SECTION II
MARKET CHARACTERIZATION

Home Energy Fitness Program
Market Effects Evaluation

Final Report

STUDY 3701

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CONTENTS

EXECUTIVE SUMMARY

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This report presents the results of the evaluation of the market effects of Southern California Gas Company's (SoCalGas) Home Energy Fitness (HEF) Program. The HEF Program promotes the adoption of energy efficient measures and practices by providing informational audits to residential customers. The goal of this evaluation was to determine the extent to which the HEF Program has produced sustained changes in the market for efficient gas technologies and in the behavior of residential customers beyond the direct impacts. These effects could result from additional energy efficiency actions that program participants have taken outside the program, changes in the supply of energy-using equipment, and changes in the energy use and buying habits of nonparticipants. These are changes that would not have occurred in the absence of the promotion and delivery of the program services. The research team used the following techniques to determine if the HEF Program has caused any such changes in the market for efficient gas measures and practices using the following techniques:

- Interviews with SoCalGas Company personnel;
- Interviews with suppliers of gas measures and contractors;
- Interviews and surveys of program participants and nonparticipants; and
- Analysis of gas billing data of past participants and nonparticipants.

The following is a summary of the findings of these investigations.

Review of Documents and Interviews with SoCalGas Company Personnel

The HEF Program provides a mail-based analysis of residential customers' gas consumption and makes recommendations on cost-effective gas efficiency measures and practices. The HEF Program was instituted in 1993 as part of SoCalGas Company's rate decision. In the five-year period since its inception, approximately 124,000 residential customers have participated in the HEF Program. This number represents almost 3% of SoCalGas Company's residential accounts and approximately 4.2% of the target population of customers in single family homes.

SoCalGas personnel indicated during our interviews that any market effects from the HEF Program probably occur through increased awareness of gas consumption and improved attitudes toward energy efficiency. We interviewed staff who have responsibility for the design and administration of the HEF Program and other SoCalGas personnel with general service responsibilities directed at existing residential customers. SoCalGas promotes energy efficiency to its residential customers in existing housing through the HEF Program. If, during other service contacts, customers indicate the need for assistance with efficiency decisions, SoCalGas refers them to the HEF Program.

The central strategy of the HEF Program is to increase customers' awareness of their annual natural gas usage, to educate consumers about energy saving measures and practices, and to inform customers about other available residential DSM programs. The program offers residential consumers, living in single-family homes, an evaluation of the "energy fitness" of their homes. Based on questionnaire responses, SoCalGas sends a personalized report to participants that breaks down gas consumption and costs by end-use, along with some recommendations for gas saving measures. The list of potential recommendations is short and based on fairly general rules. In addition to the personalized report's energy saving tips and recommendations, a handbook is included that offers general advice on efficient gas equipment and energy conservation practices. The HEF program does not contain a component that is aimed at directly influencing businesses, manufacturers, or government agencies. In terms of the possible market effects listed in Table 2-1 of the scoping study prepared for CADMAC (*A Scoping Study of Energy Efficiency Market Transformation by California Utility DSM Programs* by Joe Eto, Ralph Prahl, and Jeff Schlegel, July 1996), the HEF Program may be viewed as promoting the market effects of changing energy efficiency behavior due to changes in awareness, attitudes, knowledge, and (possibly) decision-making processes.

Based on past evaluations, the HEF Program appears to be effective in reducing gas consumption for at least the first impact year. Studies aimed at the persistence of the HEF Program impacts have not been performed. There seems to be no evidence from previous studies or from the experience of program administrators one way or the other to indicate whether the effects continue beyond the first year.

Interviews with Contractors and Suppliers of Gas Measures

The interviews with contractors and suppliers of residential gas indicate that the HEF Program has no discernible effect on the supply of efficient measures. None of the respondents was familiar with the HEF Program, although some mentioned that they were aware of past SoCalGas programs that offered rebates for high efficiency equipment and insulation. They said that SoCalGas programs do not have an effect on the technologies they stock or recommend to customers. Some said that the equipment exceeding the current equipment standards is not cost-effective in most applications in Southern California; they do not recommend high efficiency models for this reason. Suppliers said that very few customers specifically request high-efficiency models of furnaces or water heaters.

Interviews and Surveys of Residential Customers

We conducted a survey of residential customers to compare the ownership patterns and conservation practices of past HEF participants with those of a comparison group of

nonparticipants. We asked participants to recall the effects of the HEF audit report on their decisions to install efficiency measures and adopt conservation practices. We asked both participants and nonparticipants about ownership and recent installations of efficiency measures, changes in conservation behavior, and attitudes toward different energy decisions. The analysis of the survey responses revealed the following:

- **Participant Recall of HEF Audit Report**. Less than 30% of past participants recalled having received the audit report. Only one-third of those who recalled the report could remember any of the recommendations contained in the report. Among those who did recall at least one recommendation, most said they were planning to implement the measure before receiving the HEF audit report. Nonetheless, most of these respondents found the information in the report helpful.

- **Penetrations of Efficiency Measures and Conservation Practices**. More past HEF Program participants than nonparticipants report that they observe various conservation practices, such as changing furnace filters, using pool and spa covers, and turning off the furnace pilot light during the summer. Jointly, these differences are statistically significant, but individually most are not.

- **Efficiency Measure Installations and Changes in Conservation Practices**. A higher rate of HEF Program participants than nonparticipants reported that they installed various efficiency measures and adopted certain conservation behaviors. Both groups were asked about a series of conservation actions taken in the past three years. A higher rate of participants said they had had installed low-flow showerheads and water heater wraps and had lowered water heater temperatures and thermostat settings more frequently.

- **Attitudes Regarding Energy Practices**. Participants and nonparticipants were asked a series of attitudinal questions about various energy practices. The response patterns of the two groups were very similar, suggesting that the attitudes toward such concepts as cost-effectiveness, convenience, and equitable use of energy are comparable for the two groups.

Analysis of Billing Data for Participants and Nonparticipants

We estimated a series of load impact regression models (LIRM) on a sample of 1994 HEF Program participants and a comparison group of nonparticipants to determine whether savings attributable to the program persisted beyond the first year. LIRM's are statistical regression models that attempt to isolate the effects of program participation from other factors that determine natural gas consumption. These models examined the gas consumption patterns of the two customer groups for a period of almost three years beyond the program year. The results of the regression analysis confirmed that the HEF Program had a significant net impact in the first year after delivery of the audit reports, but that these impacts fell significantly in the second and third years. These estimates, taken in conjunction with the survey responses where participants said they already planned to take many of the recommended measures, suggest that the HEF Program accelerates the adoption of some conservation practices that participants would have taken eventually without the program.

Conclusions and Recommendations

The results of the various methods used to investigate the possible market effects of the HEF Program indicate that any such effects have been modest and confined to changes in consumer practices. There is no evidence that the HEF Program has directly affected supplier behavior. On the demand side, there is evidence from the surveys of moderate differences in conservation practices between past participants and nonparticipants. The analysis of gas consumption patterns suggests that the HEF Program accelerates the adoption of conservation practices that would have occurred eventually without the program.
Based on these findings, we have developed certain general recommendations for changes to the HEF Program that we believe would increase its cost-effectiveness and the likelihood of causing more significant market effects. These recommendations include:

- **Involve Suppliers in the Program**. As currently designed, the HEF Program contains no feature aimed at influencing the supply of efficient devices. In order to have any such effect, the HEF Program should contain some component whereby providers of efficient measures are recommended to HEF participants. Given that SoCalGas has unregulated affiliates that supply certain gas equipment, any program component of this type must deal with the issues surrounding affiliate contacts.

- **Follow-Up Recommendations**. After SoCalGas delivers the HEF audit report, there is currently no follow-up to confirm whether participants have implemented any of the recommendations. Given the poor recall rate of past program participants, SoCalGas should consider experimenting with the effectiveness of reminder letters to increase the adoption rate of the recommendations.

- **Include Recommendations in the Offer Letter**. The majority of the recommendations in the audit report are not specifically tied to the information provided by participants. Many, if not all, of these recommendations could be included with the original offer letter to residential customers at little or no additional cost. Recipients could be offered the personalized analysis of the HEF report if they want additional information on how they use natural gas and suggestions on how they can save energy.

- **Target Different Customer Segments**. Currently, the HEF Program is targeted at households in single-family residences with more than 5 years of continuous gas service or houses with vintages of at least 10 years. SoCalGas should consider targeting the program at other customer segments. For example, the offer letter could be directed at households who have started gas service in the past year. These households may be more receptive to the recommendations because they are more likely to be considering other changes in the dwelling.

- **Increased Use of Multimedia**. SoCalGas should investigate the cost-effectiveness of increasing its use of multimedia channels to promote conservation practices and the HEF Program services. The repetition of the advertising spots would reinforce conservation behavior and would give customers an ongoing opportunity to receive the HEF Program services.

Section I
INTRODUCTION

I. INTRODUCTION

This report presents the results of the evaluation of the market effects of Southern California Gas Company's (SoCalGas) Home Energy Fitness (HEF) Program. The HEF Program promotes the adoption of energy efficient measures and practices by providing informational audits to residential customers. The goal of this evaluation was to determine the extent to which the HEF Program has produced sustained changes in the market for efficient gas technologies and in the behavior of residential customers beyond the direct impacts. This market effects study was performed in response to Decision 96-12-079, issued December 20, 1996, regarding the "Final Opinion on 1996 Annual Earnings Assessment Proceeding," in which the California investor-owned electric and gas utilities were ordered to file an advice letter to conduct market effects studies.

The HEF Program provides a mail-based analysis of residential customers' gas consumption and makes recommendations on cost-effective gas efficiency measures and practices. The HEF Program was instituted in 1993 as part of SoCalGas Company's rate decision. In the five-year period since its inception, approximately 124,000 residential customers have participated in the HEF Program. This number represents almost 3% of SoCalGas Company's residential customer population.[1]

I.1 GOALS AND OBJECTIVES OF EVALUATION

The purpose of this study was to determine whether the HEF Program has produced any significant "market effects" and whether these effects have been sustained. Market effects are reductions in energy consumption in the SoCalGas service territory beyond program-related gross savings of participants. These effects could result from additional energy efficiency actions that program participants have taken outside the program, changes in the supply of energy-using equipment, and changes in the energy use and buying habits of nonparticipants. These are changes that would not have occurred in the absence of the promotion and delivery of the program services.

The determination of whether the HEF Program has produced any significant, sustained market effects has three main components:

1. The characterization of the markets for gas equipment and other measures affecting gas consumption. This characterization encompasses supply channels for gas equipment and of customer demand for gas appliances, including how customers currently access or obtain information on the relative energy use of different appliances in their gas bill and how they use this information to make decisions;

[1] Program administrators estimate that approximately 12% of households responded to the HEF solicitation from SoCalGas. implying that over 23% of residential households have been offered the audit services.

2. The estimates of whether the program has stimulated changes in these supply and demand characteristics; and

3. The estimates of whether any changes are sustainable in the sense that they will continue even after the program services have been withdrawn.

Under this goal of characterizing the market for efficient gas technologies and estimating any sustained market effects of the HEF Program, there are a number of specific objectives or research questions the study sought to address, including the following:

Market Characterization

- What are the penetrations of gas technologies in the existing housing replacement market, and how much do each of the technologies contribute to the overall level and change in residential sales?
- What are the distribution channels for the different gas end-uses in the existing housing replacement market?
- How do customers obtain information on the characteristics of alternative gas technologies when they need to install a piece of equipment in an existing home?
- What role does SoCalGas currently play in assisting customers in making decisions about gas equipment?

Program Effects

- How do the managers of the HEF Program believe that HEF affects the market for gas technologies and practices?
- How was the HEF Program targeted, and was any design consideration given to influencing suppliers?
- Did the HEF Program change participant attitudes toward energy efficiency?
- Did SoCalGas take follow-up steps to encourage participants to take actions recommended in the audit?
- Among participants who decided not to take recommendations, what were the reasons?
- To what degree do the changes in participant behavior persist after receipt of the audit?
- What are the sustained effects of the program on the behavior of suppliers?

- What possible changes in the delivery of program services would increase the level and the sustainability of the changes in the market for gas equipment in favor of more efficient technologies?

I.2 EVALUATION METHODOLOGY

The goal of the study was to answer the research questions above using multiple approaches. The key approaches were a) applications of survey research techniques, and b) regression analyses of gas consumption patterns for samples of past program participants and a comparison group of nonparticipants. These quantitative analyses were supplemented by a review of past studies and interviews with different participants in the market for gas equipment and other measures that affect the efficient use of natural gas in the residential sector. The interviews were conducted with SoCalGas personnel, residential customers, and suppliers to obtain a qualitative understanding of respondents' perceptions of the program and its effects. The results of these interviews, which were conducted before the surveys, were also used to develop specific questions in the surveys. The review of past studies included results from earlier surveys that were compared with responses to the surveys administered under this study.

The survey research component of the evaluation consisted of the administration of two telephone surveys and the comparisons of responses across different customer groups. The two surveys were directed to past program participants and to a comparison group of nonparticipants. The survey included a series of questions about gas equipment ownership and use, recall of the HEF program recommendations (participants only), investments in energy efficient technologies in the past three years, changes in energy efficiency practices, attitudes toward energy practices and appliance decisionmaking, and housing and demographic characteristics.

Analysis of survey responses yielded estimates of whether the program caused any changes in behavior beyond the first year impacts. The research team estimated changes based on participant self-reports of the program effects and on comparisons of attitudes and behavior between participants and nonparticipants. In an effort to identify possible changes over time, we also compared some of the responses to the 1997 surveys to those from a general residential survey conducted in 1991.

In the regression analysis, we examined patterns of gas consumption for a sample of 1993 HEF participants relative to a comparison group for a period from 1992 through the middle of 1997. The regression model specification included variables that capture the changes in gas consumption on the part of program participants in each of the three years following receipt of the HEF audit, after controlling for trends in gas consumption; variations in weather; and equipment, dwelling, and demographic characteristics.

The results of the interviews and analyses are presented and discussed in Sections II through VI of this report. The appendices include documentation of the survey sample design, data preparation. and related analysis. The remainder of the report is organized in this way:

Section II	Market Characterization
Section III	Results of Internal Interviews
Section IV	Analysis of Participant and Nonparticipant Surveys
Section V	Billing Analysis of Persistence of Program Effects
Section VI	Conclusions and Recommendations

II. MARKET CHARACTERIZATION

This section summarizes the size of the market for gas equipment and the distribution of technologies in existing dwellings in the SoCalGas service territory using available secondary data. The estimates of the saturations and unit energy consumption levels for the different end-uses in the SoCalGas service territory are based existing forecasting models, past residential surveys, and internal studies. The contribution of each end-use to total annual sales in this market is reported in this section.

II.1 TOTAL MARKET SIZE

The residential market for natural gas in the SoCalGas service territory consists of more than 4.4 million accounts with total sales of 243.5 million therms in 1995. This corresponds to an estimated 5.2 million households with gas service who consumed an average of 468 therms of gas during 1995. These residential customers are approximately 97% of the households in the geographical area for which SoCalGas has its retail franchise. Almost two-thirds of the households served by SoCalGas live in single-family homes, and most of the remainder live in multi-family units.

II.2 END-USE SATURATIONS

The saturations of gas equipment by end-use and building type are summarized in Table II-1. Gas technologies account for virtually all space and water heating in single family homes with natural gas service. The few homes without gas space or water heating were either built before gas service was extended to the local area or they were built by developers who participated in all-electric promotional programs during the 1950's and 60's. The single family dwellings without gas service are generally older and smaller than average.

Table II-1
Saturations of Gas End-Uses by Building Type

End-Use	Building Type	
	Single-Family	Multiple-Family
Space heating	98%	82%
Water heating	95%	68%
Cooking	77%	88%
Clothes Drying	63%	33%
Others	8%	1%

While gas is still the dominant fuel for space and water heating in multi-family housing, it is less pervasive than in single family units. Several reasons have been proposed for this lower saturation in multi-family units:

1. The low heating requirements of apartments in Southern California reduces the life cycle cost advantage of natural gas, which typically has lower operating cost than electric heating;

2. The added piping and venting requirements of gas equipment in many multi-family units both raise its cost and increase its space requirements relative to electric systems in many buildings; and

3. Electric packaged heat pumps have been favored by some builders of small apartments that require cooling in the summer because they are easy to install and can adequately serve both heating and cooling from a single ventilation register.

II.3 ENERGY CONSERVATION MEASURE SATURATIONS

The California Conservation Inventory Group (CCIG) has compiled a database of energy conservation measures (ECM's) with associated information on saturations and estimates of costs and savings. The energy conservation measures include both energy-efficient equipment, such as pulse combustion furnaces, and building treatments, such as ceiling insulation. CCIG has ranked the conservation potential of these measures and identified a subset that offers the greatest opportunities for achieving significant savings through retrofit installations. The natural gas measures that fall into this set of "Top 10 Residential Measures" are:

- Ceiling Insulation (R-30+);
- High efficiency Gas Furnaces (AFUE of 92%+);
- High efficiency Water Heaters; and
- Low-flow Showerheads

SoCalGas has developed estimates of the saturations of these ECM's for planning and forecasting purposes. The CCIG has also prepared separate estimates of the saturation of these ECM's.[1] These estimates are presented and discussed below.

Ceiling Insulation

The CCIG estimates that 50% of single family dwellings with gas furnaces in the SoCalGas service territory have ceiling insulation with an R value of 30 or more (1995 Compilation of

[1] The primary sources for the CCIG estimates are various surveys and other studies commissioned by Southern California Gas Company. They are consistent with the estimates that SoCalGas has developed independently for its forecasts.

Energy Efficiency Measure Saturation Data, March 1995. California Energy Commission Publication P300-95-003). The estimated number of households with gas furnaces in 1993 was 2.65 million. meaning that over 1.3 million dwellings with gas furnaces could potentially be upgraded to R-30+ insulation levels. The CCIG estimates do not identify the percent of remaining dwellings that have ceiling crawl space to permit upgrades or the proportion of dwellings for which such an upgrade would be cost effective at current gas prices.

The CCIG estimates are based on self-reported data from a survey of existing dwellings in 1991. According to the CCIG consultant who compiled the estimates, these estimates are considered unreliable "since respondents may not know the level (or R-value) of their insulation."

The CCIG also estimated the installation rate of ceiling insulation upgrades over R-30+ in existing dwellings. The estimate for 1993 was 0.5%. This estimate was based on figures drawn from SoCalGas Company's annual filings to the CPUC on its demand-side management program activities.

High Efficiency Space Heaters

As part of its forecasting requirements, SoCalGas has developed estimates of the saturations and penetrations of natural gas space heating systems by building type and efficiency category. The efficiency categories are defined relative to the current minimum standards for new gas furnaces. These new furnaces are required to have an average fuel utilization efficiency (AFUE) of at least 78%. The existing stock of gas furnaces were manufactured before the 1984 standard. The standard efficiency furnaces are those that meet or slightly exceed the standard. The high efficiency furnaces are those that exceed the standard category by an average of 15%, corresponding to an AFUE of approximately 92%.

The saturations of space heating system efficiencies by building type are presented in Table II-2. High-efficiency furnaces have a 7% saturation rate in single-family dwellings and mobile homes. The saturation is 2% in multi-family units.

The penetration rates of space heating system efficiencies by building type are presented in Table II-3. These rates apply to replacements of equipment in existing housing when they fail and to installations in new construction. There is a estimated 5% installation rate of low-efficiency units that represents noncompliance with current equipment code. The greatest penetration rates for high-efficiency furnaces is in single family and mobile homes. The lowest penetrations are in larger apartment buildings where loads are the smallest.

High Efficiency Water Heaters

Water heater efficiencies have been subject to standards since 1981. The standards are stated in terms of an energy factor that is an average of the thermal efficiency and stand-by loss rate of the water heater. Under the existing standards, a 50-gallon water heater would have an energy factor of at least .525.

The saturations and installation rates of gas water heaters by efficiency category and building type are shown in Tables II-2 and II-3, respectively. The saturation of high efficiency water heaters in single family and mobile homes is 19%, while the installation rate is only slightly higher at 22%.

Table II-2
Average Efficiency Shares by End-Use and Building Type

End-Use		Building Type				
		Single-Family	Multiple-Family2	Multi-Family3	Multi-Family4	Multi-Family5
Space heating	Existing	62%	73%	53%	53%	62%
	NewStd	31%	25%	45%	45%	31%
	NewHiE	7%	2%	2%	2%	7%
Water heating	Existing	13%	25%	16%	16%	13%
	NewStd	68%	61%	76%	76%	68%
	NewHiE	19%	14%	8%	8%	19%

Table II-3
Marginal Efficiency Shares by End-Use and Building Type

End-Use		Building Type				
		Single-Family	Multiple-Family2	Multi-Family3	Multi-Family4	Multi-Family5
Space heating	Existing	5.0%	5.0%	5.0%	5.0%	5.0%
	NewStd	77.9%	88.4%	91.2%	91.2%	77.9%
	NewHiE	17.1%	6.7%	3.8%	3.8%	17.1%
Water heating	Existing	1.0%	1.0%	1.0%	1.0%	1.0%
	NewStd	77.2%	80.2%	89.1%	89.1%	77.2%
	NewHiE	21.8%	18.8%	9.9%	9.9%	21.8%

Low Flow Showerheads

The maximum flow rate of all new showerheads has been subject to standards in California since 1978. These standards set a maximum flow rate of 2.75 gallons per minute on all new devices sold in the state.

According to the CCIG estimate, 55% of showers in the SoCalGas service territory have low flow devices. With the exception of a presumed small rate of noncompliance, 100% of the showerheads that are replaced are low-flow units.

Other Energy Conservation Measures

The CCIG has identified other energy conservation measures that offer potential for additional gas savings in the SoCalGas service territory. These measures are not ranked high in the priority list of ECM's because the savings per measure are small or because the number of cost effective applications in Southern California are limited.

A partial list of these measures and estimates of their saturations in Southern California are presented in Table II-4.

Table II-4
Saturations of Other Energy Conservation Measures

Energy Conservation Measure	Estimated Saturation
Duct Insulation	29%
Floor Insulation	7%
Caulking/Weather Stripping	36%
Set-Back Thermostat	34%
Wall Insulation	27%
Water Heater Insulation	25%

The estimates of the saturations for these energy conservation measures are based on a 1991 survey that asked respondents if they had these devices installed in their residences. Since the estimates are self-reported, they must be viewed with some caution. In addition, the questionnaire upon which the estimates are based did not identify cases for which the measure was unfeasible. This absence of this information makes the interpretation of the saturation rate somewhat ambiguous.

Other Energy Conservation Practices

In addition to the conservation measures that residential customers can install to reduce gas consumption, there are a number of practices that can reduce gas consumption. These practices include such actions as turning off the pilot light during summer months, turning the water heater thermostat to pilot when people go on vacation, and manually setting back the space heater thermostat at night when people are in bed. Clearly there are no markets for these practices since they do not require customers to install a device; however, the practices offer potential for moderate savings in gas consumption on the part residential customers.

II.4 UNIT ENERGY CONSUMPTION RATES

The average annual energy consumption levels for gas end-uses by building type are shown in Table II-5. In single-family homes, gas space and water heating account for almost 90% of the average annual consumption. In multi-family dwellings, gas space and water heating account for only a slightly smaller percent of average consumption (approximately 86%). While some of the remaining gas end-uses, such as pool and spa heaters, may consume a large number of therms in individual applications, they account for a very small proportion of average consumption due to their low saturations.

Table II-5
Unit Energy Consumption by End-Use and Building Type
(Therms per Year)

End-Use	Building Type	
	Single-Family	Multiple-Family
Space heating	330	164
Water heating	221	145
Cooking	33	31
Clothes Drying	49	34
Others	123	48
Total	**599**	**272**

Table II-6 shows the estimated unit energy consumption rates by efficiency category in the different building types. These are drawn from SoCalGas Company's forecasting model data showing that the differential in equipment efficiencies is 15% across categories.

Table II-6
Unit Energy Consumption by Efficiency and Building Type

End-Use		Building Type				
		Single-Family	Multi-Family < 5 Units	Multi-Family 5+ Units	Multi-Family Master Metered	Multi-Family Sub-Metered
Space Heating	Existing	363	273	243	182	291
	NewStd	316	237	211	158	253
	NewHiE	275	206	183	137	220
Water Heating	Existing	243	190	169	127	203
	NewStd	211	158	141	106	169
	NewHiE	183	137	123	92	147

II.5 DISTRIBUTION CHANNELS FOR GAS END-USES IN EXISTING HOUSING

Based on a review of past studies of the suppliers of gas equipment, interviews and surveys with residential customers, and interviews with selected suppliers, it is clear that the distribution channels for natural gas technologies serving the existing residential housing market is very dispersed. The distribution channels are segmented to some degree according to end-use equipment and contractor versus retail outlets.

The major equipment end-uses in the residential existing home market—gas furnaces and water heaters—are served primarily by HVAC and plumbing contractors, respectively. A significant portion of water heaters and, to a lesser degree, furnaces are also supplied through retail outlets, including hardware and plumbing supply stores and home improvement centers, such as Home Depot.

The other significant gas end-uses and efficiency measures are supplied through a variety of channels. Cooking and clothes drying are also distributed primarily through retail stores. Contractors perform most of the major installations of insulation, while minor upgrades are typically done by the households themselves, with materials from hardware stores or home improvement centers.

In an effort to identify what supply channels consumers use, the residential surveys and interviews included questions for customers about their furnaces and water heater replacement decisions. Respondents were asked if they had replaced a furnace or water heater in the past several years and, if so, how they made their decisions. The interviewers also asked consumers who had not replaced a furnace or water heater how they would decide where to purchase a replacement and how they would decide on its efficiency.

The responses to the survey questions regarding gas equipment replacements are summarized in the following tables.[2] These questions were posed only to respondents who said they had replaced the equipment in the past three years. As the tables show, contractors are the largest single source of water heaters. In combination, various types of retail outlets (hardware stores, home improvement centers, department stores, and appliance stores) account for over 50% of the units.

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[2] In previous surveys of customers and suppliers, SoCalGas has not asked questions about equipment replacements that would allow comparisons with the quantitative results in this study. However, the qualitative interview responses of contractors in this study and an earlier one (Southern California Gas Company Delivery Chain Research Report, Goldfarb Consultants, October 1992) are consistent with the response frequencies in the tables.

For furnaces, contractors seem to dominate the replacement market. Over 70% of the respondents said they used a contractor to replace their space heaters. Retail outlets accounted for most of the remainder of the market.

In the interviews that explored the replacement decisions in greater depth, respondents were asked how they would make a decision on a furnace or water heater replacement. For furnace replacements, most said they would ask one or more contractors directly for a replacement. These respondents typically said they would look in the telephone book for names. Many said they would ask for a referral from a personal acquaintance. Several responded that they would ask SoCalGas for a recommendation.[3] Almost all respondents said they would rely on the contractor's recommendation to decide what model to install, but some said they would compare the recommendations from more than one source.

The responses regarding water heater replacements were similar. Many of the respondents said they would buy the water heater from a retail outlet and either have a plumber install it or do it themselves. They typically said they would either rely on the plumbing contractor to recommend the model or, if they installed the water heater themselves, they would ask the retail vendor what to buy. Many respondents mentioned the yellow Energy Guide tag as a source of information they would use in making their choices.

Table II-7
Where did you go to replace your water heater?

	Participant		Nonparticipant		All Respondents	
	#	%	#	%	#	%
Hardware Store	13	6.9%	15	8.1%	28	7.5%
Home Improvement	54	28.6%	62	33.5%	116	31.0%
Contractor	69	36.5%	51	27.6%	120	32.1%
Other	10	5.3%	3	1.6%	13	3.5%
Department Store	29	15.3%	31	16.8%	60	16.0%
Appliance Store	7	3.7%	6	3.2%	13	3.5%
Don't Know	7	3.7%	17	9.2%	24	6.4%
Total	189	100.%	185	100.%	374	100.%

[3] At the beginning of the interview, the interviewer said she was calling on behalf of Southern California Gas Company.

Table II-8
Where did you go to replace your space heater?

	Participant		Nonparticipant		All Respondents	
	#	%	#	%	#	%
Hardware Store	0	0.0%	4	5.9%	4	2.9%
Home Improvement	2	2.9%	7	10.3%	9	6.6%
Contractor	55	79.7%	43	63.2%	98	71.5%
Other	3	4.3%	1	1.5%	4	2.9%
Department Store	4	5.8%	4	5.9%	8	5.8%
Appliance Store	5	7.2%	6	8.8%	11	8.0%
Don't Know	0	0.0%	3	4.4%	3	2.2%
Total	69	100.%	68	100.%	137	100.%

The responses to the questions on replacement decisions indicate that customers rely heavily on contractors and their recommendations in making their gas equipment choices. This suggests that an important feature of an information program such as HEF would be to refer customers to qualified contractors who provide efficient models. In the past, the HEF Program has referred participants to SoCalGas Company's Energy Facts Program which provides a list of qualified contractors. This component of the Energy Facts Program has been suspended since January 1998 due to issues surrounding affiliate contacts. Any re-design of the HEF Program should consider adding a contractor referral component, with support to contractors in providing information on efficient technologies.

Tables II-7 and II-8 summarize replacement decisions discussed above.

II.6 HEF Program Penetration

Since its inception in late 1993, SoCalGas has delivered approximately 124,000 audit reports and informational handbooks to its residential customers under the HEF Program. This represents about 4.2% of the target population of customers in single family homes with gas service in the SoCalGas service territory.[4] The breakdown of delivered HEF reports by program year is shown in Table II-9.

Table II-9
HEF Program Participation by Year

1994	41,329
1995	33,363
1996	27,972
1997 (est.)	20,500
Total	124,164

The HEF Program administrators do not maintain data on the number of solicitations it has sent to its customers. However, they estimate that approximately 12% of the households who receive a solicitation for a HEF audit respond and return a completed questionnaire. Using this response rate, over 35% of all households in single family dwellings have been offered a HEF audit.

The recipients of HEF audits use, on average, 25% more natural gas per year than the average residential customer (584 versus 468 therms in 1995). This reflects, in part, the past targeting of the HEF offers to households with above average use of gas.

Based on the responses to the surveys whose results are summarized in Section IV, participants are fairly similar to nonparticipants in single family homes with comparable gas consumption. Age is the only demographic characteristic where the two groups differ significantly. Over half of the participants have at least one person in the household over 65 years of age, versus less than 40% for nonparticipants. The average square footage of participant homes is also slightly higher than that of nonparticipants. Twenty-four percent of participants live in homes under 600 square feet, versus 31% for nonparticipants. Other demographic and dwelling variables are fairly comparable between the two groups. These include characteristics such as household size, education, age of dwelling, and self-reported annual income. All of these comparisons control for differences between participants and nonparticipants in the distribution of gas consumption and geographical location by reweighting the survey responses of nonparticipants.

[4] Based on an estimated 2,943,000 customers in single family homes as of January 1995.

SECTION III
RESULTS OF INTERNAL INTERVIEWS

III. RESULTS OF INTERNAL INTERVIEWS

This section summarizes the results of the review of internal documents and interviews with SoCalGas personnel. It describes how SoCalGas deals with its residential customers, both outside and inside the HEF Program, and how SoCalGas personnel believe that these interactions may affect the market for efficient measures. The section is broken down into three parts:

1. Description of the general customer contact media used by SoCalGas;
2. Description of the history of residential audits performed by SoCalGas, and;
3. Summary of the views of SoCalGas personnel on the possible market effects of the HEF Program.

III.1 SOUTHERN CALIFORNIA GAS GENERAL CUSTOMER SERVICE CONTACTS

The following section summarizes how SoCalGas interacts with its residential customers through the various communication channels—multimedia, mail, in-person contacts, and telephone—and the role the promotion of energy efficiency plays in these media.

Multimedia. Historically, SoCalGas has used television, radio, and print media to a limited degree to communicate with its residential customers. In the past, SoCalGas has conducted some cooperative advertising with the American Gas Association to promote gas as a fuel source, primarily television commercials with a general message about gas as a clean, inexpensive fuel. SoCalGas also does some multimedia advertising that offers tips to customers on how to save energy. The advertisements are presented primarily on the radio and during the cold weather months when gas use is typically the highest.

Mail. The overwhelming majority of SoCalGas Company-initiated contacts with customers are made by mail, usually in monthly bills that include "bill stuffers." In the past, bill stuffers have included CPUC mandatory notifications such as regulatory filings, terms of gas tariff changes, and gas safety related issues. SoCalGas has also promoted some of its marketing programs through bill stuffers (e.g., Simple Pay, Level Pay, Energy Facts). In 1997, Energy Facts provided customers with a list of League of California Homeowners-approved contractors; the list included a SoCalGas affiliate. Because of recent affiliate transaction rules, the contractor referral program was temporarily suspended pending clarification of the rules.

Aside from the monthly bills, SoCalGas regularly uses the mail to administer surveys and to promote its customer programs. SoCalGas uses the mail to solicit participation in its HEF Program and has decided to use a separate mailing, rather than bill stuffers, for better targeting of the solicitations and because the number of responses can be controlled more precisely.

Telephone Contacts. SoCalGas maintains the Customer Resource Center (CRC) that handles incoming telephone calls. The function of the CRC is to handle customer inquiries or refer calls to other service representatives as needed. Most of the calls to the CRC deal with changes in gas service (e.g., connections), field service requests, and bill complaints. Approximately three years ago, a special group— the Residential Marketing Unit—was established within the CRC to handle residential marketing inquiries about such programs as the Level Pay Program, the Patio Plus Program, and Energy Facts. As customers request a HEF Survey, customer service representatives (CSRs) enter a request within the Energy Facts on-line information program. Subsequently, a survey is mailed to the customer by the HEF processing group. If a customer has questions about their personalized survey results, he is referred to a separate (800) telephone number. If customers ask about service contractors, the customer service representatives provide them with a list of qualified contractors. The list has been compiled by The League of California Homeowners, an independent, nonprofit, third-party organization. There are approximately 140 contractors on the list. The list is sorted by geographical area and the specialty of the contractor.[1]

In-Person Contacts. SoCalGas has a large staff of field personnel to maintain its retail distribution system. These staff members deal with residential customers regularly on a broad range of service-related matters, including complaints about gas service (e.g., leaking gas) and equipment problems. The field service representatives are authorized to make minor adjustments to equipment where appropriate. If gas equipment requires replacement, the field representatives provide customers with the LCH-approved list of qualified contractors.**{Note: Mark the same footnote as above.}**In the past, field representatives have provided a gas pilot relighting service, but this has been discontinued in recent years. Prior to 1993, the field service representatives also performed home energy audits in conjunction with other service calls. These audits were discontinued in 1993 when the current Home Energy Fitness Survey was instituted. (See discussion below.)

SoCalGas personnel also regularly participate in outdoor marketing events. SoCalGas sponsors booths that provide information on the company and its customer programs, including referrals to the Home Energy Fitness and the Energy Facts Programs, to consumers. For example, SoCalGas sponsored a booth at the 1997 Los Angeles County Fair that was visited by an estimated 70,000 persons. Its booth at Taste of Orange County fair was visited by an estimated 3,300 persons. Aside from the referrals to other programs, SoCalGas does not specifically promote efficient technologies at these booths.

In interviews with SoCalGas personnel regarding these in-person contacts, we asked respondents their views on how these interactions might affect the overall market for efficient

[1] As noted above, the distribution of the list of contractors has been suspended since the beginning of 1998 pending resolution of issues concerning affiliate contacts.

measures and energy practices. None of the respondents cited any activities that directly affect the supply of efficient equipment and measures. Only the Energy Facts Program was mentioned as an activity that may influence the supply of gas technologies. Even in this case, SoCalGas personnel said the company is careful not to make recommendations that might be perceived as favoring its affiliates or any group of suppliers over others. The list of contractors supplied under the Energy Facts Program was obtained from California League of Homeowners. According to SoCalGas personnel, the League places no requirements on contractors regarding energy efficiency to qualify for inclusion on the list.

On the demand side, SoCalGas staff said that SoCalGas personnel do not specifically promote or recommend efficient measures and practices outside of the programs mentioned above. Customer service personnel are not trained to make such recommendations and are instructed to refer interested parties to the HEF Program.

III.2 HISTORY OF RESIDENTIAL ENERGY AUDITS

SoCalGas has provided home energy audits to its residential customers since the late 1970s. These audits were both in-person (Class A) and mail audits. Prior to 1993, many of the in-person audits were performed by SoCalGas service personnel during the course of their normal service calls to customer premises. For example, if a customer requested SoCalGas to relight the furnace pilot light in the fall, the customer representative would also take the opportunity to conduct an audit.

The information collected during the in-person audits was used as input data to an internally developed computer program that allocated the gas consumption for the residence into its end-use components and estimated the cost-effectiveness of various efficiency measures and conservation practices. According to staff members who were involved in the program at that time, the audit report included a fairly extensive list of recommendations in a computer print-out format.

Before 1993, SoCalGas administered a companion rebate program that gave financial incentives to residential customers who purchased qualifying measures. While receipt of the audit was not a pre-condition for the rebates, audit recipients were advised of the availability of the rebates, and many took advantage of them to install recommended measures.

In its 1993 rate case decision, SoCalGas agreed to redesign its audit program and to eliminate its rebate program in favor of participating in a statewide pilot performance contracting program. As part of the redesign, SoCalGas performed a formal review of the old program. This review reached the following key conclusions regarding the existing program that influenced the redesign:

- While the audit report provided very detailed information about home gas use and conservation measures, many recipients found the format of the report difficult to read and understand;

- Many of the Class A (on-site) audit recipients were not even aware that they had received an audit, perhaps because the audits were often performed in conjunction with an unrelated service call to the residence. For example, if a customer requested assistance in re-lighting his/her pilot light, the SoCalGas field service representative would often collect information for an audit during the service call. The information was used later to perform the audit analysis at the SoCalGas Company offices, and the results were presented in a report that was subsequently mailed to the customer. This was a standard practice aimed at reducing the cost of the audits. Many field service representatives did not adequately inform customers of the purpose of the audit or what information they would receive later as a result of the visit:

- In a large number of cases, a home was audited more than once because certain customers made multiple service call requests. For example, the same customers tended to ask for the gas pilot lighting service each year. These customers typically received an audit each time they had their pilots relighted; and

- There was no organized targeting of the program to maximize its impact. The audits were performed as the opportunities presented themselves in the course of other, unrelated service calls.

Based on the findings from the review of the earlier audit program, SoCalGas designed the HEF Program with the following features:

- **Mail-Based Delivery**. SoCalGas decided that the HEF Program audits should be offered and delivered by mail. This delivery method was judged to be the most cost-effective way to provide the audit services,[2] and it allowed SoCalGas to target the solicitation at customer segments who were expected to derive the greatest benefit from the information. The use of mail-based offers for the energy audit also allowed SoCalGas to control the number of reports that would be conducted each month and match them to the staff resources available to process the requests.

- **Redesign of Report Format and Recommendations**. SoCalGas changed the audit report format, featuring a graphical presentation of the estimates of end-use gas consumption and operating costs along with a breakdown of monthly gas billing history. The number of general recommendations was reduced significantly from the previous audit report. An additional handbook offers general advice on efficient gas equipment and energy conservation practices.

- **Targeting of HEF Offer to High Use Customers**. SoCalGas decided to target the HEF solicitation at customers with above-average gas usage, living in single-family homes, with continuous gas service for more than ten years. This subpopulation was expected to benefit the most from the audit because of its high gas usage. SoCalGas felt that

[2] SoCalGas personnel estimated the cost effectiveness of in-person versus mail based audits at that time using pre-program estimates of delivery costs and program savings. In subsequent evaluations, the HEF Program was shown to be cost effective, but the comparisons with the old audit program were not reviewed.

customers with high gas usage in single family homes would tend to have the most opportunities for energy saving measures and would be most receptive to the recommendations. The length of tenure was used as an indicator of home ownership and expected commitment to making investments in efficient equipment and measures. The vintage of the house was also used because of the tendency that older homes may be less energy-efficient than newly-built homes.

Since the re-designed HEF Program was instituted in 1993, it has been implemented with only minor modifications. Originally, the HEF offers were targeted at high usage customers in single family homes with continuous service for more than ten years. Over time, however, SoCalGas has included a broader range of residential customers in the mailings, as the original target subpopulation has been saturated with offers.[3] The mailings have been extended to customers with lower gas use and those with shorter continuous gas service. SoCalGas has continued to aim the offer at single-family homes; however, in line with the perception that these customers would benefit from the program more than multi-family occupants.

During the past five years, SoCalGas has sent out over one million offers and has performed over 124,000 audits under the HEF Program. In terms of the target population of almost 3,000.000 customers in single family homes, this represents approximately 35% who have received offers and over 4% who have responded.

SoCalGas has also refined the HEF report format over time. While keeping the graphical presentation format for the end-use consumption breakdown and the cost information, many of the recommendations were changed. Originally most of the recommendations were keyed off of the customer responses in the questionnaire. These recommendations included installation of ceiling insulation and pool covers, based on what the respondents said about the existing level of insulation and ownership of a pool. The current report provides similar recommendations, but it also includes a handbook that offers extensive advice on efficient gas equipment and energy conservation practices that save energy.

The handbook also refers customers to other services that provide assistance and information on energy conservation practices. These services include the California Home Energy Efficiency Ratings System (CHEERS) and Energy Facts. CHEERS is a nonprofit organization that provides efficiency ratings for homes and offers advice on energy-efficient improvements. The CHEERS ratings can be used by homeowners who apply for mortgage financing to obtain credits for low energy costs in the qualification formula. Energy Facts is a SoCalGas program started in 1997 that provides information about gas products and a list of qualified contractors and vendors who can provide these products.

[3] SoCalGas has typically offered the audit services once, at most, to a given customer through the mail solicitation.

III.3 MARKET EFFECTS CONSIDERATIONS IN THE HEF PROGRAM DESIGN AND ADMINISTRATION

In the interviews with SoCalGas personnel responsible for the 1993 HEF Program redesign and its administration since then, the research team explored possible market effects of the program. We asked what consideration had been given to producing market effects of different types in the program design and administration. The responses are summarized below:

- **Customer Awareness and Attitudes**. The respondents said one of the basic ideas behind the HEF audits is that if customers understand better how their gas expenses are distributed among end-uses, they will tend to select and operate gas equipment more efficiently. These changes in awareness and knowledge fall under the definition of market effects as outlined in the scoping study on this topic conducted for CADMAC in 1996.

- **Supply of Efficiency Measures**. SoCalGas does not actively encourage suppliers to promote high efficiency products either inside or outside of the HEF Program. Respondents indicated that there was no feature of the program specifically designed to influence the supply of efficient equipment and measures. The only feature of the program that might be construed as affecting supply channels is the list of contractors that is available to participants who request it. This list is not screened based on the products offered by the contractors. One of the reasons for not promoting specific, efficient models of gas equipment is a concern that such endorsements might draw complaints from other suppliers who did not offer these models. SoCalGas is also concerned that its recommendations might raise some potential liability problems if the equipment does not work properly.

- **Sustainability of Effects**. The respondents said that SoCalGas does not take any steps to follow up its report with any additional customer contacts. The report provides the names and telephone numbers customers can use to obtain additional information and assistance in taking efficiency actions. These resources include the Energy Facts Program and CHEERS.

SECTION IV
ANALYSIS OF PARTICIPANT AND NONPARTICIPANT SURVEYS

IV. ANALYSIS OF PARTICIPANT AND NONPARTICIPANT SURVEYS

In order to investigate the effects of Home Energy Fitness (HEF) Program on customer awareness and attitudes toward efficient measures and practices, we conducted a series of interviews and surveys with different residential customer groups. We conducted the interviews and surveys to collect information about customer recall of the HEF Program services, efficient measure installation patterns and other conservation behavior, and awareness of and attitudes toward energy efficiency.

We conducted the interviews with past participants in the HEF Program who said they recalled having received the HEF report. The interviews included a small sample of households not necessarily representative of past program participants. The primary goal of the interviews was to gain an understanding of how people regarded program services and different gas measures. This understanding was used to guide the formulation of the closed ended survey questions that were administered to large, representative samples of customers.

The interviews were in open-ended topic format. Questions or topic areas dealt with the respondents' recall of the HEF recommendations and their impressions of the usefulness of the recommendations, efficiency practices, and gas equipment decisionmaking processes. The interviewer was instructed to probe for explanations where appropriate and to change any question order where responses to earlier questions warranted it.

We conducted two telephone surveys with closed-ended questions. The first survey was directed at past participants in the HEF Program, and the second survey was administered to households who had not participated.

We drew the participant survey sample from the HEF Program files. Records with incomplete program data or billing histories were deleted, as were cases in which there had been a change in party at the residence after the program participation date. The remaining program records were stratified by annual gas consumption, participation year, and climate zone, and then the sample was drawn in proportion to the frequencies in each stratum.

We drew the nonparticipant survey from the general customer billing system. We included only customers identified as single-family dwelling occupants with at least ten years of continuous gas service in the sample universe. (This group was the target population for the HEF Program.) We deleted the records of all past HEF Program participants from the remaining dataset. We drew a stratified sample from this customer population with the stratum frequencies equal to those for the participant sample with respect to annual gas consumption and climate zone. As a result, the nonparticipant sample was comparable to the participant population with respect to these variables.

We conducted the telephone survey during December 1997. Telephone numbers came from SoCalGas Company's customer information system. If SoCalGas did not have a valid telephone number, we obtained one through a reverse directory based on the billing address. We placed calls during weekday evenings and all day on Saturdays. We administered the survey using a CATI system and used standard call-back procedures to maximize the response rate. We set completion quotas for each gas consumption and climate zone stratum. The sample construction and attrition rates by screening criterion are documented in an appendix to this report.

In the surveys, we used multiple approaches to investigate the effects of the HEF Program services on customer behavior and attitudes. In the first approach, we asked participants directly about their recall of the HEF audit report and their impressions of its usefulness. In the second method, we asked respondents about conservation actions they had taken in the past five years and then compared the rates with those for households in the nonparticipant sample. We used a similar method to compare efficient equipment operating practices and conservation behaviors between past participants and nonparticipants. In the last approach, we attempted to estimate measures of customer attitudes toward energy efficiency and conservation. We constructed these measures from responses to attitudinal questions about respondents' agreement/disagreement with a series of statements about energy efficiency, equipment purchase behavior, and conservation. We compared measures for participants with those for the nonparticipants and, separately, for a sample of households who responded to a similar survey in 1991. The summary results of these indicators are presented below.

IV.1 PARTICIPANT RECALL

In the participant survey, we asked respondents if they recalled having received an evaluation of their gas usage from SoCalGas or any other entity in the past five years. The survey takers described this evaluation as "an analysis of how your household uses gas, along with recommendations on measures you can take to save energy. The evaluation offered by Southern California Gas is called the Home Energy Fitness Survey. The Home Energy Fitness Survey is based on information you would have provided by filling out a questionnaire."

Less than 30% of the respondents said that they recalled having received the evaluation. We noted this low recall rate in spite of the fact that the customers were known participants (service accounts to whom a report was sent with no change of party since the receipt of the audit report) and in spite of the fact that the individual who responded to the questions was identified as the person on the SoCalGas billing statement in over 95% of the cases.

The recall rate did not differ significantly with respect to the length of time since the HEF participation. The recall rates by year of program participation are shown in Table IV-1.

Table IV-1
HEF Participation Recall Rates By Year

Year	Yes, participated in HEF		Don't recall participating in HEF	
	#	%	#	%
1993	15	25%	46	75%
1994	76	29%	185	71%
1995	79	32%	169	68%
1996	45	26%	129	74%
Total	**215**	**29%**	**529**	**71%**

We asked the 29% (215) of respondents who recalled having received the HEF evaluation if they remembered any of the specific recommendations in the audit report. Only 34% of these customers said that they recalled at least one recommendation, an indication that less than 10% of all participants in the survey had any recollection of measures that were recommended in the report.

The possible reasons for the poor recall rate are unclear. We are not aware of any studies of recall rates in other programs that establish a baseline against which the ones in the HEF Program could be compared. The recall rate from the survey of participants under the impact evaluation of the 1994 HEF Program was approximately 65%. The recall rates of specific measures in the opened ended interviews of past HEF Program participants, conducted for this evaluation, were also low, confirming the findings from the close ended survey. In the case of the open ended interviews, respondents were screened based on whether they first recalled receiving the audit report, and they were paid a $25 incentive. As such, they might be expected to have higher recall rates than uncompensated respondents.

The program administrators have offered no specific opinions on why the recall rate was low, other than the length of time between the receipt of the audit reports and the survey and the difficulty of remembering a specific mailing when customers are typically inundated with information from all media. They are confident that tracking system accurately identified the respondents as past HEF Program participants.

We believe that, when compared to response and recall rates for mail based advertising promotions, the rates for the HEF Program do not seem so low. A mail-based advertising promotion that achieved a 25%+ recall rate after four years would probably be seen as very successful. It also seems reasonable to expect that the rates for specific measures be higher if the promotional message had been repeated and reinforced though other media. These observations are, of course, speculative, but they deserve consideration under any future re-design of the HEF Program.

We asked the respondents who said they recalled at least one recommendation if they adopted the measure and, if so, if they had planned to implement it before receiving the recommendation. The responses to these questions are summarized in Table IV-2. As the table shows, there was a wide range of measures that respondents identified. The most common measures were water heater wraps, low flow showerheads, ceiling insulation, and caulking and weatherstripping. In addition, several conservation practices were mentioned frequently, including setting back the thermostat and lowering the water heater temperature.

Table IV-2
Participant Recollection of HEF Recommendations

Conservation Measure	# respondents who recalled recommendation	Of those who recall, number who say... was implemented		was not implemented		don't know	Of those implemented, # which were planned anyway		not planned		don't know
	#	#	%	#	%	#	#	%	#	%	#
Low-Flow Showerheads	17	15	100%	0		2	6	75%	2	25%	7
Water Heater Wrap	35	22	65%	12	35%	1	9	64%	5	36%	8
Pipe Insulation	0	0		0		0	0		0		0
Faucet Aerator	1	1	100%	0		0	0		1		0
Replace Water Heater	3	2	67%	1	33%	0	2	100%	0		0
Other WtrHt Install	0	0		0		0	0		0		0
Full Dishwasher Loads	7	7	100%	0		0	4	80%	1	20%	2
Shorter Showers	6	6	100%	0		0	3	75%	1	25%	2
Full Laundry Loads	5	5	100%	0		0	2	67%	1	33%	2
Lower Water Temperature	10	9	90%	1	10%	0	4	44%	5	56%	0
Other WtrHt Behavior	0	0		0		0	0		0		0
Attic Insulation	11	9	82%	2	18%	0	7	78%	2	22%	0
Wall Insulation	2	2	100%	0		0	1	50%	1	50%	0
Floor Insulation	1	0		1	100%	0	0		0		0
Caulk and/or Weatherstrip	14	11	79%	3	21%	0	8	89%	1	11%	2
Door Sweeps	2	2	100%	0		0	1	50%	1	50%	0
Wall Socket Sealers	0	0		0		0	0		0		0
Programmable Thermostats	2	0		2	100%	0	0		0		0
Replace Gas Furnace	0	0		0		0	0		0		0
Other SpHt Install	0	0		0		0	0		0		0
Set Back Thermostat	19	16	89%	2	11%	1	10	77%	3	23%	3
Gas Furnace Maintenance	3	3	100%	0		0	3	100%	0		0
Turn Off Heat No One Home	2	2	100%	0		0	2	100%	0		0
Other SpHt Behavior	0	0		0		0	0		0		0
Replace Cooking Equipment	0	0		0		0	0		0		0
Replace Clothes Dryer	0	0		0		0	0		0		0

Perhaps the most interesting aspect of the responses is the high frequency at which respondents stated they had planned to adopt the measures prior to receiving the recommendations. For example, seven of nine respondents who said they installed attic insulation also said they were planning to do it anyway.

While the responses to these questions should be interpreted with caution given the poor overall recall rate, they are consistent with an interpretation that the HEF Program has its greatest impact through accelerating already planned efficiency decisions rather than stimulating new ones. This interpretation is also consistent with the results of the conditional demand analysis presented below. That analysis revealed significant savings attributable to the HEF Program in the first year but a severe drop-off to insignificant savings afterward. This pattern would result from this sort of "acceleration" effect.

While the recall rate of program recommendations is disappointingly low, it is consistent with the comments from the open-ended interviews and the findings of the impact evaluation of the 1993 program. In the interviews, which were conducted with households who said they did recall receiving the HEF reports, most respondents could not remember anything specific about the report. In the 1993 Program impact evaluation, less than 25% of the respondents in the participant survey could identify any specific measures that were recommended to them. According to the HEF Program tracking system, these 1993 respondents had received the audit report within the previous twelve months of being contacted for the survey.

The overall results show that participants typically remember little or nothing about the HEF information or recommendations for a long time after the receipt of the report. Given this finding, it is hard to see how the HEF Program can have any significant long-term, sustained effect on customer awareness, attitudes, knowledge, or decisionmaking processes at a conscious level. Any significant effects the Program may produce in these areas must be the result of more subtle process in which the HEF information produces changes that continue after the original cause of those changes are forgotten.

IV.2 EFFICIENCY MEASURES AND CONSERVATION PRACTICES

As a separate method of examining potential market effects of the HEF Program, we asked a series of questions about the ownership and installation rates of efficient measures and conservation practices by participants and nonparticipants. The objective of these questions was to identify any significant differences between the two groups in these ownership patterns and practices. After controlling for other differences in demographic and housing characteristics, any remaining differences in conservation practices may be attributable to the effects of the HEF Program. The absence of any significant differences would be evidence that the Program had no long-term effect of these practices.

As described above, we stratified the participant and nonparticipant surveys by location and annual gas consumption, and we drew the nonparticipant sample so that its stratum frequencies matched those of the participant population. We intended to control for differences between participants and the general residential customer population to the extent possible, given the information available in SoCalGas Company's billing system.

The results of the surveys show that the participant and nonparticipant respondents are fairly similar with respect to most demographic and dwelling characteristics. The frequencies of key variables are presented in Tables IV-3 through IV-14. These tables indicate that the samples are comparable in terms of household size, education, age of dwelling, and self-reported annual income. For these characteristics, any differences in individual cell frequencies are statistically insignificant based on t-tests.

Table IV-3
Number of Persons in Household

	1		2		3		4		5		6		7+	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Participant	113	15.7%	298	41.4%	136	18.9%	102	14.2%	43	6.0%	16	2.2%	12	1.7%
Nonparticipant	124	16.9%	269	36.7%	128	17.5%	127	17.3%	55	7.5%	17	2.3%	13	1.8%
Total	**237**	**16.3%**	**567**	**39.0%**	**264**	**18.2%**	**229**	**15.8%**	**98**	**6.7%**	**33**	**2.3%**	**25**	**1.7%**

Table IV-4
Age of Oldest Member

	65 or older		21-64 years old	
	#	%	#	%
Participant	391	54.3%	329	45.7%
Nonparticipant	332	45.3%	401	54.7%
Total	**723**	**49.8%**	**730**	**50.2%**

Table IV-5
Number of Household Members Over 64 Years Old

	0		1		2		3		4	
	#	%	#	%	#	%	#	%	#	%
Participant	305	49.8%	95	15.5%	208	33.9%	3	0.5%	2	0.3%
Nonparticipant	363	59.0%	111	18.0%	141	22.9%	0		0	
Total	**668**	**54.4%**	**206**	**16.8%**	**349**	**28.4%**	**3**	**0.2%**	**2**	**0.2%**

Table IV-6
Number of Household Members 21 to 64 Years Old

	0		1		2		3		4		5+	
	#	%	#	%	#	%	#	%	#	%	#	%
Participant	182	29.7%	96	15.7%	243	39.6%	68	11.1%	22	3.6%	2	0.3%
Nonparticipant	116	18.9%	110	17.9%	292	47.5%	66	10.7%	25	4.1%	4	0.7%
Total	**298**	**24.3%**	**206**	**16.8%**	**535**	**43.6%**	**134**	**10.9%**	**47**	**3.8%**	**8**	**0.7%**

Table IV-7
Number of Household Members 6 to 20 Years Old

	0		1		2		3		4+	
	#	%	#	%	#	%	#	%	#	%
Participant	417	68.0%	105	17.1%	65	10.6%	21	3.4%	5	0.8%
Nonparticipant	378	61.5%	124	20.2%	83	13.5%	19	3.1%	11	1.8%
Total	**795**	**64.7%**	**229**	**18.6%**	**148**	**12.1%**	**40**	**3.3%**	**16**	**1.3%**

Table IV-8
Number of Household Members Under 6 Years Old

	0		1		2		3	
	#	%	#	%	#	%	#	%
Participant	553	90.2%	39	6.4%	18	2.9%	3	0.5%
Nonparticipant	540	87.8%	55	8.9%	18	2.9%	2	0.3%
Total	**1093**	**89.0%**	**94**	**7.7%**	**36**	**2.9%**	**5**	**0.4%**

Table IV-9
Highest Education Level in Household

	Grammar school		Some high school		High school grad		Some college		College grad		Post-grad	
	#	%	#	%	#	%	#	%	#	%	#	%
Participant	8	1.2%	12	1.7%	136	19.6%	181	26.0%	268	38.6%	90	12.9%
Nonparticipant	11	1.6%	10	1.5%	152	22.1%	171	24.9%	238	34.6%	106	15.4%
Total	**19**	**1.4%**	**22**	**1.6%**	**288**	**20.8%**	**352**	**25.5%**	**506**	**36.6%**	**196**	**14.2%**

Table IV-10
Annual Household Income

	<$10K/yr		$10-20K/yr		$20-30K/yr		$30-40K/yr		$40-50K/yr		$50-75K/yr		>$75K/yr	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Participant	14	2.9%	65	13.4%	58	12.0%	85	17.6%	78	16.1%	96	19.8%	88	18.2%
Nonparticipant	15	3.3%	51	11.4%	53	11.8%	77	17.2%	69	15.4%	86	19.2%	97	21.7%
Total	**29**	**3.1%**	**116**	**12.4%**	**111**	**11.9%**	**162**	**17.4%**	**147**	**15.8%**	**182**	**19.5%**	**185**	**19.8%**

Table IV-11
Building Type

	Single-family		Other	
	#	%	#	%
Participant	732	98.4%	12	1.6%
Nonparticipant	730	96.9%	23	3.1%
Total	**1462**	**97.7%**	**35**	**2.3%**

Table IV-12
Square Feet of Gas Heated Space

	< 600 sq ft		601-1000 sq ft		1001-1500 sq ft		1501-2000 sq ft		2001+ sq ft	
	#	%	#	%	#	%	#	%	#	%
Participant	175	23.5%	37	5.0%	198	26.6%	185	24.9%	149	20.0%
Nonparticipant	235	31.2%	31	4.1%	176	23.4%	176	23.4%	135	17.9%
Total	**410**	**27.4%**	**68**	**4.5%**	**374**	**25.0%**	**361**	**24.1%**	**284**	**19.0%**

Table IV-13
Number of Bedrooms

	1		2		3		4		5+	
	#	%	#	%	#	%	#	%	#	%
Participant	5	0.7%	119	16.0%	416	55.9%	170	22.8%	34	4.6%
Nonparticipant	13	1.7%	133	17.7%	409	54.5%	154	20.5%	43	5.7%
Total	**18**	**1.2%**	**252**	**16.9%**	**825**	**55.2%**	**324**	**21.7%**	**77**	**5.2%**

Table IV-14
Approximate Year House Was Built

	1978-now		1976-1977		1966-1975		1946-1965		1921-1945		pre-1920	
	#	%	#	%	#	%	#	%	#	%	#	%
Participant	98	14.8%	34	5.1%	102	15.4%	347	52.5%	67	10.1%	13	2.0%
Nonparticipant	93	15.2%	32	5.2%	96	15.7%	299	48.9%	81	13.3%	10	1.6%
Total	**191**	**15.0%**	**66**	**5.2%**	**198**	**15.6%**	**646**	**50.8%**	**148**	**11.6%**	**23**	**1.8%**

Age is the only demographic characteristic in which the two groups differ significantly. Fifty percent of the participants reported that at least one person in the household over 65 years of age in the household, while less than 40% of the nonparticipants responded affirmatively to this question.

Square footage is the only housing characteristic that is substantially different between the participant and nonparticipant respondents. The nonparticipants have a significantly higher percentage of houses under 600 square feet (31% versus 24% for the participants).

To test whether the differences in age and dwelling size would significantly affect the frequencies of responses to questions about efficiency measures and conservation behavior, the nonparticipant sample was re-weighted so that it matched the participant sample with

respect to these variables. The weighted frequencies differed very little from the unweighted ones, usually by less than 1%. Based on this finding, we decided to use the unweighted response frequencies for comparison with the participant sample. We were thus able to retain observations with missing data for the age and dwelling size questions.

The surveys included questions regarding three different categories about efficiency measures and conservation practices:

1. ownership of certain measures;
2. certain equipment operational practices that reduce gas consumption; and
3. installations of certain efficiency measures and adoption of conservation practices in the past three years.

In the area of ownership of efficient measures, questions covered ceiling insulation, programmable thermostats, and pool or spa covers. The response rates of the participants and nonparticipants are presented in Tables IV-15 through IV-19. Ceiling insulation questions included whether the dwelling had ceiling insulation and, if so, whether the respondent considered the level of insulation poor, average, or good. Questions on programmable thermostats covered whether the dwelling furnace(s) has a thermostat and, if so, whether it is manual or programmable. Pool/spa cover questions included whether the respondent had a pool or spa and, if so, whether he or she used a cover.

Table IV-15
Do you have insulation in your attic?

	Yes		No	
	#	%	#	%
Participant	607	90.6%	63	9.4%
Nonparticipant	585	88.4%	77	11.6%
Total	**1192**	**89.5%**	**140**	**10.5%**

Table IV-16
How would you describe your attic insulation?

	Poor		Average		Good	
	#	%	#	%	#	%
Participant	35	6.2%	168	29.7%	362	64.1%
Nonparticipant	30	5.8%	181	35.2%	303	58.9%
Total	**65**	**6.0%**	**349**	**32.3%**	**665**	**61.6%**

Table IV-17
What type of thermostat is on your main furnace or heater?

	Manual		Programmable	
	#	%	#	%
Participant	425	61.7%	264	38.3%
Nonparticipant	445	66.7%	222	33.3%
Total	**870**	**64.2%**	**486**	**35.8%**

Table IV-18
Do you use a cover on your pool?

	Yes		No	
	#	%	#	%
Participant	16	31.4%	35	68.6%
Nonparticipant	10	17.5%	47	82.5%
Total	**26**	**24.1%**	**82**	**75.9%**

Table IV-19
Do you use a cover on your spa or Jacuzzi?

	Yes		No	
	#	%	#	%
Participant	56	66.7%	28	33.3%
Nonparticipant	33	45.8%	39	54.2%
Total	**89**	**57.1%**	**67**	**42.9%**

As the tables show, in all cases a higher percentage of participants than nonparticipants said they had the efficient measures. For ceiling insulation and programmable thermostats, the difference was approximately 5%. For the pool and spa covers, the differences are much greater, but the number of cases is much smaller because so few respondents have pools or spas. Most of the differences are only marginally significant from a statistical standpoint, however. The difference for "good" insulation has a computed t-statistic of 1.35, which is significant at the 80% level but not at the 90% level. For the programmable thermostats, the t-statistic is 1.15, which is not significant at the 80% level. The t-statistic for pool covers is less than one, but the value for spas is almost 2, indicating a high level of statistical significance (90%+).

The next set of questions dealt with the operation and maintenance of gas equipment that saves energy. These operational practices include furnace thermostat setting behavior, furnace filter replacement, and turning off the furnace pilot light during summer months. The response frequencies for these questions are presented in Tables IV-20 through IV-27.

Table IV-20

During winter, at what temperature do you set your main thermostat when you are home and awake?

	< 60°F		60°-65°F		66°-68°F		69°-70°F		71°-72°F		73°-75°F		> 75°F	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Participant	45	6.7%	75	11.2%	136	20.4%	267	40.0%	80	12.0%	47	7.0%	17	2.5%
Nonparticipant	59	9.2%	75	11.6%	109	16.9%	251	39.0%	91	14.1%	42	6.5%	17	2.6%
Total	**104**	**7.9%**	**150**	**11.4%**	**245**	**18.7%**	**518**	**39.5%**	**171**	**13.0%**	**89**	**6.8%**	**34**	**2.6%**

Table IV-21

During winter, at what temperature do you set your main thermostat when you are asleep?

	< 61°F		61°-63°F		64°-65°F		66°-68°F		69°-70°F		71°-72°F		>72°F	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Participant	389	58.3%	39	5.8%	97	14.5%	69	10.3%	49	7.3%	13	1.9%	11	1.6%
Nonparticipant	375	58.3%	27	4.2%	95	14.8%	65	10.1%	55	8.6%	11	1.7%	15	2.3%
Total	**764**	**58.3%**	**66**	**5.0%**	**192**	**14.7%**	**134**	**10.2%**	**104**	**7.9%**	**24**	**1.8%**	**26**	**2.0%**

Table IV-22

Once you set your thermostat, do you...

	(1) leave it alone		(2) change to h/c		(3) lower not home		both 2&3	
	#	%	#	%	#	%	#	%
Participant	335	51.9%	154	23.9%	13	2.0%	143	22.2%
Nonparticipant	313	49.8%	171	27.2%	8	1.3%	137	21.8%
Total	**648**	**50.9%**	**325**	**25.5%**	**21**	**1.6%**	**280**	**22.0%**

Table IV-23

How frequently do you override or change your programmable thermostat during winter?

	Almost never		Once a week		2-4 times/wk		>4 times/wk		Every day	
	#	%	#	%	#	%	#	%	#	%
Participant	131	50.8%	28	10.9%	27	10.5%	12	4.7%	60	23.3%
Nonparticipant	100	46.1%	27	12.4%	31	14.3%	3	1.4%	56	25.8%
Total	**231**	**48.6%**	**55**	**11.6%**	**58**	**12.2%**	**15**	**3.2%**	**116**	**24.4%**

Table IV-24

Would you say that you keep the temperature in your home...

	Barely warm		Comfortable		Warm		Toasty	
	#	%	#	%	#	%	#	%
Participant	168	24.5%	448	65.3%	62	9.0%	8	1.2%
Nonparticipant	183	26.7%	435	63.5%	60	8.8%	7	1.0%
Total	**351**	**25.6%**	**883**	**64.4%**	**122**	**8.9%**	**15**	**1.1%**

Table IV-25

Have you or someone else ever changed or cleaned the filter on your furnace?

	Yes		No	
	#	%	#	%
Participant	568	84.5%	104	15.5%
Nonparticipant	551	84.0%	105	16.0%
Total	**1119**	**84.3%**	**209**	**15.7%**

Table IV-26

How frequently would you say your filter is changed or cleaned?

	2+ times a year		Once a year		Every few years		Very seldom		Never	
	#	%	#	%	#	%	#	%	#	%
Participant	398	66.9%	169	28.4%	11	1.8%	13	2.2%	4	0.7%
Nonparticipant	346	60.5%	193	33.7%	21	3.7%	7	1.2%	5	0.9%
Total	**744**	**63.8%**	**362**	**31.0%**	**32**	**2.7%**	**20**	**1.7%**	**9**	**0.8%**

Table IV-27

Do you turn off your furnace pilot light during the summer months?

	Yes		No	
	#	%	#	%
Participant	271	49.4%	278	50.6%
Nonparticipant	257	46.5%	296	53.5%
Total	**528**	**47.9%**	**574**	**52.1%**

The responses regarding furnace thermostat operation reveal no significant differences between participant and nonparticipant behavior. Based on response frequencies for the daytime and nighttime thermostat settings, the average set point is virtually the same for the two groups (68 degrees during the daytime and 66 degrees at night). While this measure is admittedly crude, it is indicative of the similarities in behavior between the two groups, at least with respect to thermostat usage.

In the other areas, there are notable differences in behavior. A significantly higher percent of participants said they change their furnace filters at least two times per year. Given the sample sizes, this difference—6.4%—is statistically significant at the 90%+ level. With respect to turning off the furnace pilot light during the summer months, approximately 3% more participants responded affirmatively. This difference is not statistically significant, however.

The last area of questions about efficiency measures and conservation behavior dealt with installations or changes in practices the respondents had made in the previous three years.

The installations questions dealt with the following measures:

- Low-flow Showerheads
- Water Heater Wraps
- Pipe Insulation
- Faucet Aerators
- Insulation (attic, floor and wall)
- Caulking and Weatherstripping
- Door Sweeps
- Wall Socket Sealers
- Programmable Thermostats

The response frequencies for these measures are presented in Table IV-28. The table shows a general pattern of higher installation rates for most measures on the part of past HEF participants. The differences range from negligible (programmable thermostats) to substantial (water heater wraps and low-flow showerheads). Among the measures shown in Table IV-28, the differences for the last two measures are statistically significant, as is that for door sweeps.

Table IV-28

Have you installed any of the following conservation measures?

	Participants					Nonparticipants				
	Yes		No		dk/na	Yes		No		dk/na
	#	%	#	%	#	#	%	#	%	#
Low-Flow Showerheads	410	59.4%	280	40.6%	54	373	53.1%	330	46.9%	50
Water Heater Wrap	298	42.8%	398	57.2%	48	231	32.6%	478	67.4%	44
Pipe Insulation	118	17.1%	574	82.9%	52	81	11.6%	617	88.4%	55
Faucet Aerators	245	35.6%	443	64.4%	56	207	29.5%	494	70.5%	52
Attic Insulation	83	13.7%	524	86.3%	137	67	11.4%	521	88.6%	165
Wall Insulation	37	5.3%	657	94.7%	50	22	3.1%	688	96.9%	43
Floor Insulation	20	2.9%	672	97.1%	52	14	2.0%	696	98.0%	43
Caulk or Weatherstripping	208	29.9%	487	70.1%	49	177	25.0%	531	75.0%	45
Door Sweeps	238	34.2%	457	65.8%	49	195	27.5%	514	72.5%	44
Wall Socket Sealers	55	7.9%	638	92.1%	51	26	3.7%	679	96.3%	48
Programmable Thermostat	47	17.2%	226	82.8%	471	40	17.5%	189	82.5%	524

Changes in equipment operation and related conservation behavior questions dealt with the following actions:

- Full dishwasher loads
- Shorter showers
- Full laundry loads
- Lower water temperature
- Lower thermostat setting
- Furnace maintenance
- Turning off heat when not at home

The response frequencies for these changes in conservation behavior are presented in Table IV-29. They also show a similar, albeit less pronounced, pattern of higher rates on the part of past HEF participants. There is virtually no difference in certain behaviors, such as full dishwasher loads and turning off heat when not at home. On the other hand, there are substantial differences in the lowering water temperatures and reducing thermostat settings frequencies. These differences are statistically significant, as are the responses regarding laundry loads and shorter showers.

Table IV-29
Changes in Equipment Operation and Conservation Behavior

	Participants					Nonparticipants				
	Yes		No		dk/na	Yes		No		dk/na
	#	%	#	%	#	#	%	#	%	#
Do you do full dishwasher loads?	446	92.9%	34	7.1%	264	418	94.1%	26	5.9%	309
Are you taking shorter showers?	184	26.7%	506	73.3%	54	128	18.4%	569	81.6%	56
Do you do full laundry loads?	557	82.0%	122	18.0%	65	529	76.9%	159	23.1%	65
Have you lowered your hot water temperature?	247	36.3%	434	63.7%	63	162	23.6%	523	76.4%	68
Have you lowered your thermostat setting?	253	39.8%	383	60.2%	108	196	31.2%	432	68.8%	125
Have you done maintenance on your furnace?	402	58.8%	282	41.2%	60	375	54.2%	317	45.8%	61
Do you turn off the heat when no one's home?	563	82.7%	118	17.3%	63	573	82.6%	121	17.4%	59

Taken together, the responses to the questions regarding installations of efficiency measures and adoption of conservation practices indicate that the participants have made changes at a significantly higher rate than nonparticipants in recent years. It is unclear, however, whether these changes are the direct result of the receipt of the HEF services or whether they reflect a "self-selection" process by participants. There are clear differences in conservation behavior between participant and nonparticipants that have taken place in the past few years after controlling for observable demographic and housing differences between the two groups. The participants have very poor recall of even having received the HEF evaluation. The majority of those who do remember specific recommendations state that they were planning to install the measures before they received the HEF evaluation.

IV.3 ATTITUDES

In an effort to identify whether the attitudes of participants and nonparticipants had changed substantially during the period when SoCalGas had conducted the HEF Program, we administered a series of attitudinal questions to the participant and nonparticipant samples. The questions were a subset of a battery that had been administered in 1992 to a random sample of residential customers.

This 1992 battery was based on a series of value statements that had been developed to measure the distribution of certain psychometric profiles (i.e., attitudes) in the residential sector. The questions take the form of a value statement with which the respondent is asked to state his/her strength of agreement or disagreement. For example, the respondent is

presented with a statement such as, "I track my monthly gas bills pretty closely." Then the respondent is asked whether he/she agrees or disagrees with the statement and to indicate the strength of his/her agreement/disagreement.

The responses to these questions are analyzed using factor analysis or a related technique to extract certain value-based profiles of different customer segments. This analysis is based on the idea that there are some underlying generalized values or attitudes that cause the responses. In the analysis, we attempt to identify these underlying values or attitudes by examining correlations in response patterns. While this technique is somewhat controversial, it is widely used to "measure" generalized preferences toward energy efficiency and conservation practices.

The availability of the responses to this battery from a 1992 survey of residential customers presented the possibility of making some longitudinal comparisons between attitudes before and after the HEF Program. While any changes could not necessarily be attributed to the effects of the HEF Program, an absence of differences could be taken as evidence that the overall activities of SoCalGas and other entities to promote energy efficiency in the past three years had not materially changed customer attitudes.

The 1992 survey was administered by mail, while the 1997 surveys were conducted by telephone. Some changes in the phrasing were required in the 1997 survey given the difference in the medium. In the 1992 survey, the attitudinal statements were phrased in the first person singular (e.g., "I track my monthly gas bills pretty carefully"), and the respondents were given a printed scale of 1 (strongly disagree) to 6 (strongly agree) upon which they indicated their agreement/disagreement. In the 1997 survey, the questions were restated in the second person. Thus, the telephone interviewer in 1997 asked respondents a question in the form, "I am going to read you a number of statements and ask you to state whether you disagree or disagree with them. 'You track your monthly bills pretty carefully.' Do you agree or disagree with this statement? Would you say you agree/disagree slightly. just agree/disagree, or agree/disagree strongly?"

The responses to the attitudinal questions are presented in Figures IV-1 through IV-12 below. The numerical values of the responses are shown in Tables IV-30 to V-41.

Figure IV-1

You do not pay attention to specials or rebates

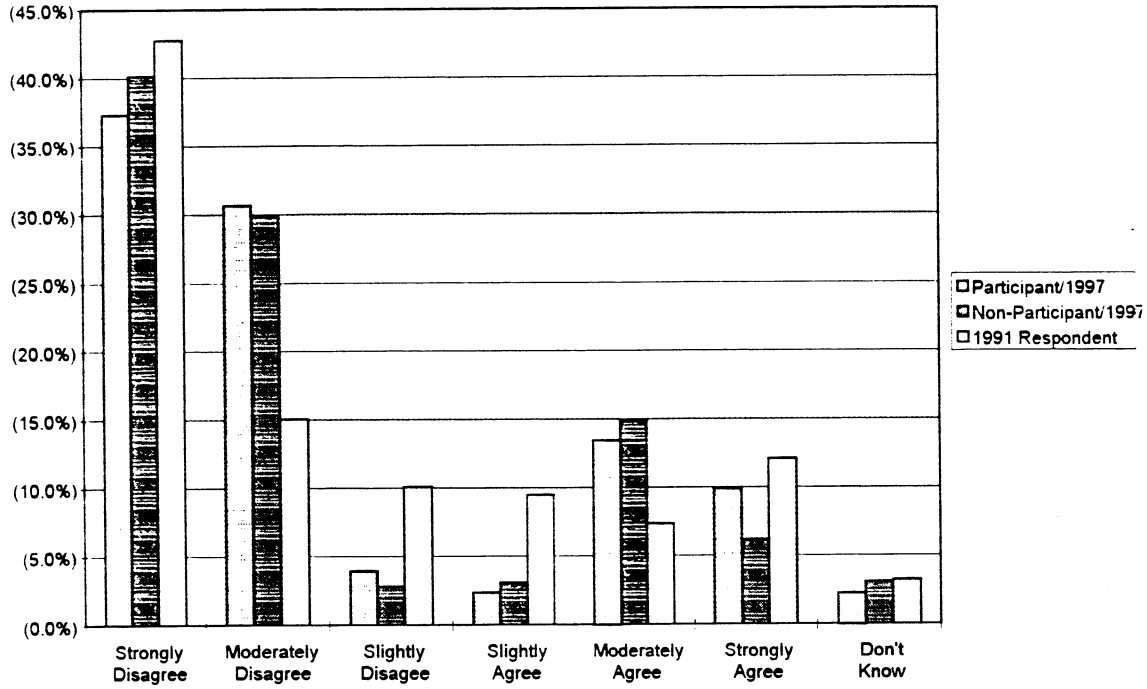


Figure IV-2

You think it is silly (unreasonable) to spend money lighting areas of the hom when on one is home at the time.

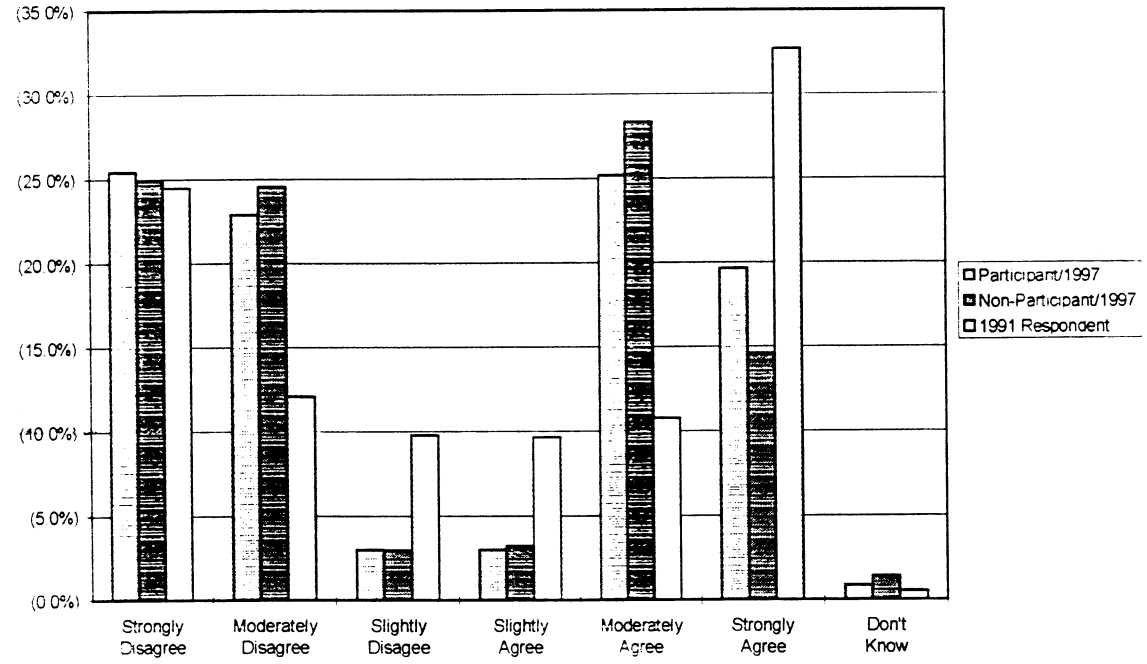


Figure IV-3

You do not like to spend much of your time looking around when you need to buy or replace an appliance.

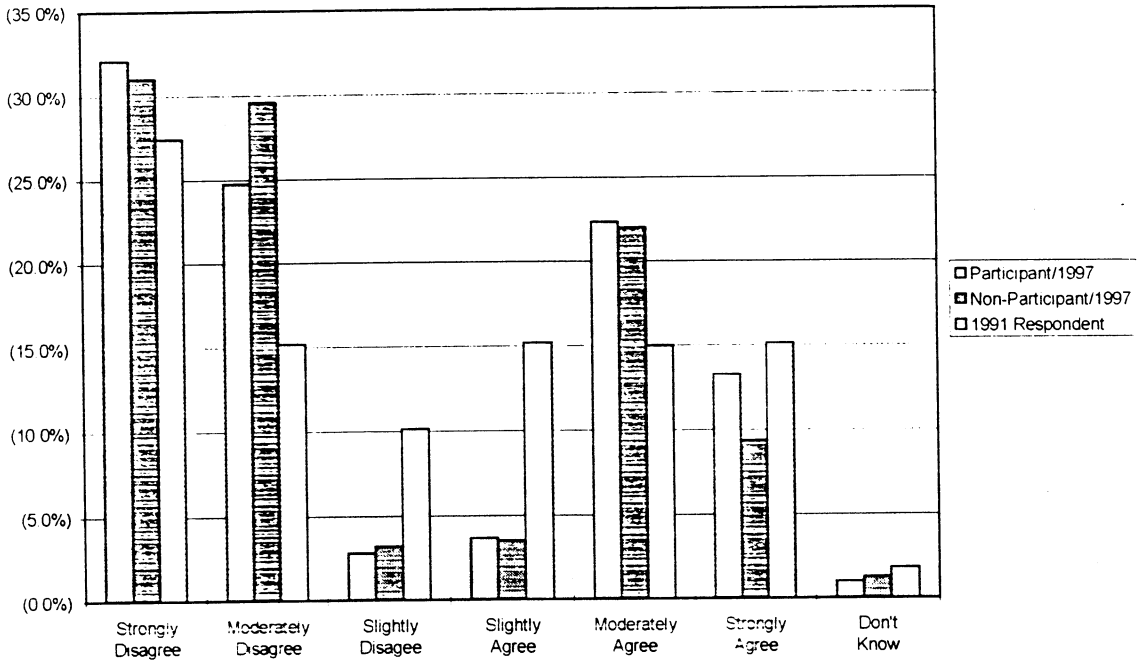


Figure IV-4

You usually find out it's easier to replace a worn out major appliance with the same brand rather than spend a lot of time looking at other brands.

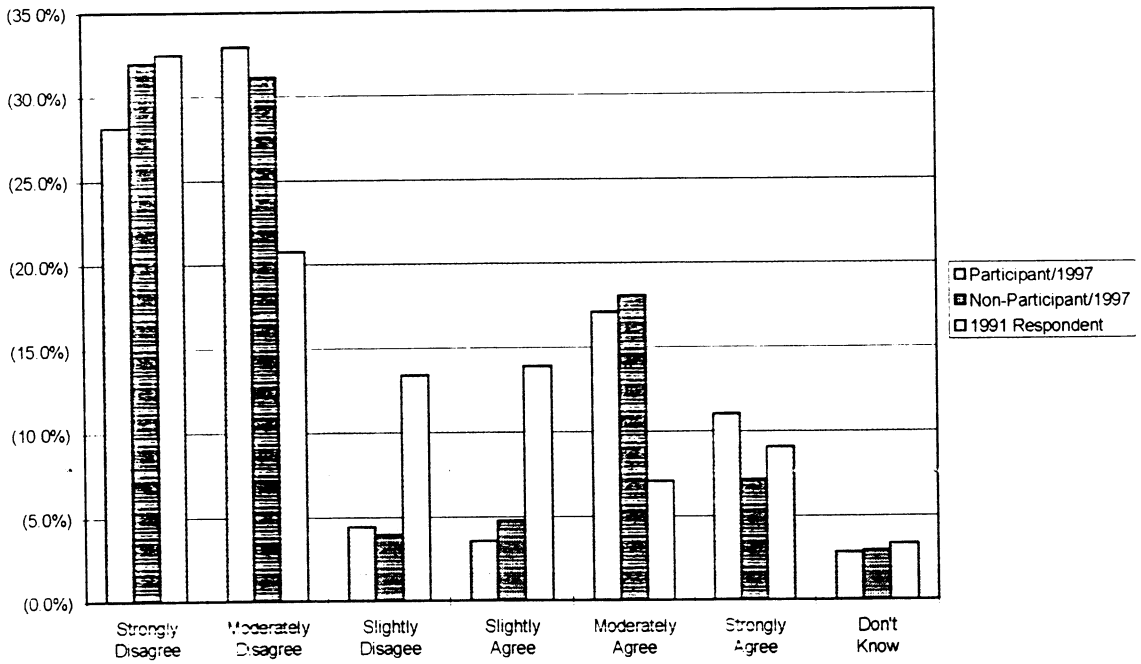


Figure IV-5

You track your monthly gas bill pretty carefully.

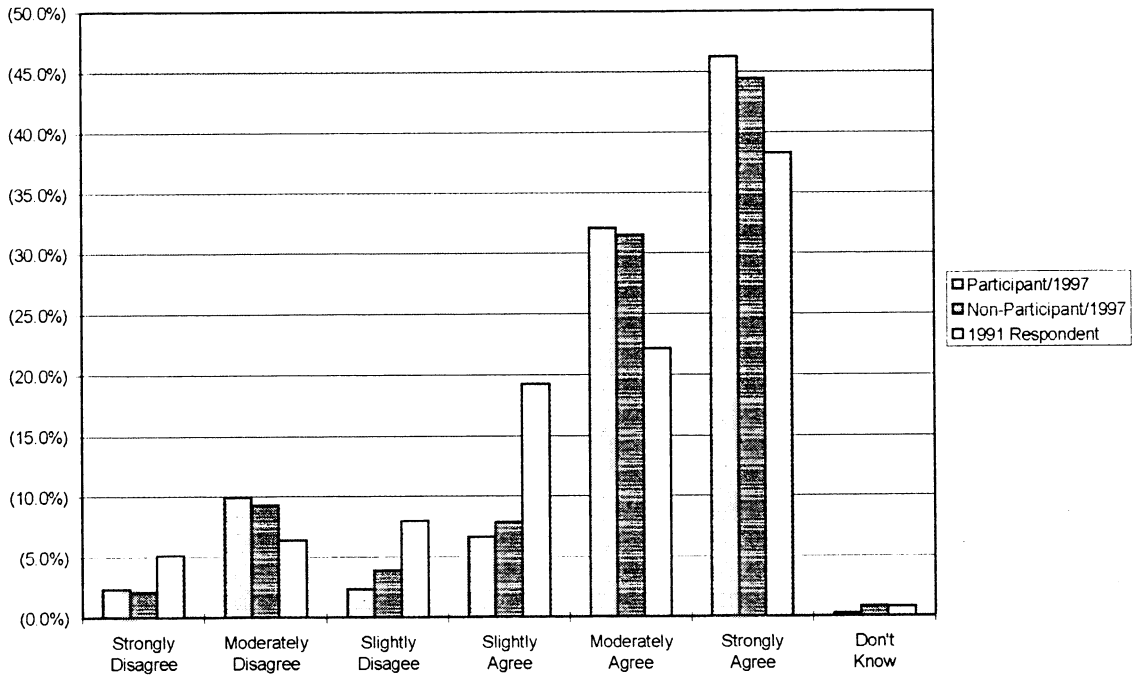


Figure IV-6

What you look for in a heating and cooling system is the even distribution of temperature around the house.

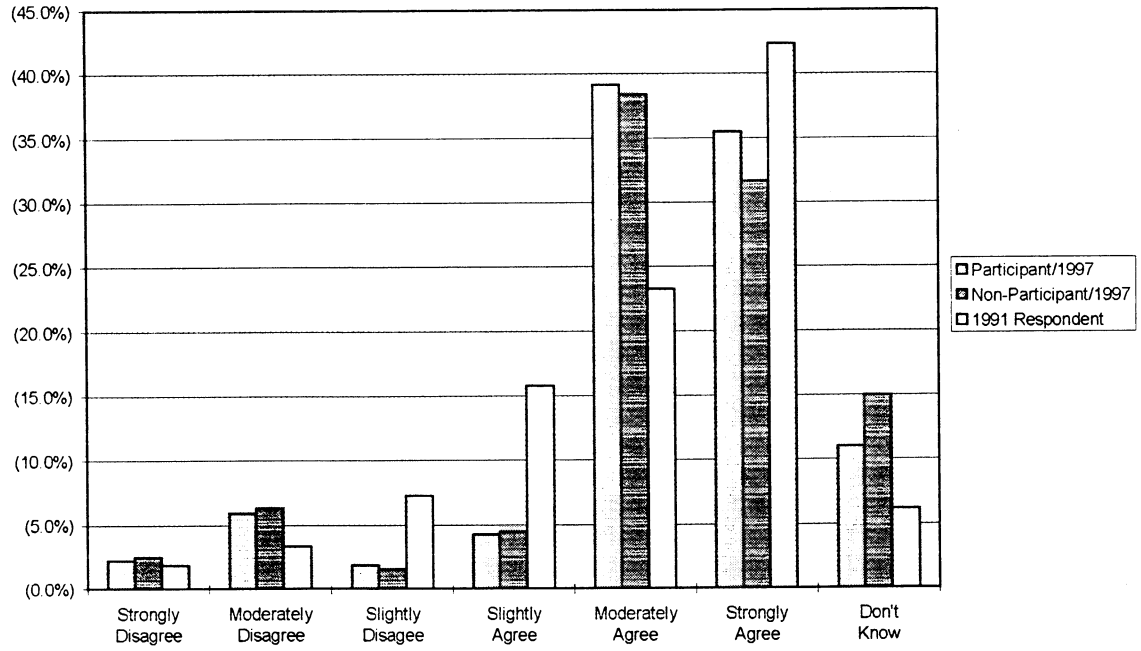


Figure IV-7

Before you buy or replace a furnace, you would try to figure out which type (model) is going to be cheapest to run in future years.

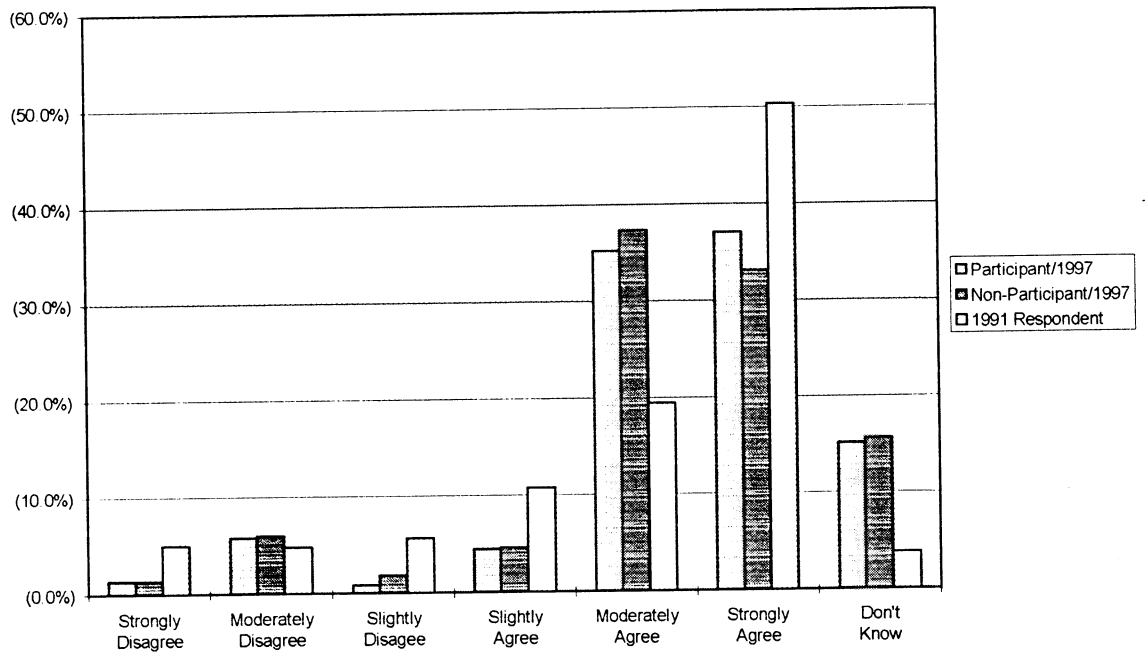


Figure IV-8

It's very important to you not to use more than your fair share of natural gas.

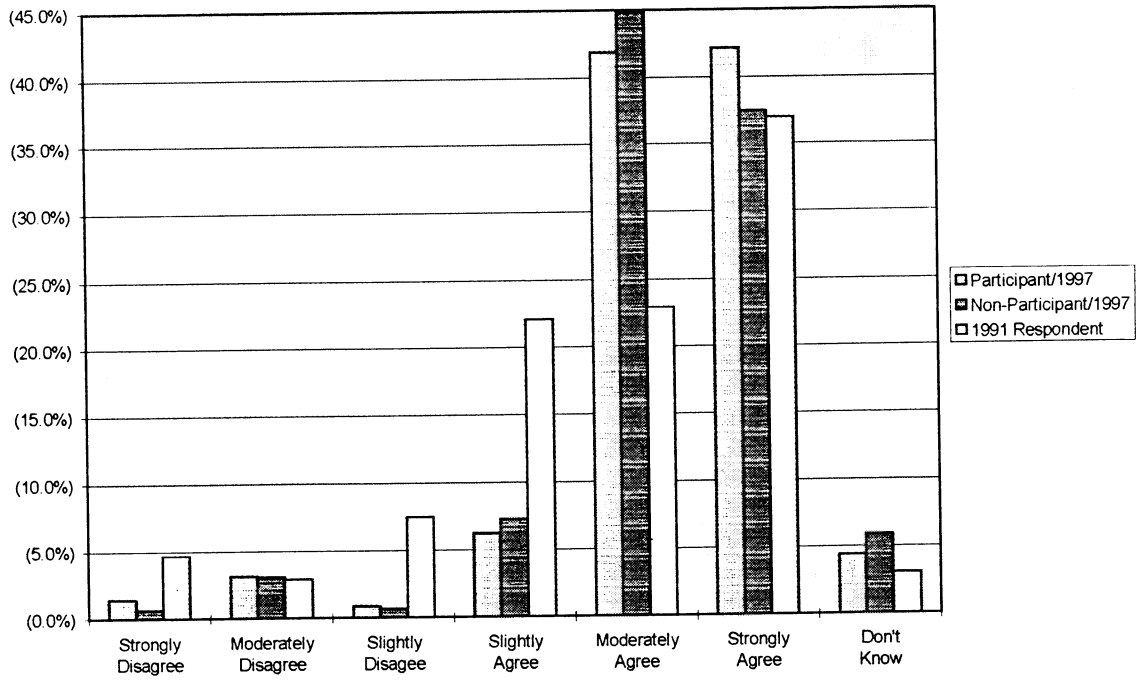


Figure IV-9

You sometimes worry about which is safer - a gas clothes dryer or an electric clothes dryer

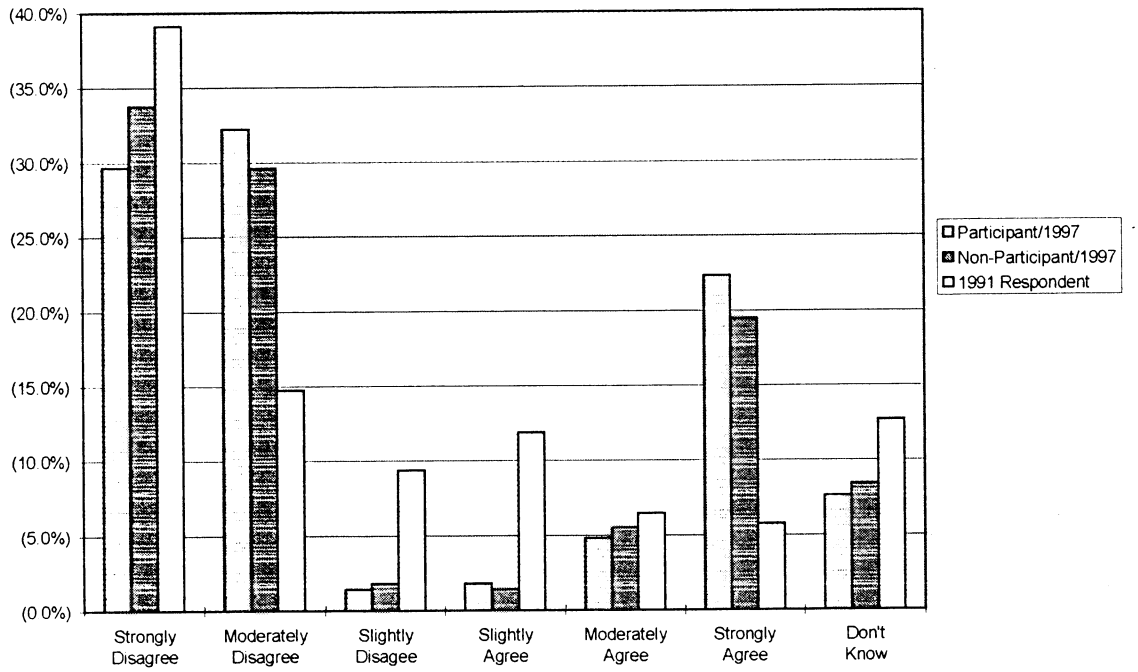
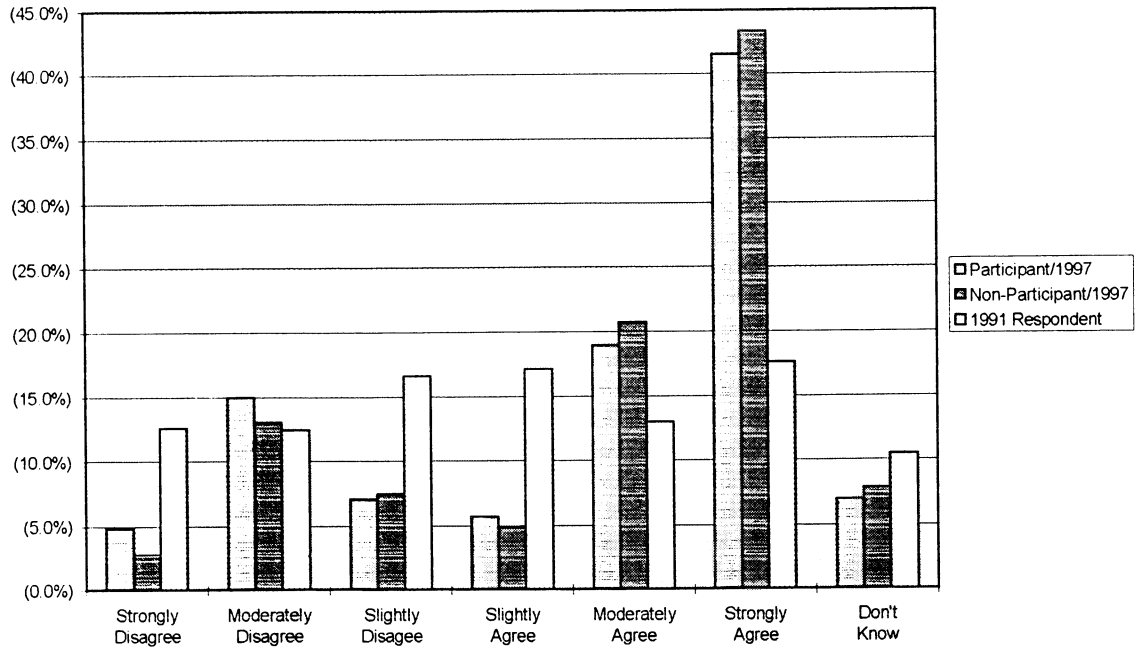


Figure IV-10

ou could not accept any restriction on the amount of natural gas used in your household at any time.



The Gas Company®

30-Jun-98

JANE L MAY
150 E 18TH ST
COSTA MESA CA 92627-3036

Southern California
Gas Company
Home Energy
Fitness Program

P.O. Box 513249
ML 12D2
Los Angeles, CA
90051-1249

Dear JANE L MAY:

Here are the results from your Home Energy Fitness Survey, giving you a graphic picture of how your natural gas usage shapes up, along with your personalized energy-saving tips. We've designed this information to help you use energy more efficiently and trim your monthly gas bills.

Also enclosed is your Home Energy Fitness Handbook, giving you the "how-to's" on most energy improvements. Together with your personalized report, the handbook will help you decide which recommendations are best for you -- and help you implement them.

Thank you for participating in the Home Energy Fitness Program.

Sincerely,
The Gas Company

P.S. If you have any questions about your Home Energy Fitness Report, please call us at 1-800-427-2200 and select 'other marketing products and programs' from the menu options.

 Printed on Recycled Paper 659-003/004-97 6/98

The Gas Company

Glad to be of service.

Home Energy Fitness Report

Prepared For: JANE L MAY
Account Number: 008-508-0000

Energy Saving Recommendations

Space Heating:

Congratulations, you are saving energy and money by insulating your home. You are saving an average of 23% of your heating costs through insulation.

Energy-Saving Tips: Keep your heating system tuned up, just like you would a car. 1) For peak operating efficiency, clean and change furnace filters regularly. 2) Turn your furnace off when no one is home. 3) Loose-fitting windows and doors will lose hot or cool air through cracks around the edges. Sealing these edges with caulk and weatherstriping will keep heat and cold air where they belong. These easy practices will save $$$ and energy.

Water Heating:

Congratulations, you are saving energy and approximately 5-7% of your water heating costs by installing a high efficiency water heater(s).

By installing a water heater wrap(s) you can save both $$$ and energy. Insulating the sides of a water heater tank will save a great deal of the heat lost through the walls of a storage tank.

Energy-Saving Tip: You can save even more $$$ and energy by making sure your water heater thermostat is set to 120 F.

Shower Heads:

Congratulations, you are saving energy and an average of 8-10% of your water heating costs because you have installed an energy-efficient shower head(s).

Energy-Saving Tip: You can save both water and energy by making sure that you take showers that are less than five minutes long.

Clothes Washer:

Energy-Saving Tips: 1) Whenever possible, use warm or cold settings instead of hot on your washing machine. Most laundry detergents are formulated to clean just as well at warm and cold temperatures. 2) By running your clothes washer only when it has a full load you will also save $$$ and energy.

The Gas Company

Glad to be of service

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Energy Saving Recommendations

Range & Oven:

Energy-Saving Tip: By keeping lids on your pots while cooking you can reduce your energy needs.

Clothes Dryer:

Energy-Saving Tips: 1) Follow manufacturers' loading instructions. Don't overload the dryer (which reduces energy efficiency) or run very small loads (which wastes energy) and you will save money; 2) Separate lightweight and heavy clothes for more energy-efficient drying; 3) Clean the lint trap regularly to optimize energy efficiency.

Specialty Appliances:

LOG LIGHTERS: Using a natural gas log lighter is faster and more convenient for starting log fires.

GAS LOGS: Natural gas fireplace logs offer old-fashioned charm, a safe clean-burning fuel, convenience, and cost savings. A recent national survey indicated savings of approximately 57% with gas logs versus wood logs. By switching to natural gas logs you will both reduce pollution in Southern California and save money.

GAS BBQs: A natural gas barbecue is the most economical fuel you can use and is a healthier choice for the environment. Your average energy cost per cookout with natural gas is $.07, compared to $.16 for propane and $1.68 with charcoal.

OUTDOOR HEATERS: Create a circle of warmth up to 10 feet away by installing outdoor gas heaters. The low-cost fuel allows frequent use while being easy on the environment. Outdoor gas heaters emit fewer pollutants into the atmosphere than other heating sources.

OUTDOOR LIGHTS: Outdoor gas lights are an attractive addition to the appearance of your home. The warm glow of a gas light never attracts insects while providing the equivalent of a 100 watt electric bulb that lasts for years without replacement.

Home Energy Fitness Report

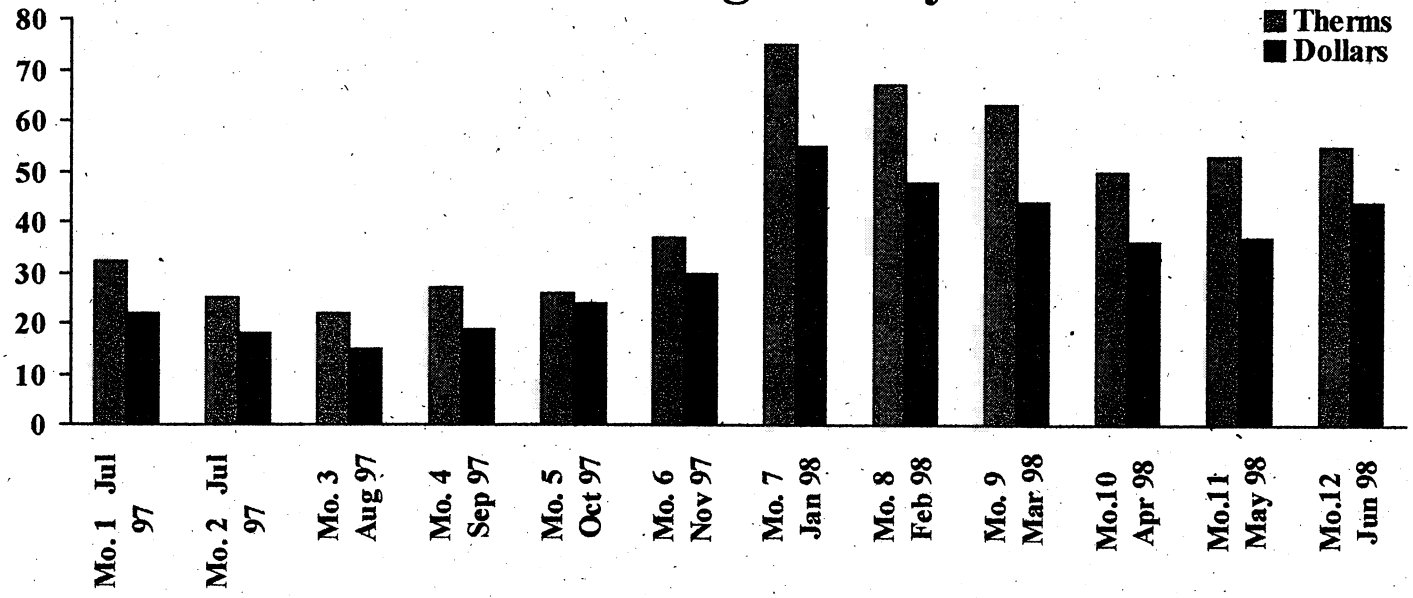
The Gas Company®

Glad to be of service.

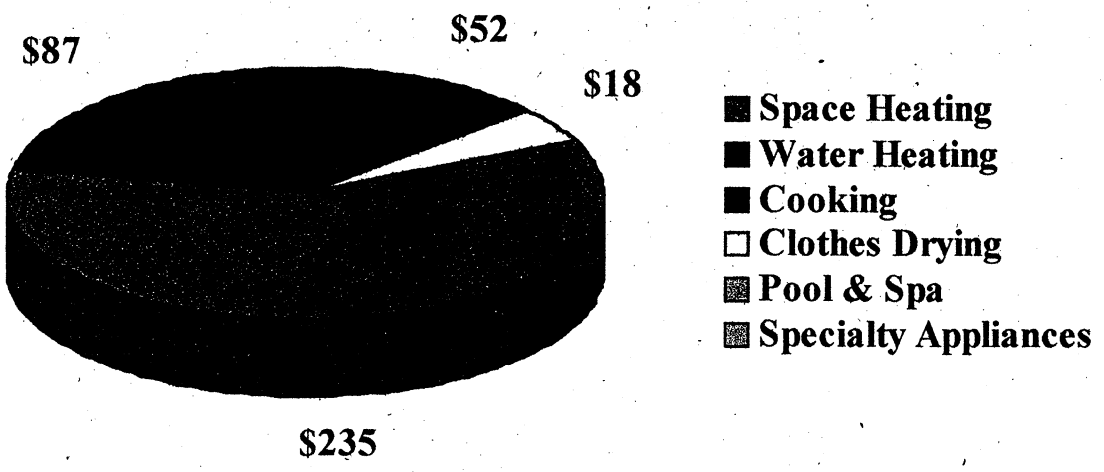
Prepared For: JANE L MAY
Account Number: 008-508-0000

Period Covered: Jul 1997 - Jun 1998
Total Cost: $391.83
Total Therms: 532

Gas Billing History



Gas Usage Analysis



All figures in your report are estimates only, based upon certain assumptions. Your actual figures may vary depending upon your gas usage.

Figure IV-11

You encourage your family to take steps to save money on your utility bills.

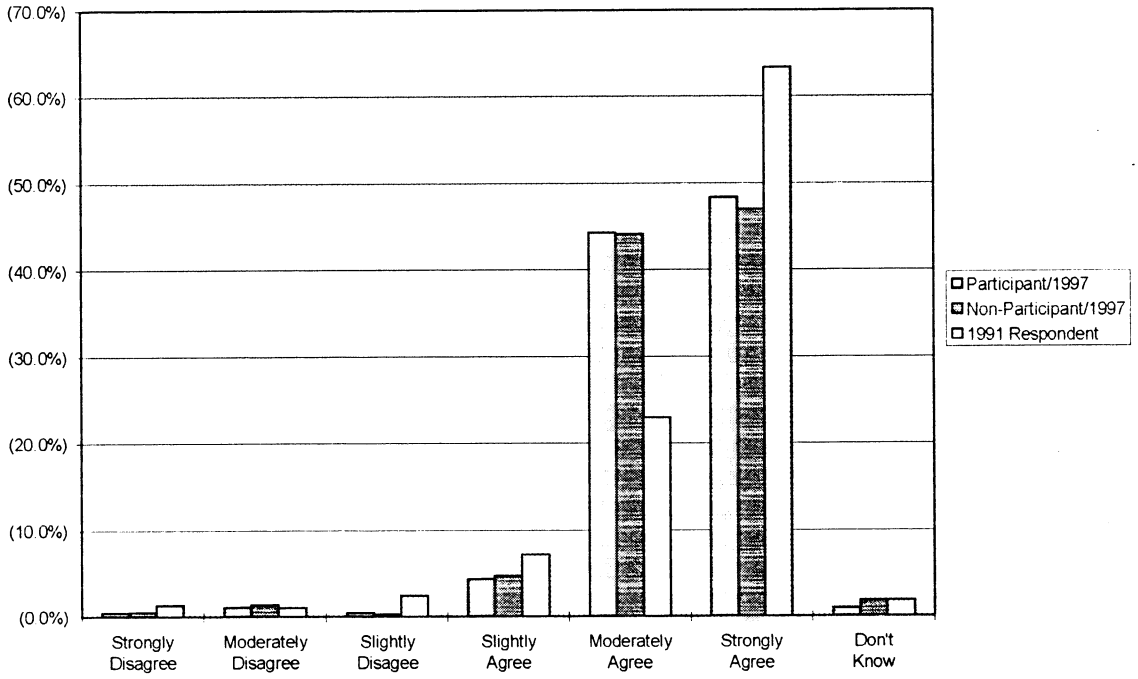


Figure IV-12

You would not be happy with any new laws requiring you to take energy conservation actions in your home.

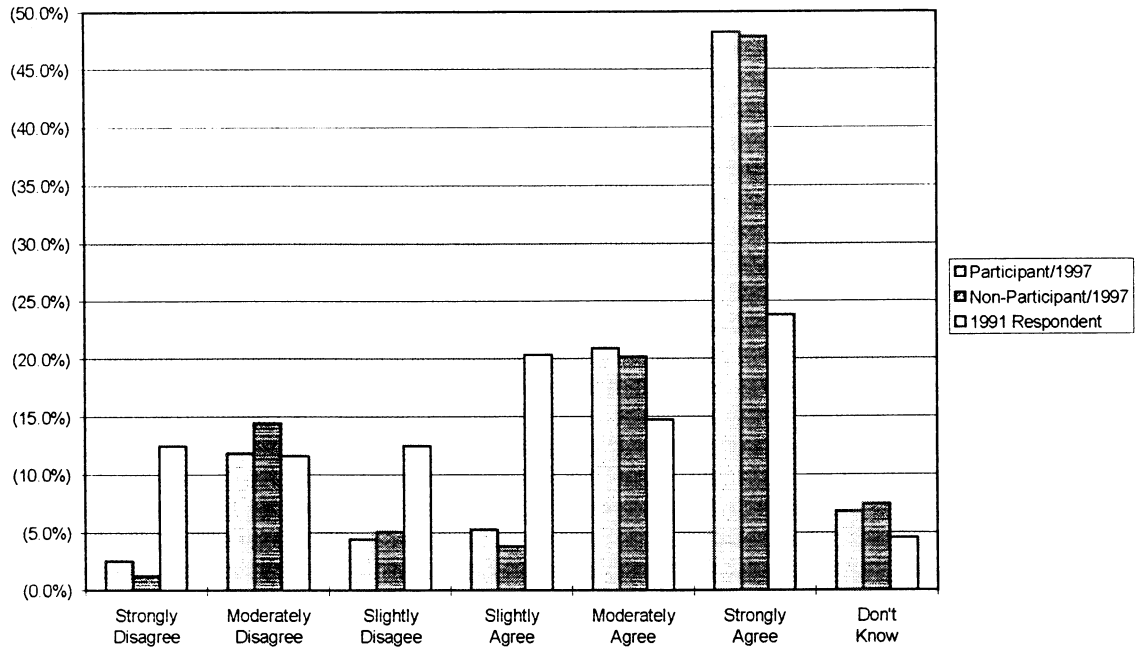


Table IV-30

1997: Once you've decided to buy or replace a major appliance, you do not pay attention to specials or rebates.
1991: Once I've decided to buy or replace a major appliance, I don't pay attention to specials or rebates.

	strongly disagree <--										--> strongly agree				Mean
	1		2		3		3.5 (dk)		4		5		6		
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
Participant/1997	264	(37.3%)	217	(30.7%)	28	(4.0%)	16	(2.3%)	17	(2.4%)	95	(13.4%)	70	(9.9%)	2.5
Non-Participant/1997	286	(40.1%)	213	(29.9%)	20	(2.8%)	22	(3.1%)	22	(3.1%)	106	(14.9%)	44	(6.2%)	2.4
1991 Respondent	424	(42.7%)	149	(15.0%)	100	(10.1%)	32	(3.2%)	94	(9.5%)	73	(7.4%)	120	(12.1%)	2.6
Total	974	(40.4%)	579	(24.0%)	148	(6.1%)	70	(2.9%)	133	(5.5%)	274	(11.4%)	234	(9.7%)	2.5

Table IV-31

1997: You think it is silly (unreasonable) to spend money lighting areas of the home when no one is home at the time.
1991: I think it's silly to spend money lighting up areas of the home when no one is home at the time.

	strongly disagree <--										--> strongly agree				Mean
	1		2		3		3.5 (dk)		4		5		6		
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
Participant/1997	180	(25.5%)	162	(22.9%)	21	(3.0%)	6	(0.8%)	21	(3.0%)	178	(25.2%)	139	(19.7%)	3.4
Non-Participant/1997	178	(25.0%)	175	(24.5%)	21	(2.9%)	10	(1.4%)	23	(3.2%)	202	(28.3%)	104	(14.6%)	3.3
1991 Respondent	243	(24.5%)	120	(12.1%)	97	(9.8%)	5	(0.5%)	96	(9.7%)	107	(10.8%)	324	(32.7%)	3.7
Total	601	(24.9%)	457	(18.9%)	139	(5.8%)	21	(0.9%)	140	(5.8%)	487	(20.2%)	567	(23.5%)	3.5

Table IV-32

1997: You do not like to spend much of your time looking around when you need to buy or replace an appliance.
1991: I don't like to spend much of my time looking around when I need to buy or replace an appliance.

	strongly disagree <--										--> strongly agree				Mean
	1		2		3		3.5 (dk)		4		5		6		
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
Participant/1997	227	(32.1%)	175	(24.8%)	20	(2.8%)	7	(1.0%)	26	(3.7%)	158	(22.3%)	94	(13.3%)	3.0
Non-Participant/1997	221	(31.0%)	211	(29.6%)	23	(3.2%)	9	(1.3%)	25	(3.5%)	157	(22.0%)	67	(9.4%)	2.8
1991 Respondent	272	(27.4%)	151	(15.2%)	101	(10.2%)	18	(1.8%)	151	(15.2%)	149	(15.0%)	150	(15.1%)	3.2
Total	720	(29.9%)	537	(22.3%)	144	(6.0%)	34	(1.4%)	202	(8.4%)	464	(19.2%)	311	(12.9%)	3.0

Table IV-33

1997: You usually find out it's easier to replace a worn out major appliance with the same brand rather than spend a lot of time looking at other brands.
1991: I usually find it's easiest to replace a worn out major appliance with the same brand rather than spend a lot of time looking around.

	strongly disagree <--										--> strongly agree				Mean
	1		2		3		3.5 (dk)		4		5		6		
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
Participant/1997	199	(28.1%)	233	(33.0%)	31	(4.4%)	20	(2.8%)	25	(3.5%)	121	(17.1%)	78	(11.0%)	2.8
Non-Participant/1997	228	(32.0%)	222	(31.1%)	28	(3.9%)	21	(2.9%)	34	(4.8%)	129	(18.1%)	51	(7.2%)	2.7
1991 Respondent	322	(32.5%)	206	(20.8%)	133	(13.4%)	33	(3.3%)	138	(13.9%)	70	(7.1%)	90	(9.1%)	2.7
Total	749	(31.1%)	661	(27.4%)	192	(8.0%)	74	(3.1%)	197	(8.2%)	320	(13.3%)	219	(9.1%)	2.7

Table IV-34

1997: You track your monthly gas bill pretty carefully.
1991: I track my monthly gas bill pretty carefully.

	strongly disagree <—											—> strongly agree				Mean
	1		2		3		3.5 (dk)		4		5		6			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%		#
Participant/1997	17	(2.4%)	70	(9.9%)	17	(2.4%)	2	(0.3%)	47	(6.6%)	227	(32.1%)	327	(46.3%)		5.0
Non-Participant/1997	15	(2.1%)	66	(9.3%)	28	(3.9%)	6	(0.8%)	56	(7.9%)	225	(31.6%)	317	(44.5%)		4.9
1991 Respondent	51	(5.1%)	63	(6.4%)	79	(8.0%)	8	(0.8%)	191	(19.3%)	220	(22.2%)	380	(38.3%)		4.6
Total	83	(3.4%)	199	(8.3%)	124	(5.1%)	16	(0.7%)	294	(12.2%)	672	(27.9%)	1024	(42.5%)		4.8

Table IV-35

1997: What you look for in a heating and cooling system is the even distribution of temperature around the house.
1991: What I look for in a heating and cooling system is the even distribution of temperature around the house.

	strongly disagree <—											—> strongly agree				Mean
	1		2		3		3.5 (dk)		4		5		6			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%		#
Participant/1997	16	(2.3%)	42	(5.9%)	13	(1.8%)	78	(11.0%)	30	(4.2%)	277	(39.2%)	251	(35.5%)		5.0
Non-Participant/1997	18	(2.5%)	45	(6.3%)	11	(1.5%)	107	(15.0%)	32	(4.5%)	274	(38.4%)	226	(31.7%)		4.9
1991 Respondent	18	(1.8%)	33	(3.3%)	72	(7.3%)	61	(6.1%)	157	(15.8%)	231	(23.3%)	420	(42.3%)		4.9
Total	52	(2.2%)	120	(5.0%)	96	(4.0%)	246	(10.2%)	219	(9.1%)	782	(32.4%)	897	(37.2%)		5.0

Table IV-36

1997: Before you buy or replace a furnace, you would try to figure out which type (model) is going to be cheapest to run in future years.
1991: Before I would buy or replace a furnace, I would try to figure out which fuel, gas or electricity, is going to be cheapest in future years.

	strongly disagree <—											—> strongly agree				Mean
	1		2		3		3.5 (dk)		4		5		6			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%		#
Participant/1997	10	(1.4%)	41	(5.8%)	6	(0.8%)	107	(15.1%)	32	(4.5%)	249	(35.2%)	262	(37.1%)		5.1
Non-Participant/1997	10	(1.4%)	43	(6.0%)	13	(1.8%)	112	(15.7%)	33	(4.6%)	266	(37.3%)	236	(33.1%)		5.0
1991 Respondent	50	(5.0%)	48	(4.8%)	57	(5.7%)	38	(3.8%)	107	(10.8%)	193	(19.5%)	499	(50.3%)		4.9
Total	70	(2.9%)	132	(5.5%)	76	(3.2%)	257	(10.7%)	172	(7.1%)	708	(29.4%)	997	(41.3%)		5.0

Table IV-37

1997: It's very important to you not to use more than your fair share of natural gas.
1991: It's very important to me not to use more than my fair share of natural gas.

	strongly disagree <—											—> strongly agree				Mean
	1		2		3		3.5 (dk)		4		5		6			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%		#
Participant/1997	10	(1.4%)	22	(3.1%)	6	(0.8%)	31	(4.4%)	44	(6.2%)	296	(41.9%)	298	(42.1%)		5.2
Non-Participant/1997	5	(0.7%)	22	(3.1%)	5	(0.7%)	42	(5.9%)	52	(7.3%)	320	(44.9%)	267	(37.4%)		5.2
1991 Respondent	46	(4.6%)	29	(2.9%)	74	(7.5%)	30	(3.0%)	219	(22.1%)	227	(22.9%)	367	(37.0%)		4.7
Total	61	(2.5%)	73	(3.0%)	85	(3.5%)	103	(4.3%)	315	(13.1%)	843	(35.0%)	932	(38.6%)		5.0

Table IV-38

1997: You sometimes worry about which is safer - a gas clothes dryer or an electric clothes dryer.
1991: I sometimes worry about which is safer - a gas clothes dryer or an electric clothes dryer.

	strongly disagree <—											—> strongly agree				Mean
	1		2		3		3.5 (dk)		4		5		6			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%		#
Participant/1997	210	(29.7%)	228	(32.2%)	10	(1.4%)	54	(7.6%)	13	(1.8%)	34	(4.8%)	158	(22.3%)		2.9
Non-Participant/1997	241	(33.8%)	211	(29.6%)	13	(1.8%)	60	(8.4%)	10	(1.4%)	39	(5.5%)	139	(19.5%)		2.7
1991 Respondent	388	(39.1%)	146	(14.7%)	93	(9.4%)	126	(12.7%)	118	(11.9%)	64	(6.5%)	57	(5.7%)		2.4
Total	839	(34.8%)	585	(24.3%)	116	(4.8%)	240	(10.0%)	141	(5.8%)	137	(5.7%)	354	(14.7%)		2.6

Table IV-39

1997: You could not accept any restriction on the amount of natural gas used in your household at any time.
1991: I couldn't accept any restriction on the amount of natural gas used in my household at any time.

	strongly disagree <-----> strongly agree															Mean
	1		2		3		3.5 (dk)		4		5		6			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%		#
Participant/1997	34	(4.8%)	106	(15.0%)	50	(7.1%)	49	(6.9%)	40	(5.7%)	134	(19.0%)	294	(41.6%)		4.5
Non-Participant/1997	20	(2.8%)	93	(13.0%)	53	(7.4%)	56	(7.9%)	34	(4.8%)	148	(20.8%)	309	(43.3%)		4.7
1991 Respondent	125	(12.6%)	124	(12.5%)	165	(16.6%)	104	(10.5%)	170	(17.1%)	129	(13.0%)	175	(17.6%)		3.7
Total	179	(7.4%)	323	(13.4%)	268	(11.1%)	209	(8.7%)	244	(10.1%)	411	(17.0%)	778	(32.3%)		4.2

Table IV-40

1997: You encourage your family to take steps to save money on your utility bills.
1991: I encourage my family to take steps to save money on our utility bills.

	strongly disagree <-----> strongly agree															Mean
	1		2		3		3.5 (dk)		4		5		6			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%		#
Participant/1997	3	(0.4%)	8	(1.1%)	3	(0.4%)	7	(1.0%)	31	(4.4%)	313	(44.3%)	342	(48.4%)		5.4
Non-Participant/1997	4	(0.6%)	10	(1.4%)	2	(0.3%)	13	(1.8%)	34	(4.8%)	315	(44.2%)	335	(47.0%)		5.4
1991 Respondent	13	(1.3%)	10	(1.0%)	24	(2.4%)	18	(1.8%)	71	(7.2%)	228	(23.0%)	628	(63.3%)		5.4
Total	20	(0.8%)	28	(1.2%)	29	(1.2%)	38	(1.6%)	136	(5.6%)	856	(35.5%)	1305	(54.1%)		5.4

Table IV-41

1997: You would not be happy with any new laws requiring you to take energy conservation actions in your home.
1991: I would not be happy with any new laws requiring me to take energy conservation actions in my home.

	strongly disagree <-----> strongly agree															Mean
	1		2		3		3.5 (dk)		4		5		6			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%		#
Participant/1997	18	(2.5%)	84	(11.9%)	31	(4.4%)	48	(6.8%)	37	(5.2%)	148	(20.9%)	341	(48.2%)		4.9
Non-Participant/1997	9	(1.3%)	103	(14.4%)	36	(5.0%)	53	(7.4%)	27	(3.8%)	144	(20.2%)	341	(47.8%)		4.8
1991 Respondent	124	(12.5%)	115	(11.6%)	124	(12.5%)	45	(4.5%)	202	(20.4%)	146	(14.7%)	236	(23.8%)		3.9
Total	151	(6.3%)	302	(12.5%)	191	(7.9%)	146	(6.1%)	266	(11.0%)	438	(18.2%)	918	(38.1%)		4.5

Two overall results are apparent from the response frequencies. First, there is little difference in the distribution of attitudes between participants and nonparticipants in the 1997 surveys. There is not a single response category where the frequencies differ significantly between the two groups.

Second, the differences in presentation medium and format between the 1992 and 1997 surveys appear to affect the response intensities. There is a consistent pattern of higher frequencies for the response categories of mild agreement/disagreement (numbers 3 and 4) in the 1992 survey relative to the 1997 surveys. The mail medium used in 1992 allowed respondents to think about their responses for a longer period of time before indicating their agreement/disagreement and to review all of the questions before responding to any single one.

The first result suggests that the HEF Program has had no significant direct effect on the attitudes of participants relative to nonparticipants. If the HEF Program had such an effect (and

one accepts that the responses to these questions capture these effects), then the response frequencies would be different. While it is possible that the HEF Program exerts an indirect effect on the attitudes of nonparticipants, it is unlikely that the magnitude of any such effect would be comparable to that for the participants. Based on the results of these questions, we conclude that there is no evidence indicating that the HEF Program has caused any long-term, sustained effect on the attitudes of participants toward energy efficiency.

The second finding that the differences in survey medium between 1992 and 1997 affected the responses raises a question about the validity of any comparisons of attitudinal constructs across the two surveys. Without additional data collection to compare response patterns under the two survey media in a controlled experiment, there is no way to determine whether the differences introduce any biases and, if so, what are the magnitudes of such biases. We did perform a factor analysis of the responses as an informational exercise, nonetheless, recognizing that the interpretation of any differences between 1991 and 1997 could be ambiguous.

In the factor analysis, we identified three attitudinal constructs that account for almost 50% of the variations in responses. These are attitudes associated with:

1. ***Cost effective, rational decisionmaking***, an attitude that reflects high levels of agreement with the desire to track energy bills carefully, encouraging the family to save energy, and figuring the long term cost of owning an appliance;

2. ***Convenience***, an attitude associated with strong agreement with the questions dealing with time saving or hassle avoidance ("easier to replace appliance with the same brand; don't want to spend time shopping; don't bother checking for specials or rebates"); and

3. ***Desire to control***, an attitudinal construct associated with strong disagreement with the statements that "you could not accept laws mandating conservation or restrictions on gas use."

The average factor scores for the three different samples are presented in Table IV-42. As they show, the levels of these attitudinal variables are quite similar between participants and nonparticipants in 1997. This finding is consistent with the comparability of the frequencies for the raw questions.

Table IV-42
Average Factor Value by Survey Group

	Number	Factor 1 Prudence	Factor 2 Convenience	Factor 3 Legislation
1997 Participant	594	16.41	13.74	2.67
1997 Non-Participant	578	16.51	13.44	2.35
1991 Respondent	861	14.71	12.90	3.71
Total	**2033**	**15.72**	**13.30**	**3.02**

The attitudes differ somewhat between the 1997 and the 1991 surveys. They show a moderate increase in the average factor scores for cost-effective decisionmaking and convenience between 1991 and 1997. At the same time, the score for the third attitudinal variable, desire for control, is lower in 1997. Given the construction of these variables, it is impossible to determine whether these differences are statistically significant. Neither is it possible to determine whether the differences reflect changes in underlying values or simply the effects of differences in the survey medium.

SECTION V
BILLING ANALYSIS OF PERSISTENCE OF PROGRAM EFFECTS

V. BILLING ANALYSIS OF PERSISTENCE OF PROGRAM EFFECTS

This section presents the results of the analysis of the persistence of impacts from the Home Energy Fitness Program and documents the steps that were taken to obtain them. The objective of the persistence analysis was to estimate the degree to which savings attributable to the program continue beyond the first year after customers participate in the HEF Program. These estimates of longer-term impacts are used in conjunction with the results from other tasks to determine the degree to which the program has caused significant, sustainable changes in the market for efficient gas measures and practices.

The method used to estimate the persistence of the savings from the HEF Program was to extend a previous analysis of the first year impacts of the 1994 program year. That analysis consisted of the estimation of a series of statistical regression models that relate gas consumption to variables representing program participation, weather, and gas equipment holdings, as well as other residence and household characteristics. The specifications used in the regression analysis are referred to as Load Impact Regression Models (LIRM) in the Verification Protocols. The analysis and associated documentation in the original analysis conformed to the quality assurance guidelines developed by the Retrofit Modeling Subcommittee of CADMAC. (see Quality Assurance Guidelines for Statistical and Engineering Models, Final Report, CADMAC Subcommittee on Modeling Standards for End Use Consumption and Load Impact Models, December 1994). The documentation of the original sample and statistical analysis is contained in First Year Load Impact Study of Southern California Gas Company's 1994 Home Energy Fitness Program, Study ID 708, Andrew A. Goett, February 27, 1996, submitted to CADMAC by Southern California Gas Company. In the persistence analysis, we have addressed any relevant issues dealing with additional data attrition for the expanded dataset.

In the original impact evaluation, the regression models were estimated on consumption data covering the period from January 1993 through November 1995. This period spanned the time from approximately one year before the program year (1994) through one year after. In the persistence analysis, the time period was extended to August 1997—almost two years more than the original analysis.

Under the analysis of program persistence, the first year load impact regression models were re-estimated with additional variables to capture net program effects in the second and third years after participation. Other variables were added to the model specification to identify any trends in gas consumption that occurred for all customers in the years after 1994. In combination, the coefficients of these additional variables quantify both gross and net responses to the program treatment, after controlling for changes in weather and other differences between participants and the general residential customer population.

V.1 DATA PREPARATION

Data for regression models estimates came from four sources:

1. The HEF Program tracking database that identified the participants and the dates audit reports were sent to them;

2. SoCalGas Company's billing system, from which consumption data were extracted for participants and a sample of nonparticipants covering the period from January 1993 through August 1997;

3. Temperature data from the various weather stations in the SoCalGas service territory that were used to construct a heating degree day variable that was matched to the period of each gas bill; and

4. A survey of a sample of participants and nonparticipants that included information on the respondents' demographic and dwelling characteristics and gas equipment holdings and operation.

The information from these sources was merged to construct a time series/cross sectional data set of consumption for a sample of participants and nonparticipants spanning the period from 12 months prior to the 1994 program year through almost 3 years afterward. This data set permitted comparison of changes in gas consumption for participants and nonparticipants from before to after program treatment, controlling for changes in weather and other nonprogram effects.

The definitions of the variables in the time series/cross sectional data set are presented in Table V-1. The mean values and other relevant information for these variables are shown in Tables V-2 and V-3.

Table V-1
Listing of Regression Variables

AHDD65	Average base 65 heating degree-days per day in billing period
CZ1	1 if in Mountain climate zone, else 0
CZ4	1 if in Upper Desert climate zone, else 0
CZ6	1 if in LA Basin climate zone, else 0
DAYHOME	1 if someone is home during the day, else 0
DAYUSE	Average therms per day used in billing period
GASDRYR	1 if own a gas clothes dryer, else 0
GASHEAT	1 if use gas for heating, else 0
GASPOOL	1 if own a gas-heated swimming pool, else 0
HEF1	1 for participants after participation during period 1/94-11/95, else 0
HEF2	1 for participants during period 12/95-11/96, else 0
HEF3	1 for participants during period 12/96-8/97, else 0
HHSIZE	Number of persons in household
HTHDDSF	GASHEAT*AHDD65*SQFT**(2/3)/1000
INCOME	Average annual income, in thousand $ per year
NEWHTSYS	1 if installed new heating system during period 1/93-10/95, else 0
PARTIC	1 if participant, else 0
PHTHDSF1	HTHDDSF*HEF1
PHTHDSF2	HTHDDSF*HEF2
PHTHDSF3	HTHDDSF*HEF3
PILOT	1 if gas cook stove has pilot light, else 0
POST1	1 for all households during period 12/94-11/95, else 0
POST2	1 for all households during period 12/95-11/96, else 0
POST3	1 for all households during period 12/96-8/97, else 0
SBT	1 if have set-back thermostat, else 0
SQFT	Square feet of floor area
SQFTQ	SQFT Squared
SUMPOOL	1 if GASPOOL during months May through October, else 0
V46T65	1 if house built during period 1946-1965, else 0
V66T77	1 if house built during period 1966-1977, else 0
VPOST77	1 if house built after 1977, else 0
WINPOOL	1 if GASPOOL during months November through April, else 0

Table V-2-a
Means for Household Sample B, 1995 Model Specification
Nonparticipants

Variable	Label	N	Mean	Min	Max
DAYHOME	Anyone Home During Day (0/1)	27664	0.75	0	1
INCOME	Income, $1000/Year	27664	44.21	10	80
SBT	Set-Back Thermostat (0/1)	27664	0.33	0	1
PILOT	Pilot Light on Stove (0/1)	27440	0.35	0	1
GASPOOL	Gas-Heated Swimming Pool (0/1)	27664	0.07	0	1
NDAYS	# Days in Billing Period	27664	30.42	11	59
HHSIZE	Household Size	27664	2.79	1	10
V46T65	House Built 1946-1965	27664	0.44	0	1
V66T77	House Built 1966-1977	27664	0.25	0	1
VPOST77	House Built After 1977	27664	0.16	0	1
SQFT	Square Feet	27664	1643.00	420	9000
GASHEAT	Gas is Primary Heat	27664	0.97	0	1
NEWHTSYS	Heating System Has Changed	27664	0.05	0	1
GASWHT	Gas Water Heat	27664	0.99	0	1
GASDRYR	Gas Clothes Dryer	27664	0.71	0	1
GASCOOK	Gas Cooking	27664	0.73	0	1
DAYUSE	Gas Use Per Day, Therms	27664	1.67	0	17.28
POST1	12/94 thru 11/95	27664	0.21	0	1
POST2	12/95 thru 11/96	27664	0.21	0	1
POST3	12/96 thru 9/97	27664	0.16	0	1
HEF1	GOTHEF from 1/94 thru 11/95	27664	0.00	0	0
HEF2	GOTHEF from 12/95 thru 11/96	27664	0.00	0	0
HEF3	GOTHEF from 12/96 thru 8/97	27664	0.00	0	0
AHDD65	Average Daily HDDs, Base 65	27664	4.68	0	31.12
SQFTQ	SQFT squared	27664	3,268,339	176,400	8.10E+07

Table V-2-b
Means for Household Sample B, 1995 Model Specification
Participants

Variable	Label	N	Mean	Min	Max
DAYHOME	Anyone Home During Day (0/1)	33712	0.76	0	1
INCOME	Income, $1000/Year	33712	38.00	10	80
SBT	Set-Back Thermostat (0/1)	33712	0.27	0	1
PILOT	Pilot Light on Stove (0/1)	33600	0.33	0	1
GASPOOL	Gas-Heated Swimming Pool (0/1)	33712	0.06	0	1
NDAYS	# Days in Billing Period	33712	30.41	9	58
HHSIZE	Household Size	33712	2.43	1	8
V46T65	House Built 1946-1965	33712	0.50	0	1
V66T77	House Built 1966-1977	33712	0.27	0	1
VPOST77	House Built After 1977	33712	0.12	0	1
SQFT	Square Feet	33712	1550.10	120	9000
GASHEAT	Gas is Primary Heat	33712	0.97	0	1
NEWHTSYS	Heating System Has Changed	33712	0.05	0	1
GASWHT	Gas Water Heat	33712	0.98	0	1
GASDRYR	Gas Clothes Dryer	33712	0.64	0	1
GASCOOK	Gas Cooking	33712	0.73	0	1
DAYUSE	Gas Use Per Day, Therms	33712	1.61	0	13.74
POST1	12/94 thru 11/95	33712	0.21	0	1
POST2	12/95 thru 11/96	33712	0.21	0	1
POST3	12/96 thru 9/97	33712	0.16	0	1
HEF1	GOTHEF from 1/94 thru 11/95	33712	0.24	0	1
HEF2	GOTHEF from 12/95 thru 11/96	33712	0.21	0	1
HEF3	GOTHEF from 12/96 thru 8/97	33712	0.16	0	1
AHDD65	Average Daily HDDs, Base 65	33712	4.76	0	31.12
SQFTQ	SQFT squared	33712	2.94E+06	1.44E+04	8.10E+07

Table V-3-a
Means for Household Sample C, 1997 Model Specifications
Nonparticipants

Variable	Label	N	Mean	Min	Max
DAYHOME	Anyone Home During Day (0/1)	28840	0.75	0	1
INCOME	Income, $1000/Year	28840	43.88	10	80
PILOT	Pilot Light on Stove (0/1)	28840	0.36	0	1
NDAYS	# Days in Billing Period	28840	30.42	11	59
HHSIZE	Household Size	28840	2.78	1	10
V46T65	House Built 1946-1965	28840	0.44	0	1
V66T77	House Built 1966-1977	28840	0.25	0	1
VPOST77	House Built After 1977	28840	0.15	0	1
SQFT	Square Feet	28840	1621.50	30	9000
GASHEAT	Gas is Primary Heat	28840	0.97	0	1
GASWHT	Gas Water Heat	28840	0.99	0	1
GASDRYR	Gas Clothes Dryer	28840	0.70	0	1
GASCOOK	Gas Cooking	28840	0.73	0	1
DAYUSE	Gas Use Per Day, Therms	28840	1.65	0	17
POST1	12/94 thru 11/95	28840	0.21	0	1
POST2	12/95 thru 11/96	28840	0.21	0	1
POST3	12/96 thru 9/97	28840	0.16	0	1
HEF1	GOTHEF from 1/94 thru 11/95	28840	0.00	0	0
HEF2	GOTHEF from 12/95 thru 11/96	28840	0.00	0	0
HEF3	GOTHEF from 12/96 thru 8/97	28840	0.00	0	0
CZ1	Mountain Zone	28840	0.08	0	1
CZ2	Lower Desert	28840	0.06	0	1
CZ3	Coastal Strip	28840	0.15	0	1
CZ4	Upper Desert	28840	0.23	0	1
CZ5	SF/SG Valleys	28840	0.40	0	1
CZ6	LA Basin	28840	0.07	0	1
AHDD65	Average Daily HDDs, Base 65	28840	4.68	0	31.12
HTHDDSF	GASHEAT*AHDD65*SQFT**(2/3)	28840	0.61	0	8.14
PHTHDSF1	HTHDDSF*HEF1	28840	0.00	0	0.00
PHTHDSF2	HTHDDSF*HEF2	28840	0.00	0	0.00
PHTHDSF3	HTHDDSF*HEF3	28840	0.00	0	0.00
WINPOOL	GASPOOL Nov-Apr	28840	0.03	0	1
SUMPOOL	GASPOOL May-Oct	28840	0.04	0	1

Table V-3-b
Means for Household Sample C, 1997 Model Specifications
Participants

Variable	Label	N	Mean	Min	Max
DAYHOME	Anyone Home During Day (0/1)	34944	0.76	0	1
INCOME	Income, $1000/Year	34944	37.57	10	80
PILOT	Pilot Light on Stove (0/1)	34944	0.33	0	1
NDAYS	# Days in Billing Period	34944	30.42	9	58
HHSIZE	Household Size	34944	2.44	1	8
V46T65	House Built 1946-1965	34944	0.50	0	1
V66T77	House Built 1966-1977	34944	0.27	0	1
VPOST77	House Built After 1977	34944	0.12	0	1
SQFT	Square Feet	34944	1538.90	120	9000
GASHEAT	Gas is Primary Heat	34944	0.97	0	1
GASWHT	Gas Water Heat	34944	0.98	0	1
GASDRYR	Gas Clothes Dryer	34944	0.64	0	1
GASCOOK	Gas Cooking	34944	0.73	0	1
DAYUSE	Gas Use Per Day, Therms	34944	1.60	0	13.74
POST1	12/94 thru 11/95	34944	0.21	0	1
POST2	12/95 thru 11/96	34944	0.21	0	1
POST3	12/96 thru 9/97	34944	0.16	0	1
HEF1	GOTHEF from 1/94 thru 11/95	34944	0.24	0	1
HEF2	GOTHEF from 12/95 thru 11/96	34944	0.21	0	1
HEF3	GOTHEF from 12/96 thru 8/97	34944	0.16	0	1
CZ1	Mountain Zone	34944	0.08	0	1
CZ2	Lower Desert	34944	0.06	0	1
CZ3	Coastal Strip	34944	0.16	0	1
CZ4	Upper Desert	34944	0.23	0	1
CZ5	SF/SG Valleys	34944	0.42	0	1
CZ6	LA Basin	34944	0.05	0	1
AHDD65	Average Daily HDDs, Base 65	34944	4.69	0	31.12
HTHDDSF	GASHEAT*AHDD65*SQFT**(2/3)	34944	0.59	0	8.62
PHTHDSF1	HTHDDSF*HEF1	34944	0.15	0	8.30
PHTHDSF2	HTHDDSF*HEF2	34944	0.11	0	6.86
PHTHDSF3	HTHDDSF*HEF3	34944	0.10	0	7.23
WINPOOL	GASPOOL Nov-Apr	34944	0.03	0	1
SUMPOOL	GASPOOL May-Oct	34944	0.03	0	1

In the course of extending the period of analysis, three changes were made to the original data. First, some of the households in the sample were lost because they had terminated gas service between December 1995 and August 1997, reducing the sample size from 1169 to 1073. Second, some households who had been surveyed, but deleted from the original analysis because of incomplete consumption data, were added back into the dataset because their consumption data was now complete, increasing the sample size back up to 1096.

Finally, the heating degree day variable was recalculated for the last six months 1995. In the original analysis, these were based on temperatures reported in newspapers because NOAA

data were not available at that time. The recalculated values were based on the NOAA data that had become available in the meantime. [1]

V.2 ANALYSIS

The final results from the 1994 program impact evaluation was the point of departure for the model estimation in the persistence analysis. One set of regression results from the 1994 analysis was selected for estimating the first year impacts. These results are reproduced in Table V-4.

Table V-4
Results of First Year Impact Regression Model

Variable	Description	Parameter Estimate	t-statistic
TCONST	Intercept	-0.122	-1.42
POST1	1 from 12/94 thru 11/95	-0.119	-4.05
PARTIC	Participant (0/1)	0.093	2.55
HEF1	Got HEF and Date=01/94-11/95	-0.121	-4.05
V46T65	House Built 1946-1965	-0.139	-2.39
V66T77	House Built 1966-1977	-0.250	-4.39
VPOST77	House Built After 1977	-0.524	-7.90
INCOME	Income, $1000/Year	0.002	2.60
AHDD65	Average Daily HDDs, Base 65	0.173	113.90
HHSIZE	Household Size	0.076	6.48
DAYHOME	Anyone Home During Day (0/1)	0.099	2.58
GASDRYR	Gas Clothes Dryer	0.071	2.10
GASPOOL	Gas-Heated Swimming Pool (0/1)	0.525	6.51
SBT	Set-Back Thermostat (0/1)	0.062	1.68
SQFT	Square Feet	0.0005	9.68
SQFTQ	SQFT squared	-5.0E-10	-5.71
NEWHTSYS	Heating System Changed? (0/1)	-0.076	-1.07
Adj R-Squared			0.529
First Year Savings			0.121 therms/day

The key variable in the regression model that captures the net effect of participation in the 1994 HEF Program is HEF1. HEF1 is a binary variable that is defined as 1 if the billing period falls between January and November of 1994 and if the customer was a participant in the

[1] In the extended data set, values from the newspaper were used to calculate heating degree days from April through August 1997. Since these are Spring and Summer months, there were very few heating degree days in this period.

program. The coefficient for this variable captures the average change in consumption for program participants relative to nonparticipants after controlling for other factors such as changes in weather, equipment holdings, and household/dwelling characteristics. These other factors include any underlying trend in gas consumption for both participants and nonparticipants during the period, which is captured in the variable POST1.

The value of the coefficient HEF1 in the original regression is -0.121. The average use of program participants in 1995 was 0.121 therms less than that for nonparticipants after controlling for the other factors, the equivalent of approximately 44 therms of gas savings per year. These are net savings in addition to an underlying trend on the part of both participants and nonparticipants to reduce gas consumption by an average of 0.12 therms per day in 1995 relative to 1993 and 1994.

The period of time covered in the persistence analysis of consumption was extended for almost two more years to August 1997. The additional monthly bills for the customers in the sample were extracted from SoCalGas Company's billing system and were merged into the original dataset, along with the heating degree days for the periods that each bill covered.

An examination of the effects of the changes in the original data set on the first year impacts preceded the regression analysis for the full dataset. The analysis included a re-estimation of the original model specification for the time period from January 1993 through November 1995 with the changes in households and heating degree variables.

Table V- 5 presents the results of the analysis of the data for the original time period of January 1993 through November 1995. MOD95A represents the re-estimated model reflecting the loss of the 96 households who had moved. The estimated net impact from this model, captured by the parameter estimate for the variable HEF1, is 0.124 therms per day, which is virtually identical to the original results. [2]

[2] In this discussion, we use the convention that if the coefficient is negative, then the savings are presented as a positive number. Thus the coefficient estimate of -0.124 represents a savings of +0.124 therms per day.

Table V-5
Results of Regressions Run Using the 1995 Model Specification

Variable	Description	MOD95A Coeff	MOD95A Tstat	MOD95B Coeff	MOD95B Tstat	MOD95C Coeff	MOD95C Tstat
TCONST	Intercept	-0.165	-1.74	-0.156	-1.69	-0.139	-1.52
POST1	1 from 12/94 thru 11/95	-0.069	-2.27	-0.002	-0.05	0.002	0.05
PARTIC	Participant (0/1)	0.076	2.03	0.062	1.68	0.065	1.77
HEF1	Got HEF and Date=01/94-11/95	-0.124	-3.99	-0.08	-2.61	-0.079	-2.64
V46T65	House Built 1946-1965	-0.103	-1.77	-0.106	-1.81	-0.112	-1.95
V66T77	House Built 1966-1977	-0.223	-3.61	-0.202	-3.26	-0.197	-3.22
VPOST77	House Built After 1977	-0.496	-7.35	-0.47	-6.97	-0.475	-7.23
INCOME	Income, $1000/Year	0.002	2.42	0.002	2.46	0.002	2.24
AHDD65	Average Daily HDDs, Base 65	0.174	107.59	0.176	107.24	0.176	108.6
HHSIZE	Household Size	0.076	6.42	0.075	6.45	0.075	6.56
DAYHOME	Anyone Home During Day (0/1)	0.106	2.52	0.092	2.19	0.09	2.17
GASDRYR	Gas Clothes Dryer	0.091	2.43	0.083	2.24	0.075	2.05
GASPOOL	Gas-Heated Swimming Pool (0/1)	0.555	6.14	0.53	5.9	0.534	6.02
SBT	Set-Back Thermostat (0/1)	0.06	1.55	0.054	1.41	0.063	1.67
SQFT	Square Feet	0.0005	8.83	0.0005	9.08	0.0005	9.25
SQFTQ	SQFT squared	-4.38E-08	-5.01	-4.48E-08	-5.39	-4.32E-08	-5.49
NEWHTSYS	Heating System Changed? (0/1)	-0.031	-0.42	-0.001	-0.01	-0.003	-0.04
Adj R-Squared			0.537		0.562		0.563
First Net Year Savings		0.124 therms/day		0.080 therms/day		0.079 therms/day	

MOD95B uses the recalculated heating degree days based on NOAA readings with the same sample as MOD95A. The estimate of the net first year impact falls significantly to 0.08 therms per day. At the same time, the underlying trend in consumption (captured through the variable POST1) becomes negligible.

In MOD95C, we have added back the households who had been eliminated in the 1994 evaluation due to incomplete billing data, and MOD95C uses the NOAA-based values of heating degree days. The net impact results are very similar in magnitude to those in the previous regression (MOD95B).

Next, we estimated new regression models on the expanded dataset to examine the persistence of program savings beyond the first year. These regression models included new explanatory variables to represent program participation and underlying trends in gas consumption in the second and third years. These variables are HEF2 and HEF3 for the program impacts and POST2 and POST3 for the consumption trends, respectively. These variables, along with HEF1, POST1, and AHDD65, are the only ones that change over time. All of the other variables differ only across households. (See Table V-1 for exact definitions.)

Table V-6 presents the results of the analysis of the data for the period January 1993 to August 1997. MOD97O is the original specification with only the additional variables HEF2 and HEF3, plus the trend variables POST2 and POST3. Under this model specification, the estimates of first, second, and third year net program savings are 0.11, .03, and -0.02,

respectively. The estimate of first year savings is similar to the value in the original first year impact analysis, but the second and third year estimates are smaller.

The second and third year estimates have very low statistical significance as well. The hypothesis that the "true" net savings in the second and third years are actually zero cannot be rejected with any degree of confidence. At the same time, one cannot reject the hypothesis that the "true" net savings in the second and third years are actually comparable to the level in the first year at, say, the 90% confidence level. The statistical significance of the estimates for the second and third years are simply so low that "true" values could fall in a very wide range. For example, using the 90% criterion, the true value for the second year savings could fall in the range of 0 to 0.11. The range for the third year savings falls in the range of 0 to 0.10.

Table VI-6

Results of Regressions Run Using 1997 Model Specifications

		---- MOD97O ----		---- MOD97A ----		---- MOD97B ----		---- MOD97C ----	
Variable	**Description**	**Coeff**	**Tstat**	**Coeff**	**Tstat**	**Coeff**	**Tstat**	**Coeff**	**Tstat**
TCONST	Intercept	-0.049	-0.66	0.465	7.51	0.614	10.45	0.601	10.25
POST1	1 from 12/94 thru 11/95	0.032	1.24	0.026	1.08	0.019	0.79	0.023	0.98
POST2	1 from 12/95 thru 11/96	-0.091	-2.69	-0.089	-2.76	-0.083	-2.71	-0.077	-2.54
POST3	1 from 12/96 thru 9/97	-0.149	-3.10	-0.139	-3.07	-0.121	-2.81	-0.113	-2.65
PARTIC	Participant (0/1)	0.043	1.15	0.064	1.78	0.057	1.70	0.055	1.64
HEF1	Got HEF and Date=01/94-11/95	-0.111	-3.97	-0.116	-4.28	-0.101	-3.84	-0.084	-3.30
HEF2	Got HEF and Date=12/95-11/96	-0.030	-0.73	-0.051	-1.26	-0.046	-1.19	0.031	0.77
HEF3	Got HEF and Date=12/96-08/97	0.021	0.36	-0.009	-0.16	-0.014	-0.26	-0.013	-0.22
V46T65	House Built 1946-1965	-0.122	-2.64	-0.111	-2.64	-0.129	-3.34	-0.127	-3.31
V66T77	House Built 1966-1977	-0.217	-4.37	-0.193	-4.28	-0.167	-3.98	-0.167	-3.98
VPOST77	House Built After 1977	-0.468	-8.80	-0.426	-8.70	-0.352	-7.73	-0.352	-7.72
INCOME	Income, $1000/Year	0.002	3.43	0.004	5.30	0.004	5.61	0.004	5.59
AHDD65	Average Daily HDDs, Base 65	0.175	143.73	0.087	17.72	0.093	19.16	0.093	19.33
HHSIZE	Household Size	0.077	8.23	0.074	8.49	0.062	7.56	0.062	7.54
DAYHOME	Anyone Home During Day (0/1)	0.095	2.87	0.089	2.80	0.065	2.21	0.065	2.20
GASDRYR	Gas Clothes Dryer	0.084	2.82	0.094	3.41	0.091	3.51	0.091	3.54
GASPOOL	Gas-Heated Swimming Pool (0/1)	0.510	7.14						
SUMPOOL	GASPOOL May-Oct			0.457	6.50	0.363	5.49	0.361	5.49
WINPOOL	GASPOOL Nov-Apr			0.703	9.23	0.603	8.38	0.604	8.41
SBT	Set-Back Thermostat (0/1)	0.036	1.19						
SQFT	Square Feet	0.0005	10.43						
SQFTQ	Sqft squared	-4.00E-08	-6.10						
NEWHTSYS	Heating System Changed? (0/1)	-0.032	-0.58						
HTHDDSF	GASHEAT*AHDD65*SQFT**(2/3)			0.686	17.34	0.668	16.98	0.68	16.87
CZ1	Mountain Climate Zone					-0.922	-19.54	-0.923	-19.50
CZ4	Upper Desert Climate Zone					-0.188	-8.12	-0.188	-8.11
CZ6	LA Basin Climate Zone					0.115	2.15	0.116	2.17
PILOT	Pilot Light on Stove (0/1)			0.059	2.22	0.040	1.64	0.04	1.64
PHTHDSF1	HTHDDSF*HEF1							-0.035	-1.42
PHTHDSF2	HTHDDSF*HEF2							-0.12	-4.47
PHTHDSF3	HTHDDSF*HEF3							-0.003	-0.13
Adj R-Squared			0.544		0.553		0.588		0.588

First Year Savings		0.111 therms/day	0.116 therms/day	0.101 therms/day	0.105 therms/day
Second Year Savings		0.030 therms/day	0.051 therms/day	0.046 therms/day	0.030 therms/day
Third Year Savings		-0.021 therms/day	0.009 therms/day	0.014 therms/day	0.015 therms/day

The estimated values for the additional trend parameters (POST2 and POST3) are noteworthy—they are both negative and statistically significant, indicating a clear downward trend in gas consumption for all customers in the second and third years. In the absence of the net effects of the HEF Program, all customers reduced gas consumption on average by 33 therms in the second year and an additional 21 therms in the third year. The explanation for this trend is unclear, but some possibilities include:

- A market effect of the HEF Program, where participants "spread the word" to nonparticipants about the savings from measures installed due to the program[3];
- A general pattern of increased "energy efficiency awareness" caused by some factor that is common to all residential customers;
- The average overall effect of replacement of broken down, inefficient water heaters and furnaces with new equipment that must meet higher efficiency standards; and
- The impact of the program on accelerating saving actions that would have been taken later by participants. As a result, participants realize significant savings in the first year, while the general population realizes savings later.

MOD97A, MOD97B, and MOD97C present the results of alternative specifications that were investigated as part of the analysis. MOD97A replaces the variables representing square feet with an algebraic transformation of square feet. This transformation is intended to approximate the surface area of the dwelling. This transformed variable interacts with the heating degree days to capture the dwelling heating requirements. In MOD97A, the variable representing gas pool heater is broken down into two variables, one that captures the summer effects and another that captures possible winter effects. While the change in specification improves the overall explanatory power of the model slightly, the estimates of net program savings are quite comparable to the previous ones. Second year net savings are slightly higher, but they are still statistically insignificant.

Variables representing the different climate zones are added in MOD97C. These variables are statistically significant, but their addition changes the net program savings in each year very little.

Three additional interactive variables that capture differences in net program savings by heating degree days are part of MOD97C. Only one of these three variables is statistically significant, and the overall estimates of program savings by year are not affected very much.

[3] This possibility was suggested by a reviewer. We regard this explanation as unlikely, given the poor recall rate and the small percentage of customers who actually participated in the HEF Program.

V.3 CONCLUSION

The regression analysis of the persistence of HEF Program impacts points toward one main overall conclusion, regardless of the specification that is selected to estimate the second and third year effects—the point estimates of net savings from the program decline significantly after the first post-program year. The estimated parameters indicate that these savings fall from values in the range of 30 to 45 therms per year to levels less than 20 therms in the second year and less than 5 therms per year after the second year. The low statistical significance of the savings estimates in the second and third years makes it impossible to rule out the hypothesis that the "true" savings are negligible after the first year (or that they are really comparable in magnitude to the first year savings). At the same time, the analysis shows that there is a significant general downward trend in gas consumption for the population as a whole in the second and third years.

SECTION VI

Conclusions and Recommendations

APPENDIX B
Residential Survey Instrument

VI. Conclusions and Recommendations

The results of the various methods used to investigate the possible market effects of the HEF Program indicate that any such effects have been modest at best. The findings from the interviews indicate that any market effects have been confined to changes in consumer practices. SoCalGas personnel said that the HEF Program had not been designed to influence supplier behavior. Accordingly, there was no evidence to suggest that it had caused any changes in supplier behavior. This finding was confirmed in the supplier interviews in which respondents said that they were not familiar with the HEF Program and that there is limited demand for equipment significantly exceeding the current standards.

The analyses of the customer surveys and billing data revealed only modest differences in ownership and installation patterns of efficiency measures and conservation practices between participants and nonparticipants. A very small percentage of past HEF Program participants even recalled any measures recommended in the audit reports. Most of the respondents who said they did recall at least one measure stated that they were planning to adopt the measure prior to receiving the HEF audit report.

Comparisons of changes in conservation practices in the past three years show some moderate differences between participants and nonparticipants, including such measures as installing low-flow showerheads and water heater wraps and turning back the water heater temperature and thermostat. The individual differences for many of these practices were small and often statistically insignificant, but the overall pattern of these measures and practices was significantly higher for participants than nonparticipants.

The billing analysis showed that the savings attributable to the HEF Program fell significantly after the first impact year. There were significant savings in the first year but insignificant levels in the second and third years. These results, taken in conjunction with the survey responses, suggest that the HEF Program accelerates the adoption of conservation practices that participants would have taken eventually without the program.

Given the findings from these analyses, there are two natural questions about the absence of significant market effects from the HEF Program—why are there none and what changes might be undertaken to increase possible market effects?

The answer to the first question seems relatively clear. In the first place, the HEF Program was never intended to influence supplier behavior. There is no direct connection between the Program features and decisions that suppliers make about efficient equipment promotions. In fact, most of the recommendations that are made in the HEF report involve energy practices or widely available measures, such as low-flow showerheads and weatherstripping. In the case of major gas equipment, the recommendations are fairly generic. They offer such advice such as, "if you plan to buy a new furnace, water heater or any new equipment, be sure to check energy efficiency ratings before you buy." There are no specific recommendations regarding

what models might be appropriate given the respondents' characteristics. Detailed information about where high efficiency equipment could be obtained is neither available. The numerous energy-savings tips in the HEF audit report and handbook can be useful, but they are not likely to influence suppliers.

Second, it is unlikely that the Program could have affected suppliers indirectly by influencing customer demand for efficient measures. Less than 3% of residential accounts have received a HEF audit since the start of the program in 1993. This seems too small a number to significantly affect overall demand for efficient devices.

Finally, SoCalGas has typically offered the service only once to each customer in the target population. By design, SoCalGas targeted customers who had not received the HEF survey in the past. Once the report is delivered, there are no further interactions with the participating customer to follow up or reinforce the recommendations. Such follow-up strategies might involve reminder letters or the use of multimedia promotions to encourage customers to practice energy-efficient behavior.

This evidence suggests a fundamental redesign would need to undertaken if the program was changed to focus on achieving market effects. Some possible changes to increase the market effects of the HEF Program include the following:

- **Involve Suppliers in the HEF Program**. The HEF Program should include recommendations of specific efficient technologies and providers who supply them. SoCalGas should identify the circumstances under which efficient technologies that exceed current standards are cost-effective and identify models that meet these requirements. Firms could qualify to be included in a list of recommended contractors and suppliers by stocking one of more of these models. Last year, SoCalGas developed the Energy Facts Program which had a contractor referral element. , This element has been suspended since the beginning of 1998 pending clarification of the affiliate transaction rules that preclude SoCalGas from providing any information to customers if such information mentions an unregulated affiliate. These questions would have to be resolved before making this recommended change to the HEF Program.

- **Follow-Up Recommendations**. SoCalGas should consider experimenting with strategies that follow up the audit report with reminder letters or other devices to reinforce the recommendations. It appears that some low-cost techniques that repeatedly remind participants of the ways they can reduce energy consumption are needed to instill conservation habits.

- **Include Recommendations in the Offer Letter**. Few, if any, of the recommendations for energy-savings measures and behavior in the audit report are specifically tied to the information provided by the participants. Many of these recommendations could be provided directly to the customers without requiring them to complete a questionnaire. Including these recommendations in the offer letter could be done at moderate incremental cost, involving the small additional printing cost of the Energy Fitness Handbook and the extra postage. The recommendations would then be available to many more customers, including those who are not willing to fill out the questionnaire. Recipients of the general

handbook could be offered a personalized analysis if they want a breakdown of their gas consumption and expenditures. The savings for those who receive the personalized analysis could be compared to that for the general recipients of the handbook.

- **Increase Use of Multimedia Promotion**. SoCalGas should consider using multimedia advertising more extensively to promote the HEF Program and general conservation practices. This strategy would reinforce recommendations to adopt conservation behavior and would give the entire residential population an ongoing opportunity to participate in the program.

- **Target HEF Program at Different Customer Segments**. Currently, the HEF Program is targeted at households in single-family residences with more than 5years of continuous gas service. SoCalGas should consider targeting the program at other customer segments. For example, the offer letter could be directed at households who have started gas service in the past year. These households may be more receptive to the recommendations because they are more likely to be considering other changes in the dwelling.

APPENDIX A
COPY OF HEF REPORT

APPENDIX B
Residential Survey Instrument

(*** HELLO RESPONDENT GREETING ***)

Hello. I'm [fill INAM] calling on behalf of Southern California Gas Company to conduct a survey of the energy practices of its residential customers. All of the information we receive will be kept strictly confidential and used only to guide our energy efficiency programs.

May I speak to [fill NAME]
<1> Person who answered is [fill NAME]
<2> [fill NAME] comes to phone
<3> Person is spouse/parent/child of [fill NAME]
<5> new number for [fill NAME]
<7> No such person/possible wrong number
<x> Callback
<y> Refused
<z> Problems--language, hearing, too ill, incapable, out of town for duration of study, etc.
Answer ===>

>intr< (*** STUDY INTRODUCTION ***)

We are calling today to get some information about the energy practices of residential customers.

Do you have a few minutes to answer some questions?

All of the information you provide will be kept strictly confidential.

<1> PROCEED with interview
<x> Callback
<y> Refused
<z> Problems--language, hearing, too ill, incapable, out of town for duration of study, etc. [goto T162]

>cbak< (*** CALL BACK INTRO ***)

Hello. I'm [fill INAM] calling on behalf of the Southern California Gas Company.

I'm calling to complete the interview we started with you . . .

Are you ready to start?

<1> PROCEED

<x> Callback some other time
<y> Refused this time

Answer ===>

Heating Characteristics

>01< What is the primary fuel you use for heating your home?
(If don't know, ask "is it natural gas?")

<1> Natural Gas
<3> Other [goto 09] <5> Don't know [goto 09]

Answer ===>

>02< How would you describe the type of the insulation in your attic?
Would you say you have... (READ LIST)

<1> Poor or no insulation
<2> Average insulation
<3> Good insulation

<5> Don't know

Answer ===>

>03< What type of thermostat do you have? That is, is it a manual thermostat or programmable type (that is, a thermostat that can automatically set the temperature back at night)?

<1> Manual
<3> Programmable/set back
<4> Both

<5> Don't know

Answer ===>

>04< During the winter months, at what temperature do you typically set your thermostat during the daytime when you are home and evening hours before you go to bed?

<1> Less than 60 degrees
<2> 60-65 degrees
<3> 66-68 degrees
<4> 69-70 degrees
<5> 71-72 degrees
<6> 73-75 degrees
<7> Over 75 degrees

<9> Don't know

Answer ===>

>05< During the winter months, at what temperature do you typically set your thermostat at night when you normally are in bed?

<1> Less than 61 degrees
<2> 61-63 degrees
<3> 64-65 degrees
<4> 66-68 degrees
<5> 69-70 degrees
<6> 71-72 degrees
<7> 73-75 degrees
<8> Over 75 degrees

<9> Don't know

Answer ===>

>06< [if 03 eq <1> goto 07] [if 03 eq <5> goto 07]
How frequently do you override or change your programmable thermostat settings during the winter months? (READ LIST)

<1> Almost never
<2> once a week
<3> 2-4 times a week
<4> more than 4 times a week
<5> every day

<9> Don't know

Answer ===>

>07< How frequently would you say that you change your furnace filter per year?

<1> Two or more times per year
<2> Once per year
<3> Once every few years
<4> Very seldom
<5> Never

<9> Don't know

Answer ===>

>08< Do you turn off your furnace pilot light during the summer months?

<1> Yes
<3> No
<4> Doesn't Apply <5> Don't know

Answer ===>

Other Appliances

Now, we would like to ask you a few questions about the appliances you have in your home and the type of fuel these appliances use.

>09< Do you have a gas or electric water heater?
(If don't know, ask "is it natural gas?")

<1> Natural Gas
<3> Other <5> Don't know

Answer ===>

>10< Do you have a gas clothes dryer?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>11< What is the primary fuel you use for cooking?
(Stove, Cooktop or Oven. Not microwave)

<1> Natural Gas
<3> Other [goto 13]

Answer ===>

>12< Does any of your cooking equipment have continuously-operating pilot lights?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>13< Do you have a gas-heated swimming pool?

<1> Yes
<3> No [goto 15]

Answer ===>

>14< Do you use a cover on your pool?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>15< Do you have a gas-heated spa or jacuzzi?
<1> Yes
<3> No [goto 16a]
Answer ===>

>16< Do you use a cover on your spa or jacuzzi?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>16a< continue

[if non-participant goto 37]

Replacement Behavior

>17< In the past three years have you replaced your furnace?

<1> Yes
<3> No [goto 18]

Answer ===>

>17a< When you decided to replace your furnace, where did you go to replace it?

<1> Hardware Store
<2> Home improvement Store
<3> Hire Contractor
<4> Other
<5> Department (Sears, Penneys)
<6> Appliance/Specialty (Adrays, Circuit City)

<9> Don't Know

Answer ===>

>18< In the past three years have you replaced your water heater?

<1> Yes
<3> No [goto 19]
Answer ===>

>18a< When you decided to replace your water heater, where did you go to replace it?
<1> Hardware Store
<2> Home improvement Store
<3> Hire Contractor
<4> Other
<5> Department (Sears, Penneys)
<6> Appliance/Specialty (Adrays, Circuit City)
<9> Don't Know
Answer ===>

>19< In the past three years have you replaced your Cooking Equipment?

<1> Yes
<3> No [goto 20]

Answer ===>

>19a< When you decided to replace your cooking equipment where did you go to replace it?

<1> Hardware Store
<2> Home improvement Store
<3> Hire Contractor
<4> Other
<5> Department (Sears, Penneys)
<6> Appliance/Specialty (Adrays, Circuit City)

<9> Don't Know

Answer ===>

>20< In the past three years have you replaced your clothes dryer?

<1> Yes
<3> No [goto 21]

Answer ===>

>20a< When you decided to replace your clothes dryer where did you go to replace it?

<1> Hardware Store
<2> Home improvement Store
<3> Hire Contractor
<4> Other
<5> Department (Sears, Penneys)
<6> Appliance/Specialty (Adrays, Circuit City)

<9> Don't Know

Answer ===>

Energy Fitness Program

>30< (** Energy Fitness Program Participation - Participants only**)

Has your household received an evaluation of your gas usage from Southern California Gas Company or any other entity in the past five years?

(Use the following as an explanation of the program...

This is an analysis of how your household uses gas, along with recommendations on measures you can take to save energy. The evaluation offered by Southern California Gas is called the Home Energy Fitness Survey. The Home Energy Fitness Survey is based on information you would have provided by filling out a questionnaire and mailed to Southern California Gas Company.)

<1> Yes, HEF study [goto 32]
<3> Yes, other energy audit [goto 31]

<5> Don't recall participating / Don't Know [goto 37]

Answer ===>

>31< Did the other survey cover gas usage or just electric usage?

<1> Natural Gas
<3> Electric only [goto 37]

<5> Don't know [goto 37]

Answer ===>

>32< Do you recall in what year you received the Home Energy Fitness Survey or other home energy audit? If you have received more than one HEF Survey/audit, in what year was the most recent one?

<90-96> Year <99> Don't know

Answer ===>

>33< Do you recall the recommendations you received from the HEF report?

<1> Yes
<3> No [goto 37]

Answer ===>

>34< What were those recommendations?

Allow time for the respondent to give unprompted answers

WATER HEATING Installation Measures
<1> Low-flow showerhead.....[fill 34a with 'x']
<2> Water heater wrap.....[fill 34b with 'x']
<3> Pipe insulation.....[fill 34c with 'x']
<4> Faucet aerators.....[fill 34d with 'x']
<5> Replace water heater.....[fill 34e with 'x']
<6> Other (specify).....[fill 34f with 'x']
<7> Full dishwasher loads.....[fill 34g with 'x']
<8> Shorter showers.....[fill 34h with 'x']
<9> Full clothes washer loads...[fill 34I with 'x']
<10> Lower thermostat.....[fill 34j with 'x'
<11> Other (specify).....[fill 34k with 'x']

SPACE HEATING Installation Measures
<12> Attic insulation.....[fill 34l with 'x']
<13> Wall insulation.....[fill 34m with 'x']
<14> Floor insulation.....[fill 34n with 'x']
<15> Caulk/weather stripping.....[fill 34o with 'x']
<16> Door sweeps.....[fill 34p with 'x']
<17> Wall socket sealers.....[fill 34q with 'x']
<18> Programmable thermostat.....[fill 34r with 'x']
<19> Replace gas furnace.....[fill 34s with 'x']
<20> Other (specify).....[fill 34t with 'x']
<21> Set back thermostat (heating)...[fill 34u with 'x']
<22> Gas furnace maintenance.....[fill 34v with 'x']
<23> Turn-off heat/AC nobody home....[fill 34w with 'x']
<24> Other (specify).....[fill 34x with 'x']
<25> Replace Cooking Equipment.....[fill 34y with 'x']
<26> Replace Clothes Dryer.....[fill 34z with 'x']

Enter a 1 or 2-digit code for each choice mentioned

Repeat Block for Questions 34 parts 1-26 (if selected)

>34a< Did you implement this recommendation?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>34b< If yes, Before you heard about the Home Energy Fitness Program, were you already planning to implement this measure?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

End Repeat Block

>36< On a scale of 1 to 6, where 1 represents "not at all helpful" and 6 "very helpful", how helpful would you rate the information you received from the Home Energy Fitness Survey?

Not At All Helpful — Very Helpful — Don't Know

<1> <2> <3> <4> <5> <6> <9>

Answer ===>

>37< (Participants: Other than the measures you may have identified above) (Non-Participants) Has your household installed OR REPLACED any new gas equipment or taken any significant measures to reduce gas consumption in the past three years?

<1> Yes
<3> No [goto 70] <5> Don't know [goto 70]

Answer ===>

>38< What were those measures?

(I'm going to give you a list of several possible measures you might have taken to reduce your consumption of gas. These questions will require a Y/N response for each one

WATER HEATER
Installation Measures

>40< [if 34a eq <x> goto 41]
Did you install Low-flow showerheads?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>41< [if 34b eq <x> goto 42]
Did you install Water heater wrap?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>42< [if 34c eq <x> goto 43]
Did you install Pipe insulation?
<1> Yes
<3> No <5> No Answer or Don't Know
Answer ===>

>43< [if 34d eq <x> goto 44]
Did you install Faucet aerators?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>44< [if 34e eq <x> goto 45]
Did you Replace your water heater?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

Behavioral Measures

>45< [if 34g eq <x> goto 46]
Are you doing Full dishwasher loads?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>46< [if 34h eq <x> goto 47]
Are you taking Shorter showers?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>47< [if 34i eq <x> goto 48]
Are you doing Full clothes washer loads?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>48< [if 34j eq <x> goto 50]
Did you lower the Water heater thermostat?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

SPACE HEATING Installation Measures

>50< [if 34l eq <x> goto 51]
Did you install Attic insulation?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>51< [if 34m eq <x> goto 52]
Did you install Wall insulation?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>52< [if 34n eq <x> goto 53]
Did you install Floor insulation?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>53< [if 34o eq <x> goto 54]
Did you install Caulk/weather-stripping around windows?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>54< [if 34p eq <x> goto 55]
Did you install any Door sweeps?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>55< [if 34q eq <x> goto 56]
Did you install Wall socket sealers?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>56< [if 34r eq <x> goto 57]
Did you install Programmable thermostat(s)?
<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>57< [if 34s eq <x> goto 58]
Did you replace your gas furnace?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

Behavioral Measures

>58< [if 34u eq <x> goto 59]
Did you install a Set back thermostat on your furnace?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>59< [if 34v eq <x> goto 60]
Have you done Gas furnace maintenance?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>60< [if 34w eq <x> goto 62]
Do you Turn-off heat/AC when nobody home?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

Other Appliances

>62< [if 34y eq <x> goto 63]
Did you Replace your cooking equipment?

<1> Yes
<3> No <5> No Answer or Don't Know

Answer ===>

>63< [if 34z eq <x> goto 64]
Did you Replace your clothes dryer?
<1> Yes
<3> No <5> No Answer or Don't Know
Answer ===>

>64< [if participant goto 70]

>65< [if 44 ne <1> goto 66]
>65a< When you decided to replace your water heater where did you go to replace it?

<1> Hardware Store
<2> Home improvement Store
<3> Hire Contractor
<4> Other
<5> Department (Sears, Penneys)
<6> Appliance/Specialty (Adrays, Circuit City)

<9> Don't Know

Answer ===>

>66< [if 57 ne <1> goto 67]
>66a< When you decided to replace your gas furnace where did you go to replace it?

<1> Hardware Store
<2> Home improvement Store
<3> Hire Contractor
<4> Other
<5> Department (Sears, Penneys)
<6> Appliance/Specialty (Adrays, Circuit City)

<9> Don't Know

Answer ===>

>67< [if 62 ne <1> goto 68]
>67a< When you decided to replace your cooking equipment where did you go to replace it?

<1> Hardware Store
<2> Home improvement Store
<3> Hire Contractor
<4> Other
<5> Department (Sears, Penneys)
<6> Appliance/Specialty (Adrays, Circuit City)

<9> Don't Know

Answer ===>

>68< [if 63 ne <1> goto 69]
>68a< When you decided to replace your clothes dryer where did you go to replace it?

<1> Hardware Store
<2> Home improvement Store
<3> Hire Contractor
<4> Other
<5> Department (Sears, Penneys)
<6> Appliance/Specialty (Adrays, Circuit City)

<9> Don't Know

Answer ===>

>69< (Nonparticipants only) Has your household received an evaluation of your gas usage from Southern California Gas Company or any other entity in the past five years?

Use the following as an explanation of the program.

(This is an analysis of how your household uses gas, along with recommendations on measures you can take to save energy. The evaluation offered by Southern California Gas is called the Home Energy Fitness Survey. The Home Energy Fitness Survey is based on information you would have provided by filling out a questionnaire.)

<1> Yes, HEF study
<3> Yes, other energy audit

<3> Don't recall participating / Don't Know

Answer ===>

ATTITUDES / OPINIONS

Now I am going to read a number of statements and ask you if you agree or disagree with them.

>70a< Once You've decided to buy or replace a major appliance, you don't pay attention to specials or rebates.

<1> Strongly disagree
<2> Just disagree
<3> Slightly disagree

<4> Slightly agree
<5> Just agree
<6> Strongly agree

<9> Don't Know

Answer ===>

>70d< You think it is silly to spend money lighting areas of the home when no one is home at the time.

<1> Strongly disagree
<2> Just disagree
<3> Slightly disagree

<4> Slightly agree
<5> Just agree
<6> Strongly agree

<9> Don't Know

Answer ===>

>70e< You don't like to spend much of your time looking around when you need to buy or replace an appliance.

<1> Strongly disagree
<2> Just disagree
<3> Slightly disagree

<4> Slightly agree
<5> Just agree
<6> Strongly agree

<9> Don't Know

Answer ===>

>70h< You usually find out it's easier to replace a worn out major appliance with the same brand rather than spend a lot of time looking at other brands.

<1> Strongly disagree
<2> Just disagree
<3> Slightly disagree

<4> Slightly agree
<5> Just agree
<6> Strongly agree

<9> Don't Know

Answer ===>

>70k< You track your monthly gas bill pretty carefully.

<1> Strongly disagree
<2> Just disagree
<3> Slightly disagree

<4> Slightly agree
<5> Just agree
<6> Strongly agree

<9> Don't Know

Answer ===>

>70l< What you look for in a heating and cooling system is the even distribution of temperature around the house.

<1> Strongly disagree
<2> Just disagree
<3> Slightly disagree

<4> Slightly agree
<5> Just agree
<6> Strongly agree

<9> Don't Know

Answer ===>

>70o< Before you buy or replace a furnace, you would try to figure out which fuel, gas or electricity, is going to be cheapest in future years

<1> Strongly disagree
<2> Just disagree
<3> Slightly disagree

<4> Slightly agree
<5> Just agree
<6> Strongly agree

<9> Don't Know

Answer ===>

>70r< It's very important to you not to use more than your fair share of natural gas.

<1> Strongly disagree
<2> Just disagree
<3> Slightly disagree

<4> Slightly agree
<5> Just agree
<6> Strongly agree

<9> Don't Know

Answer ===>

>70u< You sometimes worry about which is safer - a gas clothes dryer or an electric clothes dryer.

<1> Strongly disagree
<2> Just disagree
<3> Slightly disagree

<4> Slightly agree
<5> Just agree
<6> Strongly agree

<9> Don't Know

Answer ===>

>70v< You couldn't accept any restriction on the amount of natural gas used in your household at any time.

<1> Strongly disagree
<2> Just disagree
<3> Slightly disagree

<4> Slightly agree
<5> Just agree
<6> Strongly agree

<9> Don't Know

Answer ===>

>70w< You encourage your family to take steps to save money on your utility bills.

<1> Strongly disagree
<2> Just disagree
<3> Slightly disagree

<4> Slightly agree
<5> Just agree
<6> Strongly agree

<9> Don't Know

Answer ===>

>70x< You would not be happy with any new laws requiring you to take energy conservation actions in your home.

<1> Strongly disagree
<2> Just disagree
<3> Slightly disagree

<4> Slightly agree
<5> Just agree
<6> Strongly agree

<9> Don't Know

Answer ===>

HOUSING CHARACTERISTICS

>80< Which of the following best describes your home?
(READ LIST. RECORD ONE RESPONSE.)

<1> Single family house
<2> Duplex or two family house
<3> Apartment/condominium in building with 2-4 units
<4> Apartment/condominium in building with 5 or more units
<5> Mobile home/trailer/manufactured home
<6> Other please specify [specify]

Answer ===>

>81< Approximately how many square feet of your home is gas-heated?

<300 - 6000> square feet [goto 83]

<9> Don't Know

Answer ===>

>82< Which range is closest to the square footage of gas-heated enclosed space of your home. (READ LIST)

<1> Under 600 square feet
<2> 601 - 1,000 square feet
<3> 1,001 - 1,500 square feet
<4> 1,501 - 2,000 square feet
<5> 2,001 or more square feet

<9> Don't Know

Answer ===>

>83< How many bedrooms are in your home?

<1-5> One to Five or more

Answer ===>

>84< Approximately what year was your home built?

<1> 1978-Present
<2> 1976-1977
<3> 1966-1975
<4> 1946-1965
<5> 1921-1945
<6> Before 1920
<9> Don't know
Answer ===>

DEMOGRAPHICS

>90< The last few questions about your household are for statistical purposes only. They help us to classify our questionnaires into groups. All individual responses are strictly confidential.

Including yourself, how many people live in your household for the majority of the year?

<1> One
<3> More than One [goto 91b1]

<5> No response/Refused [goto 92]

Answer ===>

>91a< Are you: (READ LIST)

<1> 65 or older
<2> 21 to 64 years old
<3> 20 or younger

<5> No response/Refused

Answer ===> [goto 92]

Of these individuals, how many fall into each of the following age categories?

>91b1< <0-10> 65 or older Answer ===>

>91b2< <0-10> 21 to 64 years old Answer ===>

>91b3< <0-10> 6 to 20 years old Answer ===>

>91b4< <0-10> Less than 6 years old Answer ===>

>92< What is the highest level of education completed by anyone living in your household? (READ LIST)

<1> Grammar school
<2> Some high school
<3> High school graduate or equivalent
<4> Some college or technical school
<5> College graduate
<6> Post-graduate study

<9> No response/refused

Answer ===>

>93< Which of the following best describes your total household annual income before taxes and other deductions. (READ LIST)

<1> Under $10,000
<2> Above $10,000 less than $20,000
<3> Above $20,000 less than $30,000
<4> Above $30,000 less than $40,000
<5> Above $40,000 less than $50,000
<6> Above $50,000 less than $75,000
<7> $75,000 or more

<9> No response/refused

Answer ===>

>thnk< (*** THANK YOU ENDING ***)

Thank you [fill NAME] very much for giving us your time today. We appreciate your help with this study.

(HANG UP LINE)

Any notes for supervisor or for coders before you finish with this case?

<1> Yes
<3> No

Answer ===>

End Home Energy Fitness Program Survey Script

APPENDIX C
Supplier Interview Script and Summary

ID # _____

SOUTHERN CALIFORNIA GAS
HOME ENERGY FITNESS PROGRAM
OPEN-ENDED SUPPLIER SURVEY
Draft: 02/20/98

Hello, my name is _____. I am calling on behalf of Southern California Gas Company to talk to suppliers of gas equipment and other measures affecting gas consumption about the energy efficiency programs that the Gas Company sponsors. All of the information that we obtain will be kept strictly confidential and used only to guide our customer programs.

I1. I would like to speak to a person in your company who is responsible for marketing products to customers in existing housing. Would you be that person?
1. Yes (SKIP TO I3)
2. No

I2. [If I1 = No] Is there anyone else I could speak to at your company who is responsible for marketing products to customers in existing housing?

Yes

(REPEAT INTRODUCTION)
(IF UNAVAILABLE, SCHEDULE CALL BACK)

No

THANK AND TERMINATE

A. Home Energy Fitness Program Recall

A1. Are you familiar with Southern California Gas Company's Home Energy Fitness Program? This is a program that provides an analysis of how residential customers use natural gas, along with recommendations on measures they can take to save energy. This type of program is commonly referred to as an home energy audit.

Yes, Ask HEF Survey Questions
No, SKIP TO A4.

A2. What do you know about the Home Energy Fitness Program?

A3. Have any of your customers mentioned the Home Energy Fitness Program or information they have received from a home energy audit in the course of your marketing or service calls? If yes, how frequently would you say this occurs?

A4. Are you familiar with any of the customer programs that Southern California Gas Company conducts? If so, which ones?

A5. Do Southern California Gas Company's customer programs have any effect on the type or models of equipment that you stock or recommend to your residential customers?

A6. Do your customers ever mention recommendations from Southern California Gas Company on gas equipment or measures in the course of your marketing or service calls? If yes, how frequently would you say this occurs?

B. Stocking and Promotion of Efficient Equipment (Water Heating and HVAC Contractors only)

B1. Do you stock models of equipment that significantly exceed the minimum efficiency standards in California?

B2. Do you recommend models that significantly exceed the minimum efficiency standards in California? If no, why not?

B3. Do your customers ask for high efficiency models (i.e. models that significantly exceed the minimum efficiency standards in California)? If so , how frequently?

B4. Do you use energy efficiency or the lower operating cost of your equipment in your promotions of your products?

Memorandum

To: Melissa Cuaycong

From: Andy Goett

Date: March 26, 1998

Re: Summary of Supplier Interviews

This memorandum summarizes the results of the interviews of gas equipment suppliers and contractors that were performed as part of the study of the market effects of Southern California Gas Company's Home Energy Fitness Program. The purpose of these interviews was to determine whether the HEF Program had affected vendor practices with respect to the supply of efficient gas equipment and thermal measures. The interviews asked contractors and suppliers about :

- their awareness of the HEF Program and other SoCalGas customer services,
- the effect, if any, these programs had on their marketing and sales of efficient products, and
- their practices in stocking and recommending efficient products.

The interviews were conducted on a sample of businesses identified as residential remodeling contractors and heating and air conditioning contractors. The sample was drawn from a list of contractors that had been compiled by League of California Homeowners. In 1997 under the Energy Facts Program, SoCalGas had provided a version of this list to residential customers who requested recommendations of contractors.

The interviews were conducted by telephone during February and March. A total of 30 contractors were contacted. These were split roughly equally between general building contractors and heating and air conditioning contractors.

The following is a summary of the major findings of the interviews.

Awareness of HEF Program

Very few of the respondents were aware of the Home Energy Fitness Program or of the energy audit services that SoCalGas provides to residential customers. When asked whether they had heard of the HEF Program, only 5 of the people who were interviewed responded affirmatively. When these 5 respondents were asked what they knew about the program, only 2 described it as an audit program. The others confused the HEF Program with another one that the unregulated affiliate of SoCalGas is developing to provide low interest financing for home improvements. Of the two who were familiar with the HEF Program, one knew

about it due to his active involvement in the CHEERS Program. The other said that only one customer, at most, had ever mentioned the HEF Program in the course of any sales or service calls.

The respondents were also asked what they knew about SoCalGas Company's efficiency programs in general. Over half of them said that they knew nothing about any programs that SoCalGas sponsors. The others referred to SoCalGas's advertising and participation in regional fairs, as well as the past rebate program.

All of the respondents were asked whether their customers had ever mentioned any efficiency programs or recommendations from SoCalGas in the course of sales or service calls. Except for the case cited above, none said that any of their customers had ever said anything about a program or efficiency measure recommendation. One contractor did say that SoCalGas had referred customers to them for gas repairs, but these were recommendations to fix defective equipment rather than efficiency measures.

As a summary question, the respondents were asked whether SoCalGas programs or services had any effect on the recommendations they made to their customers regarding equipment efficiency or conservation measures. All of the respondents said that SoCalGas had no appreciable effect on what they recommended to their customers.

Stocking and Promotion of Efficient Technologies

The contractors were asked general questions about their stocking and promotion of efficient technologies. These included questions about the degree to which the contractors recommend high efficiency models, as well as the extent to which customers request high efficiency equipment and measures.

Among the general building contractors who were interviewed, none specialized in the installation of insulation or similar thermal efficiency measures. None of them said that they specifically promote energy efficiency measures as a line of business. They all said they perform general contracting services for residential customers in existing houses, including remodeling and additions. If these projects require the installation of efficient measures, most are qualified to perform this work. Some of the respondents said they use subcontractors for certain items, especially HVAC equipment.

In the general contractor group, the respondents all said that they are guided primarily by code requirements and customer preferences in their construction practices. For such measures as insulation in home additions, the code requirements are based on the prescriptive standards in the California building efficiency standards. For smaller jobs that are not covered by the standards, most of the respondents said they observe "standard building practices" or the requirements of the standards.

When asked whether they promote energy efficiency as a feature of their contracting services, the responses were mixed. Most said that they mention

specific energy saving features where appropriate. One general contractor said he emphasizes energy efficiency as a selling point in offering his services. Some said that most customers are not interested in special energy efficient measures. Others responded that it is difficult to justify measures significantly above the standards on a cost effectiveness basis.

Respondents in the general contracting group said that few customers specifically request efficient measures. When they do make a request, it is typically for such measures as double paned windows or extra high efficiency equipment. A few of the respondents said that customers often change their minds about these measures when they see how much it adds to the cost of the project.

Among the heating and air conditioning contractors, most respondents said that they do not actively promote equipment that significantly exceeds the current standards. Several mentioned that they could justify the high efficiency models in the past when SoCalGas offered rebates, but that the incremental cost was no longer justified without the rebates. One said that he only recommends standard efficiency equipment, except in the mountain region where the extra cost of the high efficiency models is warranted.

Most of the respondents said they base their recommendations on the cost effectiveness of the equipment. These estimates of cost effectiveness are provided by the manufacturers to the contractors. One respondent said he assumed that these estimates come from the California energy Commission or other common source. Another said that he uses a 5 year payback rule in recommending heating equipment models based on guidance form Southern California Edison.

All of the HVAC contractor respondents said that few customers specifically request high efficiency furnaces. One estimated that perhaps 10% of customers ask about high efficiency models, but that most of these customers are discouraged by the extra cost. Another said that his customers are generally more concerned about the air conditioner efficiency because cooling costs are much larger than heating costs in his area.

APPENDIX D
Household Interview Script and Summary

SCG 1997 Home Energy Fitness Pre-Test Survey

ID # _____
Acct # _____

HOME ENERGY FITNESS PROGRAM
PRELIMINARY INTERVIEW

Hello, my name is Mr_____ I am calling on behalf of Southern California Gas Company as a follow-up to the Home Energy Fitness Conservation Program.

As a reminder, The Gas Company's **Home Energy Fitness Program** was based on survey information you provided by filling out a questionnaire and returning it. Then, the Gas Company would have returned a report to you with various energy savings recommendations.

Are you the person in your household who is responsible for selecting gas appliances and for making other decisions about energy use?

Yes → Name: _____

No → Is there someone else (*more knowledgeable*) that I should speak to?

Who? _____

Call back time: _____

Do you, recall participating in the Home Energy Fitness Program?

Yes **No → Thank you for your time, have a nice day**

Again, I'm Mr. _____ and the purpose of today's call is to find a small number of Gas Company Customers who would agree to take part in an in-depth telephone interview as part of a research effort. I'm not conducting the interviews today, just setting appointments for a researcher to call you back at a convenient time.

If your household is chosen for the interview, it should only take about 15-20 minutes of your time. Once it's completed we will send you a check for $25 to thank you for your time and cooperation.

(All of the information that we obtain will be kept strictly confidential and used only to guide our customer conservation programs.)

*First, **I need to ask a few questions to see if your household is one we need for our research.***

SCG 1997 Home Energy Fitness Pre-Test Survey

Demographic and Household Characteristics

Do you live in a house, an apartment, condominium or mobile home?

Single family house..... 1
Duplex or two-family house 2
Apartment/condominium in building with 2-4 units 3
Apartment/condominium in building with 5 or more units..... 4
Mobile home/trailer/manufactured home 5
Other specify _____

Do you know the square footage of your home? No or Yes → _____ sq ft

How many bedrooms do you have? _____

Including yourself, how many people live in your household (*most of the year*)? _____

Are you. . .

65 or older..... 1
40 to 64 years old 2
21 to 39 years old 3
20 or younger..... 4

No response/refused 9

How many individuals in your household fall into each of the following age categories?

65 or older _____
40 to 64 years old _____
21 to 39 years old _____
6 to 20 years old _____
Less than 6 years old _____

What is the highest level of education completed by anyone living in your household?

Post-graduate study..... 6
College graduate 5
Some college or technical school 4
High school graduate or equivalent 3
Some high school 2
Grammar school 1
No Response / Refused..... 9

SCG 1997 Home Energy Fitness Pre-Test Survey

*What is your total household income (*annual before taxes and other deductions*)*
Again, this is just for classification purposes.

$75,000 or more	7
$50,000 to $74,999	6
$40,000 to $49,999	5
$30,000 to $39,999	4
$20,000 to $29,999	3
$10,000 to $19,999	2
Under $10,000	1
No response/refused	9

If some items are not answered (a refusal) then say...
Thank you for your time today, I see that we've filled our quota for households like yours.

Otherwise, If all demographic items answered, say...
Now we need to schedule an appointment. I have the following times available...

(read list of available days and times)

Date: _____ ***Time:*** _____ ***Phone: ( ) ____ - _____***

Notes: _____

Ms. _____ will be calling you at (*mention appointment time*) to talk some more.
If anything comes up in the mean time you can call us back at the toll-free...

Survey Information Line (800) 227-5943

Thank you for your cooperation with this survey. Southern California Gas Company will use the results of this study to better serve customers like you in the future.

SCG 1997 Home Energy Fitness Pre-Test Survey

ID # _____
Acct # _____

HOME FITNESS ENERGY PROGRAM
OPEN-ENDED QUESTIONS

A Questions

Do you recall the information you received from the Home Energy Fitness report?

YES **NO**

What do you remember about it?

_____

_____

What was your overall opinion?

Was it helpful? **YES** **NO**

Why?

_____

_____

Did it give you information that you did not already know? YES NO

Please specify...

_____

_____

Was the report what you expected?

Did it give you the types of information and advice you expected when you filled out the survey?

YES ***NO***

Please explain...

_____

SCG 1997 Home Energy Fitness Pre-Test Survey

What kind of information, not in the report, would you have found helpful?

_____

_____

Do you recall any of the specific recommendations in the Home Energy Fitness report?

YES **NO**

If **yes**, what were they?

_____

_____

Did you implement any of the recommendations? ***YES*** ***NO***

If** yes, **which ones?

_____

_____

Did you implement the recommended measures because of the Home Energy Fitness report, or do you think you would have done them anyway?

_____

_____

If** not, **why not?

_____

_____

Have you used other sources of information about conservation measures?

If **yes**, what types?

_____

_____

Do you expect to implement any of the report's recommendations in the future?

Please explain...

_____

SCG 1997 Home Energy Fitness Pre-Test Survey

B Questions

Now let me ask you some general questions about your natural gas usage...

Do you have any concerns about your household's level of gas usage or the service you receive from the Gas Company?

_____

_____

Do you do anything on a regular basis to conserve on your gas usage?

(These might include such things as regularly setting back the thermostat at night and when you go out, turning off the pilot light in the summer, or turning the water heater off when you go on vacation.)

_____

_____

In addition to any measures you mentioned in conjunction with the Home Energy Fitness Survey...

Has your household done anything in the past three years that significantly affected your natural gas consumption?

(This might include your household's energy using habits as well as things you may have installed to affect on energy use or remodeling of home.)

YES **NO**

Please explain...

_____

_____

What were those measures?

_____

_____

What were your primary reasons for taking these actions or installing these measures?

_____

_____

SCG 1997 Home Energy Fitness Pre-Test Survey

Have you ever called the Gas Company for energy saving advice?

YES NO

Has a Gas Company service representative ever given you written advice about saving energy?

YES NO

C Questions

Now I would like to talk to you about your gas using equipment...

Do you use gas for space heating furnace? YES NO

Have you ever needed to replace your gas furnace?
If **yes**, please describe what you did?

_____

_____

Did it break down or did you decide to replace it while it was still operating?

BROKEN ***OPERATING***

What type of supplier did you contact?

_____

_____

How did you find them? How many? _____

_____

_____

How did you decide on the model of furnace to select?

contractor_____

retailer_____

other_____

Did you simply take the recommendation of the contractor, or did you ask for options, specify features?

_____

_____

If **no**, please consider a situation where you needed to replace your furnace. Describe how you would go about it...

Who would you contact? How many?_____

_____

_____

How would you find them?

_____

_____

How would you decide on the model of furnace to select?

contractor_____

retailer_____

other_____

Would you simply rely on the recommendation of the contractor, or would you ask for options, specify features? What would they be?

_____

_____

D Questions

Do you use gas for water heating unit? YES NO

Have you ever needed to replace your gas water heater?

If **yes**, please describe what you did?

_____

_____

SCG 1997 Home Energy Fitness Pre-Test Survey

Did it break down or did you decide to replace it while it was still operating?

BROKEN ***OPERATING***

What type of supplier did you contact?

_____

_____

How did you find them? How many? _____

_____

_____

How did you decide on the model of water heater to select?

contractor_____

retailer_____

other_____

Did you simply take the recommendation of the contractor, or did you ask for options, specify features?

_____

_____

If **no**, please consider a situation where you needed to replace your water heater. Describe how you would go about it...

Who would you contact? How many?_____

_____

_____

How would you find them?

_____

_____

How would you decide on the model of water heater to select?

contractor_____

retailer_____

other_____

SCG 1997 Home Energy Fitness Pre-Test Survey

Would you simply rely on the recommendation of the contractor, or would you ask for options, specify features? What would they be?

_____

_____

Thank you for your cooperation with this survey. Southern California Gas Company will use the results of this study to better serve customers like you in the future.

SCG 1997 Home Energy Fitness Pre-Test Survey

SECTION TWO

The following section consists of transcribed comments to the open-ended questions on the Home Energy Fitness Survey. These comments are presented in question order as indicated by the bolded headings.

Do you recall the information you received from the Home Energy Fitness report? What do you remember about it?

30 YES: I don't remember real specifically, I recall information such as, insulating the home, keeping appliances in good condition and comments about the electric stove and oven.

38 YES: I recall information such as, how to cut the bill down, turn the heater to a certain degree (70), don't stay in the shower more than 5 minutes (but I am disabled, so I need a longer stay), use stove, and cover pots and pans. I never use the oven because it requires a match to light, so I just use the microwave. I use the range frequently. I keep the drapes closed in cold weather.

40 YES: I don't remember much about it.

51 YES: Change heater filter and lower refrigerator temperature.

54 NO: Ceiling fans were an idea, I think.

58 YES: So much paperwork at 89 years old, I can't remember much unless you help me.

64 YES: Nothing in particular.

66 YES: Nothing.

70 YES.

72 YES: I remember getting it, that's about it.

81 NO: Nothing really.

82 YES: I don't remember the results. I know I received it.

93 YES: I remember the values and costs of operating certain appliances.

103 YES: Cut down on usage. I vaguely remember.

105 YES: Very vague.

121 YES: Nothing in particular.

125 YES: Nothing in particular.

128 NO: Nothing really.

135 YES: Nothing specific. I'm sure it was good.

138 YES: Very general, nothing specific.

149 YES: Not too much.

What was your overall opinion?
Was it helpful? Why?

30 YES: It made me stop and think at the time, but that was awhile back.

38 YES: It was helpful, but it didn't lower the bill because I don't use much gas. I cut showers down to every other day, but then, I have to wash clothes more often.

40 YES: To some degree, but I don't remember much.

51 YES: It helped cut costs. My gas bill is not even $5 a month, I really like it that low.

54 YES: It just was helpful.

58 YES: I don't know.

64 YES. I don't know

66 YES. I don't remember

70 YES: It was helpful, but everything is in pretty good shape. The report did not give us much to do.

72 YES: It was helpful, because it confirmed that we were already doing most of the recommendations.

81 YES: It was interesting and helpful, I'm sure. The Gas Company is always helpful.

82 NO.

93 YES: It was helpful because it modified our use of appliances.

103 YES: I've been around a lot of years, and I am always looking for helpful information.

105 YES: I think I did some of it.

121 NO: I normally do these things anyway.

125 YES: It confirmed what we already knew.

128 YES: I'm sure it was helpful.

135 YES: It gave me peace of mind.

138 NO: It was not too helpful, we have always been energy conscious.

149 NO: I'm not sure how to apply it, or maybe I mean that there were no low cost ideas that were helpful.

SCG 1997 Home Energy Fitness Pre-Test Survey

Did it give you information that you did not already know?
Please specify...

30 NO: I think I knew everything.

38 YES: I didn't know about not staying in the shower more than five minutes.

40 NO: I already knew everything. Do we pay attention to our own knowledge? That is the real question.

51 Don't know, Not sure.

54 YES: Overall, I think I got some ideas such as, ceiling fans.

58 YES: I'm sure I learned something.

66 YES.

70 NO.

72 YES: It reminded us to put in water-saving shower heads.

81 NO: I've been around a lot of years and I just know these things.

82 NO: Already implemented. I didn't take it very seriously.

93 YES: But we also received information from the electric company and I hope I don't confuse the information I received.

103 YES: Now I'm not sure what.

105 NO: The information given was pretty much common sense.

121 NO.

125 NO.

128 YES: My husband is a contractor and is very careful about saving energy.

135 YES: I've learned that setting back the water heater temperature will save energy.

138 NO.

149 NO: It's been several years, so I have forgotten.

SCG 1997 Home Energy Fitness Pre-Test Survey

Was the report what you expected?
Did it give you the types of information and advice you expected when you filled out the survey? Please explain...

30 YES.

38 YES: It was worth filling out the form. It was worthwhile.

40 YES: It was more extensive than expected.

51 YES: I don't remember anything real specific about the report.

54 YES: It was more than expected. Nice report.

58 YES. I don't remember

64 YES. I don't remember

66 YES: Some things I had not thought about, but I can't remember what they were.

70 YES. I don't remember

72 YES: I was satisfied with the report. It was good.

81 YES. Can't remember

82 YES . Don't really know

93 YES. It was a while ago

103 YES. Don't remember

105 YES. I don't know

121 YES: I was hoping for something I did not know.

125 YES: I was hoping to find new ways to save gas, but we were already aware of what it said.

128 YES. Don't remember

135 YES: It was confirming and it gave me peace of mind.

138 NO: Most were things I already knew.

149 YES. I don't remember

What kind of information, not in the report, would you have found helpful?

30 Nothing.

40 Why don't they make gas refrigerators anymore?

54 None.

58 Everything.

64 None.

66 None.

70 Nothing.

72 I can't think of anything.

81 None. Over the years, I've become aware of these things. I do a lot around the house myself.

82 I can't think of anything.

93 I can't think of anything.

103 There is nothing I can think of.

105 None.

121 Nothing.

125 Just something new.

128 Don't know.

135 Nothing.

138 Nothing.

Do you recall any of the specific recommendations in the Home Energy Fitness report? If yes, what were they?

30 NO: (After some prompting from the interviewer, customer remembered things such as: low-flow shower heads, reinforce water heater for earthquakes, weather-stripping around door, and to run full loads in washer and dishwasher.)

38 YES: I recall recommendations such as, turning heater to 70 degrees, don't stay in shower more than five minutes, cover pots and pans, keep drapes closed and clean lint trap in dryer.

40 YES: The recommendations were that windows should be caulked and that attic insulation checked to see if there is enough.

51 YES: Reinforce water heater in case of earthquakes.

54 NO: They were minor things, but I can't recall.

58 NO: (After interviewer gave some ideas) I recall information such as, turn off circulating hot water heater pump, weather-stripping is a good idea and to turn off pilots on space heaters in the summer. I re-light the pilot myself.

64 YES: (After interviewer gave some ideas) I recall low-flow shower heads, I do my own caulking myself, I wash full loads and usually use cold water. I don't have a dishwasher.

66 YES: Sealing your home from air coming through. Set back thermostat (prompted by interviewer).

70 NO: Not too many; I'm already doing the recommendations from the report.

72 YES: It confirmed that we were doing the right things. Shower heads were the only idea I can recall. (Interviewer prompted her on others, but she said there were no additional ones.)

81 YES: Before the report, I was already using the water heater blanket, but the information on shower heads was taken from the report. (Interviewer gave other ideas, but nothing else came up.)

82 NO: Low-flow shower heads. (interviewer prompted)

93 YES: Blanket water heater, change filters in furnaces, washing shorter loads. I also remember the "sing shorter songs" in shower advertising.

103 YES: Double pane windows are too expensive, but a good idea. I knew about weather-stripping doors before the report, but it is always a good idea. I did it for years as a contractor.

105 YES: Caulking, weather-stripping, low-flow shower heads, and turn water down. It's really hard for me to think of anything. (interviewer prompted)

121 YES: We do full loads of wash (dryer and dishwasher). (interviewer prompted)

125 NO. (Interviewer prompted her, but she could not think of anything beyond what interviewer mentioned.)

128 YES: Caulking and weather-stripping reminded us, but my husband does this anyway.

135 YES: Insulation around doors, turn off air conditioning in the room, insulate water heater with blanket, set back thermostat at night, and keep water heater at low, not hot setting.

138 YES: Weather-stripping for windows, insulation upgraded to R26 (we upgraded ours about 15 years ago) and wait for dishwasher to be loaded.

149 YES, insulation, double pane windows, shut off pilot during summer, and low-flow shower heads.

SCG 1997 Home Energy Fitness Pre-Test Survey

Did you implement any of the recommendations?
If yes, which ones?

30 NO.

38 YES: I implemented all, except I'm disabled, so I need a 10 minute shower.

40 YES: Caulking around windows and seal the doors.

51 YES: Reinforce water heater in case of earthquake, change filters, but not very often on furnace.

54 NO.

58 NO.

64 NO.

66 NO.

70 YES: Sealing window and doors. I did this.

72 YES: Shower heads.

81 YES: Shower heads.

82 NO.

93 YES: Low-flow shower heads. We installed a water heater blanket on our old water heater.

103 YES: Energy saving shower heads, but my son took his off. My wife washes full loads (several loads a week) both clothes and dishes.

105 NO.

121 YES: Low-flow shower heads.

125 NO.

128 YES: Water heater blanket and water saving shower heads. I think we may have done these because of the survey.

135 YES: I put in a water heater blanket and low-flow shower heads.

138 NO.

149 NO: I think I have already done everything that was low cost.

SCG 1997 Home Energy Fitness Pre-Test Survey

Did you implement the recommended measures because of the Home Energy Fitness report, or do you think you would have done them anyway?

30 Shower head needed replacing; I would have done it anyway. For six years, my home has had aluminum siding with insulation, this was done before the report, I guess.

38 The bill is now down to $18. It used to be $27 and $40 in the winter. I wanted to do something, so this report helped me figure out what to do. Because I would not have thought to cut back on showers.

40 Yes, the report brought them to my attention.

51 Yes, I would not have known if I did not have the report.

58 No.

64 No.

66 Yes, I would have done them anyway.

70 We would have done them anyway.

72 Probably would have done them anyway. Because I also heard from the water company and they can get them for free. We bought them ourselves.

81 Yes, installed shower heads because of the report.

93 We might have done them eventually, but the report gave us good ideas.

103 I've already done a lot, but they were good ideas.

105 No.

121 We are already doing most of these items.

125 No.

128 Not sure.

135 No, if it weren't for the report, I would not have known.

138 We have already done most of them. We bought a rubber seal for the bottom of the garage door.

149 I have already done many of these things, but I am not sure I got the ideas from the report.

If not, why not?

54 There wasn't anything I hadn't heard before.

138 I don't like low-flow shower heads.

Have you used other sources of information about conservation measures? If yes, what types?

30 Someone checks the air conditioner and furnace each year and he might have given me some ideas.

38 No.

40 Yes, from the electric company, which were similar because the electric bill was so high.

51 Yes, just the bill insert. I've read these, but can't recall anything specifically.

54 I don't really remember, maybe from the electric company. I also look at the gas bill inserts.

58 Newspaper maybe, mostly utilities.

64 None.

66 None.

70 I read brochures and learn from them.

72 I taught conservation in college, so I know a lot about energy use.

81 No, but we keep up over the years.

82 I always keep my eyes open for information.

93 I read and recycle everything. We're very conservation minded.

103 I've been in the building business since 1946, so I already know a lot. I did a lot of custom work and was also a construction maintenance supervisor for the Federal Government.

105 None.

121 I've been a contractor all my life (for cabinets) and I already know about conservation through my association in the building industry.

125 The electric company information also provides information and we would really like to cut back on that bill.

128 None.

135 None.

138 I'm always listening and reading and I read Consumer Reports.

149 I'm always reading or seeing things from newspapers and other utilities.

149 1. I might consider sealing up the house, renting a smoke gun and installing a fan, then see where the air leaks are and then do the repair to conserve air conditioning and heat. 2. Put in an earthquake valve, but I know this is not a conservation idea.

B Questions

Do you have any concerns about your household's level of gas usage or the service you receive from the Gas Company?

30 I'm careful with usage, so I am not concerned. Very courteous and efficient people at the Gas Company.

38 Yes, keep the bill down, I don't have much money. The Gas Company reads the meter like the bill says. Try to use less per billing cycle. I do my laundry after he reads the meter.

40 No service needed in 18 years.

51 No, everything is great.

54 Satisfied; works efficiently and it is low cost.

58 The gas bill is the lowest bill out of all the utilities. I'm very happy about this.

64 Yes, the Gas Company is great. No concerns. The bill is low.

66 Yes, I am happy with the service.

70 The gas bill is not a big problem; the electric bill is. The service responses have been very good when needed them.

72 Service has always been excellent. Leaks have been fixed quickly. We use the same amount of gas as 15 years ago and it seems reasonable.

81 Service has always been excellent. I don't like it when they raise rates in the winter when we use gas; they cheat us then. They should have higher rates in the summer, when we don't use as much gas.

82 This is a question that is hard to answer. A few years ago, they gave me a higher rate if I did not conserve, that was wrong.

93 No concerns. We live on fixed income, so we're very conservation minded. They provide excellent service. They have checked the furnace several times for us over the years.

103 We have not had much to do with the Gas Company because we only have a water heater and furnace. I'm sure it could be less expensive; only $100 use time, I think, during a cold winter.

105 No problems with gas usage. It is just fine. But I am concerned with the cutbacks of service from the Gas Company. I don't know what these might be.

121 No concerns about usage. I don't contact the Gas Company too often for anything, but they have been out to look at my 30 year old floor furnace.

125 No, our gas bill is reasonable. Gas Company service representative is always very helpful.

128 Gas usage is not a problem, just water usage. We also have a high electric bill.

135 No concerns about gas consumption. The service is good.

138 No concerns. Our gas bill is very reasonable. Quite satisfied with the Gas Company service.

149 No, it seems like the bill is fairly low. No complaints about service. I'd just like to lower my water bill and electric bill.

Do you do anything on a regular basis to conserve on your gas usage?

30 Last year when I called, they said they won't turn off the pilot anymore, so I don't do it myself. I never really have the heater on much, so I don't set it back. I turn all the water off to the house when I go to Las Vegas for a couple of days.

38 Turn furnace down to 70 degrees; turn it off at night and when I am gone. Try to wear warmer clothes.

40 I heard that it wasn't a good idea to turn off pilots, so I don't. Turn hot water heater down when we go on vacation. Watch the thermostat; turn it off at night. Get it to 72 degrees in the morning and then turn it off unless it's very cold weather.

51 No.

54 Not really. I already have an electronic ignition, so I don't need to do anything.

58 Turn off pilot lights on two furnaces in the summer. Turn off water heater while on vacation.

64 No gas furnace. We never go on vacation so we don't turn off the water heater.

66 Wall heater pilot is off in the summer and then the Gas Company comes to re-light them in the winter.

70 Keep furnace at a low setting during the night. Turn down water heater when we go on vacation.

72 Two Forced Air Units(FAU); we turn them off most of the time, unless it's extremely cold. The house warms naturally. We turn them on for cool mornings. They do not turn off in the summer, the older one has a pilot. There is normally someone at the house, so we don't set anything back for vacations.

81 Have had lots of different houses over the years, but we have been here for the last 20 years. We turn off the heater during the summer and the Gas Company checks every year for me. We turn down the water heater while on vacation. We just turn on the older wall heater when we need it. The new one has a thermostat that we can set, but we usually just leave it on as needed.

82 Yes, shut off or set back 95% of the time, unless it is very cold. Water heater - turn control to pilot when we go on vacation.

93 Turn off furnace completely at night. Turn off water heater while on vacation - very definitely.

103 Always set back to 50 or 55 at night for furnace. We don't turn off water heater because someone is always here.

105 Have to set back thermostat. Turn pilot off in the summer.

121 We do not set back at night, we just turn it off when not needed. Yes, we do shut down water heater while we're away, but this is not very often.

125 Yes, set back thermostat on furnace in cold weather. We don't do anything with the water heater.

128 We have two furnaces with thermostats that we set and two water heaters that we don't turn down. We don't go on vacation, so there's no reason to turn it off.

135 No, I don't turn off water heater, but I keep it at a lower setting. No pilots so I don't turn these off. Yes, I set back my thermostat at night.

138 Manual set thermostat about 65-68 at night and while away. Turn off water heater in the summer - 100% on solar heaters in the summer.

149 Yes, set back the furnace at night. I don't turn off the water heater.

Has your household done anything in the past three years that significantly affected your natural gas consumption? Please explain...

30 NO.

38 NO: I didn't get information anywhere else.

40 NO.

51 YES.

54 YES.

58 YES: We have a new roof, the old roof was a shake. Now we have a Class 1 shingle and insulation. We replaced boards too.

64 NO.

66 NO.

70 NO.

72 NO: The addition was not significant. One new Forced Air Unit (FAU) but rarely used, so it did not really increase our usage.

81 NO.

82 YES: No change in our gas usage was noticed.

93 NO: Replaced water heater and expected lower gas usage.

103 NO.

105 YES: Copper gas line replaced because we were afraid it might start leaking. However, it did not change our usage.

121 NO.

125 YES: We've installed some new gas appliances that I think helped us save money.

128 NO.

135 NO.

138 YES: However, the new oven did not lower gas bill noticeably.

149 YES: Did not lower heating bill.

What were those measures?

51 Put in energy saving shower heads. I want to install on/off automatic faucets.

54 Put on water heater blanket - no change that is noticeable. I could have tracked it on the bills, but just did not.

72 None.

82 Remodeled kitchen, new appliances. No dishwasher, but stove and oven are gas.

93 No change in energy usage, even though we replaced it with a higher efficiency model.

125 1. New gas water heater. 2. New energy efficient dishwasher.

128 Replaced windows 7 years ago, so it was before the survey.

138 Purchased new gas oven.

149 Replaced roof, but did not put in ventilators. Installed a power fan, but I don't believe it works very well.

What were your primary reasons for taking these actions or installing these measures?

51 Plumber advised while making repairs.

58 Roof was not leaking, but neighbors put on new ones due to fire damage because they are on a hillside - $16,500 total cost.

72 None.

93 Broken water heater.

125 They were old. The water heater leaked and the dishwasher needed to be replaced.

138 Old - worn out.

149 Needed to be replaced.

Have you ever called the Gas Company for energy saving advice?

30 NO: Just called for service.

38 YES: Furnace pilot light went out. It was cleaned.

40 NO.

51 NO.

54 NO.

58 NO.

64 NO.

66 NO.

70 NO.

72 NO.

81 NO.

82 NO.

93 NO.

103 NO.

105 NO.

121 NO.

125 YES: Same things as survey, when I asked.

128 NO.

135 NO.

138 NO.

149 NO.

Has a Gas Company service representative ever left you advice about saving energy?

30 YES: Talked about changing furnace filter when they come, usually.

38 NO: They gave a pamphlet, but I already knew everything in it.

40 NO.

51 YES: Came out to re-light pilots and show how to clean stove from previous owners. Clean heater vents on ceiling.

54 NO.

58 YES: I turn on my own pilot lights, but they told me when you turn heaters on, to make sure flame is blue not yellow, because this is when they operate most efficiently.

64 NO.

66 YES: About one week ago, they left a booklet that might have some information in it, but I have not yet looked at it.

70 YES: One time, the Gas Company mailed a brochure after an in-home survey, which was very complete. We learned a lot at that time.

72 YES: Left booklets that I have read.

81 YES: Adjust pilots on two wall heaters; one is 30 years old and the newer one is in the room addition. He gives us ideas and helps when he comes each year.

82 YES, when I called about my water heater being too hot. I took their advice to turn down several degrees, they were helpful.

93 YES: I'm sure they have, but I can't remember what. I also pay attention to bill inserts and see what it might recommend.

103 NO.

105 YES: Several years ago, I had somebody out to adjust the furnace.

121 NO: They checked floor furnaces, but I don't recall any advice.

125 YES: One time, they told me about water heater blankets.

128 YES: Advised me to clean trap in dryer, but I do that all the time.

135 NO.

138 NO.

149 NO.

C Questions

Do you use gas for space heating furnace?

30 YES.

38 YES.

40 YES.

51 YES.

54 YES.

58 YES.

64 NO.

66 YES.

70 YES.

72 YES.

81 YES.

82 YES.

93 YES.

103 YES.

105 YES.

121 YES.

125 YES.

128 YES: One electric, one gas.

135 YES.

128 YES: Advised me to clean trap in dryer, but I do that all the time.

135 NO.

138 NO.

149 NO.

C Questions

Do you use gas for space heating furnace?

30 YES.

38 YES.

40 YES.

51 YES.

54 YES.

58 YES.

64 NO.

66 YES.

70 YES.

72 YES.

81 YES.

82 YES.

93 YES.

103 YES.

105 YES.

121 YES.

125 YES.

128 YES: One electric, one gas.

135 YES.

138 YES.

149 YES.

Have you ever needed to replace your gas furnace?
If yes, please describe what you did?

72 Added one new furnace with the addition to our house.

128 My husband is a contractor, so he knew what to do.

135 There was a fire in the house, so it needed to be replaced. It was really a blessing because it was getting old anyway.

Did it breakdown or did you decide to replace it while it was still operating

128 BROKEN
135 OPERATING: destroyed

What type of supplier did you contact?

72 HVAC contractor for the addition.

128 An HVAC contractor that my husband knew.

135 The contractor to rebuild house.

How many? How did you find them?

72 1 was working with a contractor on a remodel.

128 1 or 2, already know.

How did you decide on the model of furnace to select?
Contractor, Retailer, or Other...

72 Contractor: He selected it for us.

128 Contractor: HVAC type.

135 Contractor.

Did you simply take the recommendation of the contractor, or did you ask for options, specify features?

72 Went with what he said. It was a new energy efficient model.

128 Got a more efficient one. Husband is also a contractor, so he knows how to make these choices.

135 I never thought about it before you asked. After the fire, I just did what the contractor suggested. I don't know what I would do in the future. My husband is dead, he used to take care of it.

If no, please consider a situation where you needed to replace your furnace. Describe how you would go about it...

Who would you contact? How many would you contact?

30 I might call the Gas Company. I wouldn't know otherwise. Friends and neighbors - a male for advise; several, 2-3 places.

38 Landlord - renter. He would probably fix it himself or buy a new one. I don't know him very well.

40 It's a Coleman type now. I normally get estimates from several local people.

51 Call Gas Company; I don't really know.

54 Called a contractor for service [the one] who repaired and replaced some parts last year.

58 Contractor; 2-3.

66 Gas Company will repair two heaters that I have now, so I would call them first.

70 Try Sears and other places; a couple.

72 Ask around for contractor, builder, or friends.

81 Because I'm a miser and I want to make sure I am getting the best deal; a lot, different people.

82 Local heating service or call Gas Company to find out; 3.

93 Possibly call the Gas Company for their council. Then based on what they say, I would check with others locally; 2 or 3.

103 Probably several contractor friends; 2 or 3.

105 Furnace company or plumber. Gas Company might be a good idea too; several, 2-3;.

121 Air conditioner contractor and put in Forced Air Unit (FAU) instead of floor furnace; 2-3.

125 Local home stores. I would check at several stores and then my husband would decide what to do next; several

138 It's close to 20 years old now, so I may have to search Consumer Reports first; at least 3.

149 I would call someone I've always used for air conditioning; 1.

How would you find them?

30 The Gas Company and people who I already know.

40 Ask friends, neighbors, and yellow pages.

54 Yellow pages or ask somebody.

58 Phone book, friends and neighbors.

66 I don't know how I would start if the Gas Company could not help.

70 Look locally.

72 Friends we already know.

81 Phone book. Local retail home stores.

82 Yellow pages.

93 Church friends and yellow pages and I also usually read Consumer Reports before making any major purchases.

103 Plumber friend told me he could replace it for $900, so I'd call him first.

105 Yellow pages.

121 I know plumbers and other contractors, so I would start with them and then go to the yellow pages.

125 Home stores in area - we just know where they are.

138 Maintain contractors names from repair help after the earthquake. Use coupons in the mail offering special deals.

149 Already use their service.

How would you decide on the model of furnace to select?
Contractor, Retailer, or Other...

30 Other: Whoever I decide.

40 Contractor, probably they seem to know the most. Retailer, [probably wouldn't consider [them]- they don't know.

51 Don't know.

54 Contractor: Would take his advice. Other: Also might call furnace manufacturer.

58 Contractor: That's his job and has a license so he should know.

66 Other: Gas Company.

70 Retailer: Sears.

72 Contractor.

81 Contractor and retailer, whoever is less.

82 Contractor: Ask for their advice.

93 Contractor: Would ask their advice.

103 Contractor.

105 Contractor: Asked.

121 Contractor.

125 Retailer: Home Depot.

138 Contractor: I would take their advice. Other: read Consumer Reports.

149 Contractor: Someone who specializes in air conditioning.

Would you simply rely on the recommendation of the contractor, or would you ask for options, specify features? What would they be?

30 I have to listen to them because I would not know what to ask for.

40 Yes, compare their opinions. I'd like them to tell me about heat pumps, because I heard they are good.

51 Probably ask whoever the Gas Company sent out. I would take their recommendations based on what would save me money and also ask about if it would fit alright and how much it would cost.

54 Not really. Convenience and low maintenance. I do change the filter in my furnace before each winter.

58 For the most part, they do know, but some don't, so I asked couple of them. I listen to their advice on features, etc.

66 I would listen to them.

70 We would do a comparison first and then see what the store would recommend. Nothing comes to mind except efficiency for features.

72 Ask installer/contractor like we did with the new one just installed. We are happy with it.

81 I know a lot, so I would decide based on what I learn from them.

82 Compare ideas from them for features and cost. Then I would decide myself.

93 I would check with Consumer Reports and also talk with Christian Heating and Plumbing Co., who is my neighbor. But, I would make the selection and decision myself. I don't know what the features would be now.

103 I would listen to the contractor and use my own experience. I would look for high efficiency, but I can't think of anything specifically.

105 Talk to several companies; not that I know what to look for, but I would ask.

121 Check it out myself, with efficiency as the main feature, I guess.

125 Also check with Gas Company, but would probably just listen to what the store would recommend.

138 I would check the features myself and then ask for the contractor's recommendation.

149 I would take their advice and try to get the most efficient one I can afford.

D Questions

Do you use gas for water heating unit?

30 YES.

38 YES.

40 YES.

51 YES.

54 YES.

58 YES.

64 YES.

66 YES.

70 YES.

72 YES.

81 YES.

82 YES.

93 YES.

103 YES.

105 YES.

121 YES: moved in 1957.

125 YES.

128 YES.

135 YES.

138 YES.

149 YES.

Have you ever needed to replace your gas water heater?
If yes, please describe what you did?

30 Eleven years ago; my husband handled it all before he died. Now I try to empty out the bottom every month because there is sandy stuff that builds up in there.

38 The landlord put in a new one with a blanket. Not a noticeable difference in gas usage.

40 It came with the home. Probably very cheap.

64 Just real old (15 years). It was rusting out and needed replacement.

66 On the weekend, it started leaking, so I called a plumber.

70 One year before the earthquake, we replaced it and it tilted slightly, but was still operational.

72 It started to leak.

81 It leaks. Have replaced many over the years.

82 Summer, 4 or 5 years ago, it started dripping.

93 Still under warranty with Sears so we called them to replace it.

103 I bet it is the third one in 25 years, 50 gallons in size. Glass liner breaks, fittings break, there are all kinds of breakage [problems].

105 In 1992, I could not get it to re-light.

121 Probably three or so since we moved into the house in 1957. The last one I remember.

125 After it broke, we went to Home Depot and bought a new one. Then we called a plumber friend to install it because I don't trust my husband to do it.

128 One time when we moved in, it was old, so we replaced it. One time, during the earthquake, it broke.

135 Same as furnace, it was destroyed in the fire.

138 Two 40 gallon water heaters after earthquake needed to be replaced.

149 I went and bought a new one and installed it myself.

Did it break down or did you decide to replace it while it was still operating?

30 BROKEN: slow leak.

38 BROKEN.

40 BROKEN.

64 OPERATING.

66 BROKEN.

70 BROKEN: not working.

72 BROKEN.

81 BROKEN.

82 BROKEN: leaking.

93 BROKEN: leaking.

103 BROKEN: leak.

105 OPERATING.

121 BROKEN: leaking.

125 BROKEN.

128 BROKEN: 1 time. OPERATING: 1 time.

135 OPERATING.

138 BROKEN.

149 BROKEN: leaking.

What type of supplier did you contact?

30 A friend who was in the business with my husband.

38 Landlord.

40 Only certain types installed in mobile homes. Permanent, but certain restrictions. Not certain about remembering all of this.

64 Local contractor who supplies butane in the area.

66 Plumber.

70 Sears.

72 My husband purchased it and had a plumber put it in.

81 Replaced it myself with grandson's help this last time. I usually do it myself.

82 Replaced it myself with new fittings and purchased it myself.

93 Sears.

103 Called plumber and he brought it with him. Have to have a permit from the city to change it out. Plumbers have a blanket permit. This town is crazy; Santa Maria.

105 Installed myself after selecting it myself.

121 I did it myself. I went to local B&T Hardware and since it was still under warranty, the manufacturer replaced it for no charge.

125 Plumber friend.

128 Plumbers, both times.

135 Building contractor handled it.

138 I went out myself to check it.

149 Local Home Depot. Installed it myself.

How many? How did you find them?

30 2 or 3; now I contact a neighbor or a friend.

40 Asked neighbor and went to Sears, I think.

64 1; I knew him.

66 1; I already knew him.

70 1; went down to Sears and just ordered it.

72 1; hardware store.

81 Several, went to local stores.

82 Local store.

93 1; local store.

103 1; local contractors that I know.

105 1; I just checked at the local Sears.

121 Local hardware.

125 1; a friend.

128 1 or 2; my husband asked other people he knew.

135 1; selected contractor to rebuild.

138 1; I looked in the phone book and in my area.

149 1; just the local store.

How did you decide on the model of water heater to select? Contractor, Retailer, or Other...

30 I don't know because my husband did it, but I would have to rely on whoever came out because I don't know anything.

40 Retailer: talked to Sears and they told me.

64 Contractor: butane contractor.

66 Other: plumber.

70 Retailer: Sears.

72 Retailer.

81 Ace Hardware.

82 Home Depot.

93 Retailer: asked for Sears' advice.

103 Contractor: took his advice.

105 Retailer: Sears.

121 Retailer: B&T Hardware and the manufacturer of the water heater.

125 Retailer: Home Depot.

128 Contractor: plumber.

135 Contractor.

138 Retailer: Home Depot.

149 Retailer: Home Depot.

Did you simply take the recommendation of the contractor, or did you ask for options, specify features?

40 Yes, did what they recommended and it is still working.

64 Put blanket around it when it was purchased, but I can't think of any other features, it's been too long. Took what contractor recommended.

66 Took plumbers recommendations. Good size heater; energy saving type.

70 Looked at price and efficiency and then purchased it.

72 Size is the most important thing because it is next to the space heater. Because it is in a difficult location and because it is hard to install, selection is based on fit.

81 Already know. Have done most of it myself over the years.

82 I bought an energy saving type, based on the tag. I selected it based on the information on the tag and cost of the water heater.

93 Talked about features and got a higher efficiency model. No blanket on it but they said it does not need one.

103 Plumber is a good friend and he chose a high efficiency model.

105 Size limitations and best price are the features I looked for. I also read information about the water heater energy savings.

121 I looked for an energy efficiency model and I looked at what manufacturer warranty covered. I always compare features when I go to look.

125 We listened to Home Depot to make our selection.

128 Husband is very efficiency minded, so he always checks it out thoroughly.

135 Yes, he just put it in, same as furnace. I guess he selected an efficient model.

138 Contractor installed and put on straps for stability in future earthquakes. No special features at the time. It was one of the popular models and I really didn't have much choice because they were in short supply after the earthquake.

149 Looked at tag on water heater, it showed efficiency relative to other units. Top efficiency ones might be most costly, so I tried to select the one where I could get the most efficiency for my money.

If no, please consider a situation where you needed to replace your water heater. Describe how you would go about it...

Who would you contact? How many would you contact?

51 Call mother first, she just replaced hers and uses the same person.

54 Sears; 1.

58 Shop around. Over the years, I've used lots of people, contractors and retailers; 2-3.

How would you find them?

51 Through my mother.

54 Used in the past.

58 Yellow pages - local stores.

How would you decide on the model of water heater to select? Contractor, Retailer, or Other...

51 Don't know.

54 Retailer: Sears.

58 Contractor or retailer, either one helps me.

Would you simply rely on the recommendation of the contractor, or would you ask for options, specify features? What would they be?

51 Since I don't know anything, I would rely on whoever came out.

54 Warranty is the primary basis of selection, but I would also listen to what the salesman has to say.

58 Rely on them and ask for senior discount.

Other Comments

30 Someone from the Gas Company finally found a leak in the line by the dryer and they were very helpful. Air conditioning repairman is always helpful. One time, the furnace would not turn off. Gas Company helped to turn it off and they came out at 11:00pm at night all because I just did something really silly so that it wouldn't shut off. Now I can't remember what it was. (Interviewer's comments: She was open to sharing. Remembered more and more as we talked. She forgot the appointment for interview.)

38 (Interviewers comments: Very pleasant. Liked to talk, but limited ideas.)

40 Try to maintain everything we have to the best of my ability. Other equipment that is gas: 1. Gas dryer 2. Not gas barbecue. 3. Range, only gas, we have electric oven. 4. I want a gas refrigerator, please tell Gas Company to make them again 5. I always have been a Gas Company customer. They are a nice company.

51 1. Don't like not having appointments with Gas Company. Hours were not convenient, at least last year. 2. Great service; kind, nice people have helped service my appliances.

51 (Interviewers comments: This customer did not recall very much. Not at all familiar with how to replace anything.)

54 No problems with the Gas Company. Gas dryer is great. Probably costs more initially, but I think it saves on overall energy bill.

58 Married 63 years. 50 years as Gas Company customers. Always had excellent contact with company.

64 Water heater and range, only gas appliances. Installation, 10 years ago was installed. Wish I could afford a gas dryer. Have not had Gas Company come out for years. Wood heating only. Have an insert type of heater that moves heat into rooms from wood burning fireplace.

66 There are only two of us here, so we don't use too much gas. We have been with the Gas Company for 32 years. Have not had to call too many times. (Interviewer's comments: This man never really had much to say. I had to give ideas on everything.)

70 Not many problems with gas appliances. We are very happy.

81 (Interviewers comments: Used gas for last 60 years. Is 81 years old. Has difficulty hearing questions. Had television on in the background.)

82 Never had a problem with the Gas Company, they do a great job.

93 Use fluorescent lights more now than incandescent. Two gas appliances: Water-heater and space heater only. Insulated ceiling over 15 years ago. The gas service man was very helpful last year when our fan kept running, after the furnace was shut off. Tapped switch and it stopped. We did replace our switch. Re-emphasize the high regard for Gas Company employees very favorably. (Interviewer's comments: He was waiting by the phone for my call.)

103 Electric dryer, but wife won't go gas. Converted kitchen to electric 20 years ago. Solar water heating system. Don't have blanket, but we don't use as much gas for water heating anyway. PG&E insulated the ceiling 6-8 years ago. Two inch thickness of shingles on the roof. It helps a lot. I would like to have a lower bill, but I don't know what it is now since my wife pays all the bills and she is not home.

105 There's just the two of us, we're retired. We try to minimize the furnace usage, but we're pretty happy overall.

125 Gas Company responds quite well and I like to have them come out once per year, for my furnace, I will have them check for carbon monoxide this year. (Interviewers comments: This lady was very nice, but in a hurry today. Answered everything very quickly to get off the phone.)

135 1. Sealed the refrigerator based on something I heard. Slide a piece of paper around door and then I could tell it was not sealing. 2. Happy with the Gas Company in general.

138 We were able to take advantage of the rebate program and put in a solar heater on the roof to heat water. A large 120 gallon storage tank was installed in the garage too. Purchased refrigerator after the earthquake. I surveyed energy efficient ones and that has saved us on our electric bill. Recently investigating earthquake shut-off devise. Over $200, so why is the Gas Company not getting involved. They should get involved to help lower prices to consumer. They could drive price down to under $100, I am sure the state should offer rebates on these.

149 DWP offered incentive to replace toilets last year. I think they paid $100 to replace it, so I did this. Would like to switch the stove and oven to gas (when I get some money), right now they're electric. I know they would be more efficient. I'd like to share an idea. Are there ways that the Gas Company could steer customers down a path they'd like us to take, like DWP did with the toilets? Subsidize a more expensive conservation idea that would help us with the cost, then I could do more to save money and gas. (Interviewers comments: Didn't remember appointment but was glad he was able to answer questions and collect the $25. Seemed very knowledgeable and concerned about energy usage.)

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