
		X						X									4																																	
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**KEY**  
 4 High  
 2 Moderate  
 1 Low

INTERVENTIONS THAT HELP ASSURE MARKET ACTORS OF THE QUALITY AND COST-EFFECTIVENESS OF ENERGY-EFFICIENCY MEASURES SHOULD BE EFFECTIVE IN OVERCOMING PERFORMANCE UNCERTAINTY BARRIERS. THE ENERGYSTAR® LABEL COULD BE A KEY COMPONENT OF SUCH INTERVENTIONS.

*High Performance Uncertainty Barrier*

- For lenders, performance uncertainty regarding either individual measures such as windows or HVAC or a whole-house approach can best be overcome through the institutionalization of home energy rating systems that document the expected savings attributable to specific measures or packages of measures.
- Kitchen distributors and kitchen contractors see ENERGYSTAR® product labeling as a moderately effective intervention in that it offers an opportunity to leverage a recognized brand and assuage customer concerns regarding the energy performance of individual appliances. Kitchen contractors see value in training, which nearly half of those interviewed recommended as helping them sell energy efficiency.

*Moderate Performance Uncertainty Barrier*

- General contractors face moderate customer performance uncertainty when selling energy-efficient windows or lighting, and they believe that ENERGYSTAR® labeling could help overcome that uncertainty.
- For kitchen retailers, promotion by a trusted third party can help reduce the performance uncertainty barrier by increasing customer (and retailer) confidence that promised energy savings will materialize.
- In addressing the moderate performance uncertainty faced by lighting contractors, promotion is a key to overcoming customer concerns regarding the performance of compact fluorescent residential lighting. While few supply-side interview respondents explicitly suggested the ENERGYSTAR® label, programs being implemented in New York (and considered in California) suggest that ENERGYSTAR® may provide a valuable vehicle for building public confidence in efficient lighting.

### Exhibit 8-5 Recommended Supply-side Interventions Transaction Costs

Industry					Market Actors										Barriers										Supply-Side Interventions																									
																									Information					Promotion		Education and Training			Testing/Certification		Bring B & S Together		Financial Measures		Institutional Changes									
Windows	HVAC	Kitchen	Lighting	Whole House	Manufacturers	Distributors	Retailers	Measure-Specific Contractors	General Contractors	Architects	Building Inspectors	Financiers	Realtors	Media	High Initial Cost vs Value	Info/Search Costs	Performance Uncertainty	Transaction Costs	Market Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Svc./Product Unavailability	Unseparable Features/Style	Targeted Information	Diversified Information	Brochures and Fact Sheets	Energy Surveys	Demonstrations	Advertising, PR	Energy Star Programm Label	3P Home Center Training	Home Insp./Bidg Official Training	Energy Center	Training	Testing	Certification	3P verification	Internet Commerce	Referrals	Incentives	Financing	3P HERS/SEEM Institutionalized	Systems Approach					
X	X		X				X	X					X					4								2					1		2			2										4				
		X		X	X	X												4											2																					
X					X	X												4																																
					X	X												2								2					2																			
																		2															1																	

**KEY**

4 High

2 Moderate

1 Low

BECAUSE OF THE DIVERSE CONCERNS REFLECTED IN TRANSACTION OR HASSLE COSTS, A VARIETY OF HIGH AND MEDIUM POTENTIAL INTERVENTIONS ARE APPROPRIATE.

*High Transaction Cost Barrier*

- For realtors, transaction cost barriers reflect resistance to energy-efficient financing of time-of-sale measures – either individually or as part of a whole-house project – based on concerns that installation of these measures will complicate the home sale. While targeted information can be moderately effective in overcoming these concerns, the fundamental changes associated with institutionalization of HERS and EEMs can be highly effective in overcoming this barrier.
- The high hassle and transaction cost for kitchen appliance retailers (i.e., the perception that energy-efficient equipment is harder to install) could be reduced through education and training in proper installation procedures. In addition, certification would make it easier for both retailers and customers to identify qualified installation contractors. Both sets of interventions are perceived as moderately important.
- The transaction cost barrier that keeps measure-specific contractors from pursuing whole-house energy-efficiency opportunities might be addressed through training in some of the steps associated with a whole-house approach, including HERS and EEMs as well as licensing and other legal implications. Demonstrations of whole-house retrofit projects could also make contractors more familiar with the process.
- The high transaction cost barrier faced by measure-specific distributors who are considering supporting a whole-house approach to energy efficiency might be overcome through partnership arrangements with other single-line distributors under a referral system or internet-based “virtual” multi-line distributorship.

*Moderate Transaction Cost Barrier*

- For window manufacturers, the moderate transaction cost barrier associated with submitting products for testing and certification can be reduced directly through the established protocols and standards of the ENERGYSTAR® program and the NFRC labeling system. At the same time, dissemination of the resulting ratings can educate customers and make the transaction cost associated with testing more worthwhile.
- For kitchen appliance distributors, the moderate transaction cost barrier associated with helping buyers evaluate the energy performance of various appliances can be reduced or eliminated through the use of a recognized label such as that provided by ENERGYSTAR®.





SINCE MARKET UNCERTAINTY REFLECTS SUPPLY-SIDE ACTORS DOUBTS ABOUT WHETHER INVESTMENTS IN THE PRODUCTION, STOCKING, OR MARKETING OF ENERGY-EFFICIENT TECHNOLOGIES WILL PAY OFF, THIS BARRIER CAN GENERALLY BE MITIGATED THROUGH DIVERSIFIED INFORMATION INTERVENTIONS THAT BUILD OR SUSTAIN DEMAND FOR SUCH TECHNOLOGIES.

*High Market Uncertainty Barrier*

- The high market uncertainty barrier faced by retailers or specialized contractors considering entering the whole-house market can be countered with a high degree of effectiveness through a combination of targeted information (for contractors or retailers themselves as well as other market actors with whom they interact) and diversified information to promote the whole-house concept among end users. In addition, both financing and the institutionalization of HERS/EEMs would be expected to provide a strong boost to market actors in putting together a cost-effective whole-house proposal.
- For HVAC manufacturers, the market uncertainty barrier that customers will not pay the extra cost for high-efficiency products can be reduced through testing programs that provide a standard against which improvements in efficiency can be measured. Diversified information can also be moderately effective in demonstrating to consumers that the more efficient products are cost-effective.
- In the same way, diversified information can be moderately effective in helping overcome the market uncertainty barrier faced by HVAC distributors, who have a history of trying to manage fluctuations in demand for efficient units in response to changing utility programs. Any fundamental changes in customer awareness of efficient HVAC would be expected to build a base of demand for such units.

*Moderate Market Uncertainty Barrier*

- Both window distributors and window contractors believe that the moderate market uncertainty barrier they face could be countered by an aggressive advertising/PR campaign and – to a lesser extent – by diversified information. HVAC contractors, too, see both diversified information and advertising addressing market uncertainty.

- For windows manufacturers, the moderate degree of market uncertainty from investing in new product lines can be reduced through testing programs that provide a standard against which improvements in efficiency can be measured. In addition, diversified information can be moderately effective in ensuring that consumers are aware of the benefits of energy efficiency, so that demand emerges in response to new product offerings.
- Finally, the market uncertainty reporters and editors face about whether their audience will respond to coverage of energy-efficiency topics can be overcome through a combination of targeted information telling editors why energy efficiency is important and Energy Center (or other) training to give reporters a more detailed understanding of energy issues.
-



HIDDEN COST BARRIERS – TAKEN IN THE SUPPLY-SIDE CONTEXT AS THE RISK THAT CUSTOMERS MAY REJECT OTHERWISE DESIRABLE ENERGY-EFFICIENT PRODUCTS BECAUSE OF CONCERNS ABOUT OTHER PRODUCT CHARACTERISTICS -- CAN BE DIRECTLY AND EFFECTIVELY ADDRESSED WITH INFORMATION AND DEMONSTRATIONS.

- The high hidden cost barriers faced by window contractors (regarding “too dark” windows), lighting contractors (regarding “too dim” CFLs), and general contractors (regarding both measures) can be minimized through targeted information that explains, in detail, the design or aesthetic parameters that worry buyers.
  - Equally effective would be demonstrations that provide customers a first-hand look at how the products perform.
  - In addition, contractors believe diversified information for consumers can be moderately effective in overcoming the hidden cost barrier by re-emphasizing the benefits of energy-efficient technologies.
- The high-impact targeted information and demonstration interventions are also expected to help overcome the high hidden cost barrier faced by lighting distributors and retailers, which are rooted in the same customer concerns about CFLs mentioned above.

# Exhibit 8-8 Recommended Supply-side Interventions Organizational Practices, Bounded Rationality, and Misplaced Incentives

Industry					Market Actors											Barriers															Supply-Side Interventions																			
																															Information					Promotion		Education and Training			Testing/Certification		Bring B & S Together		Financial Measures		Institutional Changes			
Windows	HVAC	Kitchen	Lighting	Whole House	Manufacturers	Distributors	Retailers	Measure-Specific Contractors	General Contractors	Architects	Building Inspectors	Financiers	Realtors	Media	High Initial Cost vs Value	Info/Search Costs	Performance Uncertainty	Transaction Costs	Market Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Svc/Product Unavailability	Unseparable Features/Style	Targeted Information	Diversified Information	Brochures and Fact Sheets	Energy Surveys	Demonstrations	Advertising, PR	Energy Star Program Label	3P Home Center Training	Home Insp./Bldg Official Training	Energy Center	Training	Testing	Certification	3P verification	Internet Commerce	Referrals	Incentives	Financing	3P HERS/EEM Institutionalized	Systems Approach					
X	X			X		X		X													4					2																								

**KEY**  
Importance  
4 High  
2 Moderate  
1 Low

**ORGANIZATIONAL PRACTICE AND OTHER BARRIERS THAT COME INTO PLAY AS MARKET ACTORS CONSIDER CHANGES IN THE WAY THEY DO BUSINESS CAN BE COUNTERED PRIMARILY BY INFORMATION-BASED INTERVENTIONS AND TRAINING.**

- Organizational practice, a powerful barrier to measure-specific contractors undertaking any kind of whole-house approach to retrofits, can be addressed with moderate success by targeted information tailored to these contractors and diversified information to build support for such an approach among customers.
- The moderate organizational practice barrier faced by HVAC distributors may also be addressed with some success by diversified information.
- For building inspectors, the moderate organizational practice barrier of applying long-standing inspection techniques to new measures and technologies that require more sophisticated inspection can best be addressed directly through inspector training.
- The bounded rationality barrier that arises when window and HVAC contractors do like-for-like replacements can be countered with targeted informational materials that show the extensive range of efficient models that the contractor can offer to customers.
- The misplaced incentive barrier that may lead window contractors to sell more rather than more efficient windows can be addressed through promotional efforts to consumers, on the assumption that contractors will respond to a shift in customer emphasis to energy efficiency.

### Exhibit 8-9 Recommended Supply-side Interventions Service/Product Unavailability, Inseparable Features/Style

Industry					Market Actors										Barriers											Supply-Side Interventions																										
																										Information				Promotion		Education and Training			Testing/Certification		Bring B & S Together		Financial Measures		Institutional Changes											
Windows	HVAC	Kitchen	Lighting	Whole House	Manufacturers	Distributors	Retailers	Measure-Specific Contractors	General Contractors	Architects	Building Inspectors	Financiers	Realtors	Media	High Initial Cost vs Value	Info/Search Costs	Performance Uncertainty	Transaction Costs	Market Uncertainty	Hidden Cost	Organizational Practices	Bounded Rationality	Misplaced Incentives	Svc/Product Unavailability	Inseparable Features/Style	Targeted Information	Diversified Information	Brochures and Fact Sheets	Energy Surveys	Demonstrations	Advertising, PR	Energy Star Program Label	3P Home Center Training	Home Insp./Bldg Official Training	Energy Center	Training	Testing	Certification	3P verification	Internet Commerce	Referrals	Incentives	Financing	3P HERS/EEM Institutionalized	Systems Approach							
	X							X	X																																											
		X						X	X																																											
		X						X	X																																											
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		X						X	X																																											
		X						X	X																																											

KEY
4 High
2 Moderate
1 Low



THE UNAVAILABILITY OF HVAC INSTALLERS CAN BE ADDRESSED THROUGH EDUCATION AND TRAINING, WHILE BARRIERS REGARDING THE AVAILABILITY AND CHARACTERISTICS OF EFFICIENT KITCHEN APPLIANCES CAN BE ADDRESSED THROUGH PROMOTIONAL INTERVENTIONS AND BRINGING BUYING AND SELLERS TOGETHER.

- The high product unavailability barrier faced by HVAC contractors reflects an acute shortage of qualified installation personnel, which can best be addressed through Energy Center-based and other training efforts.
- Since kitchen retailers were the only players in this market who expressed concerns about the availability of efficient appliances, increasing buyer and seller interaction should help reduce the unavailability barriers retailers are exposed to the full range of efficient models on the market.
- Kitchen retailer, contractor, and distributor barriers regarding the inseparability of product features (i.e., that customers believe they cannot get high-efficiency appliances without sacrificing style) should also be tractable by increasing communication not only between individual buyers and sellers, but up and down the supply chain. This would help ensure that energy-efficient appliances are offered in a wide range of styles and with precisely the features that customers demand.

NEXT, THE HIGH- AND MODERATE POTENTIAL INTERVENTIONS DETAILED ABOVE ARE SUMMARIZED IN A SET OF RECOMMENDED HIGH-PRIORITY INTERVENTIONS, DISCUSSED BY CATEGORY.

IN ORDER TO MAXIMIZE PROGRAM EFFICIENCY AND SYNERGY, THE R&R PORTFOLIO MUST ADDRESS THE FULL RANGE OF SUPPLY-SIDE ACTOR KNOWLEDGE, INTEREST, POSITIVE INTENTIONS, ACTIONS, AND "HABITUATION" WITH RESPECT TO HIGH-EFFICIENCY MEASURES AND THE WHOLE-HOUSE MODEL.

Information and promotion of high-efficiency benefits – particularly targeted, proactive communication that does not rely upon market actor initiative – is critical to increasing supply-side interest in high-efficiency measures and whole-house applications. This is particularly true because the R&R program targets an opportunity driven by situational factors (desire to buy, sell, or upgrade a home) that are difficult for potential suppliers to target or anticipate ahead of time. Every effort must be made to use market-actor awareness generation activities to link prospective consumers and suppliers.

- Information-related interventions are important for all measures, and particularly so in the high-potential windows retrofit market, where energy efficiency involves complex design and installation issues that can directly affect product performance and acceptance.
  - Particularly for windows and HVAC – measures that directly impact consumer comfort - the ability to **target information** both to market actor concerns and geographically is key. High-efficiency measures and the whole-house business model should be emphasized in climate zones that experience the greatest temperature extremes to avoid “over-selling” end users.
  - Specific information about the likely or possible payback to consumers, along with information on financing tools (EEMs and EELs) and providers, together can increase supply-side confidence that high-efficiency investments make economic and practical sense for their customers.
  - The well-received PG&E windows video can serve as a model for other measure-specific and whole-house-oriented videos. They can have the dual benefit of visibly addressing most (not all) supply-side concerns - at least those derived from perceived end-user concerns – and also can be cost-effectively targeted to high-potential end users by being put in the hands of market actors with consumer contact.

- Additional information that might be targeted to supply-side market actors themselves (in addition to information targeted to end users) could include:
  - .. Evidence, as from this study, underscoring the high-efficiency market potential to address market uncertainty among supply-side actors with product/stocking planning responsibilities
  - .. Likewise, evidence underscoring the potential for whole-house market development, particularly around discretionary retrofits
  - .. Information with “pass-through” value to consumers, regarding the benefits offered by EEMs and EELs, also would be valuable in helping actors (other than lenders) recognize additional end-user benefits associated with high-efficiency measures and planning
  - .. Voice-of-the-customer information about the non-energy benefits (customized by measure) that high-efficiency measures and measure combinations are uniquely well-suited to provide
- In addition to information targeted to specific supply-side actors, perceived end-user concerns, and (for windows and HVAC) high-potential geographies, the R&R program also should include **diversified information**. This includes the range of information dissemination tools needed to raise the overall level of awareness of efficient windows, and to ensure that the information needed to make a purchase decision is readily available). Diversified information is presumed to be more “passive” in nature, while targeted information is presumed to be more proactive on the part of program implementers. Among the specific information dissemination methods cited by supply-side actors were:
  - .. 800 numbers (indicating an opportunity to increase awareness of the successful SMARTERENERGY™ Line)
  - .. Web-based information (as discussed elsewhere, an opportunity to leverage the SMARTERENERGY™ site)
  - .. Brochures and fact sheets
  - .. Point-of-sale (POS) displays, with the dual value of keeping high-efficiency measures top-of-mind for retailers, as well as bolstering knowledge and interest among end users in the shopping stage
  - .. PSAs, with regional targeting as required by measure, and possibly in conjunction with ENERGYSTAR®
  - .. Another possibility is sponsorship of TV programs focusing on home renovation.

- For high-efficiency measures where hidden costs and style-related bounded rationality may be a concern (e.g., windows and lighting, kitchen appliances), demonstrations and displays can be used to address concerns about measure installation, impacts on other aspects of the home, or aesthetic “fit.”
- **Advertising and PR** represent a category separate from targeted information because of its broadcast nature, and separate from diversified information because of its more proactive nature. As much as possible, advertising and PR should be used to create market actor (including end-user) awareness of the non-energy and payback benefits of high-efficiency applications, and funnel market actors to more detailed and customized (or customizable) targeted and diversified information sources.
  - All advertising should have a link to direct response mechanisms, so end users can “self-select” to receive targeted information customized to their needs and stage in the knowledge-consideration-action process.
  - With the addition of energy surveys on the SMARTERENERGY™ site, and if financing information and resources can be highlighted there, all advertising and PR should point to this potentially powerful marketing resource.
  - Careful planning will be important to the development of the right “break-through-the-clutter” advertising and PR message strategy, probably with primary emphasis on non-energy benefits and the payoff that consumers can get those benefits, save themselves money, and conserve energy.
- **ENERGYSTAR® product labeling** offers an obvious opportunity to leverage an already somewhat established brand with an identity consistent with the R&R program’s mission. The **ENERGYSTAR®** brand can cement end-user and supply-side (retailer, contractor) confidence in the performance and lifecycle value of high-efficiency measures, and provide a reliable “shorthand” method of identifying approved products.

EDUCATION AND TRAINING INTERVENTIONS ARE DESIGNED TO ADDRESS SPECIFIC SUPPLY-SIDE BARRIERS REQUIRING DETAILED TECHNICAL KNOWLEDGE BEST CONVEYED IN A MORE STRUCTURED SETTING.

- Contractor **training** in proper measure installation can help to address the hidden cost barrier associated with callbacks, warranty claims, and other problems that arise from improper or less-than-optimal measure installation. For example, the AAMA training program for window installers may provide an excellent vehicle for increasing the level of competence of existing staff and for addressing shortages of qualified installers.
- For general contractors, lack of knowledge and unfamiliarity with the full range of high-efficiency measure options (windows in particular) suggests the use of **Energy Center**-based education and training.
  - This resource provides an obvious, core contractor education benefits.
  - In addition, PG&E can let contractors know that it also intends to communicate the criteria for satisfactory contractor selection and measure installation to consumers as well (similar to past PG&E activities). This will create pressure on substandard contractors, and opportunities for customer-centered contractors, to complete appropriate Energy Center sessions and be publicize the fact.
  - Increasing the visibility and differentiation potential of energy-efficiency knowledge by architects is likely to be a key driver of long-term whole-house market development. Communication of the non-energy benefits of high-efficiency measure planning (supported by their economic and “green” benefits), targeted to regional readers of House Beautiful, Sunset, etc., could have the dual benefit of heightening consumer whole-house consciousness, and letting innovative architects know that this is occurring. A link to SMARTERENERGY™ could be particularly powerful.
- For building officials, targeted training that deals, in detail, with the characteristics and installation requirements of efficient windows would be appropriate.

TRAINING EFFORTS SHOULD BE IMPLEMENTED IN CONJUNCTION WITH INFORMATION AND PROMOTION TO ENSURE THAT SESSIONS ARE ATTENDED BY THE RIGHT PLAYERS.

TESTING AND THIRD-PARTY CERTIFICATION INTERVENTIONS CAN HELP ADDRESS CONCERNS ABOUT MEASURE AND INSTALLER PERFORMANCE. BY CREATING A LIST OF PRE-SCREENED SUPPLIERS, CERTIFICATION PROGRAMS CAN ALSO HELP BRING BUYERS AND SELLERS TOGETHER.

- Window **testing** and **certification** offered by NFRC helps address window manufacturer concerns regarding the performance of new glass/window technologies. At the same time, dissemination of the resulting ratings can educate customers and make the transaction cost associated with testing more worthwhile.
- Ongoing unification of testing protocols and organizations (such as the development of unified Canadian-U.S. standards for window structural strength, thermal performance, and resistance to condensation) can also help reduce the transaction costs faced by manufacturers for testing and certification.
- Some measure retailers suggested the provision of a pre-screened list of contractors to ensure that consumers have efficient measures properly installed.
- In addition, several associations (e.g., California inspectors, NARI, AAMA, HVAC contractors) have programs that enable customer to identify members with particular skills or training; these programs could be supported, given increased visibility, and positioned as third-party certification agents, making it easier for customers to identify and make contact with high-efficiency vendors.
- Web-based commerce as a means to link buyers and sellers of window products was not raised as a high-potential approach by any of the market actors interviewed. However, more focused, recent research on the SMARTERENERGY™ Website indicates somewhat greater potential for buyer-seller “matchmaking.”

WHILE FINANCIAL INCENTIVES WERE DOWNPLAYED DURING INTERVIEWS WITH SUPPLY-SIDE MARKET ACTORS, A NUMBER OF RESPONDENTS NEVERTHELESS SUGGESTED THEM AS EFFECTIVE WAYS TO OVERCOME THE FIRST-COST BARRIER TO MORE EFFICIENT PRODUCTS, INCLUDING WINDOWS.

- Window contractors in particular raised the possibility of **rebates** or other incentives as a means of encouraging customers to select (and contractors to sell) high-efficiency windows.
- While **financing** can often be used to address the first cost barrier, there is little evidence that lack of access to financing is perceived as a barrier or, conversely, that providing financing would dramatically increase the number of energy-efficient windows installed. However, the “option value” inherent in available financing may generate greater end-user interest and consideration of high-efficiency measures, and in particular whole-house applications.
- Incentives and financing were both offered as suggestions by contractors to facilitate their entry into the whole-house market, with the specific goal of overcoming both high initial cost and the transaction costs associated with entering a new market.
- The upcoming pilot program that loosens EEM criteria should be watched closely to discern the impact of greater lendable amounts on end-user interest in EEMs and in whole-house applications.

**OVERALL, INSTITUTIONAL CHANGES ARE LESS IMPORTANT IN SUPPORTING INDIVIDUAL HIGH-EFFICIENCY MEASURES THAN IN THE DEVELOPMENT OF A WHOLE-HOUSE ENERGY-EFFICIENCY MARKET.**

- In the windows market, for example, few institutional barriers exist to the selection of efficient windows as an option, since most supply-side actors already handle efficient windows in the part of their business that involves Title 24 compliance.
- For enabling market actors (notably lenders and realtors), on the other hand, substantial institutional change will be required to make consideration of energy-efficient measures standard practice.
  - For lenders as well as realtors, the most effective intervention to overcome all the barriers faced is the institutionalization of home energy ratings as part of a seamless EEM process.
  - This would simultaneously address the financial community’s need for information to justify loans that include targeted measures and address realtor concerns about the complexity of the process.

**THE MARKET EFFECTS INDICATORS THAT WOULD BE USED TO TRACK THE SUCCESS OF THE RECOMMENDED INTERVENTIONS ARE PRESENTED BELOW.**



**Exhibit 8-10**  
**Interventions and Market Effects Indicators - Supply-side Market Actors**

Market Interventions		Market Effects Indicators				
		Awareness/ Knowledge	Interest	Intent to Use/Promote EE Solutions	Usage/Promotion of EE Solutions	Regular/Repeated Use/Promotion
Information	<b>Targeted Information</b>	4	2			
	<b>Diversified Information</b>	4	2			
	Brochures and Fact Sheets	4	2			
	Energy Surveys		2	4		
	Demonstrations		4	2		
Promotion	Advertising, PR	4	2			
	<b>Energy Star Product Label</b>		2	4		
Education and Training	<b>3P Home Center Training</b>	2	4			
	<b>Home Insp./Bldg Official Training</b>			4	2	
	<b>Energy Center</b>			4	2	
	Training			4	2	
Testing/ Certification	Testing		4	2		
	Certification			4	2	
	<b>3P verification</b>			4	2	
Bring B & S Together	Internet Commerce/ SmarterEnergy		4	2	2	
	Referrals			2	4	
Financial Measures	<b>Incentives</b>			2	4	
	<b>Financing</b>			2	4	
Institutional Changes	<b>3P HERS/EEM institutionalized</b>				2	4
	<b>Systems Approach</b>				2	4

<b>KEY</b>
Importance
4 Primary
2 Secondary
Bold interventions indicate proposed R&R program elements.



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WHILE THE ULTIMATE INDICATOR OF EFFECTIVENESS OF ANY INTERVENTION IS THE ADOPTION OF EFFICIENT SOLUTIONS AS STANDARD PRACTICE IN THE RETROFIT AND RENOVATION MARKETS, DIFFERENT INTERVENTIONS WOULD BE EXPECTED TO HAVE THEIR PRIMARY EFFECTS AT DIFFERENT STAGES OF THE AWARENESS-ADOPTION PROCESS FOR DIFFERENT MARKET ACTORS.

In this section, the relationships between intervention categories and their associated market effects indicators are described using the windows market as an example. The relationships presented in the facing exhibit and described below are generally relevant for all supply-side interventions.

- As shown in the facing exhibit, information-oriented interventions have as their most important function to increase awareness of energy-efficient options for some of the enabling market actors, such as architects, lenders, and media. For the more knowledgeable groups, such as window distributors, retailers, and contractors, the primary function of information-based interventions is to help them promote efficient windows. Greater knowledge of high-efficiency windows would be indicated by, for example, greater knowledge among general contractors of just what constitutes an efficient window.
- As a group, promotional interventions would be expected to have their primary effects in moving market actors into the interest or shopping phase. Evidence of this would be seen in increased interest in high-efficiency windows and window suppliers, and an increased willingness to invest energy in learning more about them. Evidence of increased awareness of the ENERGYSTAR® Window Program and use of the ENERGYSTAR® logo as a marketing tool would also provide a market effects indicator.
- Education and training interventions support those market actors who are seriously considering and evaluating the energy-efficient windows option, as well as assisting in developing needed infrastructure. Training on EEMs, for example, could help architects as they consider making energy-efficient windows their standard specification for remodeling designs. In addition to the number of architects who attend such training, an indicator of the success of this intervention would be the percentage of architects who discuss EEMs with their clients as a tool to install more efficient windows.

- Testing and certification interventions such as NFRC ratings and certification of window installers would help market actors move into the intent-to-purchase stage, since remaining concerns about the performance of efficient windows would be addressed. Both the share of NFRC rated windows sold and the number (or percentage) of certified installers might serve as indicators of market effects in this stage.
- Ultimately, the market effects indicator of interest among supply-side market actors is the actual share of efficient windows in their business, as well as the extent to which efficient windows are stocked and put on display by distributors and retailers.
- Indicators of a market movement toward whole-house retrofit will include active end-user knowledge about, and interest in, multi-measure retrofits and renovations. It also should include increased supply-side appreciation for the benefits of the “whole-house” approach in differentiating their business, and increased supply-side confidence in the sustainability of end-user demand. Specific indicators that we would look for among supply-side market actors include:
  - Among window contractors, greater self-reported interest in whole-house solutions that extend beyond windows, even if the window contractors themselves are not acting as the facilitator/integrator. This would include, for example, using the benefits of HVAC downsizing as a selling tool for a whole-house window retrofit.
  - Evidence of strategic alliances or partnerships between window contractors and market leaders in the emerging facilitator industry, whether general contractors or EEM facilitators.
  - The level of attendance from various market-actor groups at Energy Center seminars or other training sessions emphasizing the whole-house approach.

RECOMMENDED INTERVENTIONS AND POSSIBLE MARKET EFFECTS INDICATORS FROM THE PERSPECTIVE OF END USERS ARE DISCUSSED BEGINNING ON THE FOLLOWING PAGE.

**Exhibit 8-11**  
**End-User Market Barriers and Interventions - Discretionary Retrofit**

Activity	Barriers									Information					Promotion	Education and Training				Testing/Certification			Bring B & S Together		Financial Measures		Institutional Changes					
	High Initial Cost	Info/Search Costs	Performance Uncertainty	Transaction Costs	Hidden Cost	Bounded Rationality	Asymmetric Information	Svc./Product Unavailability	Access to Financing	Targeted Information	Energy Surveys	Demonstrations	Diversified Information	Brochures and Fact Sheets	Advertising, PR	Energy Star Product Label	3P Home Center Training	Home Insp./Bldg Official Training	Energy Center	Training	Testing	Certification	3P verification	Internet Commerce/SmarterEnergy	Referrals	Incentives	Financing	3P HERS/EEM Institutionalized	Systems Approach			
Individual Measures	4								2	4		1	1	1	1																	
		1							1	1	1	1	1	1	1																	
			1						1	1	1	1	1	1	1							1										
				1					1	1	1	1	1	1	1								1									
					1				2	2	2			1		2							2		1	2	2	2	2	2	2	2
							2			2	2					2								1	1							
								1	2	2						2								1	1							
Whole-House	4								2	4		1	1	1	1																	
		1							1	1	1	1	1	1	1																	
			1						1	1	1	1	1	1	1							1			1							
				1					1	1	1	1	1	1	1								1			1	1					
						2			2	2	2			1		2							2		1	2	2	2	2	2	2	2
							2			2	2					2								1	1							
								4		2						2	4		4	4				1								
								2	2			1	1	1								2			2	2	2	2	2	2	2	

**KEY**  
Importance  
4 High  
2 Moderate  
1 Low

- This section emphasizes interventions that QC believes will be most effective in addressing the barriers deemed most important (in Chapter 2), based primarily on voice-of-the-customer survey data. This section will progress from the scenarios with the least market barriers (individual-measure DR events, then whole-house DR events), through the scenarios with more market barriers (individual-measure TOS events, and finally whole-house TOS events). This approach allows the discussion to build on preceding scenarios for the most part.
- Regarding the individual-measure DR scenario, high initial cost is the only high-importance barrier, which QC recommends be addressed straightforwardly with incentives (at least in the short term), and financing more visibly over the longer term. Financing should take the form of EEMs and EELs where the array of providers are well-resourced and well-branded in consumers' minds, where the types and sizes of loans are more flexible than has been the case with EEMs in the past, and where the process of obtaining EEMs and EELs has been streamlined and somewhat standardized. QC also recommends the use and greater promotion of home energy surveys and stand-alone CHEERS analyses, as methods for providing reliable, detailed information to consumers, in order to position high-efficiency expenditures as money-making investments or as sources of funding for non-energy benefits (not as "costs").
  - Several obvious market effects indicators of these interventions are simply the volumes of rebated DR and TOS measure changes, R&R program-financed DR and TOS changes (including whole-house applications), and home energy surveys conducted.
  - In addition, secondary market effects indicators may include the change in volume of these activities outside of the program, in comparison to some control area outside PG&E territory.
  - As always, proximate indicators (as well as "ultimate" indicators like those above) should monitor end user awareness, interest, and intentions with regard to DR, TOS, and whole-house applications, as well as their actions. For example, these could include: awareness of the R&R program's key features and benefits; knowledge of the difference between standard and high-efficiency measures; increased knowledge of the savings potential of specific measures (possibly even measure combinations); intention to use (or continue using) high-efficiency measures when opportunities arise; and willingness to communicate the benefits of energy efficiency to friends and neighbors.

- In moving from the individual-measure DR scenario to the whole-house DR scenario, service unavailability is added to high first cost as a high-importance market barrier. (Note that this is based on the widely shared industry perspective that there is a shortage of knowledgeable whole-house contractors – not on end user input to that effect - because DR and TOS are relatively infrequent events in the lives of individual end users, they could not be expected to know the state of service provider availability in this context.)
  - QC believes that R&R training and education initiatives aimed toward supply-side market actors have very direct and important effects on service unavailability barriers for end users. Most end users cannot realistically approach DR or TOS events in a “hands-on” mode, and the apparent shortage of knowledgeable, capable contractors who can (and will) work regularly with multiple measures is a limiting factor. PG&E’s Stockton Training Center and Energy Center in San Francisco in particular could be used not only to train measure contractors about whole-house applications. PG&E also could use tools like SmarterEnergy™, features and advertising in topical media (*Sunset, House Beautiful*, etc.), bill stuffers, and public service announcements to promote consumer seminars on whole-house planning at its training and information centers. These seminars even could be opportunities for consumers to meet potential vendors. Particularly in a purchase context where prospective DR and TOS consumers cannot be readily identified beforehand, it is critical that they be given various avenues for “raising their hand” and identifying themselves as someone who may be interested in a whole-house investment.
  - End users also responded favorably to the possibility of obtaining high-efficiency information from home centers like Home Depot, who would in turn be particularly well-situated to promote and deliver whole-house solutions.
  - These interventions should particularly be useful in increasing consumer confidence that reliable, knowledgeable whole-house solution providers exist. Market effects indicators might range from consideration of high-efficiency measures and whole-house applications, to self-reported confidence in the ability to find an appropriate whole-house provider. As always, there are “ultimate” indicators of the market effects of these kinds of resource-building interventions, including the quantity of whole-house solution providers, and measurable knowledge of whole-house solutions among these providers.



**Exhibit 8-12**  
**End-User Market Barriers and Interventions - TOS Renovation**

Activity	Barriers									Information					Promotion	Education and Training					Testing/Certification			Bring B & S Together		Financial Measures		Institutional Changes								
	High Initial Cost	Info/Search Costs	Performance Uncertainty	Transaction Costs	Hidden Cost	Bounded Rationality	Asymmetric Information	Svc/Product Unavailability	Access to Financing	Targeted Information	Energy Surveys	Demonstrations	Diversified Information	Brochures and Fact Sheets	Advertising, PR	Energy Star Product Label	3P Home Center Training	Home Insp./Bldg Official Training	Energy Center	Training	Testing	Certification	3P verification	Internet Commerce/SmarterEnergy	Referrals	Incentives	Financing	3P HERS/EEM Institutionalized	Systems Approach							
Individual Measures	4									2	4		1	1	1	1																				
		2								2	2	1	2	1	2	2																				
			1							1	1	1	1	1	1	1					1	1			1											
				1						1			1	1										1			1	1								
						4				2	4			1		2								2	1	2	4	4	4	4						
							2				2					2								1	1											
								1									1							1												
									4	4	4		1	1	1									4		2	4	4	4	4	4					
Whole-House	4									2	4		1	1	1	1																				
		2								2	2	1	2	1	2	2																				
			1							1	1	1	1	1	1	1					1	1			1											
				4						1			1	1										1												
						2				2			1	1											1	1	2	2								
							4			2	4			1		2								2	1	2	4	4	4	4						
								2			2					2								1	1											
									4								4		4	4				1												
									4				1	1	1								4		2	4	4	4	4	4	4					

**KEY**  
Importance  
4 High  
2 Moderate  
1 Low

- It is very important to note that some R&R intervention elements may not have a “silver bullet” role in addressing a single, pervasive barrier, but instead may play more of a supporting role in helping to deliver, target, or promote other intervention elements. In that sense, “targeted information,” use of the ENERGYSTAR® product label, and leveraging the evolving SmarterEnergy™ Web site all provide the potential for linking end users with other interventions.
- In moving from the DR scenarios to the individual-measure TOS scenario, service unavailability recedes as a barrier, but bounded rationality and access to financing move to the forefront. Bounded rationality was somewhat more of an issue in TOS scenarios than in DR scenarios, among end users surveyed. Also, experience in consumer products shows that often the presence – the “option value” – of financing is important in engendering active consumer shopping, as well as in closing the sale. In this sense, financing can address bounded rationality as well as the direct, access-to-financing barrier.
  - As in the individual-measure DR scenario, in the individual-measure TOS scenario QC recommends emphasis of financing, rebates (at least in the near term), and also home energy surveys. Of course in TOS situations where an EEM is needed to finance the measure changes, it is imperative that end users have timely, simple access to the requisite CHEERS analysis in time to keep on track with the home offer and purchase process. Targeted information to end users who have “raised their hand” in some way, particularly promotion and use of SmarterEnergy™ for this purpose, can be used to get the right information about EEMs, CHEERS, and TOS investments to the right end users within a relevant time frame.

- In addition, although the concepts of “HERS institutionalization” and developing a “systems approach” for delivering EEMs and supporting whole-house applications are fairly general, QC believes strongly that some degree of standardization must occur in this regard. PG&E is in a strong and logical position to cause this evolution toward more of a “normalized” CHEERS/EEM/whole-house process, and it will require identifying, systematizing, and promoting a standard approach that addresses the needs and concerns of all market actors involved in the process. PG&E may need to pilot two or three approaches to this systems approach, planting seeds among several different market actor types (e.g., more entrepreneurial CHEERS raters, lenders, home centers, and realtors), and monitoring which strategies seem most promising. This approach also will help PG&E avoid both the perception and the reality of “playing favorites” on behalf of any particular market actor types.
- Market effects indicators might include end user acknowledgement of the “option value” of EEMs in causing them to actively consider TOS and whole-house applications. Likewise, proximate market effects indicators could include consumer knowledge about the specifics of PG&E’s home energy rating service, the CHEERS tool, and the benefits of EEMs, as well as expressed confidence in the ability to obtain these services in a timely manner.
- As discussed on the following page, the whole-house TOS scenario remains the most challenging of the four scenarios, as also reflected in the sparse levels of TOS events, and particularly whole-house TOS events, in the marketplace.
- As discussed earlier regarding market barriers in Chapter 2, the whole-house TOS scenario faces the high-importance barriers discussed regarding the preceding scenarios, as well as the infrequency of the event in the lives of individual consumers, and uncommonness in the market as a whole.
- In addition to the high-importance barriers discussed in the preceding pages
  - high first cost, bounded rationality, service unavailability, and access to financing (for some, not all consumers) - transaction costs become a practical barrier for prospective home buyers in a TOS situation, particularly in parts of the PG&E territory (like the Bay Area) where the real estate market favors sellers.

- In this context, potentially useful interventions include targeted information, energy surveys, home center-based training and education, PG&E’s energy centers, SmarterEnergy™, financing, incentives, and any “standardization” in the EEM/CHEERS process that PG&E may be able to provide or foster.
- At the same time, even this substantial array of end user-oriented interventions can be described as “necessary but not sufficient.” Supply-side interventions will be even more critical, and generally must precede end user-oriented interventions, in order to foster a whole-house TOS market that can deliver solutions to consumers’ time-sensitive needs on a crisp, consistent, and confidence-building manner.
- The array of market barriers to whole-house TOS is substantial enough, and the portfolio of potential interventions broad enough, that it is almost impossible to cultivate a “short list” of potential market effects indicators. In reality, measures among end users and multiple supply-side market actor types would be required all along the spectrum from awareness/knowledge, perceived barriers and conflicts with self-interest, active consideration of whole-house TOS solutions, intention to use them, and follow-through with actual whole-house TOS activity.

## AWARENESS

Most participants reported that the audit was performed at or around the time they were trying to purchase a home.

- Nine of 13 participants reported that the CHEERS audit was performed at or around the time of purchase.
- Four of 13 participants reported that the CHEERS audit was performed at some other time.

When asked to report what prompted them to have a CHEERS audit conducted in their home, most participants reported that they wanted to identify opportunities for energy-efficient improvements.

- Six of 13 participants reported that a desire to identify opportunities for energy-efficient improvements prompted them to have the CHEERS audit conducted in their home.
- Two of 13 participants reported that an energy-efficient mortgage prompted them to have a CHEERS audit conducted in their home.
- Five of 15 participants reported that they had a CHEERS energy-efficient audit conducted in their home for other reasons, such as it was required to get a loan and because a real estate agent suggested it.

Participant gave mixed responses when asked to report where they learned about the CHEERS rating system.

- Four of 13 participants learned about CHEERS through a lender.
- Three of 13 participants learned about CHEERS through a real estate agent.
- Two of 13 participants learned about CHEERS when they contacted PG&E.
- Three of 13 participants contacted PG&E to find a qualified CHEERS rater.
- One participant reported that someone they know (friend/family) had an inspection and referred the rater to them.
- Five of 13 participants reported that they found a qualified CHEERS rater via other sources, such as a lender, the Yellow Pages and HUD.

None of the participants reported that it was difficult to find someone to do the CHEERS rating.

When asked to report what changes they expected the rating to recommend, participants most often mentioned upgrading or replacing windows, upgrading or replacing furnaces, and adding insulation.

- Six of 13 participants reported that they expected the rating to recommend upgrading or replacing their windows.
- Five of 13 participants reported that they expected the rating to recommend upgrading or replacing their furnace.
- Five of 13 participants reported that they expected the rating to recommend adding insulation.

## INSPECTION PROCESS AND RESULTS

Most of the participants were present while the rater was conducting the inspection, and reported that the inspector explained what he or she was looking for.

- Eight of 13 participants reported that they were present while the rater was conducting the inspection.
- Eight of 13 participants reported that the inspector explained what he or she was looking for.

Generally, the participants reported that the inspection took less than 2 hours.

- Four of 13 participants reported that the inspection took less than one hour, and 3 of 13 participants reported that the inspection took between 1 and 2 hours.
- Only one participant reported that the inspection took more than 2 hours.

The majority of participants reported that the results of the inspection were generated and sent to them within one week.

- Ten of 13 participants reported that the inspection results were sent to them within one week.

## CHEERS POST-PARTICIPANT SURVEY RESULTS

- Two of 13 participants reported that the inspection results were sent to them 2 to 3 weeks after the inspection.
- Only one participant reported that it took longer than 6 months for the inspection results to be sent to them.

Participants generally reported that it was the inspector who discussed the rating process results and recommendations with them.

- Six of 13 participants reported that the inspector discussed the rating results and recommendations with them.
- The lender and the facilitator were mentioned as the person who discussed the rating results and recommendations by one participant each.
- Six of 13 participants reported that some “other” person discussed the rating results and recommendations with them, including the contractor, real estate agent and CHEERS representative.

When asked to report what recommendations were made by the CHEERS inspection, participants most often mentioned adding insulation and upgrading or replacing windows.

- Nine of 13 participants reported that the inspection recommended adding insulation and 7 of 13 participants reported that the inspection recommended changing or upgrading windows.
- Five of 13 participants reported that the inspection recommended making changes to their water heater and 4 of 13 participants reported that the inspection recommended upgrading or replacing their furnace.

Participants most often mentioned adding insulation and making changes to their water heater when asked to report which recommended changes they made.

- Six of 13 participants reported that they added insulation, as recommended by the inspection.
- Five of 13 participants reported that they made changes to their water heater, as recommended by the inspection.

Participants generally reported that it was the inspector who discussed the rating process results and recommendations with them.

- Six of 13 participants reported that the inspector discussed the rating results and recommendations with them.
- The lender and the facilitator were mentioned as the person who discussed the rating results and recommendations by one participant each.
- Six of 13 participants reported that some “other” person discussed the rating results and recommendations with them, including the contractor, real estate agent and CHEERS representative.

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Participants most often mentioned adding insulation and making changes to their water heater when asked to report which recommended changes they made.

- Six of 13 participants reported that they added insulation, as recommended by the inspection.
- Five of 13 participants reported that they made changes to their water heater, as recommended by the inspection.



## DECISION MAKING

When asked to report how they chose which specific changes to make, participants provided mixed responses.

- Three of 13 participants reported that they chose which specific changes to make based on the facilitator's recommendation.
- Seven of 13 participants reported that they chose which specific changes to make based on "other" reasons, including financial issues, in order to qualify for a loan, and after talking to engineers at work.

Participants generally reported that they chose not to make some of the recommended changes because those particular changes were too expensive relative to the benefits.

- Five of 13 participants reported that they chose not to make some of the recommended changes because the changes were too expensive relative to the benefits.
- One participant reported that they chose not to make some of the recommended changes because those particular changes were smaller and not top priorities.

Four participants chose not to make any recommended changes. One of these four participants reported that they did not make any of the recommended changes because the changes were too expensive, one reported that they had no room for equipment, one reported that they were planning to remodel and wanted to make all changes at that time, and one reported that the inspection results stated that they "didn't have to" make the changes.

Participants were asked if there are actions that PG&E might take to make homebuyers more likely to undertake recommended actions to increase energy efficiency. Suggestions included offering low interest loans, offering more education on the availability and cost-effectiveness of energy-efficient equipment, providing free recommendation services, making city permits less restrictive and lowering the cost to install gas meters.

## ENERGY-EFFICIENT MORTGAGE

Most of the participants did not obtain an energy-efficient mortgage to make the changes or upgrades suggested by CHEERS.

- Nine of 13 participants did not obtain an energy-efficient mortgage to make the changes or upgrades suggested by CHEERS.

Most of the participants reported that they would have made more of the recommended changes if they had obtained more money through the energy-efficient mortgage.

- Eight of 13 participants reported that they would have made more of the recommended changes if they had obtained more money through the energy-efficient mortgage.
- Three of 13 participants reported that they would not have made more of the recommended changes, even if they had obtained more money through the energy-efficient mortgage.

Participants generally reported that either the facilitator or real estate agent helped them coordinate and execute the inspection/lending/completion of the work process, or that no one helped them with these tasks.

- Four of 13 participants identified the facilitator as the person who helped them coordinate and execute the inspection/lending/completion of the work process, and 4 of 13 participants identified the real estate agent as the person who helped them with these tasks.
- Four of 13 participants reported that they coordinated and executed the inspection/lending/completion of the work process by themselves.
- One participant reported that the construction crew helped them coordinate and execute the above-mentioned tasks.

Participants gave mixed responses when asked to report how helpful the facilitator was with coordinating energy-efficient mortgages.

- One participant reported that the facilitator was “somewhat helpful” with coordinating energy-efficient mortgages, and one participant reported that the facilitator was “not at all helpful”.

Generally, participants were “very satisfied” with the facilitators’ knowledge of energy-efficient products, the time it took to process the analysis and finish the work on their home, the recommendations for upgrades and changes, and the cost of the changes.

- Three of 13 participants were “very satisfied” with the facilitators’ knowledge of energy-efficient products, the time it took to process the analysis and finish the work on their home, and the recommendations for changes and upgrades.
- Two of 13 participants were “very satisfied” with the cost of the changes.

Generally, participants were “very satisfied” with the changes that they made.

- Eleven of 13 participants were “very satisfied” with the changes that they made.
- Only one participant was “not at all satisfied” with the changes that they made, and they did not explain why.

## DEMOGRAPHICS

Most participants bought their within the last four years.

- Ten of 13 participants bought their home in 1996 or more recently.
- Two of 13 participants bought their home before 1995.

Participants generally reported that their home was built in the 1960's or 1970's.

- Five of 13 participants bought their home in the 1970's.
- Four of 13 participants bought their home in the 1960's.

Participants generally reported that their current home is not the first home that they ever bought.

- Eight of 13 participants reported that their current home is not the first home that they ever bought.
- Five of 13 participants reported that their current home is the first home that they ever bought.
- 

Most participants reported that they would not describe themselves, or another adult head of their household as Hispanic.

- Two of 13 participants reported that they would describe themselves or any other adult head of their household as Hispanic.

Most participants reported that they were between 25 and 44 years old.

- Nine of 13 participants reported they were between 25 and 44 years old.
- Three of 13 participants reported that they were between 45 and 54 years old.
- One participant reported that they were 65 years old or older.

*CHEERS POST-PARTICIPANT SURVEY RESULTS*

Half of the participants reported that their household's 1998 income before taxes was less than \$50,000, and the other half reported that their household's 1998 income before taxes was more than \$50,000.

- Six of 13 participants reported they their household's 1998 income was less than \$50,000 before taxes.
- Six of 13 participants reported that their household's 1998 income was more than \$50,000 before taxes.

**Exhibit A-1**  
**CHEERS Post-Participant Survey Results**

Q1. Was CHEERS audit performed at time of purchase or at another time?

N Population	13
at time of purchase	9
at another time	4
N Obs	13

Q3. How did you learn about the CHEERS rating system?

N Population	13
Lender	4
RE Agent	3
PG&E	2
Other	5
N Obs	13

Q5. What source of information did you use to find a qualified CHEERS rater?

N Population	13
RE Agent	4
Friend/Family	1
PG&E	3
Other	5
N Obs	13

Q2. What prompted your to have a CHEERS audit conducted in your home?

N Population	13
Obtain energy efficient mortgage	2
Identify opportunities for energy efficient improvements	6
Other	5
N Obs	13

Q4. Was it difficult to find someone to do the CHEERS rating?

N Population	13
No	13
N Obs	13

Q10. What did you expect the rating to recommend?

N Population	13
Insulation	5
CAC	4
Furnace	5
Setback Thermostat	1
Solar Screens	2
Water Heater	3
Weatherization	3
Windows	6
Other	3
N Obs	13

**Exhibit A-2**  
**CHEERS Post-Participant Survey Results**

Q6. Were you present while the rater was conducting the inspection?		Q7. How long did the inspection take?	
C	13	N Population	13
Yes	8	Less than 1 hour	4
No	5	1 to 2 hours	3
N Obs	13	More than 2 hours	1
		N Obs	8
		Q9. How quickly were the results of the inspection generated and sent to you?	
Q8. Did the inspector explain what he or she was looking for?		N Population	13
N Population	13	3 to 6 days	5
Yes	8	1 week	5
N Obs	8	2 to 3 weeks	2
		Longer than 6 months	1
		N Obs	13
Q11. Who discussed the rating process results/recommendations with you?			
N Population	13		
Inspector	6		
Facilitator	1		
Lender	1		
Other	6		
N Obs	13		
Q12. What recommendations were made?		Q13. Which recommended changes did you make?	
N Population	13	N Population	13
Add insulation	9	Add insulation	6
Upgrade/replace CAC	1	Upgrade/replace CAC	1
Upgrade/replace furnace	4	Upgrade/replace furnace	3
Change to setback thermostat	1	Change to setback thermostat	1
clean/repair ducts	1	clean/repair ducts	1
Add solar screens	2	Add solar screens	2
Changes to the water heater	5	Changes to the water heater	5
Changes to the lighting	1	Weatherization	2
Weatherization	2	Upgrade/replace windows	1
Upgrade/replace windows	7	None	3
Other	3	Other	2
N Obs	13	N Obs	13

**Exhibit A-3**  
**CHEERS Post-Participant Survey Results**

Q14. How did you choose which specific changes to make?

N Population	13
Took facilitator's recommendation	3
Other	7
N Obs	10

Q14a. Why did you choose not to make the other changes?

N Population	13
Too expensive relative to benefits	5
Other	1
N Obs	7

Q15. Why did you choose not to make any of the recommended changes?

N Population	13
Too expensive relative to benefits	1
Other	3
N Obs	3



**Exhibit A-4**  
**CHEERS Post-Participant Survey Results**

Q16. Did you obtain an energy-efficient mortgage to make the changes or upgrades suggested by CHEERS?				Q17. If you had obtained more money through the energy-efficient mortgage, would you have made more of the recommended changes?	
N Population	13			N Population	13
Yes	4			Yes	8
No	9			No	3
N Obs	13			Made all of the recommended changes	1
				Don't know/Refused	1
				N Obs	13
Q18. Who helped you coordinate and execute the inspection/lending/completion of the work process?				Q19. How helpful was the facilitator with coordinating energy-efficient mortgages?	
N Population	13			N Population	13
Facilitator	4			Very helpful	2
Real Estate Agent	4			Somewhat helpful	1
Self	4			Not at all helpful	1
Construction crew	1			N Obs	4
N Obs	13				
Q20. How satisfied are you with the following aspects of the facilitator?	Very Satisfied	Somewhat Satisfied		Q21. How satisfied are you with the changes you made?	
N Population = 13				N Population	13
Knowledge of energy-efficient products	3	1		Very Satisfied	11
The time it took to process the analysis and finish the work on your home	3	1		Not at all Satisfied	1
Recommendations for upgrades/changes	3	1		N Obs	13
The cost of the changes	2	1			
N Obs = 4					

**Exhibit A-5**  
**CHEERS Post-Participant Survey Results**

Q24. In what year did you buy your home?

N Population	13
1999	1
1998	2
1997	7
1996	1
Before 1995	2
N Population	13

Q25. In what decade was your home built?

N Population	13
1970's	5
1960's	4
1950's	1
1940's	2
Before 1940's	1
N Obs	1

Q26. Is your current home the first one you ever bought?

N Population	13
Yes	5
No	8
N Obs	13

Q27. Would you describe yourself, or any other adult head of your household as Hispanic?

N Population	13
Yes	2
No	11
N Population	13

Q28. Into which of the following categories does your age fall?

N Population	13
25 to 34	4
35 to 44	5
45 to 54	3
65 or older	1
N Population	13

Q29. Which of the following best describes your household's 1998 income before taxes?

N Population	13
Under \$ 20,000	1
Over \$20,000 but under \$30,000	3
Over \$30,000 but under \$50,000	2
Over \$50,000 but under \$75,000	2
Over \$75,000 but under \$100,000	3
Over \$100,000	1
Don't Know/Refused	1
N Obs	13

Gender

N Population	13
Female	3
Male	10

**Exhibit B-1**  
**First-time Hispanic Home Buyer Additional Survey Results**  
**Process of TOS Renovation Characteristics**

TR047B. Emphasize serving Hispanic or Latino customers

N Population	62
Yes	2
No	1
Refused	0
DK	2
N Obs	5

TR047C. Importance of this factor in your decision to do business with them

N population	62
Mean Rating	6.3
Upper Bound	10.0
Lower Bound	2.5
N obs	4
Standard Error	1.8

TR043 Importance of Energy Efficiency in Choosing Items to Upgrade  
(Scale of 1-10)

	SFD	Condo	Rural	Hispanic
N population	246	114	29	25
Mean Rating	7	6	7	8.76
Upper Bound	8	7	10	9.3859
Lower Bound	6	4	4	8.1341
N obs	40	15	5	1
Standard Error	0	1	1	0.36642

TR047F. Emphasize Serving Hispanic or Latino Customers

N Population	62
Yes	5
No	4
Refused	1
DK	4
N Obs	14

TR047G. How important was that factor in your decision to do business with them?

N population	62
Mean Rating	4
Upper Bound	7.2
Lower Bound	0.8
N obs	5
Standard Error	1.6

TR047E. Where They Were Purchased

N Population	62
Measure specialty contractor	0
General contractor	1.0
ESCO, energy services, performance contractor	0
Home center	1.0
OTHER kind of retailer	1.0
Product distributor	0
OTHER	1.0
Refused	0
DK	3.0
N Obs	14

The results covered in this section address some of the language and culture-related issues facing the Hispanic/Latino population in PG&E Territory when dealing with awareness of and shopping for energy efficiency. (Additional questions asked of this population are covered in the TOS end-user characterization, in Chapter 2). All these survey results are reported on an unweighted basis as raw frequencies. Of the 62 completed interviews, just over half were conducted in Spanish.

- Of the five respondents who reported a having a vendor make a change to their home at the time of sale, two reported they the vendors who installed their measures emphasized serving Hispanic or Latino customers, one reported no emphasis on the population, and two did not know. Not surprisingly, when asked to rate the importance of this factor when choosing a vendor on a scale of 1 to 10, 2 of the five respondents gave a number 5 or less. (Vendors in this case included contractors, dealer of the equipment, and homebuilders.)
- Most of the survey respondents who made a change to their home (8 of 14) indicated they purchased their equipment from a home center, like a Home Depot. Given the presence, in both numbers and promotion of these kinds of stores in PG&E territory, this is to be expected. While other venues of distribution were mentioned, respondents reported them significantly less frequently. Just over a third of the respondents (5 of 14) reported that the venue where they purchased their measure emphasized Hispanic or Latino customers. Like in the case of installers, respondents indicated that, overall, this factor was not very important to them, with 4 of 5 ratings at 4 or less.
- When asked about the importance of energy efficiency in deciding which specific products to replace, many of the respondents were concerned about keeping their electricity bills low. Comments included:
  - “The cost of the monthly bill”
  - “Would like to keep the bill low”
  - “Saving energy means saving money”.

LANGUAGE AS A BARRIER TO ENERGY EFFICIENCY IS DISCUSSED NEXT.

**JUST OVER HALF OF THE END-USER RESPONDENTS AGREED THAT SPANISH SPEAKERS ENCOUNTER SPECIAL PROBLEMS IN OBTAINING RELIABLE, TRUSTWORTHY INFORMATION ABOUT HIGH-EFFICIENCY PRODUCTS.**

- Two of the respondents reported that although they speak English, they prefer to speak Spanish. In addition, several respondents indicated fears about misunderstanding the information given to them in English, due the technical nature of the subject matter.
- Neither of the respondents asked was able to identify the source from which he/she first learned about energy-efficiency products. Furthermore, when questioned about specific problems resulting from the language barrier related to energy efficiency, nearly all the respondents generally reported single-word answers of “yes” [it is difficult to obtain reliable, trustworthy information], or “no” [it is not difficult if you speak the language].<sup>1</sup>
- Results of interviews from the supply-side characterization lend further insight to the needs of the Hispanic/Latino Community. Retail outlets, as one of the most often frequented by these consumers, indicated few communication problems when interviewed as part of the supply-side market characterization for this study. Ten of the 18 retailers surveyed indicated they have bilingual staff or neighbors who help by translating for them.
- Retailers provided several suggestions of how PG&E might help retailers address the needs of non-English-primary speaking customers, including:
  - “Involvement with the Chinese and Spanish community centers; PG&E should print materials in these languages.”
  - “Ads in the language and the media, like the Spanish television station, and the Spanish newspapers.”
  - “Equivalent hi-tech literature in Spanish, Chinese, and Russian.”

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<sup>1</sup> Quantum Consulting will provide all verbatim answers from this survey as recorded in English and Spanish upon request.

- One retailer, located in a mostly Hispanic/Latino area, reported that personal finances presented more of a problem for these customers obtaining energy-efficient products than did the language barrier.
- Contractors cited their greatest difficulty in communication with non-English-primary speaking customers as the need to spend more time on explaining the technical aspects of the equipment.

WHILE THE MAJORITY OF END USERS INDICATED THE LANGUAGE BARRIER AS PROBLEMATIC, PERSONAL/FAMILY FINANCES RANK A CLOSE SECOND AMONG THE REASONS THIS COMMUNITY DOES NOT CONSIDER MORE ENERGY-EFFICIENT MEASURES.

**RESIDENTIAL RETROFIT AND RENOVATION (R&R)  
BASELINE DESCRIPTIVE/SCREENING SURVEY**

BL001. Hello, this is <INTERVIEWER NAME> calling from Quantum Consulting for PG&E. We are interviewing customers like you to help PG&E better understand the current products, services, and practices of its customers. PG&E needs this information to design their new energy efficiency program. We are NOT trying to sell anything.

I'd like to speak with the person in your household most knowledgeable about energy use in your home. Would that be you?

1	Current individual is best HH contact	BL003
2	Transferred to best HH contact	1st Screen & ask for name of best person
3	Best contact not available – set up callback	Record for future contact
99	Don't know/refused	Thank & terminate

BL003. First, do you own or rent your home? [MEANS AT THIS ADDRESS/DWELLING]

1	Own	BL004
2	Rent/lease	Thank & terminate
99	Don't know/refused	Thank & terminate

BL004. And is this your primary residence?

1	Yes	BL005
2	No	Thank & terminate
99	Don't know/refused	Thank & terminate

ASK BL005 IF SAMPTYPE=SFD, CONDO

BL005. Do you live in a detached single-family home, a condominium, a townhouse, or a mobile home? [CONDO IS MULTI-LEVEL WITH ATTACHED UNITS ON EITHER SIDE; TOWNHOME HAS ATTACHED UNITS ON EITHER SIDE, BUT NONE ABOVE OR BELOW.]

1	Single-family house (SFD)	BL006 – assign/confirm to SFD cell
2	Condominium	BL008 – assign/confirm to Condo cell
3	Townhouse	BL008 assign/confirm to Condo cell
4	Mobile home	Thank & terminate
5	Other _____	Thank & terminate
99	Don't know/refused	Thank & terminate

BL006. And, just to make sure we're talking to a representative cross-section of customers for this survey, which of the following broad categories best describes your household's 1998 income? [READ LIST]

1	Under \$30,000	Thank & terminate
2	\$30,000 but under \$50,000	Thank & terminate

3	\$50,000 or more	BL008
99	[DO NOT READ:] Don't know/refused	Thank & terminate

BL007 ASK IF SAMPTYPE=RURAL

BL007. Do you live in a detached single-family home, a condominium, a townhome, or a mobile home? [CONDO IS MULTI-LEVEL WITH ATTACHED UNITS ON EITHER SIDE; TOWNHOME HAS ATTACHED UNITS ON EITHER SIDE, BUT NONE ABOVE OR BELOW.]

1	Single-family house (SFD)	BL008 – remains in Rural cell
2	Condominium	BL008 – remains in Rural cell
3	Townhome	BL008 – remains in Rural cell
4	Mobile home	BL008 – remains in Rural cell
5	Other [SPECIFY:] _____	BL008 – remains in Rural cell
99	Don't know/refused	Thank & terminate

BL008. Did you buy this home BEFORE or AFTER January 1, 1997?

1	Before	BL009
2	After	BL009
99	Don't know/refused	BL009

BL009. In the next two years, how likely are you to sell your current home and buy another single-family house, condominium or townhome, within the Northern or Central California area served by PG&E? Would you say you are ... [READ LIST]? [RESPONDENT'S BEST GUESS ABOUT PG&E TERRITORY WILL SUFFICE.]

1	Very likely	BL010
2	Somewhat likely	BL010
3	Not very likely, or	BL010
4	Not at all likely	BL010
5	[DO NOT READ:] Plan to sell, but don't plan to buy listed dwelling type in PG&E territory	BL010
6	[DO NOT READ:] Plan to buy second/other home	BL010
99	[DO NOT READ:] Don't know/refused	BL010

IF RESPONDENT'S SFD/CONDO/RURAL BASELINE CELL IS CLOSED, AND EITHER

- RESPONDENT SAID BL008=2, OR

- RESPONDENT SAID VERY/SOMEWHAT LIKELY, 1 OR 2, AT BL009,

CONTINUE AT BL010.

OTHERWISE, CONTINUE AT BL011.]

BL010. Based on your responses so far, we have an extended list of questions we'd like to ask you that would take another 15 minutes or so. We're offering a \$20 incentive to respondents who participate in the extended survey. Also, your responses will remain strictly confidential. Would you like to participate?

1	Yes, agreed to extended TOS renovation survey sequence	BL011
2	No, did NOT agree to extended TOS renovation sequence	Thank & terminate



99	Don't know/refused	Thank & terminate
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BL011. When you bought your current home, was it brand new or previously owned?

1	Brand new	BL012
2	Previously owned	BL012
99	Don't know/refused	BL012

ASK BL012 IF BL008=2, ELSE SKIP TO BL016

BL012. At the time you bought your current home, were there any improvements or upgrades that occurred as a condition of the sale at the SELLER'S expense? [IF NEEDED: I'm specifically thinking of renovations in kitchen or bathroom areas, or replacement of windows, lighting, or heating and cooling systems.]

1	Yes	BL013
2	No	BL014
99	Don't know/refused	BL014

BL013. What kinds of renovations or replacements of items like those I mentioned were done at the SELLER'S expense? [ENTER ALL THAT APPLY]

1	Windows	BL014
2	Lighting - inside	BL014
3	Lighting - outdoors	BL014
4	Heating and/or cooling - HVAC	BL014
5	Water heater	BL014
6	Plumbing - kitchen	BL014
7	Plumbing - bathroom	BL014
8	Refrigerator	BL014
9	Dishwasher	BL014
10	Other kitchen remodeling/renovation	BL014
11	Other bathroom remodeling/renovation	BL014
12	Roof (only listed because mentions may be common)	BL014
13	Insulation	BL014
14	Weather stripping/ other weatherization	BL014
88	Other [SPECIFY:] _____	BL014
99	Don't know/refused	BL014

BL014. At the time you bought your current home, were there any renovations that occurred at or around the time of sale that YOU paid for, in order to make the home more to your liking? [IF NEEDED: Again, I'm specifically thinking of renovations in kitchen or bathroom areas, or replacement of windows, lighting, or heating and cooling systems.]

1	Yes	BL015
2	No	BL016
99	Don't know/refused	BL016

BL015. What kinds of renovations or replacements were done at or around the time of sale at YOUR expense? [ENTER ALL THAT APPLY]

1	Windows	BL016
2	Lighting - inside	BL016
3	Lighting - outdoors	BL016
4	Heating and/or cooling - HVAC	BL016
5	Water heater	BL016
6	Plumbing - kitchen	BL016
7	Plumbing - bathroom	BL016
8	Refrigerator	BL016
9	Dishwasher	BL016
10	Other kitchen remodeling/renovation	BL016
11	Other bathroom remodeling/renovation	BL016
12	Roof (only listed because mentions may be common)	BL016
13	Insulation	BL016
14	Weather stripping/ other weatherization	BL016
88	Other [SPECIFY:] _____	BL016
99	Don't know/refused	BL016

BL016. Since January 1, 1997, have you SOLD a single-family house, condominium, or townhouse in the Northern or Central California area served by PG&E? [RESPONDENT'S BEST GUESS ABOUT PG&E TERRITORY WILL SUFFICE.]

1	Yes	BL017
2	No	BL021
99	Don't know/refused	BL021

BL017. At the time you sold your previous home, were there any renovations that occurred at YOUR expense as a condition of the sale? [IF NEEDED: Again, I'm specifically thinking of renovations in kitchen or bathroom areas, or replacement of windows, lighting, or heating and cooling systems.]

1	Yes	BL018
2	No	BL019
99	Don't know/refused	BL019

BL018. What kinds of renovations or replacements of items like those I mentioned were done at YOUR expense, as the SELLER of the home? [ENTER ALL THAT APPLY]

1	Windows	BL019
2	Lighting - inside	BL019
3	Lighting - outdoors	BL019
4	Heating and/or cooling - HVAC	BL019
5	Water heater	BL019
6	Plumbing - kitchen	BL019
7	Plumbing - bathroom	BL019
8	Refrigerator	BL019
9	Dishwasher	BL019

10	Other kitchen remodeling/renovation	BL019
11	Other bathroom remodeling/renovation	BL019
12	Roof (only listed because mentions may be common)	BL019
13	Insulation	BL019
14	Weather stripping/ other weatherization	BL019
88	Other [SPECIFY:] _____	BL019
99	Don't know/refused	BL019

BL019. At the time you SOLD your previous home, were there any renovations that occurred at or around the time of sale that the BUYER paid for, in order to make the home more to their liking?

1	Yes	BL020
2	No	BL021
99	Don't know/refused	BL021

BL020. What kinds of renovations or replacements of items were done at or around the time of sale at the buyer's expense? [ENTER ALL THAT APPLY]

1	Windows	BL021
2	Lighting - inside	BL021
3	Lighting - outdoors	BL021
4	Heating and/or cooling - HVAC	BL021
5	Water heater	BL021
6	Plumbing - kitchen	BL021
7	Plumbing - bathroom	BL021
8	Refrigerator	BL021
9	Dishwasher	BL021
10	Other kitchen remodeling/renovation	BL021
11	Other bathroom remodeling/renovation	BL021
12	Roof (only listed because mentions may be common)	BL021
13	Insulation	BL021
14	Weather stripping/ other weatherization	BL021
88	Other [SPECIFY:] _____	BL021
99	Don't know/refused	BL021

BL021. An energy efficient mortgage helps finance more energy efficient measures like windows, lighting and heating and cooling which help offset the cost with increased savings on your energy bills. Prior to our conversation today, had you heard of something called an ENERGY EFFICIENT MORTGAGE?

1	Yes	BL022
2	No	BL025
99	Don't know/refused	BL025

IF BL008=2 THEN GO TO BL022, ELSE GO TO BL025

BL022. Were you aware of energy efficient mortgages as a financing option, at the time you bought your current home?

1	Yes	BL023
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2	No	BL025
99	Don't know/refused	BL025

ASK BL023 IF BL008=2 AND BLO14=1, ELSE GO TO BLO25

BL023. Did you OBTAIN an energy efficient mortgage for the renovations you paid for, around the time you were BUYING your new home?

1	Yes	BL025
2	No	BL024
99	Don't know/refused	BL024

BL024. Did you CONSIDER an energy efficient mortgage for the renovations you paid for, around the time you were BUYING your new home?

1	Yes	BL025
2	No	BL025
99	Don't know/refused	BL025

BL025. Have you made any VOLUNTARY changes in your home's windows, heating and cooling system, or indoor or outdoor lighting, or kitchen since January 1, 1997, EXCLUDING any changes made right around the time of purchase? By "voluntary" I mean it was NOT an urgent replacement of something that broke down or stopped working correctly. [ENTER ALL THAT APPLY]

1	Windows	BL025a
2	Indoor lighting	BL025b
3	Outdoor lighting	BL025c
4	Heating and/or cooling - HVAC	BL025d
5	Kitchen	BL025e
6	Other	BL026
99	DK/none	BL026

ASK BL025a-e SEPARATELY FOR EACH ANSWER GIVEN IN BL025

BL025a-e. Approximately how much money did you spend on your new [BL025]?

#	Fill in response in dollars	BL026
99	Don't know/refused	BL100

BL100. Was it...? [READ LIST]

1	Less than 1,000 dollars	BL026
2	1,000 - 2,000 dollars	BL026
3	2,000 - 3,000 dollars	BL026
4	3,000 - 4,000 dollars	BL026
5	4,000 - 5,000 dollars	BL026
6	5,000 - 10,000 dollars	BL026
7	10,000 -15,000 dollars	BL026
8	15,000 - 25,000 dollars	BL026

9	Greater than 25,000 dollars	BL026
10	DK/Refused	BL026

BL026. An ENERGY EFFICIENT LOAN involves more attractive interest rates for installation of energy efficient windows, lighting, and heating and cooling that save homeowners money each month. Prior to our conversation today, had you heard of something called an ENERGY EFFICIENT LOAN?

1	Yes	BL027
2	No	BL030
99	Don't know/refused	BL030

ASK IF BL025 NE 99, ELSE SKIP TO DE091

BL027. Were you aware of energy efficient loans as a financing option, at the time you voluntarily replaced your [MEASURES AT BL025]?

1	Yes	BL028
2	No	BL030
99	Don't know/refused	BL030

BL028. Did you OBTAIN an energy efficient loan for the voluntary replacement of [MEASURES MENTIONED AT BL025]? [ENTER ALL THAT APPLY]

[CATI - DISPLAY ONLY MEASURES CORRESPONDING TO THOSE MENTIONED AT BL025.]

1	Yes, for windows	BL028a
2	Yes, for indoor lighting	BL028a
3	Yes, for outdoor lighting	BL028a
4	Yes, for heating and cooling - HVAC	BL028a
5	No/No to all	BL029
99	Don't know/refused	BL029

BL028a. Who was the loan obtained from?

1	PG&E	BL030
2	Wells Fargo	BL030
3	Bank of America	BL030
4	Washington Mutual	BL030
5	Great Western Bank	BL030
6	Other: [specify] _____	BL030
99	Don't know/refused	BL030

BL029. Did you CONSIDER an energy efficient loan when you were voluntarily replacing your [MEASURES MENTIONED AT BL025]? [ENTER ALL THAT APPLY]

[CATI - DISPLAY ONLY MEASURES CORRESPONDING TO THOSE MENTIONED AT BL025.]

1	Yes, for windows	BL030
2	Yes, for indoor lighting	BL030

3	Yes, for outdoor lighting	BL030
4	Yes, for heating and cooling - HVAC	BL030
5	No	BL030
99	Don't know/refused	BL030

[BL030 PRE-SKIP:

IF RESPONDENT'S SFD/CONDO/RURAL BASELINE CELL IS OPEN, AND EITHER

- RESPONDENT SAID BL008=2, OR

- RESPONDENT SAID VERY/SOMEWHAT LIKELY, 1 OR 2, AT BL009,

CONTINUE AT BL030.

OTHERWISE, CONTINUE AT DE091.]

BL030. Based on your responses so far, we have an extended list of questions we'd like to ask you that would take another 15 minutes or so. We're offering a \$20 incentive to respondents who participate in the extended survey. Your responses will remain strictly confidential. Would you like to participate?

1	Yes, agreed to extended TOS renovation survey sequence	TR043
2	No, did NOT agree to extended TOS renovation sequence	DE091
99	Don't know/refused	DE091

### TOS RENOVATION SEQUENCE

[ASK TR043 IF BL012=1 OR BL014=1 ELSE GO TO TR047.]

TR043 Using a scale from 1 to 10, where 1 means NOT important and 10 means VERY important, how important was energy efficiency in deciding which SPECIFIC **energy-related products** to INSTALL when making the changes to your current home when buying it?

#	1-10	TR044
99	DK/RF	TR044

TR044. Did you use an architect or designer to plan or consult with about the changes you made when buying your current home?

1	Yes, used architect or designer	TR047
2	No, did not use architect or designer	TR047
99	DK/refused	TR047

[ASK TR047A if BL013 in (1,2,3,4) or BLO15 in (1,2,3,4) FOR EACH TECHNOLOGY CHANGED IN BL013 OR BL015; THEN GO TO TR048. IF NONE OF THOSE MEASURES CHANGED AT BL013 OR BL015, GO TO TR048.]

TR047. To the best of your knowledge, [were/was] the [MEASURE(S) in BL013 and BL015] you installed when buying your current home HIGH efficiency or STANDARD efficiency?

1	HIGH efficiency	TR047A
2	STANDARD efficiency	TR047A

99	DK/refused	TR047A
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TR047A. To the best of your knowledge, who installed the [MEASURE(S) in BL013 and BL015]?

1	Contractor	TR048
2	Family member/ friend	TR048
3	Did it myself	TR048
4	Dealer who sold the equipment	TR048
5	Homebuilder	TR048
6	Other: [SPECIFY] _____	TR048
99	DK/refused	TR048

**Shopping**

TR048. For the next portion of this survey, imagine you are PURCHASING a home. These questions will address opportunities to replace or upgrade aspects of this home, like windows, lighting, heating and cooling, and the kitchen area. These would be upgrades you, AS THE BUYER, pay for at the time of purchase.

[Each respondent should only get ONE of the questions TR048-TR050]

In this home you're purchasing, imagine that you discover that the WINDOWS could be upgraded. They aren't broken and still function, but that the seals on a few windows appear broken, and the style of windows isn't particularly to your taste. While it depends on the cost, what would be your general attitude regarding window replacement in this situation? Please give me a rating from 1 to 10, where 1 means you WOULD NOT replace the windows, and 10 means you would ACTIVELY INVESTIGATE replacing them.

#	1-10	TR052
99	Dk/refused	TR052

TR049. In this home you're purchasing, imagine that you discover that the INDOOR LIGHTING could be upgraded. The lighting works OK, but the lighting quality and fixture styles aren't particularly to your taste. While it depends on the cost, what would be your general attitude regarding lighting replacement in this situation? Please give me a rating from 1 to 10, where 1 means you WOULD NOT replace the lighting, and 10 means you would ACTIVELY INVESTIGATE replacing them.

#	1-10	TR052
99	DK/Refused	TR052

TR050. In this home you're purchasing, imagine that you discover that the HEATING AND COOLING SYSTEM could be upgraded. The system works OK, but you know it's 10 years old and you wonder how reliable it is, how high the bill will be, and how long it will last. While it depends on the cost, what would be your general attitude regarding heating and cooling replacement in this situation? Please give me a rating from 1 to 10, where 1 means you WOULD NOT replace the heating and cooling system, and 10 means you would ACTIVELY INVESTIGATE replacing them.

#	1-10	TR052
99	Dk/refused	TR052

TR052. Please rate how important would ENERGY EFFICIENCY be in deciding whether to upgrade these kinds of **energy-related products** in a home you want to buy on a scale of 1 to 10 where 1 means NOT important and 10 means EXTREMELY important?

#	1-10	TR053
99	DK/refused	TR053

TR053. In general, how much confidence do you have in your ability to distinguish between HIGH efficiency and STANDARD efficiency versions of products like windows, lighting, and heating and cooling systems? Are you ... [READ LIST] ...?

1	Completely confident	TR054
2	Fairly confident	TR054
3	Not too confident, or	TR054
4	Not at all confident	TR054
99	[DO NOT READ:] DK/no answer	TR054

ASK TR054 IF TR052=6-10; OTHERWISE GO TO TR055.

TR054. If you were considering replacement of windows, lighting, or heating and cooling systems when purchasing your next home, who would you rely on as a source of RELIABLE, OBJECTIVE information about high-efficiency products? [RECORD UNPROMPTED RESPONSES]

1	PG&E (general/unlisted mentions)	TR055a-c
2	PG&E REBATE program	TR055a-c
3	PG&E ENERGY ANALYSIS program	TR055a-c
4	Home inspector	TR055a-c
5	Realtor	TR055a-c
6	Measure manufacturer	TR055a-c
7	Measure distributor	TR055a-c
8	Home Depot (specific mentions)	TR055a-c
9	OTHER retailers	TR055a-c
10	Measure installer/contractors	TR055a-c
11	Yellow pages	TR055a-c
12	Other advertising	TR055a-c
13	Consumer Reports	TR055a-c
14	Other media	TR055a-c
15	Government/DOE/Energy Star	TR055a-c
88	Other [SPECIFY:] _____	TR055a-c
99	[DO NOT READ:] DK/NONE/no answer	TR055a-c

[Each respondent should get ONE of the following (TR055a-TR055c) questions.]

TR055a. Assume you are still considering purchasing this home. You decide to replace or upgrade the WINDOWS,. Information about high efficiency windows that you feel is objective and reliable is readily available. In that situation, what are the reasons why you might NOT seriously consider the high efficiency windows? [RECORD UNPROMPTED RESPONSES.]



1	Concern that information is incomplete	TR056
2	Concern that information may become outdated quickly	TR056
3	Concern that I didn't ask some important question	TR056
4	Seems uncommon/don't know others who have done it	TR056
5	Doubts that they really save money/are worth it	TR056
6	Concern about high first (costs too much)	TR056
7	Concerns about comfort	TR056
8	Concerns about style/aesthetic aspect	TR056
9	Concerns about other non-energy aspect	TR056
10	What I have now is fine/works well	TR056
88	Other [SPECIFY:] _____	TR056
99	[DO NOT READ:] DK/NONE/no answer	TR056

TR055b. Assume that you have bought the home you've been considering. You decide to replace or upgrade the LIGHTING. Information about high efficiency LIGHTING that you feel is objective and reliable is readily available. In that situation, what are the reasons why you might NOT seriously consider the high efficiency LIGHTING? [RECORD UNPROMPTED RESPONSES.]

1	Concern that information is incomplete	TR056
2	Concern that information may become outdated quickly	TR056
3	Concern that I didn't ask some important question	TR056
4	Seems uncommon/don't know others who have done it	TR056
5	Doubts that they really save money/are worth it	TR056
6	Concern about high first cost (costs too much)	TR056
7	Concerns about lighting quality	TR056
8	Concerns about style/aesthetic aspects	TR056
9	Concerns about other non-energy aspect	TR056
10	What I have now is fine/works well	TR056
88	Other [SPECIFY:] _____	TR056
99	[DO NOT READ:] DK/NONE/no answer	TR056

TR055c. Assume that you have bought the home you've been considering. You decide to replace or upgrade the HEATING AND COOLING. Information about high efficiency HEATING AND/OR COOLING that you feel is objective and reliable is readily available. In that situation, what are the reasons why you might NOT seriously consider the high efficiency HEATING AND/OR COOLING SYSTEM? [RECORD UNPROMPTED RESPONSES.]

1	Concern that information is incomplete	TR056
2	Concern that information may become outdated quickly	TR056
3	Concern that I didn't ask some important question	TR056
4	Seems uncommon/don't know others who have done it	TR056
5	Doubts that it really saves money/is worth it	TR056
6	Concern about high first cost (costs too much)	TR056
7	Concerns about comfort	TR056
8	Concerns about reliability	TR056
9	Concerns about other aspect	TR056
10	What I have now is fine/works well	TR056

88	Other [SPECIFY:] _____	TR056
99	[DO NOT READ:] DK/NONE/no answer	TR056

TR056. Assume PG&E offers a free analysis to identify specific high efficiency measures like windows, lighting, or heating and cooling that are likely to save energy. How important would this analysis be in your consideration of higher efficiency items like these? Please give a rating from 1 to 10, where 1 means the PG&E analysis would NOT be important at all, and 10 means it would be EXTREMELY important.

[IF RESPONDENT ASKS, SAVINGS COULD BE SMALL OR NONE IF HIGH EFFICIENCY ALREADY EXISTS.]

#	1-10	TR057
99	DK/refused	TR057

TR057. Assume you could obtain detailed information about high efficiency **energy-related products** from knowledgeable staff at home center retailers like a Home Depot. How important would this kind of resource be in your consideration of higher efficiency items like these? Please give a rating from 1 to 10, where 1 means it would NOT be important at all, and 10 means it would be EXTREMELY important.

#	1-10	TR061
99	DK/refused	TR061

**Knowledge/Evaluation/Decide to buy**

TR061. Again, let me remind you we're not selling anything. These types of hypothetical scenario questions help us better understand customer perceptions and priorities.

[EACH RESPONDENT SHOULD BE ASKED ONLY **ONE** OF THE QUESTIONS TR061, TR062, TR063; THEN GO TO TR064.]

TR061. Imagine you were actively considering replacement of the LIGHTING at the time of purchasing your home. You have information from an objective, reliable source showing you could save a significant amount on your energy bill each year. Based on that scenario, how likely would you be to replace the LIGHTING in a home you wanted to buy with high efficiency lighting? Please give me a rating from 1 to 10, where 1 means you would NOT be at all likely to install high efficiency lighting, and 10 means you'd be EXTREMELY likely to.

#	1-10	TR061-TR063 randomize
99	DK/refused	TR601-TR063 randomize

TR062. Imagine you were actively considering replacement of the WINDOWS at the time of purchasing your home. You have information from an objective, reliable source showing you could save a significant amount on your energy bill each year. Based on that scenario, how likely would you be to replace the WINDOWS in a home you wanted to buy with high efficiency windows? Please give me a rating from 1 to 10, where 1 means you would NOT be at all likely to install high efficiency lighting, and 10 means you'd be EXTREMELY likely to.

#	1-10	TR061-TR063 randomize
99	DK/Refused	TR061-TR063 randomize

TR063. Imagine you were actively considering replacement of the HEATING AND COOLING SYSTEM at the time of purchasing your home. You have information from an objective, reliable source showing you could save a significant amount on your energy bill each year. Based on that scenario, how likely would you be to replace the HEATING AND COOLING SYSTEM in a home you wanted to buy with a high efficiency system? Please give me a rating from 1 to 10, where 1 means you would NOT be at all likely to install high efficiency lighting, and 10 means you'd be EXTREMELY likely to.

#	1-10	TR061-TR063 randomize
99	DK/Refused	TR061-TR063 randomize

TR064. I'd like to read you a few statements and have you rate your agreement or disagreement with them. Please rate each statement from 1 to 10, this time where 1 means you strongly DISAGREE, and 10 means you strongly AGREE.  
[RANDOMIZE; OBTAIN RATING FOR EACH; GO TO TR065.]

My decision to invest in high efficiency **energy-related products** would depend on the availability of financing

#	1-10	TR064 randomize TR071
99	DK/Refused	TR064 randomize TR071

I would hesitate to invest in high efficiency **energy-related products** because of serious doubts that they will save me as much money as claimed

#	1-10	TR064 randomize TR071
99	DK/Refused	TR064 randomize TR071

Regardless of how much money I can save, and the information I have about high efficiency **energy-related products**, I would want to avoid the hassle of installing them at the time I'm buying a home

#	1-10	TR064 randomize TR071
99	DK/Refused	TR064 randomize TR071

### **Financing**

TR071. Assume you were actively considering investing in high efficiency windows, lighting, or heating and cooling when buying your home and you knew you could obtain an energy efficient mortgage. On a scale of 1 to 10, how important would the availability of an energy efficient mortgage be in persuading you to invest in high efficiency measures when buying your home? [IF NEEDED: AN ENERGY EFFICIENT MORTGAGE CAN FINANCE THE ENERGY-EFFICIENT MEASURES, AND OFFSET THE COST WITH INCREASED SAVINGS ON YOUR BILL.]

#	1-10	TR072
99	DK/Refused	TR072

TR072. Please rate these next two statements from 1 to 10, where 1 means you strongly DISAGREE, and 10 means you strongly AGREE. [RANDOMIZE; OBTAIN RATING FOR EACH; GO TO TR073.]

Obtaining information about energy efficient mortgages on a timely basis from a reliable source would have a major impact on whether or not I invest in high efficiency measures when buying a home

#	1-10	TR072 randomize
99	DK/Refused	TR072 randomize

Going through the process of applying for and obtaining an energy efficient mortgage at the time when I'm buying my next home would just be too much of a hassle

#	1-10	TR072 randomize
99	DK/Refused	TR072 randomize

TR073. What other factors could prevent you from considering an energy efficient mortgage as I've described it, if you were considering investing in high efficiency **energy-related products** when buying your next home?

1	Enter comments verbatim	TR074
2	No	TR074
99	DK/Refused	TR074

TR074. Have you heard of a home energy analysis that provides accurate estimates of what you would save on your energy bill if you replaced existing windows, lighting, and/or heating and cooling systems with high efficiency measures. This analysis costs around \$200, and is offered through an independent organization called CHEERS?

1	Yes	TR075
2	No	TR075
3	DK/refused	TR075

TR075. Assume you're considering replacement of existing **energy-related products** in a home you wanted to buy, and you knew you were interested in obtaining an Energy Efficient Mortgage. Since the \$200 analysis is required to qualify for the mortgage, how likely would you be to invest in the energy analysis, on a scale of 1 to 10?

[IF NEEDED: 1 means NOT likely at all, and 10 means EXTREMELY likely. An EEM helps finance energy efficient measures in your mortgage and offsets the cost with increased savings on your energy bills.]

#	1-10	TR077
99	DK/Refused	TR077

### **Whole-House**

TR077. Let's assume you invested in the home energy analysis before buying your home, and it showed that you could save money by installing higher efficiency windows, lighting, AND heating and cooling than the home currently has. On a scale of 1 to 10, please rate your likelihood of pursuing an ENERGY EFFICIENT MORTGAGE to finance higher efficiency products for ALL THREE.

[IF NEEDED: 1 means NOT likely at all, and 10 means EXTREMELY likely. An EEM helps finance energy efficient measures in your mortgage and offsets the cost with increased savings on your energy bills.]

#	1-10	TR079
99	DK/Refused	TR079

TR079. Let's still assume the situation where the \$200 analysis shows that you could save money by installing higher efficiency measures than the home currently has. Assume that installing higher efficiency windows, lighting, and heating and cooling will save 10-30% of the monthly energy bill in your new home. On a scale from 1 to 10, where 1 means NOT likely at all and 10 means EXTREMELY likely, please rate your likelihood of installing higher-efficiency windows, lighting, AND heating and cooling in this situation.

#	1-10	TR081
99	DK/Refused	TR081

TR081. Assume you're purchasing a home. There is a reasonable possibility that you might replace ALL THREE **energy-related products**, based on reliable knowledge that higher-efficiency versions will save you money each month. I'd like to read you a few statements and have you rate your agreement or disagreement with them. Please rate each statement from 1 to 10, where 1 means you strongly DISAGREE, and 10 means you strongly AGREE. [RANDOMIZE; OBTAIN RATING FOR EACH; GO TO TR082.]

I would be concerned about finding enough reliable information about ALL THREE products to know how to get the higher-efficiency versions for the home installed.

#	1-10	TR081 randomize
99	dk/rf	TR081 randomize

Going through the process of installing higher-efficiency versions of ALL THREE products when I'm buying my next home would just be too much of a hassle.

#	1-10	TR081 randomize
99	dk/rf	TR081 randomize

I would hesitate to invest in high efficiency windows, lighting, AND heating and cooling at the same time because of serious doubts that I'd save the money I've been told I will.

#	1-10	TR081 randomize
99	dk/rf	TR081 randomize

I'd be concerned that getting several higher-efficiency products installed at the same time I'm buying a home would involve costs I can't anticipate.

#	1-10	TR081 randomize
99	dk/rf	TR081 randomize

TR082. What would cause you to seriously consider replacement of the all three **energy-related products** in your next home, with higher-efficiency versions at the time of purchase? What else?

1	Enter comments verbatim	TR088
2	No reasons	TR088
99	DK/Refused	TR088

Wrap-up

TR088. Overall, how important will energy efficiency be to you in the future, when looking to buy or replace things like windows, lighting, heating and cooling, refrigerators, and dishwashers? Please give me a rating from 1 to 10, where 1 means energy efficiency will NOT be at all important to you, and 10 means energy efficiency will be EXTREMELY important to you.

#	1-10	TR089
99	dk/rf	TR089

TR089. Let's say there was a Federal or state tax credit up to \$250 per installation for investing in high efficiency windows, lighting, heating and cooling, refrigerators, and dishwashers. On a scale of 1 to 10, how would you rate the much impact this would this have on your likelihood of investing in high efficiency measures like these in the future?

#	1-10	DE091
99	dk/rf	DE091

**[DEMOGRAPHICS]**

DE091. OK, these last few questions are just to wrap up. In what year did you buy your current home?

1	1999	DE092
2	1998	DE092
3	1997	DE092
4	1996	DE092
5	1995	DE092
6	1990-1994	DE092
7	1985-1989	DE092
8	1980-1984	DE092
9	1970-1979	DE092
10	1960-1969	DE092
11	1950-1959	DE092
12	1940-1949	DE092
13	Before 1940	DE092
99	DK/refused	DE092

DE092. And in what decade was your home built? Was it during the ...[READ LIST]

1	90s	DE093
2	80s	DE093
3	70s	DE093

4	60s	DE093
5	50s	DE093
6	40s	DE093
7	Before 1940s	DE093
9	DK/refused	DE093

DE093. Was your current home the first one you have ever bought?

1	Yes, first home ever bought	DE094
2	No, have bought other homes before (self or other HH head)	DE095
99	DK/refused	DE095

DE094. Would you describe yourself or any other adult head of your household as Hispanic?

1	Yes, Hispanic household/household head	DE095
2	No, not Hispanic household	DE095
99	DK/refused	DE095

DE095. Into which of the following categories does your age fall? [READ LIST]

1	Under 25	DE096
2	25 to 34	DE096
3	35 to 44	DE096
4	45 to 54	DE096
5	55 to 64	DE096
6	65 or older	DE096
99	[DO NOT READ:] DK/refused	DE096

DE096. And, just to make sure that we talked to a cross-section of people with this survey, which of the following best describes your household's 1998 income before taxes? [READ LIST]

1	Under \$20,000	DE097
2	\$20,000 but under \$30,000	DE097
3	\$30,000 but under \$50,000	DE097
4	\$50,000 but under \$75,000	DE097
5	\$75,000 but under \$100,000	DE097
6	Over \$100,000	DE097
99	[DO NOT READ:] DK/refused	DE097

DE097. [RECORD GENDER - DO NOT ASK:]

1	Female	AD001
2	Male	AD001
3	DK	AD001

IF BL010=1, or BL030=1 then ask AD001, ELSE go to GOODBYE

AD001 In order to send you your \$20 check for completing this survey, we need to verify your address and name. Are you at &CUSTADDR &CUSTCITY &CUSTZIP?

1	Yes	AD003
2	No	AD002
99	DK/refused	AD002

AD002 Could you please tell me the correct address?

1	Yes, enter address	AD003
2	No	GOODBYE
99	DK/refused	GOODBYE

AD003 And could me tell you your name please?

1	Yes, enter name	GOODBYE
2	No	GOODBYE
99	DK/refused	GOODBYE

GOODBYE:

On behalf of PG&E and Quantum Consulting, thank you very much for your time and valuable input on this important survey. Have a great day/evening.



**RESIDENTIAL RETROFIT AND RENOVATION (R&R)  
DISCRETIONARY RETROFIT**

BL001. Hello, this is <INTERVIEWER NAME> calling from Quantum Consulting for PG&E. We are interviewing customers like you to help PG&E better understand the current products, services, and practices of its customers. PG&E needs this information to design their new energy efficiency program. We are NOT trying to sell anything.

I'd like to speak with the person in your household most knowledgeable about energy use in your home. Would that be you?

1	Current individual is best HH contact	BL003
2	Transferred to best HH contact	1st Screen & ask for name of best person
3	Best contact not available – set up callback	Record for future contact
99	Don't know/refused	Thank & terminate

BL003. First, do you own or rent your home? [MEANS AT THIS ADDRESS/DWELLING]

1	Own	BL004
2	Rent/lease	Thank & terminate
99	Don't know/refused	Thank & terminate

BL004. And is this your primary residence, or a secondary residence where you live just part of the year?

1	Primary residence	BL005
2	Secondary/seasonal residence	Thank & terminate
99	Don't know/refused	Thank & terminate

BL005. Do you live in a detached single-family home, a condominium, a townhouse, or a mobile home? [CONDO IS MULTI-LEVEL WITH ATTACHED UNITS ON EITHER SIDE; TOWNHOUSE HAS ATTACHED UNITS ON EITHER SIDE, BUT NONE ABOVE OR BELOW.]

1	Single-family house (SFD)	BL006 – assign/confirm to SFD cell
2	Condominium	BL008 – assign/confirm to Condo cell
3	Townhouse	BL008 assign/confirm to Condo cell
4	Mobile home	Thank & terminate
5	Other _____	Thank & terminate
99	Don't know/refused	Thank & terminate

BL006. And, just to make sure we're talking to a representative cross-section of customers for this survey, which of the following broad categories best describes your household's 1998 income?

1	Under \$30,000	Thank & terminate
2	\$30,000 but under \$50,000	Thank & terminate
3	\$50,000 or more	DR001
99	[DO NOT READ:] Don't know/refused	Thank & terminate

BL007 ASK IF SAMPTYPE=RURAL

BL007. Do you live in a detached single-family home, a condominium, a townhome, or a mobile home? [CONDO IS MULTI-LEVEL WITH ATTACHED UNITS ON EITHER SIDE; TOWNHOME HAS ATTACHED UNITS ON EITHER SIDE, BUT NONE ABOVE OR BELOW.]

1	Single-family house (SFD)	DR001 - remains in Rural cell
2	Condominium	DR001- remains in Rural cell
3	Townhome	DR001- remains in Rural cell
4	Mobile home	DR001- remains in Rural cell
5	Other [SPECIFY:] _____	DR001- remains in Rural cell
99	Don't know/refused	Thank & terminate

**Screen for Discretionary Retrofit and Consideration**

DR001. Have you made any voluntary CHANGES in your home's windows, heating and cooling system, indoor or outdoor lighting, refrigerator, dishwasher, or water heater since January 1, 1997 EXCLUDING any changes made right around the time of purchase of the home? [IF NEEDED: BY "VOLUNTARY" I MEAN IT WAS NOT AN URGENT REPLACEMENT OF SOMETHING THAT BROKE DOWN OR STOPPED WORKING CORRECTLY.] [ENTER ALL THAT APPLY]

1	Refrigerator	DR002
2	Dishwasher	DR002
3	Water Heater	DR002
4	Windows	DR002
5	Indoor lighting	DR002
6	Outdoor lighting	DR002
7	Heating and/or cooling - HVAC	DR002
99	DK/none	DR003

DR002. Did you replace the [DR001] because [it/they] broke, [wasn't/weren't] working, or for another reason? [ASK FOR EACH MEASURE]

1	Broke/Wasn't working	DR003
2	For another reason	DR003
99	DK/refused	DR003

DR003. Are you considering any voluntary CHANGES in your home's windows, heating and cooling system, indoor or outdoor lighting, refrigerator, dishwasher, or water heater in the next couple of years or so? And if so, which ones? [ENTER ALL THAT APPLY]

1	Refrigerator	DR004
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2	Dishwasher	DR004
3	Water Heater	DR004
4	Windows	DR004
5	Indoor lighting	DR004
6	Outdoor lighting	DR004
7	Heating and/or cooling - HVAC	DR004
99	DK/none	DR004

ASK DR004 IF DR001 IN(1,2,3)

DR004. Did you make these replacements as a result of a broader kitchen remodel? *cut candidate*

1	Yes	DR005a
2	No	DR005a
99	DK/Refused	DR005a

IF DR001=99 AND DR003=99, THEN THANK & TERMINATE.

**Discretionary Retrofit Activities**

IF DR001=4 THEN ASK DR005A, ELSE SKIP TO DR006A.

DR005a. What were the reasons you chose to replace or upgrade your WINDOWS? Are there any others?

1	They were too big	DR005B
2	They were too small	DR005B
3	They looked "fogged up" all the time/there was condensation between the panes of glass	DR005B
4	The frame style was not to my liking	DR005B
5	The home felt drafty	DR005B
6	Too light	DR005B
7	Too dark	DR005B
8	Furniture was fading	DR005B
9	Part of the kitchen remodel	DR005B
10	Moisture/mold on frames	DR005B
11	Other [SPECIFY]_____	DR005B
99	DK/Refused	DR005B

DR005b. Approximately how much money did you spend on your new windows and their installation?

#	Fill in response in dollars	DR005D
99	Don't know/refused	DR005C

DR005c. Was it...? [READ LIST]

1	Less than 1,000 dollars	DR005D
2	1,000 - 2,000 dollars	DR005D
3	2,000 - 3,000 dollars	DR005D

4	3,000 - 4,000 dollars	DR005D
5	4,000 - 5,000 dollars	DR005D
6	Greater than 5,000 dollars	DR005D
7	DK/Refused	DR005D

DR005D. Who performed the installation of your windows?

1	Contractor	DR006a
2	Family member/ friend	DR006a
3	Did it myself	DR006a
4	Dealer who sold the equipment	DR006a
5	Homebuilder	DR006a
6	Other: [SPECIFY] _____	DR006a
99	DK/refused	DR006a

IF DR001=5 THEN ASK DR006A, ELSE SKIP TO DR007A.

DR006a. What were the reasons you chose to replace or upgrade your INDOOR LIGHTING?  
Are there any others?

1	They were too dim/ did not provide enough light	DR006B
2	They were too bright/ gave too much light	DR006B
3	They got too hot when on for extended periods of time	DR006B
4	The fixtures were not to my liking	DR006B
5	They were costing too much on my electricity bill	DR006B
6	Quality of the light/color tone	DR006B
7	Part of the kitchen remodel	DR006B
8	Other [SPECIFY]: _____	DR006B
99	DK/Refused	DR006B

DR006b. Approximately how much money did you spend on your new INDOOR LIGHTING  
and its installation?

#	Fill in response in dollars	DR006D
99	Don't know/refused	DR006C

DR006c. Was it...? [READ LIST]

1	Less than 500 dollars	DR006D
2	500- 1,000 dollars	DR006D
3	1,000 - 2,000 dollars	DR006D
4	2,000 - 3,000 dollars	DR006D
5	Greater than 3,000 dollars	DR006D
6	DK/Refused	DR006D

DR006D. Who performed the installation of your INDOOR LIGHTING?

1	Contractor	DR007a
2	Family member/ friend	DR007a

3	Did it myself	DR007a
4	Dealer who sold the equipment	DR007a
5	Homebuilder	DR007a
6	Other: [SPECIFY]_____	DR007a
99	DK/refused	DR007a

IF DR001=7 THEN ASK DR007A, ELSE SKIP TO DR008A.

DR007a. What were the reasons you chose to replace or upgrade your HEATING and/or COOLING system? Are there any others?

1	It did not cool or heat well enough	DR007B
2	It was too expensive to run/ my electricity bill was too high	DR007B
3	It was too noisy	DR007B
4	It was too costly/too much hassle to maintain	DR007B
5	Kitchen remodel	DR007B
6	NON-kitchen remodel	DR007B
7	Other [SPECIFY]:_____	DR007B
99	DK/Refused	DR007B

DR007b. Approximately how much money did you spend on your new HEATING and/or COOLING system and its installation?

#	Fill in response in dollars	DR007D
99	Don't know/refused	DR007C

DR007c. Was it...? [READ LIST]

1	Less than 1,000 dollars	DR007D
2	1,000 - 2,000 dollars	DR007D
3	2,000 - 3,000 dollars	DR007D
4	3,000 - 4,000 dollars	DR007D
5	4,000 - 5,000 dollars	DR007D
6	Greater than 5,000 dollars	DR007D
7	DK/Refused	DR007D

DR007D. Who performed the installation of your HEATING and/or COOLING system?

1	Contractor	DR008a
2	Family member/ friend	DR008a
3	Did it myself	DR008a
4	Dealer who sold the equipment	DR008a
5	Homebuilder	DR008a
6	Other: [SPECIFY]_____	DR008a
99	DK/refused	DR008a

IF DR001=2 THEN ASK DR008A, ELSE SKIP TO DR009A.

DR008a. What were the reasons you chose to replace or upgrade your DISHWASHER? Are there any others?

1	It did not get the dishes clean enough	DR008B
2	It was too expensive to run/ my electricity bill was too high	DR008B
3	It was too noisy	DR008B
4	It was too costly to maintain	DR008B
5	It style/color was not to my liking OR it didn't match the kitchen	DR008B
6	Was part of the kitchen remodel	DR008B
7	Other [SPECIFY]: _____	DR008B
99	DK/Refused	DR008B

DR008b. Approximately how much money did you spend on your new DISHWASHER and its installation?

#	Fill in response in dollars	DR008D
99	Don't know/refused	DR008C

DR008c. Was it...? [READ LIST]

1	Less than 400 dollars	DR008D
2	400 – 600 dollars	DR008D
3	600 – 800 dollars	DR008D
4	Greater than 800 dollars	DR008D
5	DK/Refused	DR008D

DR008D. Who performed the installation of your DISHWASHER?

1	Contractor	DR009a
2	Family member/ friend	DR009a
3	Did it myself	DR009a
4	Dealer who sold the equipment	DR009a
5	Homebuilder	DR009a
6	Other: [SPECIFY] _____	DR009a
99	DK/refused	DR009a

IF DR001=1 THEN ASK DR009A, ELSE SKIP TO DR010A.

DR009a. What were the reasons you chose to replace or upgrade your REFRIGERATOR? Are there any others?

1	It was not keeping food cool enough/ cooling too much	DR009B
2	It was too expensive to run/ my electricity bill was too high	DR009B
3	It was too noisy	DR009B
4	It was too costly to maintain/ parts kept breaking	DR009B
5	The style/color was not to my liking OR it didn't match the Kitchen	DR009B

6	Did not have the features I wanted	DR009B
7	I did not want it to break down at a bad time	DR009B
8	It was part of the kitchen remodel	DR009B
9	Other [SPECIFY]: _____	DR009B
99	DK/Refused	DR009B

DR009B. Approximately how much money did you spend on your new REFRIGERATOR and its installation?

#	Fill in response in dollars	DR009D
99	Don't know/refused	DR009C

DR009c. Was it...? [READ LIST]

1	Less than 400 dollars	DR009D
2	400 - 1,000 dollars	DR009D
3	1,000 - 1,500 dollars	DR009D
4	Greater than 1,500 dollars	DR009D
5	DK/Refused	DR009D

DR009D. Who performed the installation of your REFRIGERATOR?

1	Contractor	DR010a
2	Family member/ friend	DR010a
3	Did it myself	DR010a
4	Dealer who sold the equipment	DR010a
5	Homebuilder	DR010a
6	Other: [SPECIFY] _____	DR010a
99	DK/refused	DR010a

IF DR001=3 THEN ASK DR010A, ELSE SKIP TO DR011A.

DR010a. What were the reasons you chose to replace or upgrade your WATER HEATER? Are there any others?

1	It did not produce enough hot water	DR010B
2	It was too expensive to run/ my electricity bill was too high	DR010B
3	It was too costly to maintain/ parts kept breaking	DR010B
4	I thought it might be a fire hazard during an earthquake	DR010B
5	It was part of the kitchen remodel	DR010B
6	It wasn't making enough hot water	DR010B
7	It wasn't the water hot enough	DR010B
8	Other [SPECIFY]: _____	DR010B
99	DK/Refused	DR010B

DR010B. Approximately how much money did you spend on your new WATER HEATER and its installation?

#	Fill in response in dollars	DR010D
99	Don't know/refused	DR010C

DR010c. Was it...? [READ LIST]

1	Less than 500 dollars	DR010D
2	500 - 1,000 dollars	DR010D
3	Greater than 1,000 dollars	DR010D
4	DK/Refused	DR010D

DR010D. Who performed the installation of your WATER HEATER?

1	Contractor	DR011A
2	Family member/ friend	DR011A
3	Did it myself	DR011A
4	Dealer who sold the equipment	DR011A
5	Homebuilder	DR011A
6	Other: [SPECIFY] _____	DR011A
99	DK/refused	DR011A

ASK DR011A if DR004=1, ELSE GO TO DR013

DR011A. What were the reasons you chose to remodel your KITCHEN? Are there any others?

1	I didn't like the style of the kitchen (color)	DR011B
2	The appliances were all getting old and worn out	DR011B
3	I didn't like the layout of the kitchen/I wanted to move something	DR011B
4	We needed a bigger kitchen	DR011B
5	Part of a broader home remodel	DR011B
6	Other [SPECIFY]: _____	DR011B
99	DK/Refused	DR011B

DR011B. Approximately how much money did you spend on your kitchen remodel?

#	Fill in response in dollars	DR011B
99	Don't know/refused	DR011C

DR011c. Was it...? [READ LIST]

1	Less than 1,000 dollars	DR011D
2	1,000 - 2,000 dollars	DR011D
3	2,000 - 3,000 dollars	DR011D
4	3,000 - 4,000 dollars	DR011D
5	4,000 - 5,000 dollars	DR011D
6	5,000 - 10,000 dollars	DR011D
7	10,000 -15,000 dollars	DR011D
8	15,000 - 25,000 dollars	DR011D
9	Greater than 25,000 dollars	DR011D
10	DK/Refused	DR011D



DR011D. Who performed the work during your KITCHEN REMODEL?

1	Contractor	DR013
2	Family member/ friend	DR013
3	Did it myself	DR013
4	Dealer who sold the equipment	DR013
5	Homebuilder	DR013
6	Kitchen/bath design store	DR013
7	Other: [SPECIFY] _____	DR013
99	DK/refused	DR013

ASK IF DR001 SELECTED 2 OR MORE IN (1,2,3,4,5,6,7) THEN ASK DR013, ELSE SKIP TO TR084

DR013. Of the changes you made, was there one item in particular that led you to make other changes? Which one? [SHOW ONLY ANSWERS GIVEN AT DR001].

1	Refrigerator	TR084
2	Dishwasher	TR084
3	Water Heater	TR084
4	Windows	TR084
5	Indoor lighting	TR084
6	Outdoor lighting	TR084
7	Heating and/or cooling - HVAC	TR084
99	DK/none	TR084

IF DR001 NE 99 THEN ASK TR084, ELSE SKIP TO BL026

TR084. Where or from whom did you purchase the [DR001] you replaced? [ASK FOR EACH DR001] *must keep*

1	Measure specialty contractor	DR014
2	General contractor	DR014
3	Specific mentions of ESCO, energy services co., performance contractor	DR014
4	Home center (Home Depot, etc.)	DR014
5	OTHER kind of retailer	DR014
6	Product distributor	DR014
7	Product manufacturer	DR014
88	Or, some other way [SPECIFY:] _____	DR014
99	[DO NOT READ:] DK/refused	DR014

DR014. How did you pay for the equipment or appliances installed [ASK EACH DR001]? *must keep*

1	Savings	TR043
2	Cash/Check	TR043
3	Agreement with contractor/retailer to pay over a couple of months	TR043

4	Credit card	TR043
5	Energy efficiency loan	TR043
6	Non- energy efficiency loan/other financing	TR043
7	Other [SPECIFY]_____	TR043
99	Don't know/refused	TR043

ASK IF DR001 NE 6 OR 99 ELSE SKIP TO BL026

TR043. Using a scale from 1 to 10, where 1 means NOT important and 10 means VERY important, how important was energy efficiency in deciding which SPECIFIC energy-related items to INSTALL?

#	1-10	BL026
99	DK/RF	BL026

BL026. Prior to our conversation today, had you heard of something called an ENERGY EFFICIENT LOAN? This involves more attractive interest rates for installation of energy efficient windows, lighting, and heating and cooling that save homeowners money each month.

1	Yes	BL027
2	No	DR015
99	Don't know/refused	DR015

ASK IF DR001 NE 99, ELSE SKIP TO TR048

BL027. Were you aware of energy efficient loans as a financing option, at the time you made the replacements or upgrades we just discussed?

1	Yes	BL028
2	No	TR044
99	Don't know/refused	TR044

BL028. Did you OBTAIN an energy efficient loan for the voluntary replacement of the measures we discussed? If so, which one(s)? [ASK FOR EACH BL028] [ENTER ALL THAT APPLY]

[CATI - DISPLAY ONLY MEASURES CORRESPONDING TO THOSE MENTIONED AT DR001.]

1	Yes, for the refrigerator	BL028a
2	Yes, for the dishwasher	BL028a
3	Yes, for the water heater	BL028a
4	Yes, for windows	BL028a
5	Yes, for indoor lighting	BL028a
6	Yes, for outdoor lighting	BL028a
7	Yes, for heating and cooling - HVAC	BL028a
8	No/No to all	BL029
99	Don't know/refused	BL029

**BL028a. Who was the loan obtained from? [RECORD ALL THAT APPLY]**

1	Bank of America	BL028b
2	EGIA	BL028c <<<<
3	Energy Star	BL028c <<<<
4	First Financial	BL028b
5	Great Western Bank	BL028b
6	PG&E	BL028c <<<<
7	The Money Store	BL028b
8	Viewtech/Volt Viewtech	BL028b
9	Washington Mutual	BL028b
10	Wells Fargo	BL028b
11	Other: [specify] _____	BL028b
99	Don't know/refused	DR015 <<<<

BL028b. Was the energy efficient loan that you obtained from [ANS. IN BLO28a] tied to any energy efficiency programs promoted by PG&E, Energy Star, or EGIA? [RECORD ALL MENTIONS.]

1	Yes, tied to PG&E program/rebate	DR015
2	Yes, tied to Energy Star program	DR015
3	Yes, tied to EGIA program	DR015
99	DK/None of the above	DR015

BL028c. Do you know who the ultimate financing source was, for the energy efficient loan you obtained through [ANS. IN BL028a]? [RECORD ALL THAT APPLY.]

1	Bank of America	DR015
2	First Financial	DR015
3	Great Western Bank	DR015
4	The Money Store	DR015
5	Viewtech/Volt Viewtech	DR015
6	Washington Mutual	DR015
7	Wells Fargo	DR015
8	Other: [specify] _____	DR015
99	Don't know/refused	DR015

BL029. Did you CONSIDER an energy efficient loan when you were voluntarily replacing or upgrading the measures we discussed? [ENTER ALL THAT APPLY]

[CATI - DISPLAY ONLY MEASURES CORRESPONDING TO THOSE MENTIONED AT DR001.]

1	Yes, for the refrigerator	DR015
2	Yes, for the dishwasher	DR015
3	Yes, for the water heater	DR015
4	Yes, for windows	DR015
5	Yes, for indoor lighting	DR015
6	Yes, for outdoor lighting	DR015
7	Yes, for heating and cooling - HVAC	DR015
8	No/Not at all	DR015

99	Don't know/refused	DR015
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DR015. What was the most important characteristic of an energy efficiency loan that caused you to consider it?

1	Lower interest rate than other loans	TR044
2	Longer payback period	TR044
3	Lender/contractor recommended it	TR044
4	Other: [SPECIFY]_____	TR044
99	Don't know/refused	TR044

ASK IF DR001 NE 99, ELSE SKIP TO TR048

TR044. Did you use an architect or designer to plan or consult with about the changes you made?

1	Yes, used architect or designer	TR047
2	No, did not use architect or designer	TR047
99	DK/refused	TR047

TR047. To the best of your knowledge, [were/was] the measures you installed when replacing or upgrading the old ones HIGH efficiency or STANDARD efficiency?

1	HIGH efficiency	TR048
2	STANDARD efficiency	TR048
3	MIX of High AND Standard efficiency	TR048
99	DK/refused	TR048

**Shopping**

TR048. For the next portion of this survey, imagine you are in a home where no upgrades or remodels have been done. This may be your current home, or a home you purchase in the future. These questions will address opportunities to replace or upgrade aspects of this home, like windows, lighting, heating and cooling, and the kitchen appliances like the refrigerator, dishwasher or water heater.

[Each respondent should get only ONE of the questions TR048-TR050.]

In this home, the seals on a few WINDOWS appear to be broken, but they still function, and the style of windows isn't particularly to your taste. While it depends on the cost, what would be your general attitude regarding window replacement in this situation? Please give me a rating from 1 to 10, where 1 means you WOULD NOT replace the windows, and 10 means you would ACTIVELY INVESTIGATE replacing them.

#	1-10	TR051
99	Dk/refused	TR051

TR049. In this home, the quality INDOOR LIGHTING and the fixture styles aren't particularly to your taste. While it depends on the cost, what would be your general attitude regarding lighting

replacement in this situation? Please give me a rating from 1 to 10, where 1 means you WOULD NOT replace the lighting, and 10 means you would ACTIVELY INVESTIGATE replacing them.

#	1-10	TR051
99	DK/Refused	TR051

TR050. In this home, the HEATING AND COOLING SYSTEM works OK, but you know it's 10 years old, wonder how reliable it is and how long it will last, and suspect that it may be making your energy bills too high. While it depends on the cost, what would be your general attitude regarding heating and cooling replacement in this situation? Please give me a rating from 1 to 10, where 1 means you WOULD NOT replace the heating and cooling system, and 10 means you would ACTIVELY INVESTIGATE replacing them.

#	1-10	TR051
99	Dk/refused	TR051

For purposes of this discussion, we are considering the water heater as a kitchen appliance since it can be affected by changes in the kitchen.

TR051. In this home, some KITCHEN APPLIANCES, such as the refrigerator, dishwasher, or supplying water heater could be upgraded. They all function, but they are not particularly your style, or they don't have all the features you would like. While it depends on the cost, what would be your general attitude regarding kitchen appliance replacement in this situation? Please give me a rating from 1 to 10, where 1 means you WOULD NOT replace the kitchen appliances, and 10 means you would ACTIVELY INVESTIGATE replacing them.

#	1-10	TR052
99	DK/refused	TR052

TR052. Please rate how important would ENERGY EFFICIENCY be in deciding whether to upgrade these kinds of energy-related items in your home on a scale of 1 to 10 where 1 means NOT important and 10 means EXTREMELY important?

#	1-10	TR053
99	DK/refused	TR053

TR053. In general, how much confidence do you have in your ability to distinguish between HIGH efficiency and STANDARD efficiency versions of products like windows, lighting, and heating and cooling systems, and kitchen appliances? Are you ... [READ LIST] ...?

1	Completely confident	TR054
2	Fairly confident	TR054
3	Not too confident, or	TR054
4	Not at all confident	TR054
99	[DO NOT READ:] DK/no answer	TR054

ASK TR054 IF TR052=6-10; OTHERWISE GO TO TR055.

TR054. If you were considering replacement of windows, lighting, heating and cooling systems, or kitchen appliances in your home, who would you rely on as a source of RELIABLE,

OBJECTIVE information about high-efficiency products? [RECORD UNPROMPTED RESPONSES]

1	PG&E (general/unlisted mentions)	TR055a-d
2	PG&E REBATE program	TR055a-d
3	PG&E ENERGY ANALYSIS program	TR055a-d
4	Home inspector	TR055a-d
5	Realtor	TR055a-d
6	Measure manufacturer	TR055a-d
7	Measure distributor	TR055a-d
8	Home Depot (specific mentions)	TR055a-d
9	OTHER retailers	TR055a-d
10	Measure installer/contractors	TR055a-d
11	Yellow pages	TR055a-d
12	Other advertising	TR055a-d
13	Consumer Reports	TR055a-d
14	Other media	TR055a-d
15	Government/DOE/Energy Star	TR055a-d
88	Other [SPECIFY:] _____	TR055a-d
99	[DO NOT READ:] DK/NONE/no answer	TR055a-d

[Each respondent should get ONE of the following (TR055a-TR055d) questions.]

TR055a. Assume you are still considering purchasing this home. You decide to replace or upgrade the WINDOWS. Information about high efficiency windows that you feel is objective and reliable is readily available. In that situation, what are the reasons why you might NOT seriously consider the high efficiency windows? [RECORD UNPROMPTED RESPONSES.]

1	Concern that information is incomplete	TR056
2	Concern that information may become outdated quickly	TR056
3	Concern that I didn't ask some important question	TR056
4	Seems uncommon/don't know others who have done it	TR056
5	Doubts that they really save money/are worth it	TR056
6	Concern about high first (costs too much)	TR056
7	Concerns about comfort	TR056
8	Concerns about style/aesthetic aspect	TR056
9	Concerns about other non-energy aspect	TR056
10	What I have now is fine/works well	TR056
88	Other [SPECIFY:] _____	TR056
99	[DO NOT READ:] DK/NONE/no answer	TR056

TR055b. Assume you are still considering purchasing this home. You decide to replace or upgrade the LIGHTING. Information about high efficiency LIGHTING that you feel is objective and reliable is readily available. In that situation, what are the reasons why you might NOT seriously consider the high efficiency LIGHTING? [RECORD UNPROMPTED RESPONSES.]

1	Concern that information is incomplete	TR056
2	Concern that information may become outdated quickly	TR056
3	Concern that I didn't ask some important question	TR056
4	Seems uncommon/don't know others who have done it	TR056

5	Doubts that they really save money/are worth it	TR056
6	Concern about high first cost (costs too much)	TR056
7	Concerns about lighting quality	TR056
8	Concerns about style/aesthetic aspects	TR056
9	Concerns about other non-energy aspect	TR056
10	What I have now is fine/works well	TR056
88	Other [SPECIFY:] _____	TR056
99	[DO NOT READ:] DK/NONE/no answer	TR056

TR055c. Assume you are still considering purchasing this home. You decide to replace or upgrade the HEATING AND COOLING. Information about high efficiency HEATING AND/OR COOLING that you feel is objective and reliable is readily available. In that situation, what are the reasons why you might NOT seriously consider the high efficiency HEATING AND/OR COOLING SYSTEM? [RECORD UNPROMPTED RESPONSES.]

1	Concern that information is incomplete	TR056
2	Concern that information may become outdated quickly	TR056
3	Concern that I didn't ask some important question	TR056
4	Seems uncommon/don't know others who have done it	TR056
5	Doubts that it really saves money/is worth it	TR056
6	Concern about high first cost (costs too much)	TR056
7	Concerns about comfort	TR056
8	Concerns about reliability	TR056
9	Concerns about other aspect	TR056
10	What I have now is fine/works well	TR056
88	Other [SPECIFY:] _____	TR056
99	[DO NOT READ:] DK/NONE/no answer	TR056

TR055d. Assume you are still considering purchasing this home. You decide to replace or upgrade the KITCHEN APPLIANCES. Information about high efficiency KITCHEN APPLIANCES that you feel is objective and reliable is readily available. In that situation, what are the reasons why you might NOT seriously consider the high efficiency KITCHEN APPLIANCES? [RECORD UNPROMPTED RESPONSES.]

1	Doubts that it really saves money/is worth it	TR057
2	Concern about high first cost (costs too much)	TR057
3	Concerns about noise level	TR057
4	Concerns about reliability	TR057
5	Concerns about other aspect	TR057
88	Other [SPECIFY:] _____	TR057
99	[DO NOT READ:] DK/NONE/no answer	TR057

TR057. Assume you could obtain detailed information about high efficiency windows, lighting, heating and cooling, and kitchen appliances from knowledgeable staff at home center retailers like a Home Depot. How important would this kind of resource be in your consideration of higher efficiency items like these? Please give a rating from 1 to 10, where 1 means it would NOT be important at all, and 10 means it would be EXTREMELY important.

#	1-10	TR061
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99	DK/refused	TR061
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**Knowledge/Evaluation/Decide to buy**

TR061. [READ AS NECESSARY] Again, let me remind you we are not selling anything. These types of hypothetical scenario questions help us better understand customer perceptions and priorities.

[EACH RESPONDENT SHOULD BE ASKED ONLY ONE OF THE QUESTIONS TR061, TR062, TR063; THEN GO TO TR063A.]

TR061. Imagine you were actively considering replacement of the LIGHTING in your home. You have information from an objective, reliable source showing you could save a significant amount of the cost of installing high efficiency lighting each year going forward, through savings on your energy bill. Based on that scenario, how likely would you be to replace the LIGHTING in a home you wanted to buy with high efficiency lighting? Please give me a rating from 1 to 10, where 1 means you would NOT be at all likely to install high efficiency lighting, and 10 means you'd be EXTREMELY likely to.

#	1-10	TR061-TR063 randomize
99	DK/refused	TR601-TR063 randomize

TR062. Imagine you were actively considering replacement of the WINDOWS. You have information from an objective, reliable source showing you could save a significant amount of the cost of installing high efficiency windows each year going forward, through savings on your energy bill. Based on that scenario, how likely would you be to replace the WINDOWS in a home you wanted to buy with high efficiency windows? Please give me a rating from 1 to 10, where 1 means you would NOT be at all likely to install high efficiency windows, and 10 means you'd be EXTREMELY likely to.

#	1-10	TR061-TR063 randomize
99	DK/Refused	TR061-TR063 randomize

TR063. Imagine you were actively considering replacement of the HEATING AND COOLING SYSTEM. You have information from an objective, reliable source showing you could save a significant amount of the cost of installing high efficiency heating and cooling each year going forward, through savings on your energy bill. Based on that scenario, how likely would you be to replace the HEATING AND COOLING SYSTEM in a home you wanted to buy with a high efficiency system? Please give me a rating from 1 to 10, where 1 means you would NOT be at all likely to install high efficiency heating and cooling, and 10 means you'd be EXTREMELY likely to.

#	1-10	TR061-TR063 randomize
99	DK/Refused	TR061-TR063 randomize

TR063A. Imagine you were actively considering replacement of the kitchen appliances in your home. You have information from an objective, reliable source showing you could save a significant amount of the cost of installing high efficiency kitchen appliances each year going forward, through savings on your energy bill. Based on that scenario, how likely would you be to replace at least one of the KITCHEN APPLIANCES in your home with a high efficiency refrigerator, dishwasher, or water heater? Please give me a rating from 1 to 10, where 1 means you would NOT be at all likely to install at least one high efficiency kitchen appliance, and 10



means you'd be EXTREMELY likely to. [IF NEEDED: KITCHEN APPLIANCES WOULD INCLUDE THE REFRIGERATOR, THE DISHWASHER, AND/OR THE WATER HEATER]

#	1-10	TR064
99	DK/Refused	TR064

TR064. I'd like to read you a few statements and have you rate your agreement or disagreement with them. Please rate each statement from 1 to 10, this time where 1 means you strongly DISAGREE, and 10 means you strongly AGREE.

[RANDOMIZE; OBTAIN RATING FOR EACH; GO TO TR071.]

My decision to invest in high efficiency energy-related products would depend on the availability of financing

#	1-10	TR064 randomize TR071
99	DK/Refused	TR064 randomize TR071

I would hesitate to invest in high efficiency energy-related products because of serious doubts that they will save me as much money as claimed

#	1-10	TR064 randomize TR071
99	DK/Refused	TR064 randomize TR071

Regardless of how much money I can save, and the information I have about high efficiency energy-related products, I would want to avoid the hassle of having them installed.

#	1-10	TR064 randomize TR071
99	DK/Refused	TR064 randomize TR071

### **Financing**

TR071. Assume you were actively considering investing in high efficiency windows, lighting, heating and cooling, or kitchen appliances for your home and you could obtain an energy efficient loan, which can finance these measures and offset the cost with increased savings on your energy bill. On a scale of 1 to 10, how important would the availability of an energy efficient loan be in persuading you to invest in high efficiency measures for your home?

#	1-10	TR072
99	DK/Refused	TR072

TR072. Please rate these next two statements from 1 to 10, where 1 means you strongly DISAGREE, and 10 means you strongly AGREE. [RANDOMIZE; OBTAIN RATING FOR EACH; GO TO TR073.]

Obtaining information about energy efficient loans from a reliable source would have a major impact on whether or not I invest in high efficiency measures for my home

#	1-10	TR072 randomize
99	DK/Refused	TR072 randomize

Going through the process of applying for and obtaining an energy efficient loan would just be too much of a hassle

#	1-10	TR072 randomize
99	DK/Refused	TR072 randomize

TR073. What other factors could prevent you from considering an energy efficient loan as I've described it, if you were considering investing in high efficiency windows, lighting, heating and cooling, or kitchen appliances?

1	Enter comments verbatim	DR015
2	No	DR015
99	DK/Refused	DR015

DR016. What are the primary benefits or features you would want in an energy efficient loan, with regards to the loan terms and funding sources?

1	Quick turnaround time	DR017
2	Low rates	DR017
3	Lower monthly payments over longer term	DR017
4	Minimal processing fees/ no points	DR017
5	Line of credit	DR017
6	Specific bank [SPECIFY]_____	DR017
5	Other: [SPECIFY]_____	DR017
99	DK/Refused	DR017

DR017. I'm going to read you four different approaches to obtaining an Energy Efficient Loan, and I'd like you to tell me which one you prefer. [READ ENTIRE LIST FIRST. THEY CAN ONLY CHOOSE ONE.] [IF RESPONDENT ASKS "CAN I DO THIS THROUGH MY BANK NOW", ANSWER IS, "IT DEPENDS ON YOUR BANK"]

1	From your primary bank [SPECIFY]_____	DR018
2	A contractor handles the paperwork and obtains the loan through a financial institution you may or may not have a relationship with.	DR018
3	You call an 800 number and use the keypad to apply for the loan from a financial institution you may or may not have a relationship with.	DR018
4	You apply for the loan through the Website of a financial institution you may or may not have a relationship with.	DR018
99	DK/Refused	DR018

DR018. If you knew that you could receive the first 6 to 12 months interest-free on an energy efficient loan, how likely would you be to select this loan over another? Please give me a rating on a scale from 1 to 10 where 1 means NOT very likely and 10 means EXTREMELY likely to apply for the loan.

#	1-10	TR077
99	Don't know/refused	TR077

**Whole-House**

TR077. We're most of the way through the survey, and this is all very helpful.

Let's assume you have information from an objective, reliable source showing that you could save money by installing higher efficiency windows, lighting, heating and cooling, refrigerator, dishwasher, AND water heater than the home currently has. On a scale of 1 to 10, please rate your likelihood of pursuing an ENERGY EFFICIENT LOAN to finance higher efficiency products for TWO OR MORE of those changes.

[IF NEEDED: 1 means NOT likely at all, and 10 means EXTREMELY likely. An EEL helps finance energy efficient measures offsets the cost with increased savings on your energy bills. Kitchen appliances are refrigerator, dishwasher, and water heater.]

#	1-10	TR079
99	DK/Refused	TR079

TR079. Let's still assume you have information from an objective, reliable source showing that you could save money by installing higher efficiency measures than the home currently has. Assume that installing TWO OR MORE higher efficiency measures will save 10-30% of the monthly energy bill in your new home. On a scale from 1 to 10, where 1 means NOT likely at all and 10 means EXTREMELY likely, please rate your likelihood of installing TWO OR MORE of the following products in this situation: higher-efficiency windows, lighting, heating and cooling, refrigerator, dishwasher, and water heater.

#	1-10	TR081
99	DK/Refused	TR081

TR081. Assume you want to upgrade TWO OR MORE of the energy using products in your home based on reliable knowledge that higher-efficiency versions will save you money each month. I'd like to read you a few statements and have you rate your agreement or disagreement with them. Please rate each statement from 1 to 10, where 1 means you strongly DISAGREE, and 10 means you strongly AGREE. [RANDOMIZE; OBTAIN RATING FOR EACH; GO TO TR083.]

I would be concerned about finding enough reliable information about TWO OR MORE of these products to know how to get the higher-efficiency versions for the home INSTALLED.

#	1-10	TR081 randomize
99	dk/rf	TR081 randomize

Going through the process of installing higher-efficiency versions of TWO OR MORE of the products would just be too much of a hassle.

#	1-10	TR081 randomize
99	dk/rf	TR081 randomize

I would hesitate to invest in TWO OR MORE of these high efficiency items at once because of serious doubts that I'd save the money I've been told I will.

#	1-10	TR081 randomize
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99	dk/rf	TR081 randomize
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I'd be concerned that getting TWO OR MORE higher-efficiency products installed at the same time would involve costs I can't anticipate.

#	1-10	TR081 randomize
99	dk/rf	TR081 randomize

TR083. Based on everything we've discussed today, if you were seriously considering replacing TWO OR MORE of the following items, windows, lighting, heating and cooling, and kitchen appliances, how would you most likely pay for it? Let's say, purely for example purposes, that it cost 2 to 3 percent of the home purchase price, again with the expectation that you'd save money each month from having high efficiency products installed. Would you most likely pay for this level of investment ... [READ LIST]?

**RANDOMIZE LIST**

1	Through an energy efficient loan	TR088
2	Through a loan, but not an energy efficient loan	TR088
3	Through a separate bank loan or credit line	TR088
4	With a credit card	TR088
5	With cash	TR088
6	Installer/contractor financing	TR088
88	Or, some other way [SPECIFY:] _____	TR088
99	[DO NOT READ:] DK/refused	TR088

Wrap-up

TR088. We're down to our last couple minutes of questions, then we're done. Overall, how important will energy efficiency be to you in the future, when looking to buy or replace things like windows, lighting, heating and cooling, refrigerators, water heaters and dishwashers? Please give me a rating from 1 to 10, where 1 means energy efficiency will NOT be at all important to you, and 10 means energy efficiency will be EXTREMELY important to you. *cut candidate*

#	1-10	TR089
99	dk/rf	TR089

TR089. Let's say there was a Federal or state tax credit up to \$250 per installation for investing in high efficiency windows, lighting, heating and cooling, refrigerators, water heaters, and dishwashers. On a scale of 1 to 10, how would you rate the much impact this would this have on your likelihood of investing in high efficiency measures like these in the future?

#	1-10	DE091
99	dk/rf	DE091

**[DEMOGRAPHICS]**

DE091. OK, these last few questions are just to wrap up. In what year did you buy your current home?

1	1999	DE092
2	1998	DE092
3	1997	DE092
4	1996	DE092
5	1995	DE092
6	1990-1994	DE092
7	1985-1989	DE092
8	1980-1984	DE092
9	1970-1979	DE092
10	1960-1969	DE092
11	1950-1959	DE092
12	1940-1949	DE092
13	Before 1940	DE092
99	DK/refused	DE092

DE092. And in what decade was your home built? Was it during the ...[READ LIST]

1	90s	DE095
2	80s	DE095
3	70s	DE095
4	60s	DE095
5	50s	DE095
6	40s	DE095
7	Before 1940s	DE095
9	DK/refused	DE095

DE095. Into which of the following categories does your age fall? [READ LIST]

1	Under 25	DE096
2	25 to 34	DE096
3	35 to 44	DE096
4	45 to 54	DE096
5	55 to 64	DE096
6	65 or older	DE096
99	[DO NOT READ:] DK/refused	DE096

DE096. And, just to make sure that we talked to a cross-section of people with this survey, which of the following best describes your household's 1998 income before taxes? [READ LIST]

1	Under \$20,000	DE097
2	\$20,000 but under \$30,000	DE097
3	\$30,000 but under \$50,000	DE097
4	\$50,000 but under \$75,000	DE097
5	\$75,000 but under \$100,000	DE097
6	Over \$100,000	DE097
99	[DO NOT READ:] DK/refused	DE097

DE097. [RECORD GENDER - DO NOT ASK:]

1	Female	GOODBYE
2	Male	GOODBYE
3	DK	GOODBYE

GOODBYE:

On behalf of PG&E and Quantum Consulting, thank you very much for your time and valuable input on this important survey. Have a great day/evening.

**RESIDENTIAL RETROFIT AND RENOVATION (R&R)  
FIRST-TIME HISPANIC HOME BUYER SURVEY**

[NOTE TO REVIEWERS: QC's CATI system allows for global translation of an English survey into a separate Spanish version – and also allows us to refine that translation on a more custom basis as well. The English version below will be the default to begin with, and will present an opportunity to identify respondents who only speak, or prefer, Spanish. Those who prefer or require Spanish will be put into the Spanish interviewer follow-up queue, and re-contacted and screened in the Spanish version of this survey. We do not believe it would be productive to ask respondents fluent in English, and who complete the screening capably in English, whether they would prefer to conduct the interview in English or Spanish. We believe continuing in English is best from an interviewer productivity perspective, and from a PG&E P.R. perspective.]

BL001. Hello, this is <INTERVIEWER NAME> calling from Quantum Consulting for PG&E. We are interviewing customers like you to help PG&E better understand the current products, services, and practices of its customers. PG&E needs this information to design their new energy efficiency program. We are NOT trying to sell anything.

[IF RESPONDENT INDICATES LANGUAGE BARRIER – SPANISH, RECORD IN APPROPRIATE DISPOSITION CATEGORY. RECORD NON-SPANISH LANGUAGE BARRIERS IN NORMAL LANGUAGE BARRIER CATEGORY.]

PG&E serves a wide range of customers, with different needs and desires. For this particular survey, we are interested in speaking with households who may consider themselves Hispanic or Latino. Would you consider your household to be Hispanic or Latino?

[IF RESPONDENT ASKS: We started with a list of PG&E customers who may be Hispanic or Latino, based simply on the family name. We then let customers tell us whether or not they consider their household to be Hispanic or Latino.]

1	Yes (Hispanic/Latino)	BL002
2	No	Thank & terminate
99	Don't know/refused	Thank & terminate

BL002. I'd like to speak with the person in your household most knowledgeable about energy use in your home. Would that be you?

1	Current individual is best HH contact	BL003
2	Transferred to best HH contact	1st Screen & ask for name of best person
3	Best contact not available – set up CB	Record for future contact
99	Don't know/refused	Thank & terminate

BL003. First, do you own or rent your home? [MEANS AT THIS ADDRESS/DWELLING]

1	Own	BL004
2	Rent/lease	Thank & terminate
99	Don't know/refused	Thank & terminate

BL004. And is this your primary residence?

1	Yes	BL004a
2	No	Thank & terminate
99	Don't know/refused	Thank & terminate

BL004a. Is this the FIRST home that your household has owned, or has your household owned previous homes before?

1	Yes, first home owned	BL007
2	No, owned other homes before	Thank & terminate
99	Don't know/refused	Thank & terminate

[CATI: Notice that logic for BL007 has changed a bit.]

BL007. Do you live in a detached single-family home, a condominium, a townhouse, or a mobile home? [CONDO IS MULTI-LEVEL WITH ATTACHED UNITS ON EITHER SIDE; TOWNHOME HAS ATTACHED UNITS ON EITHER SIDE, BUT NONE ABOVE OR BELOW.]

1	Single-family house (SFD)	BL008
2	Condominium	BL008
3	Townhouse	BL008
4	Mobile home	Thank & terminate
5	Other _____	Thank & terminate
99	Don't know/refused	Thank & terminate

BL008. Did you buy this home BEFORE or AFTER January 1, 1997?

1	Before	Thank & terminate
2	After	BL009
99	Don't know/refused	Thank & terminate

BL009. In the next two years, how likely are you to sell your current home and buy another single-family house, condominium or townhome, within the Northern or Central California area served by PG&E? Would you say you are ... [READ LIST]? [RESPONDENT'S BEST GUESS ABOUT PG&E TERRITORY WILL SUFFICE.]

1	Very likely	BL011
2	Somewhat likely	BL011
3	Not very likely, or	BL011
4	Not at all likely	BL011
5	[DO NOT READ:] Plan to sell, but don't plan to buy listed dwelling type in PG&E territory	BL011
6	[DO NOT READ:] Plan to buy second/other home	BL011
99	[DO NOT READ:] Don't know/refused	BL011

[REVIEWERS: We are obtaining sample filtered to be home purchasers in PRIZM-based "Hispanic-prevalent" ZIP codes within PG&E territory. We therefore emphasize recent first-time buyers for this survey, as opposed to a mix of recent or imminent home buyers as in the baseline and TOS renovation surveys. Therefore, BL008 comes later in the screening process, since it should be "confirmatory" for the most part. Also, BL009 is just factual information – not involved in screening respondents in or out, since for this survey we have a special sequence of questions where recent first-time home buying experience is relevant.]



BL011. When you bought your current home, was it brand new or previously owned?

1	Brand new	BL012
2	Previously owned	BL012
99	Don't know/refused	BL012

BL012. At the time you bought your current home, were there any improvements or upgrades that occurred as a condition of the sale at the SELLER'S expense? [IF NEEDED: I'm specifically thinking of renovations in kitchen or bathroom areas, or replacement of windows, lighting, or heating and cooling systems.]

1	Yes	BL013
2	No	BL014
99	Don't know/refused	BL014

BL013. What kinds of renovations or replacements of items like those I mentioned were done at the SELLER'S expense? [ENTER ALL THAT APPLY]

1	Windows	BL014
2	Lighting - inside	BL014
3	Lighting - outdoors	BL014
4	Heating and/or cooling - HVAC	BL014
5	Water heater	BL014
6	Plumbing - kitchen	BL014
7	Plumbing - bathroom	BL014
8	Refrigerator	BL014
9	Dishwasher	BL014
10	Other kitchen remodeling/renovation	BL014
11	Other bathroom remodeling/renovation	BL014
12	Roof (only listed because mentions may be common)	BL014
13	Insulation	BL014
14	Weather stripping/ other weatherization	BL014
88	Other [SPECIFY:] _____	BL014
99	Don't know/refused	BL014

BL014. At the time you bought your current home, were there any renovations that occurred at or around the time of sale that YOU paid for, in order to make the home more to your liking? [IF NEEDED: Again, I'm specifically thinking of renovations in kitchen or bathroom areas, or replacement of windows, lighting, or heating and cooling systems.]

1	Yes	BL015
2	No	BL021
99	Don't know/refused	BL021

BL015. What kinds of renovations or replacements were done at or around the time of sale at YOUR expense? [ENTER ALL THAT APPLY]

1	Windows	BL021
2	Lighting - inside	BL021
3	Lighting - outdoors	BL021

4	Heating and/or cooling – HVAC	BL021
5	Water heater	BL021
6	Plumbing – kitchen	BL021
7	Plumbing – bathroom	BL021
8	Refrigerator	BL021
9	Dishwasher	BL021
10	Other kitchen remodeling/renovation	BL021
11	Other bathroom remodeling/renovation	BL021
12	Roof (only listed because mentions may be common)	BL021
13	Insulation	BL021
14	Weather stripping/ other weatherization	BL021
88	Other [SPECIFY:] _____	BL021
99	Don't know/refused	BL021

[REVIEWERS/CATI – BL016-BL020 have been deleted here, since in the baseline/TOS survey they presumed previous home ownership and asked questions about changes made at TOS.]

BL021. An energy efficient mortgage helps finance more energy efficient measures like windows, lighting and heating and cooling which help offset the cost with increased savings on your energy bills. Prior to our conversation today, had you heard of something called an ENERGY EFFICIENT MORTGAGE?

1	Yes	BL022
2	No	BL043
99	Don't know/refused	BL043

BL022. Were you aware of energy efficient mortgages as a financing option, at the time you bought your current home?

1	Yes	BL023
2	No	BL043
99	Don't know/refused	BL043

ASK BL023 BLO14=1, ELSE GO TO BLO25

BL023. Did you OBTAIN an energy efficient mortgage for the renovations you paid for, around the time you were BUYING your new home?

1	Yes	BL043
2	No	BL024
99	Don't know/refused	BL024

BL024. Did you CONSIDER an energy efficient mortgage for the renovations you paid for, around the time you were BUYING your new home?

1	Yes	BL043
2	No	BL043
99	Don't know/refused	BL043

[REVIEWERS/CATI – BL025-BL030 deleted, since we are focused on recent first-time home buyer experiences and those questions address non-TOS discretionary retrofit issues.]

[ASK TR043 IF BL012=1 OR BL014=1; ELSE GO TO TR047.]

TR043 Using a scale from 1 to 10, where 1 means NOT important and 10 means VERY important, how important was energy efficiency in deciding which SPECIFIC energy-related products to INSTALL when making the changes to your current home when buying it?

#	1-10	TR043a
99	DK/RF	TR043a

[TR043a added relative to baseline/TOS renovation survey. Want to probe this issue among this segment.]

TR043a. And what factors caused you to feel that way then?

#	Record verbatim	TR044
99	DK/RF	TR044

TR044. Did you use an architect or designer to plan or consult with about the changes you made when buying your current home?

1	Yes, used architect or designer	TR047
2	No, did not use architect or designer	TR047
99	DK/refused	TR047

[ASK TR047-HX149 if BL013 in (1,2,3,4) or BLO15 in (1,2,3,4) FOR EACH TECHNOLOGY CHANGED IN BL013 OR BL015; THEN GO TO HX153. IF NONE OF THOSE MEASURES CHANGED AT BL013 OR BL015, GO TO HX153.]

TR047. To the best of your knowledge, [were/was] the [MEASURE(S) in BL013 and BL015] you installed when buying your current home HIGH efficiency or STANDARD efficiency?

1	HIGH efficiency	TR047A
2	STANDARD efficiency	TR047A
99	DK/refused	TR047A

TR047A. To the best of your knowledge, who installed the [MEASURE(S) in BL013 and BL015]?

1	Contractor	TR047B
2	Family member/ friend	TR047B
3	Did it myself	TR047B
4	Dealer who sold the equipment	TR047B
5	Homebuilder	TR047B
6	Other: [SPECIFY]_____	TR047B
99	DK/refused	TR047B

[TR047B-HX156 ADDED FOR THIS SURVEY.]

ASK TR047B IF TR047A=1, 4, 5, OR 6; ELSE GO TO TR047D.

TR047B. Would you say that they emphasize serving Hispanic or Latino customers?

1	Yes	TR047C
2	No	TR047D
99	DK/refused	TR047D

TR047C. How important was that factor in your decision to do business with them? Please give me a rating from 1 to 10, where 1 means it was NOT important and 10 means it was VERY important.

#	1-10	TR047D
99	DK/RF	TR047D

TR047D. Just to check, did you buy the [MEASURE(S) IN BL013 AND BL015] from someone other than the installer?

1	Yes	TR047E
2	No	HX148
99	DK/refused	HX148

TR047E. Where or from whom did you purchase [it/them]?

1	Measure specialty contractor	TR047F
2	General contractor	TR047F
3	Specific mentions of ESCO, energy services co., performance contractor	TR047F
4	Home center (Home Depot, etc.)	TR047F
5	OTHER kind of retailer	TR047F
6	Product distributor	TR047F
7	Product manufacturer	TR047F
88	Or, some other way [SPECIFY:] _____	TR047F
99	[DO NOT READ:] DK/refused	TR047F

TR047F. Would you say that they emphasize serving Hispanic or Latino customers?

1	Yes	TR047G
2	No	HX148
99	DK/refused	HX148

TR047G. How important was that factor in your decision to do business with them? Please give me a rating from 1 to 10, where 1 means it was NOT important and 10 means it was VERY important.

#	1-10	HX148
99	DK/RF	HX148

ASK HX148 AND HX149 IF HIGH EFFICIENCY AT TR047; ELSE GO TO HX153.

HX148. How or from whom did you FIRST learn about high efficiency options when looking to replace the [HIGH EFFICIENCY MEASURE(S) AT BL013 AND BL015]?

#	Record verbatim	HX149
99	DK/RF	HX153

HX149. From what OTHER sources did you search for information about high efficiency options?

#	Record verbatim	HX153
99	DK/RF	HX153

[HX153 and HX154 replace TR053 and TR054, with slight revision, to fit context.]

HX153. In general, how much confidence do you have in your ability to distinguish between HIGH efficiency and STANDARD efficiency versions of products like windows, lighting, and heating and cooling systems? Are you ... [READ LIST]...?

1	Completely confident	HX154
2	Fairly confident	HX154
3	Not too confident, or	HX154
4	Not at all confident	HX154
99	[DO NOT READ:] DK/no answer	HX154

HX154. If you were considering replacement of windows, lighting, or heating and cooling systems, who would you rely on as a source of RELIABLE, OBJECTIVE information about high-efficiency products? [RECORD UNPROMPTED RESPONSES]

1	PG&E (general/unlisted mentions)	HX155
2	PG&E REBATE program	HX155
3	PG&E ENERGY ANALYSIS program	HX155
4	Home inspector	HX155
5	Realtor	HX155
6	Measure manufacturer	HX155
7	Measure distributor	HX155
8	Home Depot (specific mentions)	HX155
9	OTHER retailers	HX155
10	Measure installer/contractors	HX155
11	Yellow pages	HX155
12	Other advertising	HX155
13	Consumer Reports	HX155
14	Other media	HX155
15	Government/DOE/Energy Star	HX155
88	Other [SPECIFY:] _____	HX155
99	[DO NOT READ:] DK/NONE/no answer	HX155

HX155. Are there any sources of information about high efficiency products that you would have doubts about, in terms of their reliability and trustworthiness? [RECORD UNPROMPTED RESPONSES]

1	PG&E (general/unlisted mentions)	HX156
2	PG&E REBATE program	HX156
3	PG&E ENERGY ANALYSIS program	HX156
4	Home inspector	HX156
5	Realtor	HX156
6	Measure manufacturer	HX156

7	Measure distributor	HX156
8	Home Depot (specific mentions)	HX156
9	OTHER retailers	HX156
10	Measure installer/contractors	HX156
11	Yellow pages	HX156
12	Other advertising	HX156
13	Consumer Reports	HX156
14	Other media	HX156
15	Government/DOE/Energy Star	HX156
88	Other [SPECIFY:] _____	HX156
99	[DO NOT READ:] DK/NONE/no answer	HX156

HX156. Do you feel that people who speak Spanish as their primary language, or who simply prefer to speak Spanish, encounter any special problems in obtaining reliable, trustworthy information about high efficiency products like these?

#	Record verbatim	TR048
99	No/none/DK/RF	TR048

**Shopping**

TR048. For the next portion of this survey, imagine you are PURCHASING a home. These questions will address opportunities to replace or upgrade aspects of this home, like windows, lighting, heating and cooling, and the kitchen area. These would be upgrades you, AS THE BUYER, pay for at the time of purchase.

[Each respondent should only get ONE of the questions TR048-TR050]

In this home you're purchasing, imagine that you discover that the WINDOWS could be upgraded. They aren't broken and still function, but that the seals on a few windows appear broken, and the style of windows isn't particularly to your taste. While it depends on the cost, what would be your general attitude regarding window replacement in this situation? Please give me a rating from 1 to 10, where 1 means you WOULD NOT replace the windows, and 10 means you would ACTIVELY INVESTIGATE replacing them.

#	1-10	TR052
99	Dk/refused	TR052

TR049. In this home you're purchasing, imagine that you discover that the INDOOR LIGHTING could be upgraded. The lighting works OK, but the lighting quality and fixture styles aren't particularly to your taste. While it depends on the cost, what would be your general attitude regarding lighting replacement in this situation? Please give me a rating from 1 to 10, where 1 means you WOULD NOT replace the lighting, and 10 means you would ACTIVELY INVESTIGATE replacing them.

#	1-10	TR052
99	DK/Refused	TR052

TR050. In this home you're purchasing, imagine that you discover that the HEATING AND COOLING SYSTEM could be upgraded. The system works OK, but you know it's 10 years old and you wonder how reliable it is, how high the bill will be, and how long it will last. While it

depends on the cost, what would be your general attitude regarding heating and cooling replacement in this situation? Please give me a rating from 1 to 10, where 1 means you WOULD NOT replace the heating and cooling system, and 10 means you would ACTIVELY INVESTIGATE replacing them.

#	1-10	TR052
99	Dk/refused	TR052

TR052. Please rate how important would ENERGY EFFICIENCY be in deciding whether to upgrade these kinds of energy-related products in a home you want to buy on a scale of 1 to 10 where 1 means NOT important and 10 means EXTREMELY important?

#	1-10	TR055a-c
99	DK/refused	TR055a-c

[Each respondent should get ONE of the following (TR055a-TR055c) questions.]

TR055a. Assume you are still considering purchasing this home. You decide to replace or upgrade the WINDOWS. Information about high efficiency windows that you feel is objective and reliable is readily available. In that situation, what are the reasons why you might NOT seriously consider the high efficiency windows? [RECORD UNPROMPTED RESPONSES.]

1	Concern that information is incomplete	TR056
2	Concern that information may become outdated quickly	TR056
3	Concern that I didn't ask some important question	TR056
4	Seems uncommon/don't know others who have done it	TR056
5	Doubts that they really save money/are worth it	TR056
6	Concern about high first (costs too much)	TR056
7	Concerns about comfort	TR056
8	Concerns about style/aesthetic aspect	TR056
9	Concerns about other non-energy aspect	TR056
10	What I have now is fine/works well	TR056
88	Other [SPECIFY:] _____	TR056
99	[DO NOT READ:] DK/NONE/no answer	TR056

TR055b. Assume that you have bought the home you've been considering. You decide to replace or upgrade the LIGHTING. Information about high efficiency LIGHTING that you feel is objective and reliable is readily available. In that situation, what are the reasons why you might NOT seriously consider the high efficiency LIGHTING? [RECORD UNPROMPTED RESPONSES.]

1	Concern that information is incomplete	TR056
2	Concern that information may become outdated quickly	TR056
3	Concern that I didn't ask some important question	TR056
4	Seems uncommon/don't know others who have done it	TR056
5	Doubts that they really save money/are worth it	TR056
6	Concern about high first cost (costs too much)	TR056
7	Concerns about lighting quality	TR056
8	Concerns about style/aesthetic aspects	TR056
9	Concerns about other non-energy aspect	TR056
10	What I have now is fine/works well	TR056

88	Other [SPECIFY:] _____	TR056
99	[DO NOT READ:] DK/NONE/no answer	TR056

TR055c. Assume that you have bought the home you've been considering. You decide to replace or upgrade the HEATING AND COOLING. Information about high efficiency HEATING AND/OR COOLING that you feel is objective and reliable is readily available. In that situation, what are the reasons why you might NOT seriously consider the high efficiency HEATING AND/OR COOLING SYSTEM? [RECORD UNPROMPTED RESPONSES.]

1	Concern that information is incomplete	TR056
2	Concern that information may become outdated quickly	TR056
3	Concern that I didn't ask some important question	TR056
4	Seems uncommon/don't know others who have done it	TR056
5	Doubts that it really saves money/is worth it	TR056
6	Concern about high first cost (costs too much)	TR056
7	Concerns about comfort	TR056
8	Concerns about reliability	TR056
9	Concerns about other aspect	TR056
10	What I have now is fine/works well	TR056
88	Other [SPECIFY:] _____	TR056
99	[DO NOT READ:] DK/NONE/no answer	TR056

TR056. Assume PG&E offers a free analysis to identify specific high efficiency measures like windows, lighting, or heating and cooling that are likely to save energy. How important would this analysis be in your consideration of higher efficiency items like these? Please give a rating from 1 to 10, where 1 means the PG&E analysis would NOT be important at all, and 10 means it would be EXTREMELY important. [IF RESPONDENT ASKS, SAVINGS COULD BE SMALL OR NONE IF HIGH EFFICIENCY ALREADY EXISTS.]

#	1-10	TR057
99	DK/refused	TR057

TR057. Assume you could obtain detailed information about high efficiency energy-related products from knowledgeable staff at home center retailers like a Home Depot. How important would this kind of resource be in your consideration of higher efficiency items like these? Please give a rating from 1 to 10, where 1 means it would NOT be important at all, and 10 means it would be EXTREMELY important.

#	1-10	TR061
99	DK/refused	TR061

**Knowledge/Evaluation/Decide to buy**

TR061. Again, let me remind you we're not selling anything. These types of hypothetical scenario questions help us better understand customer perceptions and priorities.

[EACH RESPONDENT SHOULD BE ASKED ONLY ONE OF THE QUESTIONS TR061, TR062, TR063; THEN GO TO TR064.]

TR061. Imagine you were actively considering replacement of the LIGHTING at the time of purchasing your home. You have information from an objective, reliable source showing you



could save a significant amount on your energy bill each year. Based on that scenario, how likely would you be to replace the LIGHTING in a home you wanted to buy with high efficiency lighting? Please give me a rating from 1 to 10, where 1 means you would NOT be at all likely to install high efficiency lighting, and 10 means you'd be EXTREMELY likely to.

#	1-10	TR061-TR063 randomize
99	DK/refused	TR601-TR063 randomize

TR062. Imagine you were actively considering replacement of the WINDOWS at the time of purchasing your home. You have information from an objective, reliable source showing you could save a significant amount on your energy bill each year. Based on that scenario, how likely would you be to replace the WINDOWS in a home you wanted to buy with high efficiency windows? Please give me a rating from 1 to 10, where 1 means you would NOT be at all likely to install high efficiency lighting, and 10 means you'd be EXTREMELY likely to.

#	1-10	TR061-TR063 randomize
99	DK/Refused	TR061-TR063 randomize

TR063. Imagine you were actively considering replacement of the HEATING AND COOLING SYSTEM at the time of purchasing your home. You have information from an objective, reliable source showing you could save a significant amount on your energy bill each year. Based on that scenario, how likely would you be to replace the HEATING AND COOLING SYSTEM in a home you wanted to buy with a high efficiency system? Please give me a rating from 1 to 10, where 1 means you would NOT be at all likely to install high efficiency lighting, and 10 means you'd be EXTREMELY likely to.

#	1-10	TR061-TR063 randomize
99	DK/Refused	TR061-TR063 randomize

TR064. I'd like to read you a few statements and have you rate your agreement or disagreement with them. Please rate each statement from 1 to 10, this time where 1 means you strongly DISAGREE, and 10 means you strongly AGREE.  
[RANDOMIZE; OBTAIN RATING FOR EACH; GO TO TR065.]

My decision to invest in high efficiency energy-related products would depend on the availability of financing

#	1-10	TR064 randomize TR071
99	DK/Refused	TR064 randomize TR071

I would hesitate to invest in high efficiency energy-related products because of serious doubts that they will save me as much money as claimed

#	1-10	TR064 randomize TR071
99	DK/Refused	TR064 randomize TR071

Regardless of how much money I can save, and the information I have about high efficiency energy-related products, I would want to avoid the hassle of installing them at the time I'm buying a home

#	1-10	TR064 randomize TR071
99	DK/Refused	TR064 randomize TR071

**Financing**

TR071. Assume you were actively considering investing in high efficiency windows, lighting, or heating and cooling when buying your home and you knew you could obtain an energy efficient mortgage. On a scale of 1 to 10, how important would the availability of an energy efficient mortgage be in persuading you to invest in high efficiency measures when buying your home? [IF NEEDED: AN ENERGY EFFICIENT MORTGAGE CAN FINANCE THE ENERGY-EFFICIENT MEASURES, AND OFFSET THE COST WITH INCREASED SAVINGS ON YOUR BILL.]

#	1-10	TR072
99	DK/Refused	TR072

TR072. Please rate these next two statements from 1 to 10, where 1 means you strongly DISAGREE, and 10 means you strongly AGREE. [RANDOMIZE; OBTAIN RATING FOR EACH; GO TO TR073.]

Obtaining information about energy efficient mortgages on a timely basis from a reliable source would have a major impact on whether or not I invest in high efficiency measures when buying a home

#	1-10	TR072 randomize
99	DK/Refused	TR072 randomize

Going through the process of applying for and obtaining an energy efficient mortgage at the time when I'm buying my next home would just be too much of a hassle

#	1-10	TR072 randomize
99	DK/Refused	TR072 randomize

TR073. What other factors could prevent you from considering an energy efficient mortgage as I've described it, if you were considering investing in high efficiency energy-related products when buying your next home?

1	Enter comments verbatim	TR074
2	No	TR074
99	DK/Refused	TR074

TR074. Have you heard of a home energy analysis that provides accurate estimates of what you would save on your energy bill if you replaced existing windows, lighting, and/or heating and cooling systems with high efficiency measures. This analysis costs around \$200, and is offered through an independent organization called CHEERS?

1	Yes	TR075
2	No	TR075
3	DK/refused	TR075

TR075. Assume you're considering replacement of existing energy-related products in a home you wanted to buy, and you knew you were interested in obtaining an Energy Efficient Mortgage. Since the \$200 analysis is required to qualify for the mortgage, how likely would you be to invest in the energy analysis, on a scale of 1 to 10? [IF NEEDED: 1 means NOT likely at all, and 10 means EXTREMELY likely. An EEM helps finance energy efficient measures in your mortgage and offsets the cost with increased savings on your energy bills.]

#	1-10	TR088
99	DK/Refused	TR088

[REVIEWERS – Based on the need to maintain a reasonable survey length, and to make room for the earlier additions on customer information sources and barriers regarding HE measures, I suggest that we exclude the "whole-house" component here. My logic is that we already get that component in the main TOS survey, and the first-time Hispanic survey (as I understand it) is more focused on their access to HE products and information, not multiple measures.]

Wrap-up

TR088. Overall, how important will energy efficiency be to you in the future, when looking to buy or replace things like windows, lighting, heating and cooling, refrigerators, and dishwashers? Please give me a rating from 1 to 10, where 1 means energy efficiency will NOT be at all important to you, and 10 means energy efficiency will be EXTREMELY important to you.

#	1-10	TR089
99	dk/rf	TR089

TR089. Let's say there was a Federal or state tax credit up to \$250 per installation for investing in high efficiency windows, lighting, heating and cooling, refrigerators, and dishwashers. On a scale of 1 to 10, how would you rate the much impact this would this have on your likelihood of investing in high efficiency measures like these in the future?

#	1-10	DE091
99	dk/rf	DE091

**[DEMOGRAPHICS]**

[CATI – Note abbreviated DE091 list. Also note DE093 and DE094 deleted.]

DE091. OK, these last few questions are just to wrap up. In what year did you buy your current home?

1	1999	DE092
2	1998	DE092
3	1997	DE092
99	DK/refused	DE092

DE092. And in what decade was your home built? Was it during the ...[READ LIST]

1	90s	DE095
2	80s	DE095
3	70s	DE095
4	60s	DE095
5	50s	DE095
6	40s	DE095
7	Before 1940s	DE095
9	DK/refused	DE095

DE095. Into which of the following categories does your age fall? [READ LIST]

1	Under 25	DE096
2	25 to 34	DE096
3	35 to 44	DE096
4	45 to 54	DE096
5	55 to 64	DE096
6	65 or older	DE096
99	[DO NOT READ:] DK/refused	DE096

DE096. And, just to make sure that we talked to a cross-section of people with this survey, which of the following best describes your household's 1998 income before taxes? [READ LIST]

1	Under \$20,000	DE097
2	\$20,000 but under \$30,000	DE097
3	\$30,000 but under \$50,000	DE097
4	\$50,000 but under \$75,000	DE097
5	\$75,000 but under \$100,000	DE097
6	Over \$100,000	DE097
99	[DO NOT READ:] DK/refused	DE097

DE097. [RECORD GENDER - DO NOT ASK:]

1	Female	GOODBYE
2	Male	GOODBYE
3	DK	GOODBYE

GOODBYE:

On behalf of PG&E and Quantum Consulting, thank you very much for your time and valuable input on this important survey. Have a great day/evening.

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5/20/99

**CHEERS Post-Participant Survey**  
**5/13/99**

Hello my name is <NAME>. I'm calling from Quantum Consulting for PG&E. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number people who had CHEERS inspections in northern and central California to help PG&E design better programs.

It is our understanding that you had a CHEERS home energy efficiency rating inspection performed in your home at (READ SITE ADDRESS SHOWN FOR THIS NUMBER). Is this correct?

IF NO, thank and terminate.

IF YES, Are you the right person to talk to about the inspection process and your experience with the CHEERS rater?

This is a critical stage in PG&E's planning, and to thank you for taking time to answer our questions, we'll send you a check for \$20. Do you have about 10 minutes right now to complete this interview?

If NO, schedule a callback.

If YES, continue.

---

(Name) (Phone) (Call Back Date and Time)

1. Was the CHEERS audit performed at or around the time you were trying to purchase the home, or at another time?

- \_\_\_\_\_ At the time of purchase
- \_\_\_\_\_ At another time

2. What prompted you to have a CHEERS audit conducted in your home?

**Do not read. Check all that apply**

- \_\_\_\_\_ Obtain energy efficient mortgage
- \_\_\_\_\_ Prepare home for resale
- \_\_\_\_\_ Identify opportunities for energy efficiency improvements
- \_\_\_\_\_ HUD, other federal programs
- \_\_\_\_\_ Other (specify)
- \_\_\_\_\_ Other (specify)

3. How did you learn about the CHEERS rating system?

**Do not read. Check all that apply**

- [ ] Lender/Banker
- [ ] Real Estate Agent
- [ ] Web Site
- [ ] Someone I know (friend/family) had an inspection and referred the rater to me
- [ ] Contacted PG&E
- [ ] HUD, other government programs
- [ ] Other advertising
- [ ] Facilitator, or other person who worked with you to coordinate process
- [ ] CHEERS 800 #
- [ ] Other [Specify]: \_\_\_\_\_

4. Was it difficult to find someone to do the CHEERS rating?

- No
- Yes

5. What source of information did you use to find a qualified CHEERS rater?

**Do not read. Check all that apply**

- Lender/Banker referral
- Real Estate Agent referral
- Web Site
- Someone I know (friend/family) had an inspection and referred the rater to me
- Contacted PG&E
- HUD, other government programs
- Other advertising
- Other [Specify]: \_\_\_\_\_

6. Were you present while the rater was conducting his or her inspection? Yes/No \_\_\_\_\_

**If no, go to 9.**

7. About how long did the inspection take? \_\_\_\_\_ hours

8. Did the inspector talk with you to explain what he or she was looking for? Yes/No \_\_\_\_\_

9. How quickly were the results of the inspection generated and sent to you [the homeowner]?

**Do not read. Check ONLY ONE.**

- 1-2 Days
- 3-6 Days
- 1 Week
- 2-3 Weeks
- 1 Month
- 2-3 Months
- 4-6 Months
- Longer than 6 Months
- Other: \_\_\_\_\_

10. Before the inspector processed your analysis, what did you EXPECT the rating to recommend?

(Probe: Did you hope the rating would recommend any specific changes? What would these be?)

**Check all that apply.**

- Add/change INSULATION in ceiling, floor & walls
- Upgrade/replace CENTRAL AIR CONDITIONING
- Upgrade/replace FURNACE
- Change to the automatic-SETBACK THERMOSTAT
- Test DUCTS
- Clean and/or repair DUCTS
- Add solar sun screens
- Changes to the water heater
- Changes to the LIGHTING
- Adding WEATHER-STRIPPING and CAULKING
- Replace lighting with compact fluorescent bulbs
- Upgrade/replace WINDOWS
- Upgrade/replace KITCHEN APPLIANCES
- Other [Specify]: \_\_\_\_\_
- Other [Specify]: \_\_\_\_\_
- Other [Specify]: \_\_\_\_\_

11. Who discussed the results of the rating process and the resulting recommendations with you?

**Do not read. Check all that apply**

- Inspector
- Facilitator
- Lender
- Other [Specify]: \_\_\_\_\_

**12. What recommendations were made? Do not read. Check all that apply**

- Add/change INSULATION in ceiling, floor & walls
- Upgrade/replace CENTRAL AIR CONDITIONING
- Upgrade/replace FURNACE
- Change to the automatic-SETBACK THERMOSTAT
- Test DUCTS
- Clean and/or repair DUCTS
- Add solar sun screens
- Changes to the water heater
- Changes to the LIGHTING
- Adding WEATHER-STRIPPING and CAULKING
- Replace lighting with compact fluorescent bulbs
- Upgrade/replace WINDOWS
- Upgrade/replace KITCHEN APPLIANCES
- Changes to WATER HEATER
- Other [Specify]: \_\_\_\_\_
- Other [Specify]: \_\_\_\_\_
- Other [Specify]: \_\_\_\_\_

13. Of these recommended changes, which ones did you make? **Do not read. Check all that apply**

- Add/change INSULATION in ceiling, floor & walls (Go to 14)
- Upgrade/replace CENTRAL AIR CONDITIONING (Go to 14)
- Upgrade/replace FURNACE (Go to 14)
- Change to the automatic-SETBACK THERMOSTAT (Go to 14)
- Clean and/or repair DUCTS (Go to 14)
- Add solar sun screens (Go to 14)
- Changes to the water heater (Go to 14)
- Changes to the LIGHTING (Go to 14)
- Adding WEATHER-STRIPPING and CAULKING (Go to 14)
- Replace lighting with compact fluorescent bulbs (Go to 14)
- Upgrade/replace WINDOWS (Go to 14)
- Upgrade/replace KITCHEN APPLIANCES (Go to 14)
- Other [Specify]: \_\_\_\_\_ (Go to 14)
- Other [Specify]: \_\_\_\_\_ (Go to 14)
- Other [Specify]: \_\_\_\_\_ (Go to 14)
- NONE (Go to 15)

14. How did you choose which SPECIFIC changes to make? (Go to 16)

- Took the facilitator's recommended package of changes (Go to 16)
- Did only the changes I wanted whether or not recommended (Go to 16)
- Husband/Wife decided (Go to 16)
- Other [Specify]: \_\_\_\_\_ (Go to 16)

15. Why did you choose not to make any of the recommended changes? **Do not read. Choose all that apply.**

- Don't know where to get information on recommended measures
- Doubts about Energy Savings from recommended measures
- Recommended actions cost too much relative to benefits
- Not convinced predicted savings will materialize
- Don't like specific measures
- Don't want to go into debt
- Prefer to put money into more visible improvements
- Not planning to stay in house long enough to recover costs
- Too Much Hassle
- Other Barrier 1: \_\_\_\_\_
- Other Barrier 2: \_\_\_\_\_
- Other Barrier 3: \_\_\_\_\_

16. Did you obtain an energy efficient mortgage to make the changes or upgrades suggested by CHEERS?

- Yes
- No

17. If you could have obtained more money through the energy efficient mortgage, would you have made more of the recommended changes?

- Yes
- No
- Made ALL the changes recommended
- Don't Know/Refused

18. Who worked with you to help you coordinate and execute the inspection/lending/and completion of the work processes?

- Facilitator (Company who coordinates these activities.) (Go to 19)
- Real Estate Agent (Go to 21)
- Lender (Go to 21)
- Spouse (Husband/Wife) (Go to 21)
- Other [Specify]: \_\_\_\_\_



19. Would you say that the facilitator was very helpful, somewhat helpful, or not at all helpful with coordinating energy efficient mortgages?

- Very helpful
- Somewhat helpful
- Not at all helpful

20. On a scale of 1 to 10, where 1 means NOT AT ALL satisfied, and 10 means VERY satisfied, how satisfied were you with the following aspects of the facilitator? **Read and rate each one**

- Knowledge about energy efficiency products
- The amount of time it took to process the analysis and finish the work on your home
- Recommendations for upgrades/changes to your home
- The cost of the changes

21. On the same scale from 1 to 10, how satisfied were you with the changes you made?

- 1-10

**if Q21 = 5 or less**

21a. Would you please explain why? \_\_\_\_\_

---

READ Q22 IF THEY USED A FACILITATOR

22. Do you have any additional comments about the facilitator? **Write comments verbatim.**

---

---

23. Except for rebates, are there actions that PG&E might take to make homebuyers like yourself more likely to undertake recommended actions to increase energy efficiency? **Write comments verbatim.**

---

---

24. OK, these last few questions are just to wrap up. In what year did you buy your current home?

- 1999
- 1998
- 1997
- 1996
- 1995
- Before 1995
- DK/refused

25. And in what decade was your home built? Was it during the ...[READ LIST]

- 90s
- 80s
- 70s
- 60s
- 50s
- 40s
- Before 1940s
- DK/Refused

26. Was your current home the first one you have ever bought?

- Yes, first home ever bought
- No, have bought other homes before (self or other HH head)
- DK/refused

27. Would you describe yourself or any other adult head of your household as Hispanic?

- Yes, Hispanic household/household head
- No, not Hispanic household
- DK/refused

28. Into which of the following categories does your age fall? [READ LIST]

- Under 25
- 25 to 34
- 35 to 44
- 45 to 54
- 55 to 64
- 65 or older

29. And, just to make sure that we talked to a cross-section of people with this survey, which of the following best describes your household's 1998 income before taxes? [READ LIST]

- Under \$20,000
- \$20,000 but under \$30,000
- \$30,000 but under \$50,000
- \$50,000 but under \$75,000
- \$75,000 but under \$100,000

[DO NOT READ:] DK/refused

[RECORD GENDER – DO NOT ASK]

- Male
- Female

30. In order to send you your \$20 check for completing this survey, we need to verify your address and name. Are you at (Read the site address for this phone number)

- Yes
- No (Go to 31)

31. What is the correct address please? **Record street address, city, state, and zip code.**

---

---

32. And could you tell me your name please?

---

Those are all the questions I have for you today. On behalf of PG&E thank you very much for your time.

## *R&R General Retailer Interview Guide*

Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of residential equipment retailers in northern and central California to help PG&E design better programs. Can I talk to the owner or manager . . . and could you tell me their name?

---

(Name)	(Title)	(Phone)	(Call Back Date and Time)
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Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of residential equipment retailers in northern and central California. The information we collect from these select retailers will help PG&E design better programs. This is a critical stage in PG&E's planning and, to thank you for taking time to answer our questions, we will send you a check for \$50. Do you have about 15-20 minutes to complete this interview? If not, schedule a callback.

### ***Screening***

Before we start the interview, I need to ask a few questions to make sure that your company qualifies to participate in this study.

1. Does your company sell equipment to residential customers?

**[Check ONLY ONE category]**

- Yes  
 No (T&T)

2. What types of equipment does your company sell to residential customers?

**[Read list-Check all that apply]**

- Windows  
 Lighting  
 Kitchen Appliances/Remodeling  
**[T&T if no windows AND no lighting AND no kitchen]**  
 Water Heaters  
 Cooling and/or Heating Equipment  
 Insulation  
 Duct Work  
 Siding  
 Roofing  
 Weatherization Measures (Weatherstripping/Caulk/Sealant)  
 Other 1: \_\_\_\_\_  
 Other 2: \_\_\_\_\_  
 Other 3: \_\_\_\_\_

3. What percent of your business is with residential customers?

\_\_\_\_\_ Percent (If less than 25 percent, then T&T.)

4. How many full-time employees does your company have (if chain, ask for number at location)?

\_\_\_\_\_ Full-Time Employees

**Market Structure and Flow**

I would now like to ask about your suppliers, your customers, and the types of residential equipment your company sells.

5. What percent of your residential equipment is purchased from the following groups:  
**[Responses should add to 100]**

**Percent**

\_\_\_\_\_ Manufacturers (Probe for: US - \_\_\_\_\_ vs. Foreign - \_\_\_\_\_ )  
\_\_\_\_\_ Distributors (Probe for: Multiple-Line/Independent - \_\_\_\_\_ vs. Captive - \_\_\_\_\_ )  
\_\_\_\_\_ Other: \_\_\_\_\_

**IF SELLS WINDOWS (Q2), THEN ASK Q6; ELSE ASK Q7.**

6. What brands of windows does your company sell?  
**[Check all that apply-Do not read list-Probe if necessary]**

[ ] Anderson  
[ ] Pella  
[ ] Sierra Pacific  
[ ] Biltbest of California  
[ ] California Window Corporation  
[ ] Caradco  
[ ] JELD-WEN  
[ ] Loewen  
[ ] Marvin  
[ ] Morgan  
[ ] Norco  
[ ] Sun  
[ ] Thermoview  
[ ] Weather Shield  
[ ] Wenco  
[ ] Other 1: \_\_\_\_\_  
[ ] Other 2: \_\_\_\_\_  
[ ] Other 3: \_\_\_\_\_

**IF SELLS LIGHTING (Q2), THEN ASK Q7; ELSE ASK Q8.**

7. What brands of lighting does your company sell?  
**[Check all that apply-Do not read list-Probe if necessary]**

[ ] Osram Sylvania  
[ ] General Electric  
[ ] Philips  
[ ] Durotest  
[ ] Advance  
[ ] Magnetek  
[ ] Motorola  
[ ] Power Lighting Products (Valmont)  
[ ] Kingtec  
[ ] Other 1: \_\_\_\_\_  
[ ] Other 2: \_\_\_\_\_  
[ ] Other 3: \_\_\_\_\_

8. What percent of your residential equipment sales are to the following groups:  
**[Responses should add to 100]**

**Percent**

\_\_\_\_\_ Contractors (Probe for: Specialty Contractors - \_\_\_\_\_ vs. General Contractors - \_\_\_\_\_ )  
\_\_\_\_\_ End-Users (Probe for: Do-It-Yourselfers - \_\_\_\_\_ vs. Buyers on Behalf of Contractors - \_\_\_\_\_ )  
\_\_\_\_\_ Other: \_\_\_\_\_

9. How do you get new business in the residential market?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Advertising
- Direct Mail
- Referrals from Customers
- Specialty Contractors
- General Contractors
- Relationships w/Lenders
- Relationships w/Realtors
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

10. How often do you have a residential customer's equipment order in stock versus having to fill the order from your suppliers? Would you say . . .  
**[Check ONLY ONE category]**

- Never (Q11)
- Not Very Often (Q11)
- Occasionally (Q11)
- Most of the Time (Q11)
- All of the Time (Q12)
- Other: \_\_\_\_\_ (Q11)

***IF Q10 NOT EQUAL TO ALL OF THE TIME, THEN ASK Q11; ELSE ASK Q12.***

11. How long does it typically take for you to receive a residential equipment order from your supplier?

- 1-2 Days
- 3-6 Days
- 1 Week
- 2-3 Weeks
- 1 Month
- 2-3 Months
- 4-6 Months
- Longer Than 6 Months
- Other: \_\_\_\_\_

12. What is the typical cost for a residential equipment purchase?

\_\_\_\_\_ \$

**High Efficiency Sales**

Next, I would like to ask about the energy efficiency of the residential equipment you sell.

**IF SELLS WINDOWS (Q2), THEN ASK Q13-Q14; ELSE ASK Q15.**

13. What are your company's criteria for determining if windows are energy efficient?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Double Panes
- Low-E Glass
- Wood, Vinyl, or Fiberglass Frames
- 3/8 to 1/2 Inch Space Filled w/Argon or Inert Gas
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

14. What percent of your window sales in the last year had the energy-saving features you just mentioned?

\_\_\_\_\_ Percent

**IF SELLS LIGHTING (Q2), THEN ASK Q15-Q16; ELSE ASK Q17.**

15. What are your company's criteria for determining if lighting equipment is energy efficient?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Compact Fluorescent Lamps
- T8 Fluorescent Lamps
- High Intensity Discharge Lamps (Metal Halide/High-Pressure Sodium)
- Reflectors
- Electronic Ballasts
- Lighting Controls (Dimmable Lighting/Motion Sensors)
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

16. What percent of your lighting sales in the last year had the energy-saving features you just mentioned?

\_\_\_\_\_ Percent

**High Efficiency Barriers and Perceptions - Retailers**

Next, I would like to ask about your company’s perceptions regarding the sale of energy efficient residential equipment.

17. How often do you discuss energy efficient equipment options with your customers? Is it . . .  
**[Check ONLY ONE category]**

- All Sales Situations (Q18)
- Most Sales Situations (Q18)
- Some Sales Situations (Q18)
- Very Few Sales Situations (Q18)
- Never (Q19)

**IF Q17 NOT EQUAL TO NEVER THEN ASK Q18; ELSE ASK Q19.**

18. What benefits does your company receive from promoting and selling energy efficient equipment?

---

19. What are the biggest hurdles your company faces when selling energy efficient equipment?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. More Difficult to Get EE Equipment Supplied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Harder to Install EE Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. EE Equipment Performs Unreliably	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Try to Install New Equipment that Closely Match Old Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Information on EE Equipment Hard to Find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Doubts about Energy Savings from EE Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. EE Equipment Costs Too Much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Concerns about the Style of EE Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Other Barrier 1: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Other Barrier 2: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Other Barrier 3: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Aside from rebates, how could PG&E assist retailers in selling more energy efficient equipment?

**[Check all that apply-Do not read list-Probe if necessary]**

- Sales Representative Training
- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Contractor Certification
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

**High Efficiency Barriers and Perceptions – Customers**

Next, I would like to ask about the perceptions of your residential customers regarding the purchase of energy efficient equipment.

21. What are the most important factors for you customers when buying equipment?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Price	[ ]	[ ]	[ ]
b. Contractor Reputation	[ ]	[ ]	[ ]
c. Energy Efficiency	[ ]	[ ]	[ ]
d. Brand	[ ]	[ ]	[ ]
e. Reliability	[ ]	[ ]	[ ]
f. Style	[ ]	[ ]	[ ]
g. Access to Financing	[ ]	[ ]	[ ]
h. How Quickly You Can Install	[ ]	[ ]	[ ]
i. Warranty	[ ]	[ ]	[ ]
j. Other Factor 1: _____	[ ]	[ ]	[ ]
k. Other Factor 2: _____	[ ]	[ ]	[ ]
l. Other Factor 3: _____	[ ]	[ ]	[ ]

22. What are the biggest hurdles your customers face when buying energy efficient equipment?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Incomplete/Unreliable Information on EE Equipment	[ ]	[ ]	[ ]
b. Information on EE Equipment Hard to Find	[ ]	[ ]	[ ]
c. Doubts about Energy Savings from EE Equipment	[ ]	[ ]	[ ]
d. EE Equipment Costs Too Much	[ ]	[ ]	[ ]
e. EE Equipment Performs Unreliably	[ ]	[ ]	[ ]
f. Concerns about the Style of EE Equipment	[ ]	[ ]	[ ]
g. No Access to Financing	[ ]	[ ]	[ ]
h. Too Much Hassle	[ ]	[ ]	[ ]
i. Other Barrier 1: _____	[ ]	[ ]	[ ]
j. Other Barrier 2: _____	[ ]	[ ]	[ ]
k. Other Barrier 3: _____	[ ]	[ ]	[ ]

23. Aside from rebates, how could PG&E assist customers to buy more energy efficient equipment?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ ] Financing
- [ ] Promotion of EE in Ads and Brochures
- [ ] More Information
- [ ] Better Education
- [ ] Provide Customers with Equipment EE Ratings
- [ ] Involvement w/Energy Star
- [ ] Other 1: \_\_\_\_\_
- [ ] Other 2: \_\_\_\_\_
- [ ] Other 3: \_\_\_\_\_



**Whole-House Approach**

One of the areas where PG&E is interested in capturing opportunities for energy efficiency is using a whole-house approach to promote multiple energy efficient measures. In this scenario, customers who are replacing one type of measure are encouraged to install additional energy efficient measures elsewhere in their home. An example would be encouraging a customer who is replacing a central air conditioner to also install energy efficient windows and lighting, to seal their ducts, and to add insulation.

24. When selling equipment to residential customers, which of the following best describes your company's promotion of other measures for their home?

**[Check ONLY ONE category]**

- Actively promotes the installation of other measures (Q25-Q27)
- Points out other measures that can be installed, but does not actively promote (Q25-Q27)
- Does not promote or point out other measures (Q28-Q30)

**IF Q24 EQUAL TO ACTIVELY PROMOTES OR POINTS OUT, THEN ASK Q25-Q27; ELSE ASK Q28-Q30.**

25. What measures does your company actively promote/point out?

**[Check all that apply-Do not read list-Probe if necessary]**

- Windows
- Doors
- Siding
- Roofing
- Weatherization Measures (Weatherstripping/Caulk/Sealant)
- Insulation
- Duct Work
- Lighting
- Kitchen Appliances
- Water Heaters
- Central Air Conditioners
- Furnaces
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

26. What percent of your sales involve these other measures?

\_\_\_\_\_ Percent

27. What is the role of energy efficiency in using this approach?

---

**IF Q24 EQUAL TO DOES NOT PROMOTE, THEN ASK Q28-Q30; ELSE ASK Q31.**

28. What are your company's main reasons for not promoting or pointing out other measures to your customers when selling equipment?

---

29. How interested would your company be in promoting other measures? Would you be . . .

**[Check ONLY ONE category]**

- Very Interested
- Somewhat Interested
- Not At All Interested

30. Why?

---

31. Aside from rebates, how could PG&E assist your company to promote other measures that improve the home's overall energy efficiency?

**[Check all that apply-Do not read list-Probe if necessary]**

- Retailer Certification
- Retailer Training
- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

32. Summing up, how do you view the development of a market for "whole-house" approaches to energy-oriented renovation projects? Do you think this is a likely evolution? Why or why not? What, if anything, could or should be done to encourage the development of this market?

---

**Financing**

I would now like to ask about the types of financing your company offers.

33. Does your company offer financing to its residential customers?  
**[Check ONLY ONE category]**

- Yes (Q34)
- No (Q37)

**IF OFFERS FINANCING THEN ASK Q34; ELSE ASK Q37.**

34. What percent of your residential customers use your financing?

\_\_\_\_\_ Percent

35. What are the typical terms and rates for this financing?

---

36. Through what types of sources do you offer this financing?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Your Company
- Local Bank
- Local Financing Company
- Nation-wide Bank
- Nation-wide Financing Company
- Distributors
- Manufacturers
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

37. What other methods do customers typically use to finance or pay for the cost of the equipment?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Credit Card
- Cash/Check
- Home Equity Loan/Second Mortgage
- Refinance Mortgage to Tap Equity
- Line of Credit
- Personal/Unsecured Loan
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

38. What can PG&E do to assist in creating greater access to financing?

---

**Training**

I would now like to ask about the types of training your company offers.

39. When hiring new sales representatives, what training does your company look for?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Two-Year Technical Degree
- Training from Previous Company
- Manufacturer Certificate/Training
- Distributor Certificate/Training
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

40. Where do your sales representatives get the training they need?  
**[Check all that apply-Do not read list-Probe if necessary]**

- In-House
- Technical School Classes
- Manufacturers
- Distributors
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

41. Do you feel that there is a shortage of qualified, well-trained sales representatives?  
**[Check ONLY ONE category]**

- Yes (Q42)
- No (Q43)

**IF Q41=YES, THEN ASK Q42; ELSE ASK Q43.**

42. Does this shortage limit the amount of work your company can do?  
**[Check ONLY ONE category]**

- Yes
- No

43. What specific training needs related to energy efficiency could PG&E address for you and other retailers?  
Please explain?

---

*Non-English Speaking Customers*

Finally, I would like to ask you about your company's sales to residential customers for whom English is not their primary language. (e.g., customers who speak Spanish or Cantonese)

44. What percent of your residential sales are to customers for whom English is not their primary language?

\_\_\_\_\_ Percent

***IF Q44>0 THEN ASK Q45; ELSE VERIFY NAME AND ADDRESS FOR \$50 PAYMENT.***

45. What particular problems do you face when dealing with customers for whom language may be a barrier?

\_\_\_\_\_

46. How does your organization address these problems?

\_\_\_\_\_

47. What might PG&E do to increase the extent to which these customers are able to take advantage of installing energy efficient measures?

\_\_\_\_\_

Those are all the questions I have for you today. Thank you very much for your time. Verify name and address for \$50 payment.



**Market Structure and Flow**

I would now like to ask about your suppliers, your customers, and the types of residential work performed by your company.

6. On about what percent of your residential jobs in existing homes are the following types of equipment replaced or added?

**[Record responses-Responses DO NOT need to add to 100-Record if installed by general, subcontractor, or both]**

Are any other types of equipment replaced or added on your residential jobs?

**[Ask percent of jobs for each additional appliance mentioned]**

Percent	Installer	
_____	_____	Lighting
_____	_____	Windows
_____	_____	Refrigerators
_____	_____	Dishwashers
_____	_____	Cooling and/or Heating Equipment
_____	_____	Insulation
_____	_____	Duct Work
_____	_____	Water Heaters
_____	_____	Other 1: _____
_____	_____	Other 2: _____
_____	_____	Other 3: _____

7. What is your company’s role in the selection, purchase, and installation of this equipment?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ ] Recommends Types of Appliances
- [ ] Buys Appliances from Supplier
- [ ] Installs Appliances
- [ ] Uses Subcontractor (Probe for Type)
- [ ] Other 1: \_\_\_\_\_
- [ ] Other 2: \_\_\_\_\_
- [ ] Other 3: \_\_\_\_\_

8. What percent of your residential equipment is purchased from the following groups:

**[Responses should add to 100]**

Percent	
_____	Manufacturers (Probe for: US - _____ vs. Foreign - _____ )
_____	Distributors (Probe for: Multiple-Line/Independent - _____ vs. Captive - _____ )
_____	Retailers
_____	Other: _____

***IF WINDOWS (Q6), THEN ASK Q9; ELSE ASK Q10.***

9. What brands of windows does your company sell and install?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Anderson
- Pella
- Sierra Pacific
- Biltbest of California
- California Window Corporation
- Caradco
- JELD-WEN
- Loewen
- Marvin
- Morgan
- Norco
- Sun
- Thermoview
- Weather Shield
- Wenco
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

***IF LIGHTING (Q6), THEN ASK Q10; ELSE ASK Q11.***

10. What brands of lighting does your company sell and install?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Osram Sylvania
- General Electric
- Philips
- Durotest
- Advance
- Magnetek
- Motorola
- Power Lighting Products (Valmont)
- Kingtec
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

11. How do you get new business in the residential market?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Advertising
- Direct Mail
- Referrals from Customers
- Relationships w/Lenders
- Relationships w/Realtors
- Other Contractors
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_



12. What percent of your residential sales are to customers in . . .  
**[Responses should add to 100]**

**Percent**

\_\_\_\_\_ Single-Family Detached Homes  
\_\_\_\_\_ Townhomes  
\_\_\_\_\_ Condominiums  
\_\_\_\_\_ Other: \_\_\_\_\_

13. What percent of your residential sales are to customers in rural areas?

\_\_\_\_\_ Percent

14. How often does your company work on residential jobs for someone who is getting ready to sell their home or a new buyer who has not yet moved in? Would you say . . .  
**[Check ONLY ONE category]**

[ ] Never  
[ ] Not Very Often  
[ ] Occasionally  
[ ] Most of the Time  
[ ] All of the Time  
[ ] Other: \_\_\_\_\_

17. How quickly do most customers need their home remodeled?  
**[Check ONLY ONE category-Do not read list-Probe if necessary]**

[ ] 1 Month or Less  
[ ] 2-3 Months  
[ ] 4-6 Months  
[ ] Longer Than 6 Months  
[ ] Other: \_\_\_\_\_

18. What are the main reasons why customers want to remodel their home?  
**[Check all that apply-Do not read list-Probe if necessary]**

[ ] Additions  
[ ] Room Conversions  
[ ] Update or Modernize  
[ ] Add Space  
[ ] Improved Energy Efficiency  
[ ] Enhanced Aesthetics  
[ ] Improved Comfort  
[ ] Better Performance  
[ ] Increase Value of Home  
[ ] Other 1: \_\_\_\_\_  
[ ] Other 2: \_\_\_\_\_

19. What is the typical installed cost for a remodeling jobs?

\_\_\_\_\_ \$

24. How often does your company work on residential jobs in existing homes that involve specifications developed by an independent architect/designer? Would you say . . .  
**[Check ONLY ONE category]**

- Never (Q25)
- Not Very Often (Q25)
- Occasionally (Q25)
- Most of the Time (Q25)
- All of the Time (Q26)
- Other: \_\_\_\_\_ (Q25)

**IF Q24 NOT EQUAL TO ALL OF THE TIME THEN ASK Q25; ELSE ASK Q26.**

25. For those not involving architects/designers, how is the job specified?

**[Check all that apply-Do not read list-Probe if necessary]**

- Your Company
- Customer
- General Contractor
- Generic Blueprints
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

00. What determines whether or not a Title 24 run is required for remodeling projects?

\_\_\_\_\_

00. Who does the Title 24 run?

**[Check all that apply-Do not read list-Probe if necessary]**

- Your Company
- Title 24 Consultant
- Subcontractor
- Architect
- Other: \_\_\_\_\_

00. How often do building inspectors check to ensure that the measures were actually installed to meet Title 24 for remodeling projects? Would you say . . .

**[Check ONLY ONE category]**

- Never
- Not Very Often
- Occasionally
- Most of the Time
- All of the Time
- Other: \_\_\_\_\_

**High Efficiency Sales**

Next, I would like to ask about the energy efficiency of the equipment installed on your residential remodeling jobs.

**IF SELLS WINDOWS (Q2), THEN ASK Q26-Q27; ELSE ASK Q28.**

26. What are your company's criteria for determining if windows are energy efficient?

**[Check all that apply-Do not read list-Probe if necessary]**

- Double Panes
- Low-E Glass
- Wood, Vinyl, or Fiberglass Frames
- 3/8 to 1/2 Inch Space Filled w/Argon or Inert Gas
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

27. What percent of your window replacements in existing homes in the last year had the energy-saving features you just mentioned?

\_\_\_\_\_ Percent

**IF SELLS LIGHTING (Q2), THEN ASK Q28-Q29; ELSE ASK Q30.**

28. What are your company's criteria for determining if lighting equipment is energy efficient?

**[Check all that apply-Do not read list-Probe if necessary]**

- Compact Fluorescent Lamps
- T8 Fluorescent Lamps
- High Intensity Discharge Lamps (Metal Halide/High-Pressure Sodium)
- Reflectors
- Electronic Ballasts
- Lighting Controls (Dimmable Lighting/Motion Sensors)
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

29. What percent of your lighting replacements in existing homes in the last year had the energy-saving features you just mentioned?

\_\_\_\_\_ Percent

**IF SELLS HVAC (Q2), THEN ASK Q30-Q31; ELSE ASK Q32.**

30. What are your company's criteria for determining if central air conditioners are energy efficient?

**[Check ONLY ONE category-Probe if necessary]**

- 10 SEER or Higher
- 11 SEER or Higher
- 12 SEER or Higher
- 13 SEER or Higher
- 14 SEER or Higher
- Other 1: \_\_\_\_\_

31. What percent of your central air conditioner replacements in existing homes in the last year met the energy efficiency criteria you just mentioned?

\_\_\_\_\_ Percent

**High Efficiency Barriers and Perceptions - Contractors**

Next, I would like to ask about your company's perceptions regarding the sale of energy efficient residential equipment.

32. How often do you discuss energy efficient equipment options with your customers? Is it . . .  
**[Check ONLY ONE category]**

- All Sales Situations (Q33)
- Most Sales Situations (Q33)
- Some Sales Situations (Q33)
- Very Few Sales Situations (Q33)
- Never (Q34)

**IF Q32 NOT EQUAL TO NEVER THEN ASK Q33; ELSE ASK Q34.**

33. What benefits does your company receive from promoting and selling energy efficient equipment?

---

34. What are the biggest hurdles your company faces when selling energy efficient equipment?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. More Difficult to Get EE Equipment Supplied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Harder to Install EE Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. EE Equipment Performs Unreliably	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Try to Install New Equipment that Closely Matches Old Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Information on EE Equipment Hard to Find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Doubts about Energy Savings from EE Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. EE Equipment Costs Too Much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Concerns about the Style of EE Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Other Barrier 1: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Other Barrier 2: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Other Barrier 3: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

35. Aside from rebates, how could PG&E assist contractors to sell more energy efficient equipment?

**[Check all that apply-Do not read list-Probe if necessary]**

- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

**High Efficiency Barriers and Perceptions – Customers**

Next, I would like to ask about the perceptions of your residential customers regarding the purchase of energy efficient equipment.

36. What are the most important factors for you customers when buying equipment?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Price	[ ]	[ ]	[ ]
b. Contractor Reputation	[ ]	[ ]	[ ]
c. Energy Efficiency	[ ]	[ ]	[ ]
d. Brand	[ ]	[ ]	[ ]
e. Reliability	[ ]	[ ]	[ ]
f. Style	[ ]	[ ]	[ ]
g. Access to Financing	[ ]	[ ]	[ ]
h. How Quickly You Can Install	[ ]	[ ]	[ ]
i. Warranty	[ ]	[ ]	[ ]
j. Other Factor 1: _____	[ ]	[ ]	[ ]
k. Other Factor 2: _____	[ ]	[ ]	[ ]
l. Other Factor 3: _____	[ ]	[ ]	[ ]

37. What are the biggest hurdles your customers face when buying energy efficient equipment?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Incomplete/Unreliable Information on EE Equipment	[ ]	[ ]	[ ]
b. Information on EE Equipment Hard to Find	[ ]	[ ]	[ ]
c. Doubts about Energy Savings from EE Equipment	[ ]	[ ]	[ ]
d. EE Equipment Costs Too Much	[ ]	[ ]	[ ]
e. EE Equipment Performs Unreliably	[ ]	[ ]	[ ]
f. Concerns about the Style of EE Equipment	[ ]	[ ]	[ ]
g. No Access to Financing	[ ]	[ ]	[ ]
h. Too Much Hassle	[ ]	[ ]	[ ]
i. Other Barrier 1: _____	[ ]	[ ]	[ ]
j. Other Barrier 2: _____	[ ]	[ ]	[ ]
k. Other Barrier 3: _____	[ ]	[ ]	[ ]

38. Aside from rebates, how could PG&E assist customers to buy more energy efficient equipment?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ ] Financing
- [ ] Promotion of EE in Ads and Brochures
- [ ] More Information
- [ ] Better Education
- [ ] Provide Customers with Equipment EE Ratings
- [ ] Involvement w/Energy Star
- [ ] Other 1: \_\_\_\_\_
- [ ] Other 2: \_\_\_\_\_
- [ ] Other 3: \_\_\_\_\_

**Whole-House Approach**

One of the areas where PG&E is interested in capturing opportunities for energy efficiency is using a whole-house approach to promote of multiple energy efficient measures. In this scenario, customers who are replacing one type of measure are encouraged to install additional energy efficient measures elsewhere in their home. An example would be encouraging a customer who is replacing a central air conditioner to also install energy efficient windows and lighting, to seal ducts, and to add insulation.

39. How often does your company work on residential jobs in existing homes where another contractor is also performing work? Would you say . . .

**[Check ONLY ONE category]**

- Never
- Not Very Often
- Occasionally
- Most of the Time
- All of the Time
- Other: \_\_\_\_\_

40. When performing work on one part of an existing home, which of the following best describes your company's promotion of multiple measures in other parts of the home?

**[Check ONLY ONE category]**

- Actively promotes the installation of other measures (Q40-Q42)
- Points out other measures that can be installed, but does not actively promote (Q40-Q42)
- Does not promote or point out other measures (Q43-Q45)

**IF Q40 EQUAL TO ACTIVELY PROMOTES OR POINTS OUT, THEN ASK Q41-Q43; ELSE ASK Q44-Q46.**

41. What other measures does your company actively promote/point out?

**[Check all that apply-Do not read list-Probe if necessary]**

- Windows
- Lighting
- Insulation
- Duct Work
- Central Air Conditioners
- Furnaces
- Kitchen Appliances
- Water Heaters
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

42. What percent of your installations involve these other measures?

\_\_\_\_\_ Percent

43. What is the role of energy efficiency in using this approach?

\_\_\_\_\_

**IF Q40 EQUAL TO DOES NOT PROMOTE, THEN ASK Q44-46; ELSE ASK Q47.**

44. What are your company's main reasons for not promoting or pointing out other measures to your customers?

---

45. How interested would your company be in promoting other measures? Would you be . . .

**[Check ONLY ONE category]**

- Very Interested
- Somewhat Interested
- Not At All Interested

46. Why?

---

47. Aside from rebates, how could PG&E assist your company to promote other measures that improve the home's overall energy efficiency?

**[Check all that apply-Do not read list-Probe if necessary]**

- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

48. Summing up, how do you view the development of a market for "whole-house" approaches to energy-oriented renovation projects? Do you think this is a likely evolution? Why or why not? What, if anything, could or should be done to encourage the development of this market?

---

**Financing**

I would now like to ask about the types of financing your company offers.

49. Does your company offer financing to its residential customers?  
[Check ONLY ONE category]

- Yes (Q50)
- No (Q53)

**IF OFFERS FINANCING THEN ASK Q50; ELSE ASK Q53.**

50. What percent of your residential customers use your financing?

\_\_\_\_\_ Percent

51. What are the typical terms and rates for this financing?

---

52. Through what types of sources do you offer this financing?  
[Check all that apply-Do not read list-Probe if necessary]

- Your Company
- Local Bank
- Local Financing Company
- Nation-wide Bank
- Nation-wide Financing Company
- Distributors
- Manufacturers
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

53. What other methods do customers typically use to finance or pay for the cost of installation?  
[Check all that apply-Do not read list-Probe if necessary]

- Credit Card
- Cash/Check
- Home Equity Loan/Second Mortgage
- Refinance Mortgage to Tap Equity
- Line of Credit
- Personal/Unsecured Loan
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_



54. Are you familiar with energy efficiency financing and mortgages?  
**[Check ONLY ONE category]**

- Yes (Q55)
- No (Q56)

55. Do you promote energy efficiency financing and mortgages?  
**[Check ONLY ONE category]**

- Yes
- No

56. What can PG&E do to assist in creating greater access to financing?

---

**Training**

I would now like to ask about the types of training your company offers.

57. When hiring new installers, what training does your company look for?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Two-Year Technical Degree
- Training from Previous Company
- Manufacturer Certificate/Training
- Distributor Certificate/Training
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

58. Where do your installers get the training they need?  
**[Check all that apply-Do not read list-Probe if necessary]**

- In-House
- Technical School Classes
- Manufacturers
- Distributors
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

59. Do you feel that there is a shortage of qualified, well-trained installers?  
**[Check ONLY ONE category]**

- Yes (Q60)
- No (Q61)

**IF Q59=YES, THEN ASK Q60; ELSE ASK Q61.**

60. Does this shortage limit the amount of work your company can do?  
**[Check ONLY ONE category]**

- Yes
- No

61. What specific training needs related to energy efficiency could PG&E address for you and other contractors?  
Please explain?

---

*Non-English Speaking Customers*

Finally, I would like to ask you about your company's sales to residential customers for whom English is not their primary language. (e.g., customers who speak Spanish or Cantonese)

62. What percent of your residential sales are to customers for whom English is not their primary language?

\_\_\_\_\_ Percent

***IF Q62>0 THEN ASK Q63; ELSE VERIFY NAME AND ADDRESS FOR \$50 PAYMENT.***

63. What particular problems do you face when dealing with customers for whom language may be a barrier?

\_\_\_\_\_

64. How does your organization address these problems?

\_\_\_\_\_

65. What might PG&E do to increase the extent to which these customers are able to take advantage of installing energy efficient measures?

\_\_\_\_\_

Those are all the questions I have for you today. Thank you very much for your time. Verify name and address for \$50 payment.

***R&R Kitchen Contractor Interview Guide***

Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of kitchen remodeling contractors in northern and central California to help PG&E design better programs. Can I talk to the owner or manager . . . and could you tell me their name?

---

(Name)	(Title)	(Phone)	(Call Back Date and Time)
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Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of kitchen remodeling contractors in northern and central California. The information we collect from these select contractors will help PG&E design better programs. This is a critical stage in PG&E's planning and, to thank you for taking time to answer our questions, we will send you a check for \$50. Do you have about 15-20 minutes to complete this interview? If not, schedule a callback.

***Screening***

Before we start the interview, I need to ask a few questions to make sure that your company qualifies to participate in this study.

1. Does your company perform kitchen remodeling work for residential customers?  
[Check ONLY ONE category]

[ ] Yes  
[ ] No (T&T)

2. What percent of your business is with residential customers?

\_\_\_\_\_ Percent (If less than 25 percent, then T&T.)

3. What percent of your residential sales are part of new home construction projects, excluding remodeling projects and additions?

\_\_\_\_\_ Percent (If more than 75 percent, then T&T.)

**Company Characteristics**

I would now like to ask about some of the characteristics of your company.

4. Does your company perform only kitchen remodeling work or do you perform other types of remodeling work?  
**[Check ONLY ONE category]**

- Only Kitchen Remodeling (Ask Q6)
- Other Types of Remodeling (Ask Q5)
- Other: \_\_\_\_\_ (Ask Q5)

**IF OTHER TYPES, THEN ASK Q5; ELSE ASK Q6.**

5. What other types of remodeling work does your company perform?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Windows
- Lighting
- HVAC
- Insulation
- Duct Work
- General Contracting
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

6. How many full-time employees does your company have?

\_\_\_\_\_ Full-Time Employees

**Market Structure and Flow**

I would now like to ask about your suppliers, your customers, and the types of kitchen remodeling work performed by your company.

7. On about what percent of your residential kitchen remodeling jobs are the following types of equipment replaced or added?

**[Read list and record responses-Responses DO NOT need to add to 100]**

Are any other types of equipment replaced or added on your kitchen remodeling jobs?

**[Ask percent of jobs for each additional appliance mentioned]**

**Percent**

- \_\_\_\_\_ Range and/or Oven
- \_\_\_\_\_ Refrigerator
- \_\_\_\_\_ Dishwasher
- \_\_\_\_\_ Lighting
- \_\_\_\_\_ Windows
- \_\_\_\_\_ Cooling and/or Heating Equipment
- \_\_\_\_\_ Water Heaters
- \_\_\_\_\_ Other 1: \_\_\_\_\_
- \_\_\_\_\_ Other 2: \_\_\_\_\_
- \_\_\_\_\_ Other 3: \_\_\_\_\_

8. What is your company’s role in the selection, purchase, and installation of this equipment?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ ] Recommends Types of Appliances
- [ ] Buys Appliances from Supplier
- [ ] Installs Appliances
- [ ] Uses Subcontractor
- [ ] Other 1: \_\_\_\_\_
- [ ] Other 2: \_\_\_\_\_
- [ ] Other 3: \_\_\_\_\_

9. What percent of your residential equipment is purchased from the following groups:

**[Responses should add to 100]**

**Percent**

- \_\_\_\_\_ Manufacturers (Probe for: US - \_\_\_\_\_ vs. Foreign - \_\_\_\_\_ )
- \_\_\_\_\_ Distributors (Probe for: Multiple-Line/Independent - \_\_\_\_\_ vs. Captive - \_\_\_\_\_ )
- \_\_\_\_\_ Retailers
- \_\_\_\_\_ Other: \_\_\_\_\_

***IF SELLS WINDOWS (Q7), THEN ASK Q10; ELSE ASK Q11.***

10. What brands of windows does your company sell and install?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Anderson
- Pella
- Sierra Pacific
- Biltbest of California
- California Window Corporation
- Caradco
- JELD-WEN
- Loewen
- Marvin
- Morgan
- Norco
- Sun
- Thermoview
- Weather Shield
- Wenco
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

***IF SELLS LIGHTING (Q7), THEN ASK Q11; ELSE ASK Q12.***

11. What brands of lighting does your company sell and install?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Osram Sylvania
- General Electric
- Philips
- Durotest
- Advance
- Magnetek
- Motorola
- Power Lighting Products (Valmont)
- Kingtec
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

12. How do you get new business in the residential market?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Advertising
- Direct Mail
- Referrals from Customers
- Relationships w/Lenders
- Relationships w/Realtors
- General Contractors
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

13. What percent of your residential sales are to customers in . . .  
**[Responses should add to 100]**

**Percent**

- \_\_\_\_\_ Single-Family Detached Homes
- \_\_\_\_\_ Townhomes
- \_\_\_\_\_ Condominiums
- \_\_\_\_\_ Other: \_\_\_\_\_

14. What percent of your residential sales are to customers in rural areas?

\_\_\_\_\_ Percent

15. How often does your company work on residential jobs for someone who is getting ready to sell their home or a new buyer who has not yet moved in? Would you say . . .  
**[Check ONLY ONE category]**

- [ ] Never
- [ ] Not Very Often
- [ ] Occasionally
- [ ] Most of the Time
- [ ] All of the Time
- [ ] Other: \_\_\_\_\_

16. How quickly do most customers need their kitchen remodeled?  
**[Check ONLY ONE category-Do not read list-Probe if necessary]**

- [ ] 1 Month or Less
- [ ] 2-3 Months
- [ ] 4-6 Months
- [ ] Longer Than 6 Months
- [ ] Other: \_\_\_\_\_

17. What are the main reasons why customers remodel their kitchens?  
**[Check all that apply-Do not read list-Probe if necessary]**

- [ ] Additions
- [ ] Room Conversions
- [ ] Update or Modernize
- [ ] Add Space
- [ ] Improved Energy Efficiency
- [ ] Enhanced Aesthetics
- [ ] Improved Comfort
- [ ] Better Performance
- [ ] Increase Value of Home
- [ ] Other 1: \_\_\_\_\_
- [ ] Other 2: \_\_\_\_\_

18. What is the typical installed cost for a kitchen remodeling job?

\_\_\_\_\_ \$



19. How often does your company work on kitchen remodeling jobs that involves specifications developed by an independent architect/designer? Would you say . . .

**[Check ONLY ONE category]**

- Never (Q20)
- Not Very Often (Q20)
- Occasionally (Q20)
- Most of the Time (Q20)
- All of the Time (Q21)
- Other: \_\_\_\_\_ (Q20)

***IF Q19 NOT EQUAL TO ALL OF THE TIME THEN ASK Q20; ELSE ASK Q21.***

20. For those not involving architects/designers, how is the remodeling job specified?

**[Check all that apply-Do not read list-Probe if necessary]**

- Your Company
- Customer
- General Contractor
- Generic Blueprints
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

**High Efficiency Sales**

Next, I would like to ask about the energy efficiency of the equipment installed on your residential kitchen remodeling jobs in existing homes.

21. What are your company's criteria for determining if refrigerators are energy efficient?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Energy Star
- Department of Energy Cost Labels
- California Standards
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

22. What percent of the refrigerators installed on your kitchen remodeling jobs in the last year met the energy efficiency requirements you just mentioned?

\_\_\_\_\_ Percent

**IF SELLS WINDOWS (Q7), THEN ASK Q23-Q24; ELSE ASK Q25.**

23. What are your company's criteria for determining if windows are energy efficient?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Double Panes
- Low-E Glass
- Wood, Vinyl, or Fiberglass Frames
- 3/8 to 1/2 Inch Space Filled w/Argon or Inert Gas
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

24. What percent of your window replacements in existing homes in the last year had the energy-saving features you just mentioned?

\_\_\_\_\_ Percent

**IF SELLS LIGHTING (Q7), THEN ASK Q25-Q26; ELSE ASK Q27.**

25. What are your company's criteria for determining if lighting equipment is energy efficient?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Compact Fluorescent Lamps
- T8 Fluorescent Lamps
- High Intensity Discharge Lamps (Metal Halide/High-Pressure Sodium)
- Reflectors
- Electronic Ballasts
- Lighting Controls (Dimmable Lighting/Motion Sensors)
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

26. What percent of your lighting replacements in existing homes in the last year had the energy-saving features you just mentioned?

\_\_\_\_\_ Percent

**High Efficiency Barriers and Perceptions - Contractors**

Next, I would like to ask about your company’s perceptions regarding the sale of energy efficient residential equipment.

27. How often do you discuss energy efficient equipment options with your customers? Is it . . .  
**[Check ONLY ONE category]**

- All Sales Situations (Q28)
- Most Sales Situations (Q28)
- Some Sales Situations (Q28)
- Very Few Sales Situations (Q28)
- Never (Q29)

**IF Q27 NOT EQUAL TO NEVER THEN ASK Q28; ELSE ASK Q29.**

28. What benefits does your company receive from promoting and selling energy efficient equipment?

---

29. What are the biggest hurdles your company faces when selling energy efficient equipment?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. More Difficult to Get EE Equipment Supplied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Harder to Install EE Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. EE Equipment Performs Unreliably	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Try to Install New Equipment that Closely Matches Old Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Information on EE Equipment Hard to Find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Doubts about Energy Savings from EE Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. EE Equipment Costs Too Much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Concerns about the Style of EE Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Other Barrier 1: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Other Barrier 2: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Other Barrier 3: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

30. Aside from rebates, how could PG&E assist contractors to sell more energy efficient equipment?

**[Check all that apply-Do not read list-Probe if necessary]**

- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

**High Efficiency Barriers and Perceptions – Customers**

Next, I would like to ask about the perceptions of your residential customers regarding the purchase of energy efficient equipment.

31. What are the most important factors for you customers when buying equipment?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Price	[ ]	[ ]	[ ]
b. Contractor Reputation	[ ]	[ ]	[ ]
c. Energy Efficiency	[ ]	[ ]	[ ]
d. Brand	[ ]	[ ]	[ ]
e. Reliability	[ ]	[ ]	[ ]
f. Style	[ ]	[ ]	[ ]
g. Access to Financing	[ ]	[ ]	[ ]
h. How Quickly You Can Install	[ ]	[ ]	[ ]
i. Warranty	[ ]	[ ]	[ ]
j. Other Factor 1: _____	[ ]	[ ]	[ ]
k. Other Factor 2: _____	[ ]	[ ]	[ ]
l. Other Factor 3: _____	[ ]	[ ]	[ ]

32. What are the biggest hurdles your customers face when buying energy efficient equipment?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Incomplete/Unreliable Information on EE Equipment	[ ]	[ ]	[ ]
b. Information on EE Equipment Hard to Find	[ ]	[ ]	[ ]
c. Doubts about Energy Savings from EE Equipment	[ ]	[ ]	[ ]
d. EE Equipment Costs Too Much	[ ]	[ ]	[ ]
e. EE Equipment Performs Unreliably	[ ]	[ ]	[ ]
f. Concerns about the Style of EE Equipment	[ ]	[ ]	[ ]
g. No Access to Financing	[ ]	[ ]	[ ]
h. Too Much Hassle	[ ]	[ ]	[ ]
i. Other Barrier 1: _____	[ ]	[ ]	[ ]
j. Other Barrier 2: _____	[ ]	[ ]	[ ]
k. Other Barrier 3: _____	[ ]	[ ]	[ ]

33. Aside from rebates, how could PG&E assist customers to buy more energy efficient equipment?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ ] Financing
- [ ] Promotion of EE in Ads and Brochures
- [ ] More Information
- [ ] Better Education
- [ ] Provide Customers with Equipment EE Ratings
- [ ] Involvement w/Energy Star
- [ ] Other 1: \_\_\_\_\_
- [ ] Other 2: \_\_\_\_\_
- [ ] Other 3: \_\_\_\_\_

**Whole-House Approach**

One of the areas where PG&E is interested in capturing opportunities for energy efficiency is using a whole-house approach to promote of multiple energy efficient measures. In this scenario, customers who are remodeling their kitchen would be encouraged to install additional energy efficient measures elsewhere in their home, such as water heaters, windows, insulation, lighting, duct sealing, central air conditioners, and furnaces. This is because changes made in one measure area can impact and encourage improvements in other measure areas.

34. How often does your company work on residential jobs where another contractor is also performing work?  
Would you say . . .

**[Check ONLY ONE category]**

- Never
- Not Very Often
- Occasionally
- Most of the Time
- All of the Time
- Other: \_\_\_\_\_

35. When remodeling a kitchen, which of the following best describes your company's promotion of measures in other parts of the home besides the kitchen, such as windows, insulation, lighting, duct sealing, central air conditioners, and furnaces?

**[Check ONLY ONE category]**

- Actively promotes the installation of other measures (Q36-Q38)
- Points out other measures that can be installed, but does not actively promote (Q36-Q38)
- Does not promote or point out other measures (Q39-Q41)

**IF Q35 EQUAL TO ACTIVELY PROMOTES OR POINTS OUT, THEN ASK Q36-38; ELSE ASK Q39-Q41.**

36. What other measures does your company actively promote/point out?

**[Check all that apply-Do not read list-Probe if necessary]**

- Water Heaters
- Windows
- Lighting
- Insulation
- Duct Work
- Central Air Conditioners
- Furnaces
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

37. What percent of your installations involve these other measures?

\_\_\_\_\_ Percent

38. What is the role of energy efficiency in using this approach?

\_\_\_\_\_

**IF Q35 EQUAL TO DOES NOT PROMOTE, THEN ASK Q39-41; ELSE ASK Q42.**

39. What are your company's main reasons for not promoting or pointing out other measures to your customers when remodeling their kitchen?

---

40. How interested would your company be in promoting other measures? Would you be . . .

**[Check ONLY ONE category]**

- Very Interested
- Somewhat Interested
- Not At All Interested

41. Why?

---

42. Aside from rebates, how could PG&E assist your company to promote other measures that improve the home's overall energy efficiency?

**[Check all that apply-Do not read list-Probe if necessary]**

- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

43. Summing up, how do you view the development of a market for "whole-house" approaches to energy-oriented renovation projects? Do you think this is a likely evolution? Why or why not? What, if anything, could or should be done to encourage the development of this market?

---

**Financing**

I would now like to ask about the types of financing your company offers.

44. Does your company offer financing to its residential customers?  
**[Check ONLY ONE category]**

- Yes (Q45)
- No (Q48)

**IF OFFERS FINANCING THEN ASK Q45; ELSE ASK Q48.**

45. What percent of your residential customers use your financing?

\_\_\_\_\_ Percent

46. What are the typical terms and rates for this financing?

---

47. Through what types of sources do you offer this financing?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Your Company
- Local Bank
- Local Financing Company
- Nation-wide Bank
- Nation-wide Financing Company
- Distributors
- Manufacturers
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

48. What other methods do customers typically use to finance or pay for the cost of the kitchen remodeling?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Credit Card
- Cash/Check
- Home Equity Loan/Second Mortgage
- Refinance Mortgage to Tap Equity
- Line of Credit
- Personal/Unsecured Loan
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

49. What can PG&E do to assist in creating greater access to financing?

---

**Training**

I would now like to ask about the types of training your company offers.

50. When hiring new installers, what training does your company look for?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Two-Year Technical Degree
- Training from Previous Company
- Manufacturer Certificate/Training
- Distributor Certificate/Training
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

51. Where do your installers get the training they need?  
**[Check all that apply-Do not read list-Probe if necessary]**

- In-House
- Technical School Classes
- Manufacturers
- Distributors
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

52. Do you feel that there is a shortage of qualified, well-trained installers?  
**[Check ONLY ONE category]**

- Yes (Q53)
- No (Q54)

**IF Q52=YES, THEN ASK Q53; ELSE ASK Q54.**

53. Does this shortage limit the amount of work your company can do?  
**[Check ONLY ONE category]**

- Yes
- No

54. What specific training needs related to energy efficiency could PG&E address for you and other contractors?  
Please explain?

---



*Non-English Speaking Customers*

Finally, I would like to ask you about your company's sales to residential customers for whom English is not their primary language. (e.g., customers who speak Spanish or Cantonese)

55. What percent of your residential sales are to customers for whom English is not their primary language?

\_\_\_\_\_ Percent

***IF Q55>0 THEN ASK Q56; ELSE VERIFY NAME AND ADDRESS FOR \$50 PAYMENT.***

56. What particular problems do you face when dealing with customers for whom language may be a barrier?

\_\_\_\_\_

57. How does your organization address these problems?

\_\_\_\_\_

58. What might PG&E do to increase the extent to which these customers are able to take advantage of installing energy efficient measures?

\_\_\_\_\_

Those are all the questions I have for you today. Thank you very much for your time. Verify name and address for \$50 payment.

***R&R Kitchen Distributor Interview Guide***

Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of kitchen appliance distributors in northern and central California to help PG&E design better programs. Can I talk to the owner or manager . . . and could you tell me their name?

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(Name)	(Title)	(Phone)	(Call Back Date and Time)
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Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of kitchen appliance distributors in northern and central California. The information we collect from these select distributors will help PG&E design better programs. This is a critical stage in PG&E's planning and, to thank you for taking time to answer our questions, we will send you a check for \$50. Do you have about 15-20 minutes to complete this interview? If not, schedule a callback.

***Screening***

Before we start the interview, I need to ask a few questions to make sure that your company qualifies to participate in this study.

1. Does your company sell residential kitchen appliances?

**[Check ONLY ONE category]**

- Yes
- No (T&T)

2. What percent of your business is from the sale of residential kitchen appliances?

\_\_\_\_\_ Percent (If less than 25 percent, then T&T.)

**Company Characteristics**

I would now like to ask about some of the characteristics of your company.

3. Does your company sell only kitchen appliances or do you sell other types of equipment?  
**[Check ONLY ONE category]**

- Only Kitchen Appliances (Ask Q5)
- Other Types of Equipment (Ask Q4)
- Other: \_\_\_\_\_ (Ask Q4)

**IF OTHER TYPES, THEN ASK Q4; ELSE ASK Q5.**

4. What other types of equipment does your company sell?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Water Heaters
- Windows
- Doors
- Lighting
- HVAC Equipment
- Insulation
- Duct Work
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

5. How many full-time employees does your company have (if national, ask for number in northern and central California)?

\_\_\_\_\_ Full-Time Employees

**Market Structure and Flow**

I would now like to ask about your suppliers, your customers, and the types of kitchen appliances sold by your company.

6. What types of kitchen appliances does your company sell?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Refrigerators
- Ovens
- Ranges
- Dishwashers
- Microwaves
- Cabinets
- Flooring
- Lighting
- Sinks/Faucets/Disposals
- Water Heaters
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

7. What percent of your residential kitchen appliance sales are to the following groups:  
**[Responses should add to 100]**

**Percent**

- \_\_\_\_\_ Contractors (Probe for: Kitchen Contractors - \_\_\_\_\_ vs. General Contractors - \_\_\_\_\_ )
- \_\_\_\_\_ Retailers
- \_\_\_\_\_ End-Users
- \_\_\_\_\_ Other: \_\_\_\_\_

8. How do you get new business for the residential kitchen appliances your company sells?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Advertising
- Manufacturers
- Kitchen Contractors
- General Contractors
- Relationships w/Lenders
- Relationships w/Realtors
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

**High Efficiency Sales**

Next, I would like to ask about your sales of energy efficient residential kitchen appliances.

9. What are your company's criteria for determining if refrigerators are energy efficient?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Energy Star
- Department of Energy Cost Labels
- California Standards
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

10. What percent of the refrigerators sold by your company in the last year met the energy efficiency requirements you just mentioned?

\_\_\_\_\_ Percent

**High Efficiency Barriers and Perceptions - Distributors**

Next, I would like to ask about your company's perceptions regarding the sale of energy efficient residential kitchen appliances.

11. How often do you discuss energy efficient kitchen appliance options with the contractors and/or retailers you sell to? Is it . . .

**[Check ONLY ONE category]**

- All Sales Situations (Q12)
- Most Sales Situations (Q12)
- Some Sales Situations (Q12)
- Very Few Sales Situations (Q12)
- Never (Q13)

**IF Q11 NOT EQUAL TO NEVER THEN ASK Q12; ELSE ASK Q13.**

12. What benefits does your company receive from promoting and selling energy efficient kitchen appliances?

---

13. What are the biggest hurdles your company faces when selling energy efficient kitchen appliances?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. More Difficult to Get EE Appliances Supplied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Harder to Install EE Appliances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. EE Appliances Perform Unreliably	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Not Enough Demand to Justify Stocking EE Appliances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Information on EE Appliances Hard to Find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Doubts about Energy Savings from EE Appliances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. EE Appliances Cost Too Much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Concerns about the Style of EE Appliances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Other Barrier 1: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Other Barrier 2: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Other Barrier 3: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. Aside from rebates, how could PG&E assist distributors to sell more energy efficient kitchen appliances?

**[Check all that apply-Do not read list-Probe if necessary]**

- Sales Representative Training
- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

**High Efficiency Barriers and Perceptions – Customers (ASK ONLY IF SELL TO END-USERS IN Q7)**

Next, I would like to ask about the perceptions of your residential end-users regarding the purchase of energy efficient kitchen appliances.

15. What are the most important factors for end-users when buying kitchen appliances?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Price	[ ]	[ ]	[ ]
b. Contractor Reputation	[ ]	[ ]	[ ]
c. Energy Efficiency	[ ]	[ ]	[ ]
d. Brand	[ ]	[ ]	[ ]
e. Reliability	[ ]	[ ]	[ ]
f. Style	[ ]	[ ]	[ ]
g. Access to Financing	[ ]	[ ]	[ ]
h. How Quickly You Can Install	[ ]	[ ]	[ ]
i. Warranty	[ ]	[ ]	[ ]
j. Other Factor 1: _____	[ ]	[ ]	[ ]
k. Other Factor 2: _____	[ ]	[ ]	[ ]
l. Other Factor 3: _____	[ ]	[ ]	[ ]

16. What are the biggest hurdles end-users face when buying energy efficient kitchen appliances?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Incomplete/Unreliable Information on EE Appliances	[ ]	[ ]	[ ]
b. Information on EE Appliances Hard to Find	[ ]	[ ]	[ ]
c. Doubts about Energy Savings from EE Appliances	[ ]	[ ]	[ ]
d. EE Appliances Cost Too Much	[ ]	[ ]	[ ]
e. EE Appliances Perform Unreliably	[ ]	[ ]	[ ]
f. Concerns about the Style of EE Appliances	[ ]	[ ]	[ ]
g. No Access to Financing	[ ]	[ ]	[ ]
h. Too Much Hassle	[ ]	[ ]	[ ]
i. Other Barrier 1: _____	[ ]	[ ]	[ ]
j. Other Barrier 2: _____	[ ]	[ ]	[ ]
k. Other Barrier 3: _____	[ ]	[ ]	[ ]

17. Aside from rebates, how could PG&E assist end-users to buy more energy efficient kitchen appliances?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ ] Financing
- [ ] Promotion of EE in Ads and Brochures
- [ ] More Information
- [ ] Better Education
- [ ] Provide Customers with Appliance EE Ratings
- [ ] Involvement w/Energy Star
- [ ] Other 1: \_\_\_\_\_
- [ ] Other 2: \_\_\_\_\_
- [ ] Other 3: \_\_\_\_\_

**Whole-House Approach**

One of the areas where PG&E is interested in capturing opportunities for energy efficiency is using a whole-house approach to promote of multiple energy efficient measures. In this scenario, end-users who are remodeling their kitchens would be encouraged to install additional energy efficient measures in their home, such as water heaters, windows, lighting, insulation, duct sealing, central air conditioners, and furnaces. This is because changes made in one measure area can impact and encourage improvements in other measure areas.

18. Which of the following best describes your company’s promotion of measures other than kitchen appliances, such as water heaters, windows, lighting, insulation, duct sealing, central air conditioners, and furnaces?  
**[Check ONLY ONE category]**

- Actively promotes the installation of other measures (Q19-Q21)
- Points out other measures that can be installed, but does not actively promote (Q19-Q21)
- Does not promote or point out other measures (Q22-Q24)

**IF Q18 EQUAL TO ACTIVELY PROMOTES OR POINTS OUT, THEN ASK Q19-21; ELSE ASK Q22-Q24.**

19. What other measures does your company actively promote/point out?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Water Heaters
- Windows
- Insulation
- Duct Work
- Lighting
- Central Air Conditioners
- Furnaces
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

20. What percent of your sales involve these other measures?

\_\_\_\_\_ Percent

21. What is the role of energy efficiency in using this approach?

\_\_\_\_\_



**IF Q18 EQUAL TO DOES NOT PROMOTE, THEN ASK Q22-24; ELSE ASK Q25.**

22. What are your company's main reasons for not promoting or pointing out other measures?

---

23. How interested would your company be in promoting other measures? Would you be . . .

**[Check ONLY ONE category]**

- Very Interested
- Somewhat Interested
- Not At All Interested

24. Why?

---

25. Aside from rebates, how could PG&E assist your company to promote other measures that improve the home's overall energy efficiency?

**[Check all that apply-Do not read list-Probe if necessary]**

- Retailer Certification
- Retailer Training
- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

26. Summing up, how do you view the development of a market for "whole-house" approaches to energy-oriented renovation projects? Do you think this is a likely evolution? Why or why not? What, if anything, could or should be done to encourage the development of this market?

---

**Financing (ASK ONLY IF SELL TO END-USERS IN Q7)**

I would now like to ask about the types of financing your company offers.

27. Does your company offer financing to its customers?

**[Check ONLY ONE category]**

Yes (Q28)

No (Q31)

**IF OFFERS FINANCING THEN ASK Q28; ELSE ASK Q31.**

28. What percent of your residential customers use your financing?

\_\_\_\_\_ Percent

29. What are the typical terms and rates for this financing?

---

30. Through what types of sources do you offer this financing?

**[Check all that apply-Do not read list-Probe if necessary]**

Your Company

Local Bank

Local Financing Company

Nation-wide Bank

Nation-wide Financing Company

Distributors

Manufacturers

Other 1: \_\_\_\_\_

Other 2: \_\_\_\_\_

Other 3: \_\_\_\_\_

31. What other methods do customers typically use to finance or pay for the cost of the kitchen appliances?

**[Check all that apply-Do not read list-Probe if necessary]**

Credit Card

Cash/Check

Home Equity Loan/Second Mortgage

Refinance Mortgage to Tap Equity

Line of Credit

Personal/Unsecured Loan

Other 1: \_\_\_\_\_

Other 2: \_\_\_\_\_

Other 3: \_\_\_\_\_

32. What can PG&E do to assist in creating greater access to financing?

---

**Training**

I would now like to ask about the types of training your company offers.

33. When hiring new sales representatives, what training does your company look for?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Two-Year Technical Degree
- Training from Previous Company
- Manufacturer Certificate/Training
- Distributor Certificate/Training
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

34. Where do your sales representatives get the training they need?  
**[Check all that apply-Do not read list-Probe if necessary]**

- In-House
- Technical School Classes
- Manufacturers
- Distributors
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

35. Do you feel that there is a shortage of qualified, well-trained sales representatives?  
**[Check ONLY ONE category]**

- Yes (Q36)
- No (Q37)

**IF Q35=YES, THEN ASK Q36; ELSE ASK Q37.**

36. Does this shortage limit the amount of work your company can do?  
**[Check ONLY ONE category]**

- Yes
- No

37. What specific training needs related to energy efficiency could PG&E address for you and other distributors?  
Please explain?

---

***Non-English Speaking Customers (ASK ONLY IF SELL TO END-USERS IN Q7)***

Finally, I would like to ask you about your company's sales to residential end-users for whom English is not their primary language. (e.g., customers who speak Spanish or Cantonese)

38. What percent of your residential sales are to end-users for whom English is not their primary language?

\_\_\_\_\_ Percent

***IF Q38>0 THEN ASK Q39; ELSE VERIFY NAME AND ADDRESS FOR \$50 PAYMENT.***

39. What particular problems do you face when dealing with end-users for whom language may be a barrier?

\_\_\_\_\_

40. How does your organization address these problems?

\_\_\_\_\_

41. What might PG&E do to increase the extent to which these end-users are able to take advantage of installing energy efficient measures?

\_\_\_\_\_

Those are all the questions I have for you today. Thank you very much for your time. Verify name and address for \$50 payment.

***R&R Kitchen Retailer Interview Guide***

Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of kitchen appliance retailers in northern and central California to help PG&E design better programs. Can I talk to the owner or manager . . . and could you tell me their name?

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(Name)	(Title)	(Phone)	(Call Back Date and Time)
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Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of kitchen appliance retailers in northern and central California. The information we collect from these select retailers will help PG&E design better programs. This is a critical stage in PG&E's planning and, to thank you for taking time to answer our questions, we will send you a check for \$50. Do you have about 15-20 minutes to complete this interview? If not, schedule a callback.

***Screening***

Before we start the interview, I need to ask a few questions to make sure that your company qualifies to participate in this study.

- 1. Does your company sell kitchen appliances to residential customers?  
**[Check ONLY ONE category]**

[ Y ] Yes  
[ N ] No (T&T)

- 2. What percent of your business is with residential customers?

\_\_#\_\_ Percent (If less than 25 percent, then T&T.)

**Company Characteristics**

I would now like to ask about some of the characteristics of your company.

3. Does your company sell only kitchen appliances or do you sell other types of products?  
**[Check ONLY ONE category]**

- [ 1 ] Only Kitchen Appliances (Ask Q5)
- [ 2 ] Other Types of Products (Ask Q4)
- [ 3 ] Other: \_\_\_\_\_ (Ask Q4)

**IF OTHER TYPES, THEN ASK Q4; ELSE ASK Q5.**

4. What other types of products does your company sell?  
**[Check all that apply-Do not read list-Probe if necessary]**

- [ 0/1 ] Water Heaters
- [ 0/1 ] Windows
- [ 0/1 ] Doors
- [ 0/1 ] Siding
- [ 0/1 ] Roofing
- [ 0/1 ] Weatherization Measures (Weatherstripping/Caulk/Sealant)
- [ 0/1 ] Lighting
- [ 0/1 ] HVAC Equipment
- [ 0/1 ] Insulation
- [ 0/1 ] Duct Work
- [ 0/1 ] Other 1: \_\_\_\_\_
- [ 0/1 ] Other 2: \_\_\_\_\_
- [ 0/1 ] Other 3: \_\_\_\_\_

5. How many full-time employees does your company have (if chain, ask for number at location)?

\_\_#\_\_ Full-Time Employees

**Market Structure and Flow**

I would now like to ask about your suppliers, your customers, and the types of kitchen appliances your company sells.

6. What types of kitchen appliances does your company sell?  
**[Check all that apply-Do not read list-Probe if necessary]**

- [ 0/1 ] Refrigerators
- [ 0/1 ] Dishwashers
- [ 0/1 ] Water Heaters
- [ 0/1 ] Ovens
- [ 0/1 ] Ranges
- [ 0/1 ] Microwaves
- [ 0/1 ] Cabinets
- [ 0/1 ] Flooring
- [ 0/1 ] Lighting
- [ 0/1 ] Sinks/Faucets/Disposals
- [ 0/verbatim] Other 1: \_\_\_\_\_
- [ 0/verbatim] Other 2: \_\_\_\_\_
- [ 0/verbatim] Other 3: \_\_\_\_\_

7. What percent of your residential kitchen appliances are purchased from the following groups:  
**[Responses should add to 100]**

**Percent**

- \_\_\_#\_\_\_ Manufacturers (Probe for: US - \_\_\_#\_\_\_ vs. Foreign - \_\_\_#\_\_\_ )
- \_\_\_#\_\_\_ Distributors (Probe for: Multiple-Line/Independent - \_\_\_#\_\_\_ vs. Captive - \_\_\_#\_\_\_ )
- \_\_\_#\_\_\_ Other: \_\_\_\_\_

8. What percent of your residential kitchen appliances sales are to the following groups:  
**[Responses should add to 100]**

**Percent**

- \_\_\_#\_\_\_ Contractors (Probe for: Kitchen Contractors - \_\_\_#\_\_\_ vs. General Contractors - \_\_\_#\_\_\_ )
- \_\_\_#\_\_\_ End-Users (Probe for: Do-It-Yourselfers - \_\_\_#\_\_\_ vs. Buyers on Behalf of Contractors - \_\_\_#\_\_\_ )
- \_\_\_#\_\_\_ Other: \_\_\_\_\_

9. How do you get new business in the residential market?  
**[Check all that apply-Do not read list-Probe if necessary]**

- [ 0/1 ] Advertising
- [ 0/1 ] Direct Mail
- [ 0/1 ] Referrals from Customers
- [ 0/1 ] Kitchen Contractors
- [ 0/1 ] General Contractors
- [ 0/1 ] Relationships w/Lenders
- [ 0/1 ] Relationships w/Realtors
- [ 0/verbatim] Other 1: \_\_\_\_\_
- [ 0/verbatim] Other 2: \_\_\_\_\_
- [ 0/verbatim] Other 3: \_\_\_\_\_

10. How often do you have a residential customer's kitchen appliance order in stock versus having to fill the order from your suppliers? Would you say . . .

**[Check ONLY ONE category]**

- [ 1 ] Never
- [ 2 ] Not Very Often
- [ 3 ] Occasionally
- [ 4 ] Most of the Time
- [ 5 ] All of the Time
- [ 6 ] Other: \_\_\_\_\_

***IF Q10 NOT EQUAL TO ALL OF THE TIME, THEN ASK Q11; ELSE ASK Q12.***

11. How long does it typically take for you to receive a residential kitchen appliance order from your supplier?

- [ # days ] 1-2 Days
- [ # days ] 3-6 Days
- [ # days ] 1 Week
- [ # days ] 2-3 Weeks
- [ # days ] 1 Month
- [ # days ] 2-3 Months
- [ # days ] 4-6 Months
- [ # days ] Longer Than 6 Months
- [ # days ] Other: \_\_\_\_\_

12. What is the typical cost for a residential kitchen appliance purchase?

\_\_\_#\_\_\_ \$



**High Efficiency Sales**

Next, I would like to ask about your sales of energy efficient kitchen appliances.

13. What are your company's criteria for determining if refrigerators are energy efficient?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ 0/1 ] Energy Star
- [ 0/1 ] Department of Energy Cost Labels
- [ 0/1 ] California Standards
- [ 0/verbatim] Other 1: \_\_\_\_\_
- [ 0/verbatim] Other 2: \_\_\_\_\_
- [ 0/verbatim] Other 3: \_\_\_\_\_

14. What percent of the refrigerators sold by your company in the last year met the energy efficiency requirements you just mentioned?

\_\_#\_\_ Percent

**High Efficiency Barriers and Perceptions - Retailers**

Next, I would like to ask about your company’s perceptions regarding the sale of energy efficient kitchen appliances.

15. How often do you discuss energy efficient kitchen appliance options with your customers? Is it . . .  
**[Check ONLY ONE category]**

- [ 1 ] All Sales Situations (Q16)
- [ 2 ] Most Sales Situations (Q16)
- [ 3 ] Some Sales Situations (Q16)
- [ 4 ] Very Few Sales Situations (Q16)
- [ 5 ] Never (Q17)

**IF Q15 NOT EQUAL TO NEVER THEN ASK Q16; ELSE ASK Q17.**

16. What benefits does your company receive from promoting and selling energy efficient kitchen appliances?

\_\_\_ Verbatim \_\_\_\_\_

17. What are the biggest hurdles your company faces when selling energy efficient kitchen appliances?  
**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. More Difficult to Get EE Appliances Supplied	[ 3 ]	[ 2 ]	[ 1 ]
b. Harder to Install EE Appliances	[ 3 ]	[ 2 ]	[ 1 ]
c. EE Appliances Perform Unreliably	[ 3 ]	[ 2 ]	[ 1 ]
d. Try to Install New Appliances that Closely Matches Old Appliances	[ 3 ]	[ 2 ]	[ 1 ]
e. Information on EE Appliances Hard to Find	[ 3 ]	[ 2 ]	[ 1 ]
f. Doubts about Energy Savings from EE Appliances	[ 3 ]	[ 2 ]	[ 1 ]
g. EE Appliances Cost Too Much	[ 3 ]	[ 2 ]	[ 1 ]
h. Concerns about the Style of EE Appliances	[ 3 ]	[ 2 ]	[ 1 ]
i. Other Barrier 1: _Verbatim_____	[ ]	[ ]	[ ]
j. Other Barrier 2: _Verbatim_____	[ ]	[ ]	[ ]
k. Other Barrier 3: _ Verbatim _____	[ ]	[ ]	[ ]

18. Aside from rebates, how could PG&E assist retailers in selling more energy efficient kitchen appliances?  
**[Check all that apply-Do not read list-Probe if necessary]**

- [ 0/1 ] Sales Representative Training
- [ 0/1 ] Contractor Certification
- [ 0/1 ] Contractor Training
- [ 0/1 ] Financing
- [ 0/1 ] Promotion of EE in Ads and Brochures
- [ 0/1 ] More Information
- [ 0/1 ] Better Education
- [ 0/1 ] Contractor Certification
- [ 0/Verbatim ] Other 1: \_\_\_\_\_
- [ 0/Verbatim ] Other 2: \_\_\_\_\_
- [ 0/Verbatim ] Other 3: \_\_\_\_\_

**High Efficiency Barriers and Perceptions – Customers**

Next, I would like to ask about the perceptions of your residential customers regarding the purchase of energy efficient kitchen appliances.

19. What are the most important factors for you customers when buying kitchen appliances?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Price	[ 3 ]	[ 2 ]	[ 1 ]
b. Contractor Reputation	[ 3 ]	[ 2 ]	[ 1 ]
c. Energy Efficiency	[ 3 ]	[ 2 ]	[ 1 ]
d. Brand	[ 3 ]	[ 2 ]	[ 1 ]
e. Reliability	[ 3 ]	[ 2 ]	[ 1 ]
f. Style	[ 3 ]	[ 2 ]	[ 1 ]
g. Access to Financing	[ 3 ]	[ 2 ]	[ 1 ]
h. How Quickly You Can Install	[ 3 ]	[ 2 ]	[ 1 ]
i. Warranty	[ 3 ]	[ 2 ]	[ 1 ]
j. Other Factor 1: Verbatim_____	[ ]	[ ]	[ ]
k. Other Factor 2: Verbatim_____	[ ]	[ ]	[ ]
l. Other Factor 3: Verbatim_____	[ ]	[ ]	[ ]

20. What are the biggest hurdles your customers face when buying energy efficient kitchen appliances?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Incomplete/Unreliable Information on EE Appliances	[ 3 ]	[ 2 ]	[ 1 ]
b. Information on EE Appliances Hard to Find	[ 3 ]	[ 2 ]	[ 1 ]
c. Doubts about Energy Savings from EE Appliances	[ 3 ]	[ 2 ]	[ 1 ]
d. EE Appliances Cost Too Much	[ 3 ]	[ 2 ]	[ 1 ]
e. EE Appliances Perform Unreliably	[ 3 ]	[ 2 ]	[ 1 ]
f. Concerns about the Style of EE Appliances	[ 3 ]	[ 2 ]	[ 1 ]
g. No Access to Financing	[ 3 ]	[ 2 ]	[ 1 ]
h. Too Much Hassle	[ 3 ]	[ 2 ]	[ 1 ]
i. Other Barrier 1: Verbatim_____	[ ]	[ ]	[ ]
j. Other Barrier 2: Verbatim_____	[ ]	[ ]	[ ]
k. Other Barrier 3: Verbatim_____	[ ]	[ ]	[ ]

21. Aside from rebates, how could PG&E assist customers to buy more energy efficient kitchen appliances?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ 0/1 ] Financing
- [ 0/1 ] Promotion of EE in Ads and Brochures
- [ 0/1 ] More Information
- [ 0/1 ] Better Education
- [ 0/1 ] Provide Customers with Appliance EE Ratings
- [ 0/1 ] Involvement w/Energy Star
- [ 0/verbatim ] Other 1: \_\_\_\_\_
- [ 0/verbatim ] Other 2: \_\_\_\_\_
- [ 0/verbatim ] Other 3: \_\_\_\_\_

**Whole-House Approach**

One of the areas where PG&E is interested in capturing opportunities for energy efficiency is using a whole-house approach to promote of multiple energy efficient measures. In this scenario, customers who are remodeling their kitchen would be encouraged to install additional energy efficient measures in their home, such as water heaters, windows, lighting, insulation, duct sealing, central air conditioners, and furnaces. This is because changes made in one measure area can impact and encourage improvements in other measure areas.

22. When selling kitchen appliances to residential customers, which of the following best describes your company's promotion of other measures, such as water heaters, windows, lighting, insulation, duct sealing, central air conditioners, and furnaces?

**[Check ONLY ONE category]**

- [ 1 ] Actively promotes the installation of other measures (Q23-Q25)
- [ 2 ] Points out other measures that can be installed, but does not actively promote (Q23-Q25)
- [ 3 ] Does not promote or point out other measures (Q26-Q28)

**IF Q22 EQUAL TO ACTIVELY PROMOTES OR POINTS OUT, THEN ASK Q23-Q25; ELSE ASK Q26-Q28.**

23. What other measures does your company actively promote/point out?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ 0/1 ] Water Heaters
- [ 0/1 ] Windows
- [ 0/1 ] Doors
- [ 0/1 ] Siding
- [ 0/1 ] Roofing
- [ 0/1 ] Weatherization Measures (Weatherstripping/Caulk/Sealant)
- [ 0/1 ] Insulation
- [ 0/1 ] Duct Work
- [ 0/1 ] Lighting
- [ 0/1 ] Central Air Conditioners
- [ 0/1 ] Furnaces
- [ 0/verbatim ] Other 1: \_\_\_\_\_
- [ 0/verbatim ] Other 2: \_\_\_\_\_
- [ 0/verbatim ] Other 3: \_\_\_\_\_

24. What percent of your sales involve these other measures?

\_\_\_#\_\_\_ Percent

25. What is the role of energy efficiency in using this approach?

\_\_\_Verbatim\_\_\_\_\_

**IF Q22 EQUAL TO DOES NOT PROMOTE, THEN ASK Q26-Q28; ELSE ASK Q29.**

26. What are your company's main reasons for not promoting or pointing out other measures to your customers when selling kitchen appliances?

Verbatim \_\_\_\_\_

27. How interested would your company be in promoting other measures? Would you be . . .

**[Check ONLY ONE category]**

- [ 3 ] Very Interested
- [ 2 ] Somewhat Interested
- [ 1 ] Not At All Interested

28. Why?

\_\_Verbatim \_\_\_\_\_

29. Aside from rebates, how could PG&E assist your company to promote other measures that improve the home's overall energy efficiency?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ 0/1 ] Retailer Certification
- [ 0/1 ] Retailer Training
- [ 0/1 ] Contractor Certification
- [ 0/1 ] Contractor Training
- [ 0/1 ] Financing
- [ 0/1 ] Promotion of EE in Ads and Brochures
- [ 0/1 ] More Information
- [ 0/1 ] Better Education
- [ 0/1 ] Involvement w/Energy Star
- [ 0/verbatim ] Other 1: \_\_\_\_\_
- [ 0/verbatim ] Other 2: \_\_\_\_\_
- [ 0/verbatim ] Other 3: \_\_\_\_\_

30. Summing up, how do you view the development of a market for "whole-house" approaches to energy-oriented renovation projects? Do you think this is a likely evolution? Why or why not? What, if anything, could or should be done to encourage the development of this market?

\_\_Verbatim \_\_\_\_\_

**Financing**

I would now like to ask about the types of financing your company offers.

31. Does your company offer financing to its residential customers?  
**[Check ONLY ONE category]**

- [ 1 ] Yes (Q32)
- [ 2 ] No (Q35)

**IF OFFERS FINANCING THEN ASK Q32; ELSE ASK Q35.**

32. What percent of your residential customers use your financing?

\_\_\_#\_\_\_ Percent

33. What are the typical terms and rates for this financing?

\_\_\_Verbatim\_\_\_\_\_

34. Through what types of sources do you offer this financing?  
**[Check all that apply-Do not read list-Probe if necessary]**

- [ 0/1 ] Your Company
- [ 0/1 ] Local Bank
- [ 0/1 ] Local Financing Company
- [ 0/1 ] Nation-wide Bank
- [ 0/1 ] Nation-wide Financing Company
- [ 0/1 ] Distributors
- [ 0/1 ] Manufacturers
- [ 0/verbatim ] Other 1: \_\_\_\_\_
- [ 0/verbatim ] Other 2: \_\_\_\_\_
- [ 0/verbatim ] Other 3: \_\_\_\_\_

35. What other methods do customers typically use to finance or pay for the cost of the kitchen appliances?  
**[Check all that apply-Do not read list-Probe if necessary]**

- [ 0/1 ] Credit Card
- [ 0/1 ] Cash/Check
- [ 0/1 ] Home Equity Loan/Second Mortgage
- [ 0/1 ] Refinance Mortgage to Tap Equity
- [ 0/1 ] Line of Credit
- [ 0/1 ] Personal/Unsecured Loan
- [ 0/verbatim ] Other 1: \_\_\_\_\_
- [ 0/verbatim ] Other 2: \_\_\_\_\_
- [ 0/verbatim ] Other 3: \_\_\_\_\_

36. What can PG&E do to assist in creating greater access to financing?

\_\_\_Verbatim\_\_\_\_\_

**Training**

I would now like to ask about the types of training your company offers.

37. When hiring new sales representatives, what training does your company look for?  
**[Check all that apply-Do not read list-Probe if necessary]**

- [ 0/1 ] Two-Year Technical Degree
- [ 0/1 ] Training from Previous Company
- [ 0/1 ] Manufacturer Certificate/Training
- [ 0/1 ] Distributor Certificate/Training
- [ 0/verbatim ] Other 1: \_\_\_\_\_
- [ 0/verbatim ] Other 2: \_\_\_\_\_
- [ 0/verbatim ] Other 3: \_\_\_\_\_

38. Where do your sales representatives get the training they need?  
**[Check all that apply-Do not read list-Probe if necessary]**

- [ 0/1 ] In-House
- [ 0/1 ] Technical School Classes
- [ 0/1 ] Manufacturers
- [ 0/1 ] Distributors
- [ 0/verbatim ] Other 1: \_\_\_\_\_
- [ 0/verbatim ] Other 2: \_\_\_\_\_
- [ 0/verbatim ] Other 3: \_\_\_\_\_

39. Do you feel that there is a shortage of qualified, well-trained sales representatives?  
**[Check ONLY ONE category]**

- [ 1 ] Yes (Q40)
- [ 2 ] No (Q41)

**IF Q39=YES, THEN ASK Q40; ELSE ASK Q41.**

40. Does this shortage limit the amount of work your company can do?  
**[Check ONLY ONE category]**

- [ 1 ] Yes
- [ 2 ] No

41. What specific training needs related to energy efficiency could PG&E address for you and other retailers?  
Please explain?

\_\_\_\_Verbatim\_\_\_\_\_

*Non-English Speaking Customers*

Finally, I would like to ask you about your company's sales to residential customers for whom English is not their primary language. (e.g., customers who speak Spanish or Cantonese)

42. What percent of your residential sales are to customers for whom English is not their primary language?

\_\_#\_\_ Percent

***IF Q41>0 THEN ASK Q43; ELSE VERIFY NAME AND ADDRESS FOR \$50 PAYMENT.***

43. What particular problems do you face when dealing with customers for whom language may be a barrier?

\_\_ Verbatim \_\_\_\_\_

44. How does your organization address these problems?

\_\_ Verbatim \_\_\_\_\_

45. What might PG&E do to increase the extent to which these customers are able to take advantage of installing energy efficient measures?

\_\_ Verbatim \_\_\_\_\_

Those are all the questions I have for you today. Thank you very much for your time. Verify name and address for \$50 payment.



***R&R Lighting Contractor Interview Guide***

Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of lighting contractors in northern and central California to help PG&E design better programs. Can I talk to the owner or manager . . . and could you tell me their name?

---

(Name)	(Title)	(Phone)	(Call Back Date and Time)
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Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of lighting contractors in northern and central California. The information we collect from these select contractors will help PG&E design better programs. This is a critical stage in PG&E's planning and, to thank you for taking time to answer our questions, we will send you a check for \$50. Do you have about 15-20 minutes to complete this interview? If not, schedule a callback.

***Screening***

Before we start the interview, I need to ask a few questions to make sure that your company qualifies to participate in this study.

- 1. Does your company sell and install lighting equipment to residential customers?  
[Check ONLY ONE category]

[ ] Yes  
[ ] No (T&T)

- 2. What percent of your business is with residential customers?

\_\_\_\_\_ Percent (If less than 25 percent, then T&T.)

- 3. What percent of your residential sales are part of new home construction projects, excluding remodeling projects and additions?

\_\_\_\_\_ Percent (If more than 75 percent, then T&T.)

**Company Characteristics**

I would now like to ask about some of the characteristics of your company.

4. Does your company sell and install only lighting equipment or do you sell and install other types of equipment?  
[Check ONLY ONE category]

- Only Lighting Equipment (Ask Q6)
- Other Types of Equipment (Ask Q5)
- Other: \_\_\_\_\_ (Ask Q5)

**IF OTHER TYPES, THEN ASK Q5; ELSE ASK Q6.**

5. What other types of equipment does your company sell and install?  
[Check all that apply-Do not read list-Probe if necessary]

- Windows
- HVAC Equipment
- Refrigerators
- Dishwashers
- Clothes Washers
- Clothes Dryers
- Refrigerators
- Insulation
- Duct Work
- General Contracting
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

6. How many full-time employees does your company have?

\_\_\_\_\_ Full-Time Employees

**Market Structure and Flow**

I would now like to ask about your suppliers, your customers, and the types of lighting installations performed by your company.

7. What percent of your residential lighting equipment is purchased from the following groups:  
**[Responses should add to 100]**

**Percent**

\_\_\_\_\_ Manufacturers (Probe for: US - \_\_\_\_\_ vs. Foreign - \_\_\_\_\_ )  
\_\_\_\_\_ Distributors (Probe for: Multiple-Line/Independent - \_\_\_\_\_ vs. Captive - \_\_\_\_\_ )  
\_\_\_\_\_ Retailers  
\_\_\_\_\_ Other: \_\_\_\_\_

8. What brands of lighting does your company sell and install?  
**[Check all that apply-Do not read list-Probe if necessary]**

[ ] Osram Sylvania  
[ ] General Electric  
[ ] Philips  
[ ] Durotest  
[ ] Advance  
[ ] Magnetek  
[ ] Motorola  
[ ] Power Lighting Products (Valmont)  
[ ] Kingtec  
[ ] Other 1: \_\_\_\_\_  
[ ] Other 2: \_\_\_\_\_  
[ ] Other 3: \_\_\_\_\_

9. How do you get new business in the residential market?  
**[Check all that apply-Do not read list-Probe if necessary]**

[ ] Advertising  
[ ] Direct Mail  
[ ] Referrals from Customers  
[ ] Relationships w/Lenders  
[ ] Relationships w/Realtors  
[ ] General Contractors  
[ ] Other 1: \_\_\_\_\_  
[ ] Other 2: \_\_\_\_\_  
[ ] Other 3: \_\_\_\_\_

10. What percent of your residential sales are to customers in . . .  
**[Responses should add to 100]**

**Percent**

\_\_\_\_\_ Single-Family Detached Homes  
\_\_\_\_\_ Townhomes  
\_\_\_\_\_ Condominiums  
\_\_\_\_\_ Other: \_\_\_\_\_

11. What percent of your residential sales are to customers in rural areas?

\_\_\_\_\_ Percent

12. How often does your company work on residential jobs for someone who is getting ready to sell their home or a new buyer who has not yet moved in? Would you say . . .  
**[Check ONLY ONE category]**

- Never
- Not Very Often
- Occasionally
- Most of the Time
- All of the Time
- Other: \_\_\_\_\_

13. Now, please think about all of the residential lighting installation work that your company has done in the last year. What percent were planned installations? Planned installations include remodeling and renovations, replacing lighting that is getting old, and replacing existing lighting with more efficient lighting.

\_\_\_\_\_ Percent

***IF Q13 > 0, THEN ASK Q14-Q15; ELSE ASK Q16.***

14. How quickly do most customers need you to install these planned lighting installations?  
**[Check ONLY ONE category-Do not read list-Probe if necessary]**

- 1 Week or Less
- 2-3 Weeks
- 1 Month
- 2-3 Months
- 4-6 Months
- Longer Than 6 Months
- Other: \_\_\_\_\_

15. For planned installations, what are the main reasons why customers replace their lighting?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Additions
- Room Conversions
- Improved Energy Efficiency
- Enhanced Aesthetics
- Improved Comfort
- Better Performance
- Increase Value of Home
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_

**IF Q13 < 100, THEN ASK Q16-Q17; ELSE ASK Q18.**

16. How would you characterize the remaining (100 – Q13) percent of the residential lighting installation work that is not planned?

---

17. How quickly do most customers need you to install the lighting as part of this type of work?

**[Check ONLY ONE category-Do not read list-Probe if necessary]**

- 1 Week or Less
- 2-3 Weeks
- 1 Month
- 2-3 Months
- 4-6 Months
- Longer Than 6 Months
- Other: \_\_\_\_\_

18. Again, please think about all of the residential lighting installation work that your company has done in the last year. On average, what percent of a home's lighting equipment do you replace on a typical job?

\_\_\_\_\_ Percent

19. What is the typical installed cost for this type of job?

\_\_\_\_\_ \$

**IF Q18 < 100, THEN ASK Q20-Q22; ELSE ASK Q23.**

20. Why do customers not replace all of the lighting equipment in their home when doing a replacement?

**[Check all that apply-Do not read list-Probe if necessary]**

- Costs Too Much
- Lack of Financing
- Like Existing Style
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

21. How often do you replace all of the lighting equipment in a home? Would you say . . .

**[Check ONLY ONE category]**

- Never (Q23)
- Not Very Often (Q22)
- Occasionally (Q22)
- Most of the Time (Q22)
- All of the Time (Q22)
- Other: \_\_\_\_\_ (Q22)

**IF Q21 NOT EQUAL TO NEVER, THEN ASK Q22; ELSE ASK Q23.**

22. What is the typical installed cost for a whole-house lighting equipment replacement?

\_\_\_\_\_ \$

23. How often does your company work on a lighting installation that involves specifications developed by an independent architect/designer? Would you say . . .

**[Check ONLY ONE category]**

- Never (Q24)
- Not Very Often (Q24)
- Occasionally (Q24)
- Most of the Time (Q24)
- All of the Time (Q25)
- Other: \_\_\_\_\_ (Q24)

***IF Q23 NOT EQUAL TO ALL OF THE TIME THEN ASK Q24; ELSE ASK Q25.***

24. For those not involving architects/designers, how is the installation specified?

**[Check all that apply-Do not read list-Probe if necessary]**

- Your Company
- Customer
- General Contractor
- Generic Blueprints
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

**High Efficiency Sales**

Next, I would like to ask about your sales of energy efficient lighting equipment in existing homes.

25. What are your company's criteria for determining if lighting equipment is energy efficient?

**[Check all that apply-Do not read list-Probe if necessary]**

- Compact Fluorescent Lamps
- T8 Fluorescent Lamps
- High Intensity Discharge Lamps (Metal Halide/High-Pressure Sodium)
- Reflectors
- Electronic Ballasts
- Lighting Controls (Dimmable Lighting/Motion Sensors)
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

26. What percent of your lighting replacements in existing homes in the last year had the energy-saving features you just mentioned?

\_\_\_\_\_ Percent

**High Efficiency Barriers and Perceptions - Contractors**

Next, I would like to ask about your company’s perceptions regarding the sale of energy efficient residential lighting equipment.

27. How often do you discuss energy efficient lighting options with your customers? Is it . . .  
**[Check ONLY ONE category]**

- All Sales Situations (Q28)
- Most Sales Situations (Q28)
- Some Sales Situations (Q28)
- Very Few Sales Situations (Q28)
- Never (Q29)

**IF Q27 NOT EQUAL TO NEVER THEN ASK Q28; ELSE ASK Q29.**

28. What benefits does your company receive from promoting and selling energy efficient lighting?

29. What are the biggest hurdles your company faces when selling energy efficient lighting?  
**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. More Difficult to Get EE Lighting Supplied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Harder to Install EE Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. EE Lighting Performs Unreliably	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Try to Install New Lighting that Closely Match Old Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Information on EE Lighting Hard to Find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Doubts about Energy Savings from EE Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. EE Lighting Costs Too Much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Concerns about the Light Quality of EE Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Other Barrier 1: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Other Barrier 2: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Other Barrier 3: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

30. Aside from rebates, how could PG&E assist contractors to sell more energy efficient lighting?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_



**High Efficiency Barriers and Perceptions – Customers**

Next, I would like to ask about the perceptions of your residential customers regarding the purchase of energy efficient lighting.

31. What are the most important factors for you customers when buying lighting equipment?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Price	[ ]	[ ]	[ ]
b. Contractor Reputation	[ ]	[ ]	[ ]
c. Energy Efficiency	[ ]	[ ]	[ ]
d. Brand	[ ]	[ ]	[ ]
e. Reliability	[ ]	[ ]	[ ]
f. Light Quality	[ ]	[ ]	[ ]
g. Access to Financing	[ ]	[ ]	[ ]
h. How Quickly You Can Install	[ ]	[ ]	[ ]
i. Warranty	[ ]	[ ]	[ ]
j. Other Factor 1: _____	[ ]	[ ]	[ ]
k. Other Factor 2: _____	[ ]	[ ]	[ ]
l. Other Factor 3: _____	[ ]	[ ]	[ ]

32. What are the biggest hurdles your customers face when buying energy efficient lighting?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Incomplete/Unreliable Information on EE Lighting	[ ]	[ ]	[ ]
b. Information on EE Lighting Hard to Find	[ ]	[ ]	[ ]
c. Doubts about Energy Savings from EE Lighting	[ ]	[ ]	[ ]
d. EE Lighting Costs Too Much	[ ]	[ ]	[ ]
e. EE Lighting Performs Unreliably	[ ]	[ ]	[ ]
f. Concerns about the Light Quality of EE Lighting	[ ]	[ ]	[ ]
g. No Access to Financing	[ ]	[ ]	[ ]
h. Too Much Hassle	[ ]	[ ]	[ ]
i. Other Barrier 1: _____	[ ]	[ ]	[ ]
j. Other Barrier 2: _____	[ ]	[ ]	[ ]
k. Other Barrier 3: _____	[ ]	[ ]	[ ]

33. Aside from rebates, how could PG&E assist customers to buy more energy efficient lighting?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ ] Financing
- [ ] Promotion of EE in Ads and Brochures
- [ ] More Information
- [ ] Better Education
- [ ] Involvement w/Energy Star
- [ ] Other 1: \_\_\_\_\_
- [ ] Other 2: \_\_\_\_\_
- [ ] Other 3: \_\_\_\_\_

**Whole-House Approach**

One of the areas where PG&E is interested in capturing opportunities for energy efficiency is using a whole-house approach to promote of multiple energy efficient measures. In this scenario, customers who are doing lighting installations would be encouraged to install additional energy efficient measures in their home, such as insulation, duct sealing, windows, kitchen appliances, central air conditioners, and furnaces. This is because changes made in one measure area can impact and encourage improvements in other measure areas.

34. How often does your company work on residential jobs where a remodeling contractor is also performing work?  
Would you say . . .

**[Check ONLY ONE category]**

- Never
- Not Very Often
- Occasionally
- Most of the Time
- All of the Time
- Other: \_\_\_\_\_

35. When performing a lighting installation, which of the following best describes your company's promotion of measures other than lighting, such as insulation, duct sealing, windows, kitchen appliances, central air conditioners, and furnaces?

**[Check ONLY ONE category]**

- Actively promotes the installation of other measures (Q36-Q38)
- Points out other measures that can be installed, but does not actively promote (Q36-Q38)
- Does not promote or point out other measures (Q39-Q41)

**IF Q35 EQUAL TO ACTIVELY PROMOTES OR POINTS OUT, THEN ASK Q36-38; ELSE ASK Q39-Q41.**

36. What other measures does your company actively promote/point out?

**[Check all that apply-Do not read list-Probe if necessary]**

- Insulation
- Duct Work
- Windows
- Kitchen Appliances
- Central Air Conditioners
- Furnaces
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

37. What percent of your installations involve these other measures?

\_\_\_\_\_ Percent

38. What is the role of energy efficiency in using this approach?

\_\_\_\_\_

**IF Q35 EQUAL TO DOES NOT PROMOTE, THEN ASK Q39-41; ELSE ASK Q42.**

39. What are your company's main reasons for not promoting or pointing out other measures to your customers when doing a lighting installation?

---

40. How interested would your company be in promoting other measures? Would you be . . .

**[Check ONLY ONE category]**

- Very Interested
- Somewhat Interested
- Not At All Interested

41. Why?

---

42. Aside from rebates, how could PG&E assist your company to promote other measures that improve the home's overall energy efficiency?

**[Check all that apply-Do not read list-Probe if necessary]**

- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

43. Summing up, how do you view the development of a market for "whole-house" approaches to energy-oriented renovation projects? Do you think this is a likely evolution? Why or why not? What, if anything, could or should be done to encourage the development of this market?

---

**Financing**

I would now like to ask about the types of financing your company offers.

44. Does your company offer financing to its residential customers?  
**[Check ONLY ONE category]**

- Yes (Q45)
- No (Q48)

**IF OFFERS FINANCING THEN ASK Q45; ELSE ASK Q48.**

45. What percent of your residential customers use your financing?

\_\_\_\_\_ Percent

46. What are the typical terms and rates for this financing?

---

47. Through what types of sources do you offer this financing?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Your Company
- Local Bank
- Local Financing Company
- Nation-wide Bank
- Nation-wide Financing Company
- Distributors
- Manufacturers
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

48. What other methods do customers typically use to finance or pay for the cost of the lighting installation?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Credit Card
- Cash/Check
- Home Equity Loan/Second Mortgage
- Refinance Mortgage to Tap Equity
- Line of Credit
- Personal/Unsecured Loan
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

49. What can PG&E do to assist in creating greater access to financing?

---

**Training**

I would now like to ask about the types of training your company offers.

50. When hiring new installers, what training does your company look for?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Two-Year Technical Degree
- Training from Previous Company
- Manufacturer Certificate/Training
- Distributor Certificate/Training
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

51. Where do your installers get the training they need?  
**[Check all that apply-Do not read list-Probe if necessary]**

- In-House
- Technical School Classes
- Manufacturers
- Distributors
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

52. Do you feel that there is a shortage of qualified, well-trained installers?  
**[Check ONLY ONE category]**

- Yes (Q53)
- No (Q54)

**IF Q52=YES, THEN ASK Q53; ELSE ASK Q54.**

53. Does this shortage limit the amount of work your company can do?  
**[Check ONLY ONE category]**

- Yes
- No

54. What specific training needs related to energy efficiency could PG&E address for you and other contractors?  
Please explain?

---

*Non-English Speaking Customers*

Finally, I would like to ask you about your company's sales to residential customers for whom English is not their primary language. (e.g., customers who speak Spanish or Cantonese)

55. What percent of your residential sales are to customers for whom English is not their primary language?

\_\_\_\_\_ Percent

***IF Q55>0 THEN ASK Q56; ELSE VERIFY NAME AND ADDRESS FOR \$50 PAYMENT.***

56. What particular problems do you face when dealing with customers for whom language may be a barrier?

\_\_\_\_\_

57. How does your organization address these problems?

\_\_\_\_\_

58. What might PG&E do to increase the extent to which these customers are able to take advantage of installing energy efficient measures?

\_\_\_\_\_

Those are all the questions I have for you today. Thank you very much for your time. Verify name and address for \$50 payment.

***R&R Lighting Distributor Interview Guide***

Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of lighting distributors in northern and central California to help PG&E design better programs. Can I talk to the owner or manager . . . and could you tell me their name?

---

(Name)	(Title)	(Phone)	(Call Back Date and Time)
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Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of lighting distributors in northern and central California. The information we collect from these select distributors will help PG&E design better programs. This is a critical stage in PG&E's planning and, to thank you for taking time to answer our questions, we will send you a check for \$50. Do you have about 15-20 minutes to complete this interview? If not, schedule a callback.

***Screening***

Before we start the interview, I need to ask a few questions to make sure that your company qualifies to participate in this study.

1. Does your company sell residential lighting equipment?  
[Check ONLY ONE category]

[ ] Yes  
[ ] No (T&T)

2. What percent of your business is from the sale of residential lighting equipment?

\_\_\_\_\_ Percent (If less than 25 percent, then T&T.)

**Company Characteristics**

I would now like to ask about some of the characteristics of your company.

3. Does your company sell only lighting equipment or do you sell other types of equipment?  
[Check ONLY ONE category]

- Only Lighting (Ask Q5)
- Other Types of Equipment (Ask Q4)
- Other: \_\_\_\_\_ (Ask Q4)

**IF OTHER TYPES, THEN ASK Q4; ELSE ASK Q5.**

4. What other types of equipment does your company sell?  
[Check all that apply-Do not read list-Probe if necessary]

- Doors
- Windows
- HVAC Equipment
- Refrigerators
- Dishwashers
- Clothes Washers
- Clothes Dryers
- Refrigerators
- Insulation
- Duct Work
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

5. How many full-time employees does your company have (if national, ask for number in northern and central California)?

\_\_\_\_\_ Full-Time Employees



**Market Structure and Flow**

I would now like to ask about your suppliers, your customers, and the types of lighting sold by your company.

6. What brands of lighting does your company sell?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Osram Sylvania
- General Electric
- Philips
- Durotest
- Advance
- Magnetek
- Motorola
- Power Lighting Products (Valmont)
- Kingtec
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

7. What percent of your residential lighting sales are to the following groups:  
**[Responses should add to 100]**

**Percent**

- \_\_\_\_\_ Contractors (Probe for: Lighting Contractors - \_\_\_\_\_ vs. General Contractors - \_\_\_\_\_ )
- \_\_\_\_\_ Retailers
- \_\_\_\_\_ End-Users
- \_\_\_\_\_ Other: \_\_\_\_\_

8. How do you get new business for the residential lighting your company sells?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Advertising
- Manufacturers
- Lighting Contractors
- General Contractors
- Relationships w/Lenders
- Relationships w/Realtors
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

**High Efficiency Sales**

Next, I would like to ask about your sales of energy efficient residential lighting.

9. What are your company's criteria for determining if lighting equipment is energy efficient?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Compact Fluorescent Lamps
- T8 Fluorescent Lamps
- High Intensity Discharge Lamps (Metal Halide/High-Pressure Sodium)
- Reflectors
- Electronic Ballasts
- Lighting Controls (Dimmable Lighting/Motion Sensors)
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

10. What percent of your residential lighting sales in the last year had the energy-saving features you just mentioned?

\_\_\_\_\_ Percent

**High Efficiency Barriers and Perceptions - Distributors**

Next, I would like to ask about your company’s perceptions regarding the sale of energy efficient residential lighting.

11. How often do you discuss energy efficient lighting options with the contractors and/or retailers you sell to? Is it

...

**[Check ONLY ONE category]**

- All Sales Situations (Q12)
- Most Sales Situations (Q12)
- Some Sales Situations (Q12)
- Very Few Sales Situations (Q12)
- Never (Q13)

**IF Q11 NOT EQUAL TO NEVER THEN ASK Q12; ELSE ASK Q13.**

12. What benefits does your company receive from promoting and selling energy efficient lighting?

---

13. What are the biggest hurdles your company faces when selling energy efficient lighting?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. More Difficult to Get EE Lighting Supplied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Harder to Install EE Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. EE Lighting Performs Unreliably	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Not Enough Demand to Justify Stocking EE Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Information on EE Lighting Hard to Find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Doubts about Energy Savings from EE Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. EE Lighting Costs Too Much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Concerns about the Light Quality of EE Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Other Barrier 1: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Other Barrier 2: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Other Barrier 3: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. Aside from rebates, how could PG&E assist distributors to sell more energy efficient lighting?

**[Check all that apply-Do not read list-Probe if necessary]**

- Sales Representative Training
- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

**High Efficiency Barriers and Perceptions – Customers (ASK ONLY IF SELL TO END-USERS IN Q7)**

Next, I would like to ask about the perceptions of your residential end-users regarding the purchase of energy efficient lighting.

15. What are the most important factors for end-users when buying lighting equipment?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Price	[ ]	[ ]	[ ]
b. Contractor Reputation	[ ]	[ ]	[ ]
c. Energy Efficiency	[ ]	[ ]	[ ]
d. Brand	[ ]	[ ]	[ ]
e. Reliability	[ ]	[ ]	[ ]
f. Light Quality	[ ]	[ ]	[ ]
g. Access to Financing	[ ]	[ ]	[ ]
h. How Quickly You Can Install	[ ]	[ ]	[ ]
i. Warranty	[ ]	[ ]	[ ]
j. Other Factor 1: _____	[ ]	[ ]	[ ]
k. Other Factor 2: _____	[ ]	[ ]	[ ]
l. Other Factor 3: _____	[ ]	[ ]	[ ]

16. What are the biggest hurdles end-users face when buying energy efficient lighting?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Incomplete/Unreliable Information on EE Lighting	[ ]	[ ]	[ ]
b. Information on EE Lighting Hard to Find	[ ]	[ ]	[ ]
c. Doubts about Energy Savings from EE Lighting	[ ]	[ ]	[ ]
d. EE Lighting Costs Too Much	[ ]	[ ]	[ ]
e. EE Lighting Performs Unreliably	[ ]	[ ]	[ ]
f. Concerns about the Light Quality of EE Lighting	[ ]	[ ]	[ ]
g. No Access to Financing	[ ]	[ ]	[ ]
h. Too Much Hassle	[ ]	[ ]	[ ]
i. Other Barrier 1: _____	[ ]	[ ]	[ ]
j. Other Barrier 2: _____	[ ]	[ ]	[ ]
k. Other Barrier 3: _____	[ ]	[ ]	[ ]

17. Aside from rebates, how could PG&E assist end-users to buy more energy efficient lighting?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ ] Financing
- [ ] Promotion of EE in Ads and Brochures
- [ ] More Information
- [ ] Better Education
- [ ] Provide Customers with Lighting EE Ratings
- [ ] Involvement w/Energy Star
- [ ] Other 1: \_\_\_\_\_
- [ ] Other 2: \_\_\_\_\_
- [ ] Other 3: \_\_\_\_\_

**Whole-House Approach**

One of the areas where PG&E is interested in capturing opportunities for energy efficiency is using a whole-house approach to promote of multiple energy efficient measures. In this scenario, end-users who are doing lighting installations would be encouraged to install additional energy efficient measures in their home, such as insulation, duct sealing, windows, kitchen appliances, central air conditioners, and furnaces. This is because changes made in one measure area can impact and encourage improvements in other measure areas.

18. Which of the following best describes your company's promotion of measures other than lighting, such as insulation, duct sealing, windows, kitchen appliances, central air conditioners, and furnaces?

**[Check ONLY ONE category]**

- Actively promotes the installation of other measures (Q19-Q21)
- Points out other measures that can be installed, but does not actively promote (Q19-Q21)
- Does not promote or point out other measures (Q22-Q24)

**IF Q18 EQUAL TO ACTIVELY PROMOTES OR POINTS OUT, THEN ASK Q19-21; ELSE ASK Q22-Q24.**

19. What other measures does your company actively promote/point out?

**[Check all that apply-Do not read list-Probe if necessary]**

- Insulation
- Duct Work
- Windows
- Kitchen Appliances
- Central Air Conditioners
- Furnaces
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

20. What percent of your sales involve these other measures?

\_\_\_\_\_ Percent

21. What is the role of energy efficiency in using this approach?

---

**IF Q18 EQUAL TO DOES NOT PROMOTE, THEN ASK Q22-24; ELSE ASK Q25.**

22. What are your company's main reasons for not promoting or pointing out other measures?

---

23. How interested would your company be in promoting other measures? Would you be . . .

**[Check ONLY ONE category]**

- Very Interested
- Somewhat Interested
- Not At All Interested

24. Why?

---

25. Aside from rebates, how could PG&E assist your company to promote other measures that improve the home's overall energy efficiency?

**[Check all that apply-Do not read list-Probe if necessary]**

- Retailer Certification
- Retailer Training
- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

26. Summing up, how do you view the development of a market for "whole-house" approaches to energy-oriented renovation projects? Do you think this is a likely evolution? Why or why not? What, if anything, could or should be done to encourage the development of this market?

---

**Financing (ASK ONLY IF SELL TO END-USERS IN Q7)**

I would now like to ask about the types of financing your company offers.

27. Does your company offer financing to its customers?

**[Check ONLY ONE category]**

Yes (Q28)

No (Q31)

**IF OFFERS FINANCING THEN ASK Q28; ELSE ASK Q31.**

28. What percent of your residential customers use your financing?

\_\_\_\_\_ Percent

29. What are the typical terms and rates for this financing?

---

30. Through what types of sources do you offer this financing?

**[Check all that apply-Do not read list-Probe if necessary]**

Your Company

Local Bank

Local Financing Company

Nation-wide Bank

Nation-wide Financing Company

Distributors

Manufacturers

Other 1: \_\_\_\_\_

Other 2: \_\_\_\_\_

Other 3: \_\_\_\_\_

31. What other methods do customers typically use to finance or pay for the cost of the lighting installation?

**[Check all that apply-Do not read list-Probe if necessary]**

Credit Card

Cash/Check

Home Equity Loan/Second Mortgage

Refinance Mortgage to Tap Equity

Line of Credit

Personal/Unsecured Loan

Other 1: \_\_\_\_\_

Other 2: \_\_\_\_\_

Other 3: \_\_\_\_\_

32. What can PG&E do to assist in creating greater access to financing?

---

**Training**

I would now like to ask about the types of training your company offers.

33. When hiring new sales representatives, what training does your company look for?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Two-Year Technical Degree
- Training from Previous Company
- Manufacturer Certificate/Training
- Distributor Certificate/Training
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

34. Where do your sales representatives get the training they need?  
**[Check all that apply-Do not read list-Probe if necessary]**

- In-House
- Technical School Classes
- Manufacturers
- Distributors
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

35. Do you feel that there is a shortage of qualified, well-trained sales representatives?  
**[Check ONLY ONE category]**

- Yes (Q36)
- No (Q37)

**IF Q35=YES, THEN ASK Q36; ELSE ASK Q37.**

36. Does this shortage limit the amount of work your company can do?  
**[Check ONLY ONE category]**

- Yes
- No

37. What specific training needs related to energy efficiency could PG&E address for you and other distributors?  
Please explain?

---



***Non-English Speaking Customers (ASK ONLY IF SELL TO END-USERS IN Q7)***

Finally, I would like to ask you about your company's sales to residential end-users for whom English is not their primary language. (e.g., customers who speak Spanish or Cantonese)

38. What percent of your residential sales are to end-users for whom English is not their primary language?

\_\_\_\_\_ Percent

***IF Q38>0 THEN ASK Q39; ELSE VERIFY NAME AND ADDRESS FOR \$50 PAYMENT.***

39. What particular problems do you face when dealing with end-users for whom language may be a barrier?

\_\_\_\_\_

40. How does your organization address these problems?

\_\_\_\_\_

41. What might PG&E do to increase the extent to which these end-users are able to take advantage of installing energy efficient measures?

\_\_\_\_\_

Those are all the questions I have for you today. Thank you very much for your time. Verify name and address for \$50 payment.

***R&R Lighting Retailer Interview Guide***

Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of lighting retailers in northern and central California to help PG&E design better programs. Can I talk to the owner or manager . . . and could you tell me their name?

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(Name)	(Title)	(Phone)	(Call Back Date and Time)
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Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of lighting retailers in northern and central California. The information we collect from these select retailers will help PG&E design better programs. This is a critical stage in PG&E's planning and, to thank you for taking time to answer our questions, we will send you a check for \$50. Do you have about 15-20 minutes to complete this interview? If not, schedule a callback.

***Screening***

Before we start the interview, I need to ask a few questions to make sure that your company qualifies to participate in this study.

1. Does your company sell lighting equipment to residential customers?  
[Check ONLY ONE category]

[ ] Yes  
[ ] No (T&T)

2. What percent of your business is with residential customers?

\_\_\_\_\_ Percent (If less than 25 percent, then T&T.)

**Company Characteristics**

I would now like to ask about some of the characteristics of your company.

3. Does your company sell only lighting equipment or do you sell other types of products?  
[Check ONLY ONE category]

- Only Lighting (Ask Q5)
- Other Types of Products (Ask Q4)
- Other: \_\_\_\_\_ (Ask Q4)

**IF OTHER TYPES, THEN ASK Q4; ELSE ASK Q5.**

4. What other types of products does your company sell?  
[Check all that apply-Do not read list-Probe if necessary]

- Windows
- HVAC Equipment
- Refrigerators
- Dishwashers
- Clothes Washers
- Clothes Dryers
- Refrigerators
- Insulation
- Duct Work
- General Contracting
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

5. How many full-time employees does your company have (if chain, ask for number at location)?

\_\_\_\_\_ Full-Time Employees

**Market Structure and Flow**

I would now like to ask about your suppliers, your customers, and the types of lighting your company sells.

6. What percent of your residential lighting equipment is purchased from the following groups:  
**[Responses should add to 100]**

**Percent**

\_\_\_\_\_ Manufacturers (Probe for: US - \_\_\_\_\_ vs. Foreign - \_\_\_\_\_ )  
\_\_\_\_\_ Distributors (Probe for: Multiple-Line/Independent - \_\_\_\_\_ vs. Captive - \_\_\_\_\_ )  
\_\_\_\_\_ Other: \_\_\_\_\_

7. What brands of lighting does your company sell?  
**[Check all that apply-Do not read list-Probe if necessary]**

[ ] Osram Sylvania  
[ ] General Electric  
[ ] Philips  
[ ] Durotest  
[ ] Advance  
[ ] Magnetek  
[ ] Motorola  
[ ] Power Lighting Products (Valmont)  
[ ] Kingtec  
[ ] Other 1: \_\_\_\_\_  
[ ] Other 2: \_\_\_\_\_  
[ ] Other 3: \_\_\_\_\_

8. What percent of your residential lighting sales are to the following groups:  
**[Responses should add to 100]**

**Percent**

\_\_\_\_\_ Contractors (Probe for: Lighting Contractors - \_\_\_\_\_ vs. General Contractors - \_\_\_\_\_ )  
\_\_\_\_\_ End-Users (Probe for: Do-It-Yourselfers - \_\_\_\_\_ vs. Buyers on Behalf of Contractors - \_\_\_\_\_ )  
\_\_\_\_\_ Other: \_\_\_\_\_

9. How do you get new business in the residential market?  
**[Check all that apply-Do not read list-Probe if necessary]**

[ ] Advertising  
[ ] Direct Mail  
[ ] Referrals from Customers  
[ ] Lighting Contractors  
[ ] General Contractors  
[ ] Relationships w/Lenders  
[ ] Relationships w/Realtors  
[ ] Other 1: \_\_\_\_\_  
[ ] Other 2: \_\_\_\_\_  
[ ] Other 3: \_\_\_\_\_

10. How often do you have a residential customer's lighting order in stock versus having to fill the order from your suppliers? Would you say . . .

**[Check ONLY ONE category]**

- Never
- Not Very Often
- Occasionally
- Most of the Time
- All of the Time
- Other: \_\_\_\_\_

***IF Q10 NOT EQUAL TO ALL OF THE TIME, THEN ASK Q11; ELSE ASK Q12.***

11. How long does it typically take for you to receive a residential lighting order from your supplier?

- 1-2 Days
- 3-6 Days
- 1 Week
- 2-3 Weeks
- 1 Month
- 2-3 Months
- 4-6 Months
- Longer Than 6 Months
- Other: \_\_\_\_\_

12. What is the typical cost for a residential lighting purchase?

\_\_\_\_\_ \$

**High Efficiency Sales**

Next, I would like to ask about your sales of energy efficient lighting.

13. What are your company's criteria for determining if lighting equipment is energy efficient?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Compact Fluorescent Lamps
- T8 Fluorescent Lamps
- High Intensity Discharge Lamps (Metal Halide/High-Pressure Sodium)
- Reflectors
- Electronic Ballasts
- Lighting Controls (Dimmable Lighting/Motion Sensors)
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

14. What percent of your residential lighting sales in the last year had the energy-saving features you just mentioned?

\_\_\_\_\_ Percent

**High Efficiency Barriers and Perceptions - Retailers**

Next, I would like to ask about your company’s perceptions regarding the sale of energy efficient lighting.

15. How often do you discuss energy efficient lighting options with your customers? Is it . . .  
**[Check ONLY ONE category]**

- All Sales Situations (Q16)
- Most Sales Situations (Q16)
- Some Sales Situations (Q16)
- Very Few Sales Situations (Q16)
- Never (Q17)

**IF Q15 NOT EQUAL TO NEVER THEN ASK Q16; ELSE ASK Q17.**

16. What benefits does your company receive from promoting and selling energy efficient lighting?

17. What are the biggest hurdles your company faces when selling energy efficient lighting?  
**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. More Difficult to Get EE Lighting Supplied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Harder to Install EE Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. EE Lighting Performs Unreliably	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Try to Install New Lighting that Closely Match Old Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Information on EE Lighting Hard to Find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Doubts about Energy Savings from EE Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. EE Lighting Costs Too Much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Concerns about the Light Quality of EE Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Other Barrier 1: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Other Barrier 2: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Other Barrier 3: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. Aside from rebates, how could PG&E assist retailers in selling more energy efficient lighting?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Sales Representative Training
- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Contractor Certification
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

**High Efficiency Barriers and Perceptions – Customers**

Next, I would like to ask about the perceptions of your residential customers regarding the purchase of energy efficient lighting.

19. What are the most important factors for you customers when buying lighting equipment?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Price	[ ]	[ ]	[ ]
b. Contractor Reputation	[ ]	[ ]	[ ]
c. Energy Efficiency	[ ]	[ ]	[ ]
d. Brand	[ ]	[ ]	[ ]
e. Reliability	[ ]	[ ]	[ ]
f. Light Quality	[ ]	[ ]	[ ]
g. Access to Financing	[ ]	[ ]	[ ]
h. How Quickly You Can Install	[ ]	[ ]	[ ]
i. Warranty	[ ]	[ ]	[ ]
j. Other Factor 1: _____	[ ]	[ ]	[ ]
k. Other Factor 2: _____	[ ]	[ ]	[ ]
l. Other Factor 3: _____	[ ]	[ ]	[ ]

20. What are the biggest hurdles your customers face when buying energy efficient lighting?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Incomplete/Unreliable Information on EE Lighting	[ ]	[ ]	[ ]
b. Information on EE Lighting Hard to Find	[ ]	[ ]	[ ]
c. Doubts about Energy Savings from EE Lighting	[ ]	[ ]	[ ]
d. EE Lighting Costs Too Much	[ ]	[ ]	[ ]
e. EE Lighting Performs Unreliably	[ ]	[ ]	[ ]
f. Concerns about the Light Quality of EE Lighting	[ ]	[ ]	[ ]
g. No Access to Financing	[ ]	[ ]	[ ]
h. Too Much Hassle	[ ]	[ ]	[ ]
i. Other Barrier 1: _____	[ ]	[ ]	[ ]
j. Other Barrier 2: _____	[ ]	[ ]	[ ]
k. Other Barrier 3: _____	[ ]	[ ]	[ ]

21. Aside from rebates, how could PG&E assist customers to buy more energy efficient lighting?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ ] Financing
- [ ] Promotion of EE in Ads and Brochures
- [ ] More Information
- [ ] Better Education
- [ ] Involvement w/Energy Star
- [ ] Other 1: \_\_\_\_\_
- [ ] Other 2: \_\_\_\_\_
- [ ] Other 3: \_\_\_\_\_



**Whole-House Approach**

One of the areas where PG&E is interested in capturing opportunities for energy efficiency is using a whole-house approach to promote of multiple energy efficient measures. In this scenario, customers who are doing lighting installations would be encouraged to install additional energy efficient measures in their home, such as insulation, duct sealing, windows, kitchen appliances, central air conditioners, and furnaces. This is because changes made in one measure area can impact and encourage improvements in other measure areas.

22. When selling lighting to residential customers, which of the following best describes your company's promotion of measures other than lighting, such as insulation, duct sealing, windows, kitchen appliances, central air conditioners, and furnaces?

**[Check ONLY ONE category]**

- Actively promotes the installation of other measures (Q23-Q25)
- Points out other measures that can be installed, but does not actively promote (Q23-Q25)
- Does not promote or point out other measures (Q26-Q28)

**IF Q22 EQUAL TO ACTIVELY PROMOTES OR POINTS OUT, THEN ASK Q23-25; ELSE ASK Q26-Q28.**

23. What other measures does your company actively promote/point out?

**[Check all that apply-Do not read list-Probe if necessary]**

- Insulation
- Duct Work
- Windows
- Kitchen Appliances
- Central Air Conditioners
- Furnaces
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

24. What percent of your sales involve these other measures?

\_\_\_\_\_ Percent

25. What is the role of energy efficiency in using this approach?

\_\_\_\_\_

**IF Q22 EQUAL TO DOES NOT PROMOTE, THEN ASK Q26-Q28; ELSE ASK Q29.**

26. What are your company's main reasons for not promoting or pointing out other measures to your customers when selling lighting?

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27. How interested would your company be in promoting other measures? Would you be . . .

**[Check ONLY ONE category]**

- Very Interested
- Somewhat Interested
- Not At All Interested

28. Why?

---

29. Aside from rebates, how could PG&E assist your company to promote other measures that improve the home's overall energy efficiency?

**[Check all that apply-Do not read list-Probe if necessary]**

- Retailer Certification
- Retailer Training
- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

30. Summing up, how do you view the development of a market for "whole-house" approaches to energy-oriented renovation projects? Do you think this is a likely evolution? Why or why not? What, if anything, could or should be done to encourage the development of this market?

---

**Financing**

I would now like to ask about the types of financing your company offers.

31. Does your company offer financing to its residential customers?  
**[Check ONLY ONE category]**

- Yes (Q32)
- No (Q35)

**IF OFFERS FINANCING THEN ASK Q32; ELSE ASK Q35.**

32. What percent of your residential customers use your financing?

\_\_\_\_\_ Percent

33. What are the typical terms and rates for this financing?

---

34. Through what types of sources do you offer this financing?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Your Company
- Local Bank
- Local Financing Company
- Nation-wide Bank
- Nation-wide Financing Company
- Distributors
- Manufacturers
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

35. What other methods do customers typically use to finance or pay for the cost of lighting equipment?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Credit Card
- Cash/Check
- Home Equity Loan/Second Mortgage
- Refinance Mortgage to Tap Equity
- Line of Credit
- Personal/Unsecured Loan
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

36. What can PG&E do to assist in creating greater access to financing?

---

**Training**

I would now like to ask about the types of training your company offers.

37. When hiring new sales representatives, what training does your company look for?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Two-Year Technical Degree
- Training from Previous Company
- Manufacturer Certificate/Training
- Distributor Certificate/Training
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

38. Where do your sales representatives get the training they need?  
**[Check all that apply-Do not read list-Probe if necessary]**

- In-House
- Technical School Classes
- Manufacturers
- Distributors
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

39. Do you feel that there is a shortage of qualified, well-trained sales representatives?  
**[Check ONLY ONE category]**

- Yes (Q40)
- No (Q41)

**IF Q39=YES, THEN ASK Q40; ELSE ASK Q41.**

40. Does this shortage limit the amount of work your company can do?  
**[Check ONLY ONE category]**

- Yes
- No

41. What specific training needs related to energy efficiency could PG&E address for you and other retailers?  
Please explain?

---

*Non-English Speaking Customers*

Finally, I would like to ask you about your company's sales to residential customers for whom English is not their primary language. (e.g., customers who speak Spanish or Cantonese)

42. What percent of your residential sales are to customers for whom English is not their primary language?

\_\_\_\_\_ Percent

***IF Q42>0 THEN ASK Q43; ELSE VERIFY NAME AND ADDRESS FOR \$50 PAYMENT.***

43. What particular problems do you face when dealing with customers for whom language may be a barrier?

\_\_\_\_\_

44. How does your organization address these problems?

\_\_\_\_\_

45. What might PG&E do to increase the extent to which these customers are able to take advantage of installing energy efficient measures?

\_\_\_\_\_

Those are all the questions I have for you today. Thank you very much for your time. Verify name and address for \$50 payment.

**R&R Window Contractor Interview Guide**

Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of window contractors in northern and central California to help PG&E design better programs. Can I talk to the owner or manager . . . and could you tell me their name?

---

(Name)	(Title)	(Phone)	(Call Back Date and Time)
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Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of window contractors in northern and central California. The information we collect from these select contractors will help PG&E design better programs. This is a critical stage in PG&E's planning and, to thank you for taking time to answer our questions, we will send you a check for \$50. Do you have about 15-20 minutes to complete this interview? If not, schedule a callback.

**Screening**

Before we start the interview, I need to ask a few questions to make sure that your company qualifies to participate in this study.

- 1. Does your company sell and install windows to residential customers?  
**[Check ONLY ONE category]**

[ ] Yes  
[ ] No (T&T)

- 2. What percent of your business is with residential customers?

\_\_\_\_\_ Percent (If less than 25 percent, then T&T.)

- 3. What percent of your residential sales are part of new home construction projects, excluding remodeling projects and additions?

\_\_\_\_\_ Percent (If more than 75 percent, then T&T.)

**Company Characteristics**

I would now like to ask about some of the characteristics of your company.

4. Does your company sell and install only windows or do you sell and install other types of equipment?  
**[Check ONLY ONE category]**

- Only Windows (Ask Q6)
- Other Types of Equipment (Ask Q5)
- Other: \_\_\_\_\_ (Ask Q5)

**IF OTHER TYPES, THEN ASK Q5; ELSE ASK Q6.**

5. What other types of equipment does your company sell and install?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Doors
- Lighting
- HVAC Equipment
- Refrigerators
- Dishwashers
- Clothes Washers
- Clothes Dryers
- Refrigerators
- Insulation
- Duct Work
- General Contracting
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

6. How many full-time employees does your company have?

\_\_\_\_\_ Full-Time Employees

**Market Structure and Flow**

I would now like to ask about your suppliers, your customers, and the types window installations performed by your company.

7. What percent of your residential equipment is purchased from the following groups:  
**[Responses should add to 100]**

**Percent**

- \_\_\_\_\_ Manufacturers (Probe for: US - \_\_\_\_\_ vs. Foreign - \_\_\_\_\_ )
- \_\_\_\_\_ Distributors (Probe for: Multiple-Line/Independent - \_\_\_\_\_ vs. Captive - \_\_\_\_\_ )
- \_\_\_\_\_ Retailers
- \_\_\_\_\_ Other: \_\_\_\_\_

8. What brands of windows does your company sell and install?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Anderson
- Pella
- Sierra Pacific
- Biltbest of California
- California Window Corporation
- Caradco
- JELD-WEN
- Loewen
- Marvin
- Morgan
- Norco
- Sun
- Thermoview
- Weather Shield
- Wenco
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

9. How do you get new business in the residential market?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Advertising
- Direct Mail
- Referrals from Customers
- Relationships w/Lenders
- Relationships w/Realtors
- General Contractors
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_



10. What percent of your residential sales are to customers in . . .  
**[Responses should add to 100]**

**Percent**

\_\_\_\_\_ Single-Family Detached Homes  
\_\_\_\_\_ Townhomes  
\_\_\_\_\_ Condominiums  
\_\_\_\_\_ Other: \_\_\_\_\_

11. What percent of your residential sales are to customers in rural areas?

\_\_\_\_\_ Percent

12. How often does your company work on residential jobs for someone who is getting ready to sell their home or a new buyer who has not yet moved in? Would you say . . .  
**[Check ONLY ONE category]**

[ ] Never  
[ ] Not Very Often  
[ ] Occasionally  
[ ] Most of the Time  
[ ] All of the Time  
[ ] Other: \_\_\_\_\_

13. Now, please think about all of the residential window replacement work that your company has done in the last year. What percent were planned replacements? Planned replacements include remodeling and renovations, replacing windows that are getting old, and replacing existing windows with more efficient windows.

\_\_\_\_\_ Percent

***IF Q13 > 0, THEN ASK Q14-Q15; ELSE ASK Q16.***

14. How quickly do most customers need you to install these planned replacement windows?  
**[Check ONLY ONE category-Do not read list-Probe if necessary]**

[ ] 1 Week  
[ ] 2-3 Weeks  
[ ] 1 Month  
[ ] 2-3 Months  
[ ] 4-6 Months  
[ ] Longer Than 6 Months  
[ ] Other: \_\_\_\_\_

15. For planned installations, what are the main reasons why customers replace their windows?  
**[Check all that apply-Do not read list-Probe if necessary]**

[ ] Additions  
[ ] Room Conversions  
[ ] Broken Seals on Dual Pane Glass  
[ ] Improved Energy Efficiency  
[ ] Enhanced Aesthetics  
[ ] Improved Comfort  
[ ] Better Performance  
[ ] Increase Value of Home  
[ ] Other 1: \_\_\_\_\_  
[ ] Other 2: \_\_\_\_\_

**IF Q13 < 100, THEN ASK Q16-Q17; ELSE ASK Q18.**

16. How would you characterize the remaining (100 – Q13) percent of the residential replacement work that is not planned?

---

17. How quickly do most customers need you to install the windows as part of this type of work?  
**[Check ONLY ONE category-Do not read list-Probe if necessary]**

- 1 Week
- 2-3 Weeks
- 1 Month
- 2-3 Months
- 4-6 Months
- Longer Than 6 Months
- Other: \_\_\_\_\_

18. Again, please think about all of the residential window replacement work that your company has done in the last year. On average, what percent of a home's windows do you replace on a typical job?

\_\_\_\_\_ Percent

19. What is the typical installed cost for this type of job?

\_\_\_\_\_ \$

**IF Q18 < 100, THEN ASK Q20-Q22; ELSE ASK Q23.**

20. Why do customers not replace all of the windows in their home when doing a replacement?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Costs Too Much
- Lack of Financing
- Like Existing Style
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

21. How often do you replace all of the windows in a home? Would you say . . .  
**[Check ONLY ONE category]**

- Never (Q23)
- Not Very Often (Q22)
- Occasionally (Q22)
- Most of the Time (Q22)
- All of the Time (Q22)
- Other: \_\_\_\_\_ (Q22)

**IF Q21 NOT EQUAL TO NEVER, THEN ASK Q22; ELSE ASK Q23.**

22. What is the typical installed cost for a whole-house window replacement?

\_\_\_\_\_ \$

23. How often does your company work on a window installation that involves specifications developed by an independent architect/designer? Would you say . . .

**[Check ONLY ONE category]**

- Never (Q24)
- Not Very Often (Q24)
- Occasionally (Q24)
- Most of the Time (Q24)
- All of the Time (Q25)
- Other: \_\_\_\_\_ (Q24)

***IF Q23 NOT EQUAL TO ALL OF THE TIME THEN ASK Q24; ELSE ASK Q25.***

24. For those not involving architects/designers, how is the installation specified?

**[Check all that apply-Do not read list-Probe if necessary]**

- Your Company
- Customer
- General Contractor
- Generic Blueprints
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

**High Efficiency Sales**

Next, I would like to ask about your sales of energy efficient windows in existing homes.

25. What are your company's criteria for determining if windows are energy efficient?

**[Check all that apply-Do not read list-Probe if necessary]**

- Double Panes
- Low-E Glass
- Wood, Vinyl, or Fiberglass Frames
- 3/8 to 1/2 Inch Space Filled w/Argon or Inert Gas
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

26. What percent of your window replacements in existing homes in the last year had the energy-saving features you just mentioned?

\_\_\_\_\_ Percent

**High Efficiency Barriers and Perceptions - Contractors**

Next, I would like to ask about your company's perceptions regarding the sale of energy efficient residential equipment.

27. How often do you discuss energy efficient window options with your customers? Is it . . .  
**[Check ONLY ONE category]**

- All Sales Situations (Q28)
- Most Sales Situations (Q28)
- Some Sales Situations (Q28)
- Very Few Sales Situations (Q28)
- Never (Q29)

**IF Q27 NOT EQUAL TO NEVER THEN ASK Q28; ELSE ASK Q29.**

28. What benefits does your company receive from promoting and selling energy efficient windows?

---

29. What are the biggest hurdles your company faces when selling energy efficient windows?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. More Difficult to Get EE Windows Supplied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Harder to Install EE Windows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. EE Windows Perform Unreliably	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Try to Install New Windows that Closely Match Old Windows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Information on EE Windows Hard to Find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Doubts about Energy Savings from EE Windows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. EE Windows Cost Too Much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Concerns about the Style of EE Windows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Other Barrier 1: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Other Barrier 2: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Other Barrier 3: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

30. Aside from rebates, how could PG&E assist contractors to sell more energy efficient windows?

**[Check all that apply-Do not read list-Probe if necessary]**

- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

**High Efficiency Barriers and Perceptions – Customers**

Next, I would like to ask about the perceptions of your residential customers regarding the purchase of energy efficient windows.

31. What are the most important factors for you customers when buying windows?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Price	[ ]	[ ]	[ ]
b. Contractor Reputation	[ ]	[ ]	[ ]
c. Energy Efficiency	[ ]	[ ]	[ ]
d. Brand	[ ]	[ ]	[ ]
e. Reliability	[ ]	[ ]	[ ]
f. Style	[ ]	[ ]	[ ]
g. Access to Financing	[ ]	[ ]	[ ]
h. How Quickly You Can Install	[ ]	[ ]	[ ]
i. Warranty	[ ]	[ ]	[ ]
j. Other Factor 1: _____	[ ]	[ ]	[ ]
k. Other Factor 2: _____	[ ]	[ ]	[ ]
l. Other Factor 3: _____	[ ]	[ ]	[ ]

32. What are the biggest hurdles your customers face when buying energy efficient windows?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Incomplete/Unreliable Information on EE Windows	[ ]	[ ]	[ ]
b. Information on EE Windows Hard to Find	[ ]	[ ]	[ ]
c. Doubts about Energy Savings from EE Windows	[ ]	[ ]	[ ]
d. EE Windows Cost Too Much	[ ]	[ ]	[ ]
e. EE Windows Perform Unreliably	[ ]	[ ]	[ ]
f. Concerns about the Style of EE Windows	[ ]	[ ]	[ ]
g. No Access to Financing	[ ]	[ ]	[ ]
h. Too Much Hassle	[ ]	[ ]	[ ]
i. Other Barrier 1: _____	[ ]	[ ]	[ ]
j. Other Barrier 2: _____	[ ]	[ ]	[ ]
k. Other Barrier 3: _____	[ ]	[ ]	[ ]

33. Aside from rebates, how could PG&E assist customers to buy more energy efficient windows?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ ] Financing
- [ ] Promotion of EE in Ads and Brochures
- [ ] More Information
- [ ] Better Education
- [ ] Provide Customers with Window EE Ratings
- [ ] Involvement w/Energy Star
- [ ] Other 1: \_\_\_\_\_
- [ ] Other 2: \_\_\_\_\_
- [ ] Other 3: \_\_\_\_\_

**Whole-House Approach**

One of the areas where PG&E is interested in capturing opportunities for energy efficiency is using a whole-house approach to promote of multiple energy efficient measures. In this scenario, customers who are doing window installations would be encouraged to install additional energy efficient measures in their home, such as insulation, duct sealing, lighting, kitchen appliances, central air conditioners, and furnaces. This is because changes made in one measure area can impact and encourage improvements in other measure areas.

34. How often does your company work on residential jobs where a remodeling contractor is also performing work?  
Would you say . . .

**[Check ONLY ONE category]**

- Never
- Not Very Often
- Occasionally
- Most of the Time
- All of the Time
- Other: \_\_\_\_\_

35. When performing a window installation, which of the following best describes your company's promotion of measures other than windows, such as insulation, duct sealing, lighting, kitchen appliances, central air conditioners, and furnaces?

**[Check ONLY ONE category]**

- Actively promotes the installation of other measures (Q36-Q38)
- Points out other measures that can be installed, but does not actively promote (Q36-Q38)
- Does not promote or point out other measures (Q39-Q41)

**IF Q35 EQUAL TO ACTIVELY PROMOTES OR POINTS OUT, THEN ASK Q36-38; ELSE ASK Q39-Q41.**

36. What other measures does your company actively promote/point out?

**[Check all that apply-Do not read list-Probe if necessary]**

- Insulation
- Duct Work
- Lighting
- Kitchen Appliances
- Central Air Conditioners
- Furnaces
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

37. What percent of your installations involve these other measures?

\_\_\_\_\_ Percent

38. What is the role of energy efficiency in using this approach?

\_\_\_\_\_

**IF Q35 EQUAL TO DOES NOT PROMOTE, THEN ASK Q39-41; ELSE ASK Q42.**

39. What are your company's main reasons for not promoting or pointing out other measures to your customers when doing a window installation?

---

40. How interested would your company be in promoting other measures? Would you be . . .

**[Check ONLY ONE category]**

- Very Interested
- Somewhat Interested
- Not At All Interested

41. Why?

---

42. Aside from rebates, how could PG&E assist your company to promote other measures that improve the home's overall energy efficiency?

**[Check all that apply-Do not read list-Probe if necessary]**

- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

43. Summing up, how do you view the development of a market for "whole-house" approaches to energy-oriented renovation projects? Do you think this is a likely evolution? Why or why not? What, if anything, could or should be done to encourage the development of this market?

---



**Financing**

I would now like to ask about the types of financing your company offers.

44. Does your company offer financing to its residential customers?  
[Check ONLY ONE category]

- Yes (Q45)
- No (Q48)

**IF OFFERS FINANCING THEN ASK Q45; ELSE ASK Q48.**

45. What percent of your residential customers use your financing?

\_\_\_\_\_ Percent

46. What are the typical terms and rates for this financing?

---

47. Through what types of sources do you offer this financing?  
[Check all that apply-Do not read list-Probe if necessary]

- Your Company
- Local Bank
- Local Financing Company
- Nation-wide Bank
- Nation-wide Financing Company
- Distributors
- Manufacturers
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

48. What other methods do customers typically use to finance or pay for the cost of the window installation?  
[Check all that apply-Do not read list-Probe if necessary]

- Credit Card
- Cash/Check
- Home Equity Loan/Second Mortgage
- Refinance Mortgage to Tap Equity
- Line of Credit
- Personal/Unsecured Loan
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

49. What can PG&E do to assist in creating greater access to financing?

---

**Training**

I would now like to ask about the types of training your company offers.

50. When hiring new installers, what training does your company look for?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Two-Year Technical Degree
- Training from Previous Company
- Manufacturer Certificate/Training
- Distributor Certificate/Training
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

51. Where do your installers get the training they need?  
**[Check all that apply-Do not read list-Probe if necessary]**

- In-House
- Technical School Classes
- Manufacturers
- Distributors
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

52. Do you feel that there is a shortage of qualified, well-trained installers?  
**[Check ONLY ONE category]**

- Yes (Q53)
- No (Q54)

**IF Q52=YES, THEN ASK Q53; ELSE ASK Q54.**

53. Does this shortage limit the amount of work your company can do?  
**[Check ONLY ONE category]**

- Yes
- No

54. What specific training needs related to energy efficiency could PG&E address for you and other contractors?  
Please explain?

---

*Non-English Speaking Customers*

Finally, I would like to ask you about your company's sales to residential customers for whom English is not their primary language. (e.g., customers who speak Spanish or Cantonese)

55. What percent of your residential sales are to customers for whom English is not their primary language?

\_\_\_\_\_ Percent

***IF Q55>0 THEN ASK Q56; ELSE VERIFY NAME AND ADDRESS FOR \$50 PAYMENT.***

56. What particular problems do you face when dealing with customers for whom language may be a barrier?

\_\_\_\_\_

57. How does your organization address these problems?

\_\_\_\_\_

58. What might PG&E do to increase the extent to which these customers are able to take advantage of installing energy efficient measures?

\_\_\_\_\_

Those are all the questions I have for you today. Thank you very much for your time. Verify name and address for \$50 payment.

***R&R Window Distributor Interview Guide***

Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of window distributors in northern and central California to help PG&E design better programs. Can I talk to the owner or manager . . . and could you tell me their name?

---

(Name)	(Title)	(Phone)	(Call Back Date and Time)
--------	---------	---------	---------------------------

Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of window distributors in northern and central California. The information we collect from these select distributors will help PG&E design better programs. This is a critical stage in PG&E's planning and, to thank you for taking time to answer our questions, we will send you a check for \$50. Do you have about 15-20 minutes to complete this interview? If not, schedule a callback.

***Screening***

Before we start the interview, I need to ask a few questions to make sure that your company qualifies to participate in this study.

- 1. Does your company sell residential windows?  
**[Check ONLY ONE category]**

[ ] Yes  
[ ] No (T&T)

- 2. What percent of your business is from the sale of residential windows?

\_\_\_\_\_ Percent (If less than 25 percent, then T&T.)

**Company Characteristics**

I would now like to ask about some of the characteristics of your company.

3. Does your company sell only windows or do you sell other types of building materials and equipment?  
**[Check ONLY ONE category]**

- Only Windows (Ask Q5)
- Other Types of Building Materials and Equipment (Ask Q4)
- Other: \_\_\_\_\_ (Ask Q4)

**IF OTHER TYPES, THEN ASK Q4; ELSE ASK Q5.**

4. What other types of building materials and equipment does your company sell?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Doors
- Lighting
- HVAC Equipment
- Refrigerators
- Dishwashers
- Clothes Washers
- Clothes Dryers
- Refrigerators
- Insulation
- Duct Work
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

5. How many full-time employees does your company have (if national, ask for number in northern and central California)?

\_\_\_\_\_ Full-Time Employees

**Market Structure and Flow**

I would now like to ask about your suppliers, your customers, and the types of windows sold by your company.

6. What brands of windows does your company sell?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Anderson
- Pella
- Sierra Pacific
- Biltbest of California
- California Window Corporation
- Caradco
- JELD-WEN
- Loewen
- Marvin
- Morgan
- Norco
- Sun
- Thermoview
- Weather Shield
- Wenco
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

7. What percent of your residential window sales are to the following groups:  
**[Responses should add to 100]**

**Percent**

- \_\_\_\_\_ Contractors (Probe for: Window Contractors - \_\_\_\_\_ vs. General Contractors - \_\_\_\_\_ )
- \_\_\_\_\_ Retailers
- \_\_\_\_\_ End-Users
- \_\_\_\_\_ Other: \_\_\_\_\_

8. How do you get new business for the residential windows your company sells?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Advertising
- Manufacturers
- Window Contractors
- General Contractors
- Relationships w/Lenders
- Relationships w/Realtors
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

**High Efficiency Sales**

Next, I would like to ask about your sales of energy efficient residential windows.

9. What are your company's criteria for determining if windows are energy efficient?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Double Panes
- Low-E Glass
- Wood, Vinyl, or Fiberglass Frames
- 3/8 to 1/2 Inch Space Filled w/Argon or Inert Gas
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

10. What percent of your residential window sales in the last year had the energy-saving features you just mentioned?

\_\_\_\_\_ Percent

**High Efficiency Barriers and Perceptions - Distributors**

Next, I would like to ask about your company’s perceptions regarding the sale of energy efficient residential windows.

11. How often do you discuss energy efficient window options with the contractors and/or retailers you sell to? Is it

...

**[Check ONLY ONE category]**

- All Sales Situations (Q12)
- Most Sales Situations (Q12)
- Some Sales Situations (Q12)
- Very Few Sales Situations (Q12)
- Never (Q13)

**IF Q11 NOT EQUAL TO NEVER THEN ASK Q12; ELSE ASK Q13.**

12. What benefits does your company receive from promoting and selling energy efficient windows?

---

13. What are the biggest hurdles your company faces when selling energy efficient windows?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. More Difficult to Get EE Windows Supplied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Harder to Install EE Windows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. EE Windows Perform Unreliably	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Not Enough Demand to Justify Stocking EE Windows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Information on EE Windows Hard to Find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Doubts about Energy Savings from EE Windows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. EE Windows Cost Too Much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Concerns about the Style of EE Windows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Other Barrier 1: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Other Barrier 2: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Other Barrier 3: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. Aside from rebates, how could PG&E assist distributors to sell more energy efficient windows?

**[Check all that apply-Do not read list-Probe if necessary]**

- Sales Representative Training
- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_



**High Efficiency Barriers and Perceptions – Customers (ASK ONLY IF SELL TO END-USERS IN Q7)**

Next, I would like to ask about the perceptions of your residential end-users regarding the purchase of energy efficient windows.

15. What are the most important factors for end-users when buying windows?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Price	[ ]	[ ]	[ ]
b. Contractor Reputation	[ ]	[ ]	[ ]
c. Energy Efficiency	[ ]	[ ]	[ ]
d. Brand	[ ]	[ ]	[ ]
e. Reliability	[ ]	[ ]	[ ]
f. Style	[ ]	[ ]	[ ]
g. Access to Financing	[ ]	[ ]	[ ]
h. How Quickly You Can Install	[ ]	[ ]	[ ]
i. Warranty	[ ]	[ ]	[ ]
j. Other Factor 1: _____	[ ]	[ ]	[ ]
k. Other Factor 2: _____	[ ]	[ ]	[ ]
l. Other Factor 3: _____	[ ]	[ ]	[ ]

16. What are the biggest hurdles end-users face when buying energy efficient windows?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Incomplete/Unreliable Information on EE Windows	[ ]	[ ]	[ ]
b. Information on EE Windows Hard to Find	[ ]	[ ]	[ ]
c. Doubts about Energy Savings from EE Windows	[ ]	[ ]	[ ]
d. EE Windows Cost Too Much	[ ]	[ ]	[ ]
e. EE Windows Perform Unreliably	[ ]	[ ]	[ ]
f. Concerns about the Style of EE Windows	[ ]	[ ]	[ ]
g. No Access to Financing	[ ]	[ ]	[ ]
h. Too Much Hassle	[ ]	[ ]	[ ]
i. Other Barrier 1: _____	[ ]	[ ]	[ ]
j. Other Barrier 2: _____	[ ]	[ ]	[ ]
k. Other Barrier 3: _____	[ ]	[ ]	[ ]

17. Aside from rebates, how could PG&E assist end-users to buy more energy efficient windows?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ ] Financing
- [ ] Promotion of EE in Ads and Brochures
- [ ] More Information
- [ ] Better Education
- [ ] Provide Customers with Window EE Ratings
- [ ] Involvement w/Energy Star
- [ ] Other 1: \_\_\_\_\_
- [ ] Other 2: \_\_\_\_\_
- [ ] Other 3: \_\_\_\_\_

**Whole-House Approach**

One of the areas where PG&E is interested in capturing opportunities for energy efficiency is using a whole-house approach to promote of multiple energy efficient measures. In this scenario, end-users who are doing window installations would be encouraged to install additional energy efficient measures in their home, such as insulation, duct sealing, lighting, kitchen appliances, central air conditioners, and furnaces. This is because changes made in one measure area can impact and encourage improvements in other measure areas.

18. Which of the following best describes your company's promotion of measures other than windows, such as insulation, duct sealing, lighting, kitchen appliances, central air conditioners, and furnaces?

**[Check ONLY ONE category]**

- Actively promotes the installation of other measures (Q19-Q21)
- Points out other measures that can be installed, but does not actively promote (Q19-Q21)
- Does not promote or point out other measures (Q22-Q24)

**IF Q18 EQUAL TO ACTIVELY PROMOTES OR POINTS OUT, THEN ASK Q19-21; ELSE ASK Q22-Q24.**

19. What other measures does your company actively promote/point out?

**[Check all that apply-Do not read list-Probe if necessary]**

- Insulation
- Duct Work
- Lighting
- Kitchen Appliances
- Central Air Conditioners
- Furnaces
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

20. What percent of your sales involve these other measures?

\_\_\_\_\_ Percent

21. What is the role of energy efficiency in using this approach?

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**IF Q18 EQUAL TO DOES NOT PROMOTE, THEN ASK Q22-24; ELSE ASK Q25.**

22. What are your company's main reasons for not promoting or pointing out other measures?

---

23. How interested would your company be in promoting other measures? Would you be . . .

**[Check ONLY ONE category]**

- Very Interested
- Somewhat Interested
- Not At All Interested

24. Why?

---

25. Aside from rebates, how could PG&E assist your company to promote other measures that improve the home's overall energy efficiency?

**[Check all that apply-Do not read list-Probe if necessary]**

- Retailer Certification
- Retailer Training
- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

26. Summing up, how do you view the development of a market for "whole-house" approaches to energy-oriented renovation projects? Do you think this is a likely evolution? Why or why not? What, if anything, could or should be done to encourage the development of this market?

---

**Financing (ASK ONLY IF SELL TO END-USERS IN Q7)**

I would now like to ask about the types of financing your company offers.

27. Does your company offer financing to its customers?

**[Check ONLY ONE category]**

Yes (Q28)

No (Q31)

**IF OFFERS FINANCING THEN ASK Q28; ELSE ASK Q31.**

28. What percent of your residential customers use your financing?

\_\_\_\_\_ Percent

29. What are the typical terms and rates for this financing?

---

30. Through what types of sources do you offer this financing?

**[Check all that apply-Do not read list-Probe if necessary]**

Your Company

Local Bank

Local Financing Company

Nation-wide Bank

Nation-wide Financing Company

Distributors

Manufacturers

Other 1: \_\_\_\_\_

Other 2: \_\_\_\_\_

Other 3: \_\_\_\_\_

31. What other methods do customers typically use to finance or pay for the cost of the window installation?

**[Check all that apply-Do not read list-Probe if necessary]**

Credit Card

Cash/Check

Home Equity Loan/Second Mortgage

Refinance Mortgage to Tap Equity

Line of Credit

Personal/Unsecured Loan

Other 1: \_\_\_\_\_

Other 2: \_\_\_\_\_

Other 3: \_\_\_\_\_

32. What can PG&E do to assist in creating greater access to financing?

---

**Training**

I would now like to ask about the types of training your company offers.

33. When hiring new sales representatives, what training does your company look for?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Two-Year Technical Degree
- Training from Previous Company
- Manufacturer Certificate/Training
- Distributor Certificate/Training
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

34. Where do your sales representatives get the training they need?  
**[Check all that apply-Do not read list-Probe if necessary]**

- In-House
- Technical School Classes
- Manufacturers
- Distributors
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

35. Do you feel that there is a shortage of qualified, well-trained sales representatives?  
**[Check ONLY ONE category]**

- Yes (Q36)
- No (Q37)

**IF Q35=YES, THEN ASK Q36; ELSE ASK Q37.**

36. Does this shortage limit the amount of work your company can do?  
**[Check ONLY ONE category]**

- Yes
- No

37. What specific training needs related to energy efficiency could PG&E address for you and other distributors?  
Please explain?

---

***Non-English Speaking Customers (ASK ONLY IF SELL TO END-USERS IN Q7)***

Finally, I would like to ask you about your company's sales to residential end-users for whom English is not their primary language. (e.g., customers who speak Spanish or Cantonese)

38. What percent of your residential sales are to end-users for whom English is not their primary language?

\_\_\_\_\_ Percent

***IF Q38>0 THEN ASK Q39; ELSE VERIFY NAME AND ADDRESS FOR \$50 PAYMENT.***

39. What particular problems do you face when dealing with end-users for whom language may be a barrier?

\_\_\_\_\_

40. How does your organization address these problems?

\_\_\_\_\_

41. What might PG&E do to increase the extent to which these end-users are able to take advantage of installing energy efficient measures?

\_\_\_\_\_

Those are all the questions I have for you today. Thank you very much for your time. Verify name and address for \$50 payment.

**R&R Window Retailer Interview Guide**

Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of window retailers in northern and central California to help PG&E design better programs. Can I talk to the owner or manager . . . and could you tell me their name?

---

(Name)	(Title)	(Phone)	(Call Back Date and Time)
--------	---------	---------	---------------------------

Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of window retailers in northern and central California. The information we collect from these select retailers will help PG&E design better programs. This is a critical stage in PG&E's planning and, to thank you for taking time to answer our questions, we will send you a check for \$50. Do you have about 15-20 minutes to complete this interview? If not, schedule a callback.

**Screening**

Before we start the interview, I need to ask a few questions to make sure that your company qualifies to participate in this study.

- 1. Does your company sell windows to residential customers?  
[Check ONLY ONE category]

[ ] Yes  
[ ] No (T&T)

- 2. What percent of your business is with residential customers?

\_\_\_\_\_ Percent (If less than 25 percent, then T&T.)

**Company Characteristics**

I would now like to ask about some of the characteristics of your company.

3. Does your company sell only windows or do you sell other types of products?  
**[Check ONLY ONE category]**

- Only Windows (Ask Q5)
- Other Types of Products (Ask Q4)
- Other: \_\_\_\_\_ (Ask Q4)

**IF OTHER TYPES, THEN ASK Q4; ELSE ASK Q5.**

4. What other types of products does your company sell?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Doors
- Siding
- Roofing
- Weatherization Measures (Weatherstripping/Caulk/Sealant)
- Lighting
- HVAC Equipment
- Refrigerators
- Dishwashers
- Clothes Washers
- Clothes Dryers
- Refrigerators
- Insulation
- Duct Work
- General Contracting
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

- 4a. Does your company sell window glass separate from window frames?

- Yes
- No

5. How many full-time employees does your company have (if chain, ask for number at location)?

\_\_\_\_\_ Full-Time Employees



**Market Structure and Flow**

I would now like to ask about your suppliers, your customers, and the types of windows your company sells.

6. What percent of your residential windows is purchased from the following groups:  
**[Responses should add to 100]**

**Percent**

\_\_\_\_\_ Manufacturers (Probe for: US - \_\_\_\_\_ vs. Foreign - \_\_\_\_\_ )  
\_\_\_\_\_ Distributors (Probe for: Multiple-Line/Independent - \_\_\_\_\_ vs. Captive - \_\_\_\_\_ )  
\_\_\_\_\_ Other: \_\_\_\_\_

7. What brands of windows does your company sell?  
**[Check all that apply-Do not read list-Probe if necessary]**

[ ] Anderson  
[ ] Pella  
[ ] Sierra Pacific  
[ ] Biltbest of California  
[ ] California Window Corporation  
[ ] Caradco  
[ ] JELD-WEN  
[ ] Loewen  
[ ] Marvin  
[ ] Morgan  
[ ] Norco  
[ ] Sun  
[ ] Thermoview  
[ ] Weather Shield  
[ ] Wenco  
[ ] Other 1: \_\_\_\_\_  
[ ] Other 2: \_\_\_\_\_  
[ ] Other 3: \_\_\_\_\_

8. What percent of your residential window sales are to the following groups:  
**[Responses should add to 100]**

**Percent**

\_\_\_\_\_ Contractors (Probe for: Window Contractors - \_\_\_\_\_ vs. General Contractors - \_\_\_\_\_ )  
\_\_\_\_\_ End-Users (Probe for: Do-It-Yourselfers - \_\_\_\_\_ vs. Buyers on Behalf of Contractors - \_\_\_\_\_ )  
\_\_\_\_\_ Other: \_\_\_\_\_

9. How do you get new business in the residential market?  
**[Check all that apply-Do not read list-Probe if necessary]**

[ ] Advertising  
[ ] Direct Mail  
[ ] Referrals from Customers  
[ ] Window Contractors  
[ ] General Contractors  
[ ] Relationships w/Lenders  
[ ] Relationships w/Realtors  
[ ] Other 1: \_\_\_\_\_  
[ ] Other 2: \_\_\_\_\_  
[ ] Other 3: \_\_\_\_\_

10. How often do you have a residential customer's window order in stock versus having to fill the order from your suppliers? Would you say . . .  
[Check ONLY ONE category]

- Never
- Not Very Often
- Occasionally
- Most of the Time
- All of the Time
- Other: \_\_\_\_\_

***IF Q10 NOT EQUAL TO ALL OF THE TIME, THEN ASK Q11; ELSE ASK Q12.***

11. How long does it typically take for you to receive a residential window order from your supplier?

- 1-2 Days
- 3-6 Days
- 1 Week
- 2-3 Weeks
- 1 Month
- 2-3 Months
- 4-6 Months
- Longer Than 6 Months
- Other: \_\_\_\_\_

12. What is the typical cost for a residential window purchase?

\_\_\_\_\_ \$

12a. Compared to replacing a complete window, how often do customers replace only glass? Would you say...

- Never
- Not Very Often
- Occasionally
- Most of the Time
- All of the Time
- Other: \_\_\_\_\_

**High Efficiency Sales**

Next, I would like to ask about your sales of energy efficient windows.

13. What are your company's criteria for determining if windows are energy efficient?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Double Panes
- Low-E Glass
- Wood, Vinyl, or Fiberglass Frames
- 3/8 to 1/2 Inch Space Filled w/Argon or Inert Gas
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

14. What percent of your residential window sales in the last year had the energy-saving features you just mentioned?

\_\_\_\_\_ Percent

**High Efficiency Barriers and Perceptions - Retailers**

Next, I would like to ask about your company’s perceptions regarding the sale of energy efficient windows.

15. How often do you discuss energy efficient window options with your customers? Is it . . .  
**[Check ONLY ONE category]**

- All Sales Situations (Q16)
- Most Sales Situations (Q16)
- Some Sales Situations (Q16)
- Very Few Sales Situations (Q16)
- Never (Q17)

**IF Q15 NOT EQUAL TO NEVER THEN ASK Q16; ELSE ASK Q17.**

16. What benefits does your company receive from promoting and selling energy efficient windows?

17. What are the biggest hurdles your company faces when selling energy efficient windows?  
**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. More Difficult to Get EE Windows Supplied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Harder to Install EE Windows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. EE Windows Perform Unreliably	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Try to Install New Windows that Closely Match Old Windows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Information on EE Windows Hard to Find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Doubts about Energy Savings from EE Windows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. EE Windows Cost Too Much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Concerns about the Style of EE Windows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Other Barrier 1: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Other Barrier 2: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Other Barrier 3: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. Aside from rebates, how could PG&E assist retailers in selling more energy efficient windows?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Sales Representative Training
- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Contractor Certification
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

**High Efficiency Barriers and Perceptions – Customers**

Next, I would like to ask about the perceptions of your residential customers regarding the purchase of energy efficient windows.

19. What are the most important factors for you customers when buying windows?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Price	[ ]	[ ]	[ ]
b. Contractor Reputation	[ ]	[ ]	[ ]
c. Energy Efficiency	[ ]	[ ]	[ ]
d. Brand	[ ]	[ ]	[ ]
e. Reliability	[ ]	[ ]	[ ]
f. Style	[ ]	[ ]	[ ]
g. Access to Financing	[ ]	[ ]	[ ]
h. How Quickly You Can Install	[ ]	[ ]	[ ]
i. Warranty	[ ]	[ ]	[ ]
j. Other Factor 1: _____	[ ]	[ ]	[ ]
k. Other Factor 2: _____	[ ]	[ ]	[ ]
l. Other Factor 3: _____	[ ]	[ ]	[ ]

20. What are the biggest hurdles your customers face when buying energy efficient windows?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Incomplete/Unreliable Information on EE Windows	[ ]	[ ]	[ ]
b. Information on EE Windows Hard to Find	[ ]	[ ]	[ ]
c. Doubts about Energy Savings from EE Windows	[ ]	[ ]	[ ]
d. EE Windows Cost Too Much	[ ]	[ ]	[ ]
e. EE Windows Perform Unreliably	[ ]	[ ]	[ ]
f. Concerns about the Style of EE Windows	[ ]	[ ]	[ ]
g. No Access to Financing	[ ]	[ ]	[ ]
h. Too Much Hassle	[ ]	[ ]	[ ]
i. Other Barrier 1: _____	[ ]	[ ]	[ ]
j. Other Barrier 2: _____	[ ]	[ ]	[ ]
k. Other Barrier 3: _____	[ ]	[ ]	[ ]

21. Aside from rebates, how could PG&E assist customers to buy more energy efficient windows?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ ] Financing
- [ ] Promotion of EE in Ads and Brochures
- [ ] More Information
- [ ] Better Education
- [ ] Provide Customers with Window EE Ratings
- [ ] Involvement w/Energy Star
- [ ] Other 1: \_\_\_\_\_
- [ ] Other 2: \_\_\_\_\_
- [ ] Other 3: \_\_\_\_\_

**Whole-House Approach**

One of the areas where PG&E is interested in capturing opportunities for energy efficiency is using a whole-house approach to promote of multiple energy efficient measures. In this scenario, customers who are doing window installations would be encouraged to install additional energy efficient measures in their home, such as insulation, duct sealing, lighting, kitchen appliances, central air conditioners, and furnaces. This is because changes made in one measure area can impact and encourage improvements in other measure areas.

22. When selling windows to residential customers, which of the following best describes your company's promotion of measures other than windows, such as insulation, duct sealing, lighting, kitchen appliances, central air conditioners, and furnaces?

**[Check ONLY ONE category]**

- Actively promotes the installation of other measures (Q23-Q25)
- Points out other measures that can be installed, but does not actively promote (Q23-Q25)
- Does not promote or point out other measures (Q26-Q28)

**IF Q22 EQUAL TO ACTIVELY PROMOTES OR POINTS OUT, THEN ASK Q23-25; ELSE ASK Q26-Q28.**

23. What other measures does your company actively promote/point out?

**[Check all that apply-Do not read list-Probe if necessary]**

- Doors
- Siding
- Roofing
- Weatherization Measures (Weatherstripping/Caulk/Sealant)
- Insulation
- Duct Work
- Lighting
- Kitchen Appliances
- Central Air Conditioners
- Furnaces
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

24. What percent of your sales involve these other measures?

\_\_\_\_\_ Percent

25. What is the role of energy efficiency in using this approach?

\_\_\_\_\_

**IF Q22 EQUAL TO DOES NOT PROMOTE, THEN ASK Q26-Q28; ELSE ASK Q29.**

26. What are your company's main reasons for not promoting or pointing out other measures to your customers when selling windows?

---

27. How interested would your company be in promoting other measures? Would you be . . .

**[Check ONLY ONE category]**

- Very Interested
- Somewhat Interested
- Not At All Interested

28. Why?

---

29. Aside from rebates, how could PG&E assist your company to promote other measures that improve the home's overall energy efficiency?

**[Check all that apply-Do not read list-Probe if necessary]**

- Retailer Certification
- Retailer Training
- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

30. Summing up, how do you view the development of a market for "whole-house" approaches to energy-oriented renovation projects? Do you think this is a likely evolution? Why or why not? What, if anything, could or should be done to encourage the development of this market?

---

**Financing**

I would now like to ask about the types of financing your company offers.

31. Does your company offer financing to its residential customers?  
**[Check ONLY ONE category]**

- Yes (Q32)
- No (Q35)

**IF OFFERS FINANCING THEN ASK Q32; ELSE ASK Q35.**

32. What percent of your residential customers use your financing?

\_\_\_\_\_ Percent

33. What are the typical terms and rates for this financing?

---

34. Through what types of sources do you offer this financing?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Your Company
- Local Bank
- Local Financing Company
- Nation-wide Bank
- Nation-wide Financing Company
- Distributors
- Manufacturers
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

35. What other methods do customers typically use to finance or pay for the cost of the windows?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Credit Card
- Cash/Check
- Home Equity Loan/Second Mortgage
- Refinance Mortgage to Tap Equity
- Line of Credit
- Personal/Unsecured Loan
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

36. What can PG&E do to assist in creating greater access to financing?

---



**Training**

I would now like to ask about the types of training your company offers.

37. When hiring new sales representatives, what training does your company look for?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Two-Year Technical Degree
- Training from Previous Company
- Manufacturer Certificate/Training
- Distributor Certificate/Training
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

38. Where do your sales representatives get the training they need?  
**[Check all that apply-Do not read list-Probe if necessary]**

- In-House
- Technical School Classes
- Manufacturers
- Distributors
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

39. Do you feel that there is a shortage of qualified, well-trained sales representatives?  
**[Check ONLY ONE category]**

- Yes (Q40)
- No (Q41)

**IF Q39=YES, THEN ASK Q40; ELSE ASK Q41.**

40. Does this shortage limit the amount of work your company can do?  
**[Check ONLY ONE category]**

- Yes
- No

41. What specific training needs related to energy efficiency could PG&E address for you and other retailers?  
Please explain?

---

*Non-English Speaking Customers*

Finally, I would like to ask you about your company's sales to residential customers for whom English is not their primary language. (e.g., customers who speak Spanish or Cantonese)

42. What percent of your residential sales are to customers for whom English is not their primary language?

\_\_\_\_\_ Percent

***IF Q42>0 THEN ASK Q43; ELSE VERIFY NAME AND ADDRESS FOR \$50 PAYMENT.***

43. What particular problems do you face when dealing with customers for whom language may be a barrier?

\_\_\_\_\_

44. How does your organization address these problems?

\_\_\_\_\_

45. What might PG&E do to increase the extent to which these customers are able to take advantage of installing energy efficient measures?

\_\_\_\_\_

Those are all the questions I have for you today. Thank you very much for your time. Verify name and address for \$50 payment.

***R&R Architect Interview Guide***

Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of architects and designers in northern and central California to help PG&E design better programs. Can I talk to the owner or manager . . . and could you tell me their name?

---

(Name)	(Title)	(Phone)	(Call Back Date and Time)
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Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric Company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of architects and designers in northern and central California. The information we collect from these select architects and designers will help PG&E design better programs. This is a critical stage in PG&E's planning and, to thank you for taking time to answer our questions, we will send you a check for \$50. Do you have about 15-20 minutes to complete this interview? If not, schedule a callback.

***Screening***

Before we start the interview, I need to ask a few questions to make sure that your company qualifies to participate in this study.

- 1. Does your company provide specifications and designs for residential renovation and remodeling projects?  
**[Check ONLY ONE category]**

[ ] Yes  
[ ] No (T&T)

- 3. What percent of your business is with residential customers?

\_\_\_\_\_ Percent (If less than 25 percent, then T&T.)

- 4. What percent of your residential specifications and designs are part of new home construction projects, excluding remodeling projects and additions?

\_\_\_\_\_ Percent (If more than 75 percent, then T&T.)

- 5. How many full-time employees does your company have?

\_\_\_\_\_ Full-Time Employees

**Market Structure and Flow**

I would now like to ask about your suppliers, your customers, and the types of residential work performed by your company.

6. About what percent of your designs for residential renovation and remodeling projects involve your specifying the following types of equipment?

**[Record responses-Responses DO NOT need to add to 100-Record if selected by architect, contractor, or home owner]**

Do you specify any other types of equipment?

**[Ask percent for each additional appliance mentioned]**

Percent	Selection
_____	_____ Lighting
_____	_____ Windows
_____	_____ Refrigerators
_____	_____ Dishwashers
_____	_____ Cooling and/or Heating Equipment
_____	_____ Insulation
_____	_____ Duct Work
_____	_____ Water Heaters
_____	_____ Other 1: _____
_____	_____ Other 2: _____
_____	_____ Other 3: _____

7. What percent of your residential renovation and remodeling specifications are developed for contractors rather than home owners:

**[Responses should add to 100]**

\_\_\_\_\_ Percent

8. How do you get new business in the residential market?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ ] Advertising
- [ ] Direct Mail
- [ ] Referrals from Customers
- [ ] Relationships w/Lenders
- [ ] Relationships w/Realtors
- [ ] Other Contractors
- [ ] Other 1: \_\_\_\_\_
- [ ] Other 2: \_\_\_\_\_
- [ ] Other 3: \_\_\_\_\_

9. How often does your company work on residential renovation and remodeling projects for someone who is getting ready to sell their home or a new buyer who has not yet moved in? Would you say . . .

**[Check ONLY ONE category]**

- [ ] Never
- [ ] Not Very Often
- [ ] Occasionally
- [ ] Most of the Time
- [ ] All of the Time
- [ ] Other: \_\_\_\_\_

**Title 24**

I would now like to ask about how Title 24 affects your specifications for renovation and remodeling projects.

00. What determines whether or not a Title 24 run is required for remodeling projects?

---

00. Who does the Title 24 run?

**[Check all that apply-Do not read list-Probe if necessary]**

- Your Company
- Title 24 Consultant
- Subcontractor
- Architect
- Other: \_\_\_\_\_

00. Do your specifications for renovation and remodeling projects typically meet or exceed Title 24?

**[Check ONLY ONE category – Probe if Exceed Title 24]**

- Meet Title 24
- Exceed Title 24 (> 10%)
- Exceed Title 24 (< 10%)
- Other: \_\_\_\_\_

00. How often do building inspectors check to ensure that the measures were actually installed to meet Title 24 for remodeling projects? Would you say . . .

**[Check ONLY ONE category]**

- Never
- Not Very Often
- Occasionally
- Most of the Time
- All of the Time
- Other: \_\_\_\_\_

**High Efficiency Sales**

Next, I would like to ask about the energy efficiency of the equipment you specify for residential renovation and remodeling projects.

**IF SELLS WINDOWS (Q6), THEN ASK Q10-Q11; ELSE ASK Q12.**

10. What are your company's criteria for determining if windows are energy efficient?

**[Check all that apply-Do not read list-Probe if necessary]**

- Double Panes
- Low-E Glass
- Wood, Vinyl, or Fiberglass Frames
- 3/8 to 1/2 Inch Space Filled w/Argon or Inert Gas
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

11. What percent of your window specifications for residential renovation and remodeling projects in the last year had the energy-saving features you just mentioned?

\_\_\_\_\_ Percent

**IF SELLS LIGHTING (Q6), THEN ASK Q12-Q13; ELSE ASK Q14.**

12. What are your company's criteria for determining if lighting equipment is energy efficient?

**[Check all that apply-Do not read list-Probe if necessary]**

- Compact Fluorescent Lamps
- T8 Fluorescent Lamps
- High Intensity Discharge Lamps (Metal Halide/High-Pressure Sodium)
- Reflectors
- Electronic Ballasts
- Lighting Controls (Dimmable Lighting/Motion Sensors)
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

13. What percent of your lighting specifications for residential renovation and remodeling projects in the last year had the energy-saving features you just mentioned?

\_\_\_\_\_ Percent

**IF SELLS HVAC (Q2), THEN ASK Q14-Q15; ELSE ASK Q16.**

14. What are your company's criteria for determining if central air conditioners are energy efficient?

**[Check ONLY ONE category-Probe if necessary]**

- 10 SEER or Higher
- 11 SEER or Higher
- 12 SEER or Higher
- 13 SEER or Higher
- 14 SEER or Higher
- Other 1: \_\_\_\_\_

15. What percent of your central air conditioner specifications for residential renovation and remodeling projects in the last year had the energy-saving features you just mentioned?

\_\_\_\_\_ Percent

**High Efficiency Barriers and Perceptions - Architects**

Next, I would like to ask about your company’s perceptions regarding the specification of energy efficient equipment for residential renovation and remodeling projects.

16. How often do you discuss energy efficient equipment options with your clients? Is it . . .  
**[Check ONLY ONE category]**

- All Designs (Q17)
- Most Designs (Q17)
- Some Designs (Q17)
- Very Designs (Q17)
- Never (Q18)

**IF Q16 NOT EQUAL TO NEVER THEN ASK Q17; ELSE ASK Q18.**

17. What benefits does your company receive from promoting and specifying energy efficient equipment?

---

18. What are the biggest hurdles your company faces when specifying energy efficient equipment?  
**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. More Difficult to Get EE Equipment Supplied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Harder to Install EE Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. EE Equipment Performs Unreliably	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Try to Install New Equipment that Closely Matches Old Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Information on EE Equipment Hard to Find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Doubts about Energy Savings from EE Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. EE Equipment Costs Too Much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Concerns about the Style of EE Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Other Barrier 1: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Other Barrier 2: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Other Barrier 3: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. Aside from rebates, how could PG&E assist architects and designers to specify more energy efficient equipment?

**[Check all that apply-Do not read list-Probe if necessary]**

- Architect Certification
- Architect Training
- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

**High Efficiency Barriers and Perceptions – Customers (ASK ONLY IF END-USERS IN Q7)**

Next, I would like to ask about the perceptions of homeowners regarding the selection of energy efficient equipment.

20. What are the most important factors for homeowners when selecting equipment?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Price	[ ]	[ ]	[ ]
b. Architect Recommendations	[ ]	[ ]	[ ]
c. Energy Efficiency	[ ]	[ ]	[ ]
d. Brand	[ ]	[ ]	[ ]
e. Reliability	[ ]	[ ]	[ ]
f. Style	[ ]	[ ]	[ ]
g. Access to Financing	[ ]	[ ]	[ ]
h. How Quickly You Can Install	[ ]	[ ]	[ ]
i. Warranty	[ ]	[ ]	[ ]
j. Other Factor 1: _____	[ ]	[ ]	[ ]
k. Other Factor 2: _____	[ ]	[ ]	[ ]
l. Other Factor 3: _____	[ ]	[ ]	[ ]

21. What are the biggest hurdles that homeowners face when selecting energy efficient equipment?

**[Check VERY IMPORTANT for all mentioned]**

How important are these other things?

**[Read remaining factors and check rating]**

	Very Important	Moderately Important	Not At All Important
a. Incomplete/Unreliable Information on EE Equipment	[ ]	[ ]	[ ]
b. Information on EE Equipment Hard to Find	[ ]	[ ]	[ ]
c. Doubts about Energy Savings from EE Equipment	[ ]	[ ]	[ ]
d. EE Equipment Costs Too Much	[ ]	[ ]	[ ]
e. EE Equipment Performs Unreliably	[ ]	[ ]	[ ]
f. Concerns about the Style of EE Equipment	[ ]	[ ]	[ ]
g. No Access to Financing	[ ]	[ ]	[ ]
h. Too Much Hassle	[ ]	[ ]	[ ]
i. Other Barrier 1: _____	[ ]	[ ]	[ ]
j. Other Barrier 2: _____	[ ]	[ ]	[ ]
k. Other Barrier 3: _____	[ ]	[ ]	[ ]

22. Aside from rebates, how could PG&E assist homeowners to select more energy efficient equipment?

**[Check all that apply-Do not read list-Probe if necessary]**

- [ ] Financing
- [ ] Promotion of EE in Ads and Brochures
- [ ] More Information
- [ ] Better Education
- [ ] Provide Customers with Equipment EE Ratings
- [ ] Involvement w/Energy Star
- [ ] Other 1: \_\_\_\_\_
- [ ] Other 2: \_\_\_\_\_
- [ ] Other 3: \_\_\_\_\_



**Whole-House Approach**

One of the areas where PG&E is interested in capturing opportunities for energy efficiency is using a whole-house approach to promote of multiple energy efficient measures. In this scenario, customers who are replacing one type of measure are encouraged to install additional energy efficient measures elsewhere in their home. An example would be encouraging a customer who is replacing a central air conditioner to also install energy efficient windows and lighting, to seal ducts, and to add insulation.

23. When specifying equipment for residential renovation and remodeling work on one part of a home, which of the following best describes your company's promotion of additional measures in other parts of the home?

**[Check ONLY ONE category]**

- Actively promotes the installation of other measures (Q24-Q26)
- Points out other measures that can be installed, but does not actively promote (Q24-Q26)
- Does not promote or point out other measures (Q27-Q29)

**IF Q23 EQUAL TO ACTIVELY PROMOTES OR POINTS OUT, THEN ASK Q24-Q26; ELSE ASK Q27-Q29.**

24. What other measures does your company actively promote/point out?

**[Check all that apply-Do not read list-Probe if necessary]**

- Windows
- Lighting
- Insulation
- Duct Work
- Central Air Conditioners
- Furnaces
- Kitchen Appliances
- Water Heaters
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

25. What percent of your specifications involve these other measures?

\_\_\_\_\_ Percent

26. What is the role of energy efficiency in using this approach?

\_\_\_\_\_

**IF Q23 EQUAL TO DOES NOT PROMOTE, THEN ASK Q27-29; ELSE ASK Q30.**

27. What are your company's main reasons for not promoting or pointing out other measures to your customers?

\_\_\_\_\_

28. How interested would your company be in promoting other measures? Would you be . . .

**[Check ONLY ONE category]**

- Very Interested
- Somewhat Interested
- Not At All Interested

29. Why?

\_\_\_\_\_

30. Aside from rebates, how could PG&E assist your company to promote other measures that improve the home's overall energy efficiency?

**[Check all that apply-Do not read list-Probe if necessary]**

- Contractor Certification
- Contractor Training
- Financing
- Promotion of EE in Ads and Brochures
- More Information
- Better Education
- Involvement w/Energy Star
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

31. Summing up, how do you view the development of a market for "whole-house" approaches to energy-oriented renovation projects? Do you think this is a likely evolution? Why or why not? What, if anything, could or should be done to encourage the development of this market?

---

***Financing and Training***

36. How do customers typically use to finance or pay for the cost of the plans?  
**[Check all that apply-Do not read list-Probe if necessary]**

- Credit Card
- Cash/Check
- Home Equity Loan/Second Mortgage
- Refinance Mortgage to Tap Equity
- Line of Credit
- Personal/Unsecured Loan
- Other 1: \_\_\_\_\_
- Other 2: \_\_\_\_\_
- Other 3: \_\_\_\_\_

37. Are you familiar with energy efficiency financing and mortgages?  
**[Check ONLY ONE category]**

- Yes (Q38)
- No (Q39)

38. Do you promote energy efficiency financing and mortgages?  
**[Check ONLY ONE category]**

- Yes
- No

39. What can PG&E do to assist in creating greater access to financing?

---

44. What specific training needs related to energy efficiency could PG&E address for architects, designers, and contractors? Please explain?

---

***Non-English Speaking Customers (ASK ONLY IF SELL TO END-USERS IN Q7)***

Finally, I would like to ask you about your company's work with residential customers for whom English is not their primary language. (e.g., customers who speak Spanish or Cantonese)

45. What percent of your residential sales are to customers for whom English is not their primary language?

\_\_\_\_\_ Percent

***IF Q45>0 THEN ASK Q46; ELSE VERIFY NAME AND ADDRESS FOR \$50 PAYMENT.***

46. What particular problems do you face when dealing with customers for whom language may be a barrier?

\_\_\_\_\_

47. How does your organization address these problems?

\_\_\_\_\_

48. What might PG&E do to increase the extent to which these customers are able to take advantage of installing energy efficient measures?

\_\_\_\_\_

Those are all the questions I have for you today. Thank you very much for your time. Verify name and address for \$50 payment.

## ***R&R Inspector Instrument***

Hello my name is <NAME>. I'm calling from Quantum Consulting for Pacific Gas and Electric company. PG&E is planning new residential energy efficiency programs. As part of that planning, we are surveying a small number of home inspectors in northern and central California to help PG&E design better programs.

It is our understanding that you provide home inspection services to home owners in PG&E's service territory. Is this correct?

IF NO, thank and terminate.

IF YES, Are you the right person to talk to about the inspection process and the role of energy efficiency considerations in that process? If so, can you please give me your name and title.

---

(Name)

(Title)

This is a critical stage in PG&E's planning and, to thank you for taking time to answer our questions, we will send you a check for \$50. Do you have about 15-20 minutes to complete this interview?

What I would like to discuss with you today is how your services may affect home seller or home buyer actions regarding energy efficiency. To start with, I'd like to get some indication of the scope and nature of your inspection business.

1. Could you give me a brief description of the inspection services that you provide?
2. Are you familiar with the California Home Energy Efficiency Rating System, or CHEERS? (IF ASKED: CHEERS home energy rating auditors focus on identifying opportunities for cost-effective energy efficiency improvements.) How do the services you provide differ from those provided by CHEERS raters? (Or: Are you also a CHEERS rater?)
3. Approximately how many home inspections per year do you (does your organization) conduct?  
\_\_\_\_\_ number
4. Of those inspections, what percentage are conducted for:  
\_\_\_\_\_ Home buyers?  
\_\_\_\_\_ Home sellers?  
\_\_\_\_\_ Realtors?  
\_\_\_\_\_ Lenders?  
\_\_\_\_\_ Government agencies, including local governments?  
\_\_\_\_\_ Insurance companies?  
\_\_\_\_\_ Other (specify)  
\_\_\_\_\_ Other (specify)
5. How would you break down, by percentage, your inspections among:  
\_\_\_\_\_ Urban  
\_\_\_\_\_ Suburban  
\_\_\_\_\_ Rural primary residence  
\_\_\_\_\_ Rural/resort vacation home
6. Similarly, how would you break down, by percentage, your residential inspections among:  
\_\_\_\_\_ Single family detached houses  
\_\_\_\_\_ Town homes

- \_\_\_\_\_ Condominiums
- \_\_\_\_\_ Other

7. How would your break down, by percentage, the source of your inspection jobs?

- \_\_\_\_\_ Referrals (realtors)
- \_\_\_\_\_ Referrals (lenders)
- \_\_\_\_\_ Referrals (home owners)
- \_\_\_\_\_ Yellow pages
- \_\_\_\_\_ Other advertising
- \_\_\_\_\_ Other

Next I would like to talk about the role that energy efficiency considerations might play in the inspection process and the development of your findings and recommendations.

8. I'm going to read a list of various energy efficiency related attributes of a home and ask you whether each would be noted and reported as part of your normal inspection process:

- Insulation levels in the ceiling and walls
- Window air infiltration
- Window efficiency (double vs single pane, low-e, gas-filled, etc.)
- Building shell integrity/air infiltration
- HVAC age, condition
- HVAC efficiency rating
- Duct leakage
- Appliance age, condition
- Appliance efficiency rating
- Other items (please specify)

9. How often do you discuss these energy efficiency related findings with the home owner as part of the normal inspection process?

- [ ] Never
- [ ] Not Very Often
- [ ] Occasionally
- [ ] Most of the Time
- [ ] All of the Time
- [ ] Other: \_\_\_\_\_

10. With regard to energy-related measures such as lighting, windows, or appliances, when you find specific items that require corrective action, what recommendations do you make regarding how or by whom those corrective actions should be made:

- Make no recommendations
- Provide recommendations on the type of vendor (e.g., problem requires a window contractor, an electrician, or a general contractor)
- Provide unscreened lists or directories of potential vendors
- Provide screened lists of potential vendors
- Provide referrals to specific vendors
- Other (specify)

IF NO RECOMMENDATIONS, why not? Are there actions that PG&E might take to make it easier for you to provide such recommendations (for example, information on the costs and benefits of specific measures; training in energy efficiency issues)?

IF YES, can you give me some examples of the kinds of specific recommendations you might make or have made in the past?

11. In your experience, how often do home owners/sellers/buyers act on those recommendations. Based on your experience and on what home owners tell you, how often do home owners act on the recommendations contained in your rating?

- Never
- Not Very Often
- Occasionally
- Most of the Time
- All of the Time
- Other: \_\_\_\_\_

What kinds of measures are they most likely to act on? are energy efficiency recommendations more or less likely to be acted upon?) Do realtors encourage sellers to take recommended actions?

\_\_\_\_\_

Least likely? \_\_\_\_\_

Do the results encourage people to follow a whole-house approach and implement all cost effective measures, or are the results presented in such a way that the home owner can “cream skim,” or implement only those measures that have the highest payback relative to cost?

What do you think are the main barriers to home buyers acting on your recommendations related to energy efficiency?

**Do not read; check all that apply**

- \_\_\_\_\_ Don't know where to get information on recommended measures
- \_\_\_\_\_ Doubts about Energy Savings from recommended measures
- \_\_\_\_\_ Recommended actions cost too much relative to benefits
- \_\_\_\_\_ Not convinced predicted savings will materialize
- \_\_\_\_\_ Don't like specific measures
- \_\_\_\_\_ Don't want to go into debt
- \_\_\_\_\_ Prefer to put money into more visible improvements
- \_\_\_\_\_ Not planning to stay in house long enough to recover costs
- \_\_\_\_\_ Too Much Hassle
- \_\_\_\_\_ Other Barrier 1: \_\_\_\_\_
- \_\_\_\_\_ Other Barrier 2: \_\_\_\_\_
- \_\_\_\_\_ Other Barrier 3: \_\_\_\_\_

12. Are there actions that PG&E might take to make home buyers more likely to undertake recommended actions to increase energy efficiency? (probe for information on the costs and benefits of specific measures; financing; certification of vendors)?

13. What percent of your ratings involve customers for whom English is not their primary language?

\_\_\_\_\_ Percent

14. What problems do you face when dealing with customers for whom language may be a barrier, particularly with regard to discussing results and recommendations that have energy efficiency implications?

\_\_\_\_\_

15. How does your organization address these problems?

\_\_\_\_\_

16. What might PG&E do to increase the extent to which these customers are able to take advantage of energy efficiency options?
- 

One of the areas where PG&E is interested in capturing opportunities for energy efficiency is the kind of time of sale (TOS) renovations we just discussed. In particular, PG&E would like to see more home buyers or sellers take a whole-house approach to TOS renovations, where they would install or upgrade multiple cost-effective energy efficiency measures.

In that context, are you familiar with the concept of an Energy Efficient Mortgage, or EEM? (If NO, or if asked, define: An energy efficient mortgage enables a borrower to qualify for a larger loan because of anticipated utility bill savings attributable to energy efficient features of the home being financed.) In a TOS renovation, the availability of an EEM would mean that the lender could include the cost of the improvements in the first mortgage, whereby they would yield a positive cash flow to the buyer. PG&E and others believe that EEMs might make it possible for more home buyers to pursue whole-house energy efficiency opportunities.

17. Have you seen customers, on their own, pursue a whole-house energy efficiency approach to TOS renovations?

If YES, can you provide some examples of the combinations of measures being installed?

IF NO, do you think this is something that would appeal to customers? What do you think PG&E should do to make it attractive to customers? (information at home shows; television, radio, or print ads; etc.)

18. Have you seen any indication that contractors, realtors, or others are encouraging home buyers to pursue such a whole-house, energy efficiency approach to TOS renovations?

If YES, can you provide some examples of the market actors who are taking the lead in this and the kinds of measures they are promoting? (If you know of specific firms who are providing such services, can you provide me with a contact name and number?)

What might encourage contractors, realtors, or others take on the role of facilitator or service integrator for this whole-house approach? (information, training, technical assistance, software/marketing tools)

19. Does your organization have any interest in acting as a facilitator who brings together the various components of the TOS renovation to ensure that all cost-effective energy efficiency measures are obtained and that financing is available to cover the cost of those measures?

Why (for example, competitive edge; lets you be one-stop-source for customers; more control over the quality/value of improvements)

Why not (not worth the effort, not our business, too much market risk)?

20. Summing up, how do you view the development of a market for time-of-sale, "whole-house" approaches to energy-oriented renovation projects? Do you think this is a likely evolution? Why or why not? What, if anything, could or should be done to encourage the development of this market?



21. Having thought about these issues during our conversation, are there specific training needs related to energy efficiency that you believe PG&E should address for you and other home inspectors? Can you elaborate?
22. Finally, are there specific publications oriented to the California (or national) market that you and other home inspectors regularly read? Also, are there specific local, regional, or national associations that might provide a good vehicle for disseminating information about energy efficiency to the home inspection community?

Those are all the questions I have for you today. Thank you very much for your time.

## ***R&R Lender Instrument***

Hello. I'm calling from Quantum Consulting on behalf of Pacific Gas & Electric. We are conducting a study of the residential retrofit and renovation market to assist PG&E in designing programs to help achieve greater energy efficiency in residential retrofit and renovation projects. We are speaking with a variety of players in that market so that we can better understand their business patterns and their needs and perceptions to help PG&E design better programs. Are you the best person to speak to regarding your company's residential lending, particularly as related to mortgages for existing homes and loans for renovation projects?

IF YES, Can you please give me your name and title

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(Name)

(Title)

This interview will last about 20 minutes. Do you have about 20 minutes to discuss these issues now? If NO, reschedule.

IF NOT RIGHT PERSON, Who is the most knowledgeable person that we might speak with?

---

(Name)

(Phone)

(Title)

Repeat introduction for new contact.

ONCE CORRECT CONTACT IDENTIFIED: It is our understanding that your firm provides home mortgages and home improvement loans to the residential market in PG&E's service territory. Is this correct? (IF NO, and the service they provide is not related to the R&R market, T&T)

What I would like to discuss with you today is your organization's role as a lender, specifically as this relates to energy efficiency in retrofit, renovation, and remodeling projects for existing or on-the-market homes.

1. To get a sense of your overall residential lending pattern, approximately what proportion of the new mortgages you write are for:
  - Existing home purchases?
  - Refinancing of existing homes?
  - New homes?
  
2. Of the refinanced mortgages, about what percentage were applied for primarily to:
  - Obtain better terms
  - Finance a home improvement project
  - Finance other non-home expenditures (college, cars, etc.)

Are you familiar with the concept of an Energy Efficient Mortgage, or EEM? (If NO, or if asked, define: An energy efficient mortgage offers the borrower better terms because of anticipated utility bill savings attributable to energy efficient features of the home being financed.)

3. Has your organization written any EEMs for existing homes over the past two years?

a. If YES:

How many EEMs?

How many were refinancings by existing owners and how many were by home buyers?

How many were for HUD homes and how many were for conventional FHA-financed homes?

Could you describe how the application process for an EEM might be initiated? (for example, a home inspector, CHEERS audit, or PG&E audit revealed opportunities for energy savings, which were then pursued by the buyers and included in the value of the home and the size of the mortgage; or a seller was able to prove that the home was energy efficient enough to qualify.)

Does the application process differ significantly from a conventional mortgage application? How does it differ, and is this a barrier to EEMs?

b. IF NO.

Has your organization written any EEMs for new homes over the past two years?

c. IF NO FOR BOTH:

If none written, why not? What are the major obstacles to your organizations making such loans? (Example, don't know enough about them; paperwork too complicated; don't believe reduced energy costs would be that substantial; hard to sell mortgage in secondary market, etc.)

d. ALL:

How would you describe your organization's general attitude toward EEMs?

What do you see as positive aspects of EEMs?

What do you see as drawbacks associated with EEMs?

What barriers exist to keep your organization from writing more EEMs?

Do you think that in the coming year you will write more, fewer, or about the same number of EEMs as in the past year?

1. Next, I'd like to ask you about the perceptions of customers and others regarding EEMs.

Do you think most customers are aware that EEMs may be available for certain types of homes or home improvements?

What do you think are customers' overall attitudes toward EEMs?

What do they see as positive aspects of EEMs?

What do they see as drawbacks associated with EEMs?

What barriers exist to keep customers from applying for EEMs?

2. Regarding the attitudes of realtors and real estate agents,

Have you seen evidence that realtors are reluctant to encourage home buyers to apply for EEMs?

What perceptions underlie this reluctance?

To what extent are these perceptions of realtors accurate?

3. Next I would like to talk about customer financing of home improvement projects. To the best of your knowledge, how would customers typically finance each of the following types of home improvement projects (central A/C or furnace replacement; whole house window replacement; kitchen remodeling; a room addition; lighting improvements):

- Refinancing of a whole-house mortgage
- A second mortgage or home equity loan
- A home equity line of credit
- An unsecured personal loan

4. Has your organization written any EEMs or energy efficient loans tailored to specific retrofit or renovation projects for existing homes? By that I mean, for example, providing a loan to cover attic or wall insulation on the basis of expected energy savings that would more than cover the loan principal and interest.

If yes, can you give me some examples?

If no, would you consider such a loan? What kind of documentation of energy savings expected from the project would you require to make such a loan on an existing home?

5. One of the areas where PG&E is interested in capturing opportunities for energy efficiency is renovations at the time of sale (TOS). In this scenario, a home energy rating auditor or home inspector would identify opportunities for cost-effective energy efficiency improvements that would “pay for themselves” in reduced energy bills. If the lender would include the cost of the improvements in the first mortgage, they would yield a positive cash flow to the buyer and in fact enhance their ability to repay to overall mortgage.

How often do home buyers include the cost of (non-energy-related) TOS renovations in the first mortgage on the house?

Do you have experience with energy-saving TOS renovations of the kind described above?

IF NO, what do you think of the concept; is it a kind of loan that your organization would consider? What kind of documentation would you require?

IF YES, Do you explicitly consider time-of-sale renovations from an energy efficiency standpoint; that is, do you take the reduced energy costs into account when determining whether the buyer qualifies for the loan? If not, what might induce you to do so?

What do you think PG&E could/should do to make this concept attractive to your organization or to other lenders?

What do you think they should do to make it attractive to customers?

6. Would your organization (or one of its affiliates) have any interest in acting as a facilitator who brings together the various components of the TOS renovation to ensure that all cost-effective energy efficiency measures are obtained and that financing will be available to cover the cost of those measures?
7. Do you see any organizations or market players who might naturally take on such a role?

Those are all the questions I have for you today. Thank you very much for your time.



## **Trade Association Instrument**

Hello. I'm calling from Quantum Consulting on behalf of Pacific Gas & Electric. We are conducting a study of the residential retrofit and renovation market to assist PG&E in designing programs to help achieve greater energy efficiency in residential retrofit and renovation projects. We are speaking with a variety of players in that market so that we can better understand their business patterns and their needs and perceptions to help PG&E design better programs. Since your organization represents some of those market players, we thought it would be useful to get your perspective on energy efficiency trends in the retrofit and remodeling market. Are you the right person to talk to about your association's role in the residential retrofit and renovation market? If so, can you please give me your name and title.

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(Name)

(Title)

This interview will last about 20 minutes. Do you have time to discuss these issues now? If NO, reschedule.

IF NOT RIGHT PERSON, Who is the most knowledgeable person that we might speak with?

---

(Name)

(Phone)

(Title)

Repeat introduction for new contact.

What I would like to discuss with you today is your organization's role as it relates to energy efficiency in retrofit, renovation, and remodeling projects for existing or on-the-market homes.

To start with, I'd like to get some indication of the scope and nature of your organization's activities, both overall and in the California market.

1. What specific market actors does your organization represent? Approximately how many members does it have? How many in California (if appropriate)?
2. How would you define your overall mission as it relates to those market actors? (If appropriate, how would you differentiate yourself from other associations serving all or part of that same group?)
3. How would you define your role in helping to promote energy efficiency in the California market (or the national market, as appropriate)? (For example, setting certification standards and testing protocols, providing information to members and/or end users)
4. Does your organization have or promote a specific definition of energy efficiency that applies to your members? (for example, windows, loans, lighting, kitchen design/appliances)
5. What do you see as the most important energy efficiency related issues currently facing your organization or your members? (for example, certification and testing, impact of utility restructuring, tighter federal or state regulations, etc.)
6. One of the specific issues we are investigating is the process by which energy efficient residential retrofit and renovation measures are selected and installed.

To what extent do your members emphasize energy efficiency as a selling tool? Is it of primary importance? Secondary importance? Not at all important? If not important, what are the primary attributes that your members use to sell their products/services?

Has there been any change in your members' approach to selling energy efficiency in the past year or two as, for example, traditional utility rebate programs have been phased out? Do you anticipate that their role will change?

7. We are particularly interested in determining whether there are certain groups of vendors or other market actors who are taking a lead in the installation of multiple energy efficiency measures as part of a retrofit or renovation project. (For example, a window installation contractor might put new windows in a house with no wall insulation, identify that as an energy saving opportunity to the home owner, and then act as the prime contractor who subs out the insulation work.) This whole-house approach to energy efficiency is currently being emphasized by PG&E as a means of capturing all cost-effective energy efficiency actions.

How does your organization view this approach?

Are any of your members moving in this direction?

8. One of the market developments that makes the whole-house approach to energy efficiency possible is the availability of energy-efficient financing (such as energy efficient mortgages, or EEMs) that provides home owners with positive cash flow from the installation of energy efficient measures. (IF ASKED, define: An energy efficient mortgage enables the borrower to qualify for a larger loan because of anticipated utility bill savings attributable to energy efficient features of the home being financed.) Particularly at the time an existing home is purchased, buyers are able to incorporate the cost of energy efficient retrofit and renovation measures into their overall financing package.

To what extent are your members working with energy efficient financing, specifically Energy Efficient Mortgages, or EEMs.

Have your members found EEMs useful as a selling tool? What do they see as its advantages and disadvantages? Are they particularly using it for time-of-sale (TOS) retrofit and renovation projects?

IF SCOPE EXTENDS BEYOND CALIFORNIA: Are there energy efficient financing options being used by your members elsewhere in the country that are not available in PG&E's service territory? Please explain.

What actions might PG&E take to make your members more aware of EEMs or to make them more useful as a means of encouraging energy efficient retrofit and renovation activity, either for individual measures or the whole house? (Probe for information, training)

9. In selling measures or projects that have energy efficiency implications, what particular problems do your California members face when dealing with customers for whom English is not their primary language (for example, those who speak Spanish or Cantonese.)

How frequently does this issue arise?

Does your organization have any ongoing efforts to address those problems?

What might PG&E do to increase the extent to which these customers are able to take advantage of time-of-sale energy efficiency opportunities?

10. Are any of your members currently acting (or do any have an interest in acting) as a service integrator or facilitator who pulls together a package of recommended actions to ensure that all cost-effective energy efficiency measures are obtained and that financing such as an EEM is available to cover the cost of those measures?

What do you see as benefits to a firm of taking on that role (for example, competitive edge; lets them be one-stop-source for customers; more control over the quality/value of improvements)

Why not (not worth the effort, not their business, too much market risk)?

11. Summing up, how do you view the development of a market for time-of-sale, "whole-house" approaches to energy-oriented renovation projects? Do you think this is a likely evolution? Why or why not? What, if anything, could or should be done to encourage the development of this market?
12. Are there specific training needs related to energy efficiency that you believe PG&E should address for your members or your industry? Can you elaborate?
13. Finally, is there a publication, either oriented to California or to the national market, that your organization provides to its members? Is there a website or any other medium through which you disseminate information to your members and the general public?

Those are all the questions I have for you today. Thank you very much for your time.





6. How would you break down, by percentage, your audits among:
- Urban
  - Suburban
  - Rural primary residence
  - Rural/resort vacation home
7. Similarly, how would you break down, by percentage, your audits among:
- Single family detached houses
  - Town homes
  - Condominiums
  - Other
8. How would your break down, by percentage, the source of your CHEERS jobs?
- Referrals (CHEERS)
  - Referrals (realtors)
  - Referrals (lenders)
  - Referrals (home owners)
  - Yellow pages
  - Other advertising
  - Other
9. What prompts customers to seek a CHEERS audit?
- Do not read; check all that apply**
- Obtain energy efficient mortgage
  - Prepare home for resale
  - Identify opportunities for energy efficiency improvements
  - HUD, other federal programs
  - Other (specify)
  - Other (specify)
10. About what percentage of your audits are conducted specifically to provide documentation for an Energy Efficient Mortgage? \_\_\_\_\_ percent
11. What specific actions do you think PG&E could take to increase the number of home owners who know about and take advantage of the CHEERS ratings?
- Do not read; check all that apply**
- Information and promotion for home owners
  - Information and promotion for home buyers
  - Information and promotion for realtors
  - Information and promotion for lenders
  - Training for realtors
  - Training for lenders
  - Training for contractors
  - Other (specify)
  - Other (specify)
12. Next I would like to talk about the rating process itself and the extent to which you interact with the customer whose home is being inspected.

About how long does a typical audit take? \_\_\_\_\_ hours

Is the home owner (or the person/institution requesting the rating) present while you are conducting your inspection? Yes/No \_\_\_\_\_

Do you talk with the home owner to explain what you are looking for? Yes/No \_\_\_\_\_

Do you conduct your analysis on site or later? (If later, how quickly are results generated and sent to the home owner?)

How often do you discuss the results of the rating process and the resulting recommendations with the home owner?

- Never
- Not Very Often
- Occasionally
- Most of the Time
- All of the Time
- Other: \_\_\_\_\_

If not, how often do you get follow-up questions from the home owner about the results?

- Never
- Not Very Often
- Occasionally
- Most of the Time
- All of the Time
- Other: \_\_\_\_\_

13. Based on your experience and on what home owners tell you, how often do home owners act on the recommendations contained in your rating?

What kinds of measures are they most likely to act on? \_\_\_\_\_

Least likely? \_\_\_\_\_

Do the results encourage people to follow a whole-house approach and implement all cost effective measures, or are the results presented in such a way that the home owner can “cream skim,” or implement only those measures that have the highest payback relative to cost?

14. What do you think are the main barriers to home buyers acting on the results of the CHEERS rating? (probe for lack of money/access to financing; not confident benefits as promised; not willing to spend money on energy efficiency; worried that they’ll sacrifice comfort, aesthetics.)

**Do not read; check all that apply**

- \_\_\_\_\_ Don’t know where to get information on recommended measures
- \_\_\_\_\_ Doubts about Energy Savings from recommended measures
- \_\_\_\_\_ Recommended actions cost too much relative to benefits
- \_\_\_\_\_ Not convinced predicted savings will materialize
- \_\_\_\_\_ Don’t like specific measures
- \_\_\_\_\_ Don’t want to go into debt
- \_\_\_\_\_ Prefer to put money into more visible improvements
- \_\_\_\_\_ Not planning to stay in house long enough to recover costs
- \_\_\_\_\_ Too Much Hassle
- \_\_\_\_\_ Other Barrier 1: \_\_\_\_\_
- \_\_\_\_\_ Other Barrier 2: \_\_\_\_\_
- \_\_\_\_\_ Other Barrier 3: \_\_\_\_\_

15. Are there actions that PG&E might take to make home buyers more likely to undertake recommended actions to increase energy efficiency? (probe for information on the costs and benefits of specific measures; financing; certification of vendors)?

16. What percent of your ratings involve customers for whom English is not their primary language?

\_\_\_\_\_ Percent

17. What problems do you face when dealing with customers for whom language may be a barrier, particularly with regard to discussing results and recommendations that have energy efficiency implications?

\_\_\_\_\_

18. How does your organization address these problems?

\_\_\_\_\_

19. What might PG&E do to increase the extent to which these customers are able to take advantage of energy efficient financing options?

\_\_\_\_\_

20. With regard to recommended actions, what recommendations do you make regarding how or by whom those corrective actions should be made:

**Do not read; check all that apply**

- \_\_\_\_\_ Make no recommendations
- \_\_\_\_\_ Provide recommendations on the type of vendor (e.g., problem requires a window contractor, an electrician, or a general contractor)
- \_\_\_\_\_ Provide unscreened lists or directories of potential vendors
- \_\_\_\_\_ Provide screened lists of potential vendors
- \_\_\_\_\_ Provide referrals to specific vendors
- \_\_\_\_\_ Offer to implement the recommended measures
- \_\_\_\_\_ Other (specify)

21. Is your organization currently acting (or do you have an interest in acting) as a facilitator who brings together the various components of the package of recommended actions to ensure that all cost-effective energy efficiency measures are obtained and that financing such as an EEM is available to cover the cost of those measures?

- [ ] Yes
- [ ] No

What do you see as benefits to you or your firm of taking on that role (for example, competitive edge; lets you be one-stop-source for customers; more control over the quality/value of improvements)

\_\_\_\_\_

Why not (not worth the effort, not our business, too much market risk)?

\_\_\_\_\_

Do you see a potential conflict between the CHEERS rater's role as an independent inspector and the role of general contractor or facilitator for EEMs?

- [ ] Yes
- [ ] No

How well are current facilitators balancing those two roles?

22. Summing up, how do you view the development of a market for time-of-sale, “whole-house” approaches to energy-oriented renovation projects? Do you think this is a likely evolution? Why or why not? What, if anything, could or should be done to encourage the development of this market?
23. Having thought about these issues during our conversation, are there specific training needs related to energy efficiency that you believe PG&E should address for you and other CHEERS raters? Can you elaborate?
24. Finally, are there specific publications oriented to the California (or national) market that you and other CHEERS raters regularly read? Also, are there specific local, regional, or national associations that might provide a good vehicle for disseminating information about energy efficiency to the home energy efficiency rating community?

Those are all the questions I have for you today. Thank you very much for your time.

## ***Media Instrument***

Hello. I'm calling from Quantum Consulting on behalf of Pacific Gas & Electric. We are conducting a study of the residential retrofit and renovation market to assist PG&E in designing programs to help achieve greater energy efficiency in residential retrofit and renovation projects. We are speaking with a variety of players in that market so that we can better understand their business patterns and their needs and perceptions to help PG&E design better programs. Since your publication reports on aspects of that market, we thought it would be useful to get your perspective on energy efficiency trends in the retrofit and remodeling market. Are you the right person to talk to at your publication about energy efficiency in the residential retrofit and renovation market? If so, can you please give me your name and title.

---

(Name)

(Title)

This interview will last about 15 minutes. Do you have time to discuss these issues now? If NO, reschedule.

IF NOT RIGHT PERSON, Can you tell me who I might speak with?

---

(Name)

(Phone)

(Title)

Repeat introduction for new contact.

What I would like to discuss with you today is your view of developments in energy efficiency in retrofit, renovation, and remodeling projects for existing or on-the-market homes.

To start with, I'd like to get an indication of the scope and nature of your publication's coverage.

1. How would you characterize your readership (homeowners, remodeling contractors, general contractors, lighting/window/HVAC contractors, inspectors, lenders, realtors, etc.)
2. What is your approximate circulation? How much of that is in California (if appropriate)?
3. How would you characterize your overall editorial focus as it relates to your readers? (If appropriate, how would you differentiate yourself from other publications serving all or part of that same group?)
4. What specific aspects of the residential retrofit or renovation market does your publication cover?
5. To what extent is energy efficiency a topic that you focus on in your publication?
6. How interested are your readers generally in energy efficiency compared to other topics?
7. What do you see as the most important energy efficiency related issues currently facing your readers? (for example, certification and testing, impact of utility restructuring, tighter federal or state regulations, etc.)
8. Are you following any other significant trends in energy efficiency as they relate to your readers, particularly in California?

9. One of the specific issues we are investigating is whether there are certain groups of vendors or other market actors who are taking a lead in the installation of multiple energy efficiency measures as part of a retrofit or renovation project. This whole-house approach to energy efficiency is currently being emphasized by PG&E as a means of capturing all cost-effective energy efficiency actions.

Have you seen any evidence of this approach in the marketplace?

Who are some vendors that are pursuing this whole-house approach?

Have any of your readers expressed an interest in learning more about this trend?

10. One of the market developments that relates to the whole-house approach is the availability of energy-efficient financing (such as energy efficient mortgages, or EEMs) that provides home owners with positive cash flow from the installation of energy efficient measures. (IF ASKED, define: An energy efficient mortgage enables the borrower to qualify for a larger loan because of anticipated utility bill savings attributable to energy efficient features of the home being financed.) Particularly at the time an existing home is purchased, buyers are able to incorporate the cost of energy efficient retrofit and renovation measures into their overall financing package.

Is the availability of energy efficient financing, specifically Energy Efficient Mortgages, or EEMs, something that you see affecting the market?

Have your readers or industry people you talk to found energy efficient financing useful as a tool? What do they see as its advantages and disadvantages? Are they particularly using it for time-of-sale (TOS) retrofit and renovation projects?

IF SCOPE EXTENDS BEYOND CALIFORNIA: Are there energy efficient financing options being used elsewhere in the country that are not available in PG&E's service territory? Please explain.

What actions might PG&E take to make your readers more aware of EEMs and energy-efficient renovation activity, either for individual measures or the whole house? (Probe for information)

11. One of the trends we are looking for in the market is the emergence of vendors (or lenders, or others) who are acting as service integrators or facilitators who pull together a package of recommended actions to ensure that all cost-effective energy efficiency measures are obtained and that financing is available to cover the cost of those measures.

Do you see any firms who are moving to take on that role? (If you know of specific firms who are providing such services, can you provide me with a contact name and number?)

If none are doing so now, do you know of any market players in the areas you cover who might naturally take on such a role?

12. Summing up, how do you view the development of a market for time-of-sale, "whole-house" approaches to energy-oriented renovation projects? Do you think this is a likely evolution? Why or why not? What, if anything, could or should PG&E be doing to encourage the development of this market?

Those are all the questions I have for you today. Thank you very much for your time.