FINAL REPORT

STATEWIDE SURVEY OF MULTI-FAMILY COMMON AREA BUILDING OWNERS MARKET

Volume II: Condominium and Homeowner Associations

Prepared by:

ADM Associates, Inc.
TecMRKT Works LLC

June 2000

California State-Level Market Assessment and Evaluation Study

Project Manager:
Dr. Shahana Samuillah
Southern California Edison Company

Funded with California Public Goods Charge Energy Efficiency Funds

FOREWORD

Under contract with Southern California Edison Company (SCE), ADM Associates, Inc. (ADM) and TecMRKT Works LLC have conducted a statewide survey of the multi-family common area/building owners market in California. This project was initiated as one of the market assessment and evaluation (MA&E) efforts of the California utilities to collect baseline data on measures and market actor attitudes. The survey was conducted in the service areas of Pacific Gas and Electric, Southern California Edison, Southern California Gas, and San Diego Gas and Electric.

Dr. Shahana Samuillah of Southern California Edison was the Project Manager for the survey. ADM was the prime contractor for the project. It performed the on-site and telephone survey work to collect the data for the study and prepared the estimates of common area equipment saturations. TecMRKT Works was a subcontractor to ADM. It conducted in-depth in-person interviews with key professionals in the multi-family industry, analyzed the information from the interviews, led the design of the survey instrument for the large-scale telephone survey, and prepared the analysis of the attitudinal/behavioral market characterization aspects of the study.

The project had two major components. One component was a study of common areas for condominium/homeowner associations throughout California, and the other component was a study of common areas for apartment complexes. The results of the study therefore are reported in two separate volumes. Volume I presents and discusses the results from the study of apartment complex common areas. Volume II presents and discusses the results of the study of common areas for condominium and homeowner associations.

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES

LIST OF TABLES

LIST OF TABLES

EXECUTIVE SUMMARY

A statewide survey of the common areas for multi-family housing has been undertaken to provide information about the levels of energy efficiency already being achieved for the common areas of such housing, about the decision-making processes among owners/managers of multi-family housing properties, and about the potential for programs to further improve energy efficiency in common areas of multi-family housing. The survey effort was directed at providing information for determining the baseline level of saturation of measures in common areas and for facilitating the planning of retrofit and renovation/remodeling (R&R) market transformation programs for the California state market.

The survey was focused on common areas of multi-family housing, including apartment complexes and condominium and homeowner associations. The survey results for condominium and homeowner associations (HOAs) are reported in this volume. Such associations own, operate, and govern common areas and/or facilities for Common Interest Developments (CIDs), which include condominiums, community apartments, planned developments, and stock cooperatives. Condominium/homeowner associations are self-governing bodies for the homeowners within a Community Interest Development (CID).

The data collection effort for the survey of housing developments with condominium or homeowner associations included the following:

- In-depth in-person interviews were conducted with 25 key professionals in the multi-family industry.
- Data on energy-using equipment for common areas were collected on-site for a sample of 303 condominium/homeowner associations located throughout the state.
- Decision-makers for the condominium/homeowner associations that were surveyed on-site were interviewed by telephone to obtain detailed information on decision-making procedures and on their attitudes and perceptions regarding energy efficiency for their facilities. Interviews were completed with decision makers for 273 condominium/homeowner associations.

The data collection effort produced information regarding the structure of the condominium/homeowners association market, the characteristics of the associations, the decision making for common areas (including equipment selection), the energy efficiency characteristics of common area equipment, and the potential for and barriers to making energy efficiency improvements for common areas of the associations.

CHARACTERISTICS OF CONDOMINIUM/HOMEOWNER ASSOCIATIONS

There are an estimated 25,660 associations for condominium and planned developments in the combined service areas of Pacific Gas and Electric, Southern California Edison, Southern California Gas, and San Diego Gas and Electric. About 68 percent of the associations are for condominiums, while 32 percent are for planned developments. These associations represent about 1.84 million housing units, with condominium associations accounting for 51 percent of housing units and associations for planned developments for 49 percent. Condominiums are more likely to have multi-family buildings, while planned developments are more likely to have single-family houses or townhouses.

Associations can be self-managed or managed by a property management firm. Almost 60 percent of the developments are managed by property management firms and about 40 percent are self-managed. Smaller HOAs tend toward self-management, while larger HOAs tend to use property management companies.

HIGHLIGHTS ON ENERGY-USING EQUIPMENT FOR COMMON AREAS

The survey produced information regarding energy-using equipment for common areas of condominium and homeowner associations.

Outdoor Lighting

Outdoor lighting is used at condominium/homeowner associations for parking lots, entries, walkways, stairways, and landscaping. Based on lamp wattages, the connected load for outdoor lighting at condominium/homeowner associations was estimated to be 72.6 mW. Eight types of lighting account for about 90 percent of the connected outdoor lighting load. The predominant type of outdoor lighting was incandescent, accounting for 31.6 percent of the connected outdoor lighting load. Other common types of outdoor lighting were high pressure sodium (14.6 percent of the connected load), compact pin fluorescent (14.0 percent), metal halide (8.8 percent), four-foot fluorescent (7.3 percent), high intensity discharge (7.0 percent), mercury vapor (4.3 percent), and low pressure sodium (2.7 percent).

Indoor Lighting

The connected load for lighting indoor common areas at condominium/homeowner associations is less than for lighting outdoor common areas. The connected load for lighting indoor common areas was estimated to be 32.0 mW for the combined service areas. The predominant type of indoor lighting was incandescent, accounting for 42.9 percent of the connected indoor lighting load. Other common types of indoor lighting were four-foot fluorescent (24.4 percent of the connected load), compact pin fluorescent

(13.0 percent), eight-foot fluorescent (4.9 percent), CircleLine fluorescent (4.1 percent), and incandescent exit signs (3.6 percent).

Laundry Equipment

There is common area laundry equipment at about 19 percent of the condominium/homeowner associations. However, there is a difference between condominium and planned developments with respect to the presence of common area laundry equipment. Common area laundry equipment is found at about 26 percent of condominium developments and at about 4 percent of planned developments. The overall estimated stock of laundry equipment for developments with condominium/homeowner associations consists of about 51,850 clothes washers and 51,420 dryers.

- Most common area clothes washers are top-loaded, with vertical agitators. Most of the washers draw 1 kW or less.
- Most common area clothes dryers are front-loaded. About half of the clothes dryers use natural gas, while the other half use electricity.

About 60 percent of the washers and dryers are between one and five years old. About 34 percent of the washers and dryers are over five years old, and about 6 percent are under one year old.

Swimming Pools and Hot Tubs

About 30 percent of the developments with condominium/homeowner associations have one or more swimming pools. There is a total of 16,130 swimming pools at the developments that do have swimming pools. All of the swimming pools are outdoors. About three-fourths of the pools are heated, mostly with natural gas heating.

Hot tubs are found at about 20 percent of the condominium/homeowner associations. The estimated number of hot tubs across the combined service areas is about 8,380. These hot tubs are generally outdoors and are heated using natural gas.

Water Heating Equipment

The stock of water heating equipment at developments with condominium or homeowner associations is estimated to be 40,760 pieces of equipment for the combined service areas. About 70 percent of the water heating equipment is fired by natural gas. This gas-fired equipment includes water heaters with tanks (55 percent of the stock) and water heating boilers (15 percent). Water heaters using electricity account for about 29 percent of the stock of water heaters.

Heating and Cooling Equipment

About 20 percent of the developments with condominium/homeowner associations have some type of package unit heating or cooling equipment. Only a few developments were observed to have built-up heating or cooling equipment.

DECISION MAKING PRACTICES FOR COMMON AREAS OF CONDOMINIUM AND HOMEOWNER ASSOCIATIONS

Developments with condominium or homeowner associations are similar in that they allow individual owners the use of common property and facilities. Decisions about equipment selection and replacement are almost entirely the provenance of an association's board of directors, with the board identified as the key decision-maker for 91 percent of the associations.

Information Sources

Associations usually get their information about equipment for common areas from contractors, who were identified as the key information source for 76 percent of associations. No other sources were cited as an information source for as many as 20 percent of the associations. For example, utilities were identified as a key source of information for only 10 percent of the associations. The data on sources of information suggested that decision makers spend little time on information searches, trusting contractors to do this for them. Potentially utilities and energy services companies might provide information, but it is quite likely that knowledge of where to get the information and the search costs associated with getting it would need to be very low in order for decision makers to use it.

Energy Service Companies (ESCOs) have made energy efficient product or service offerings to 10 percent of the HOA market in California. Moreover, the survey results showed that about 10 percent of the homeowners associations in California are very interested in receiving offers from ESCOs, and another 37 percent of the market is somewhat interested. About a third of the market has no interest in receiving offers from ESCOs.

Equipment Selection

In selecting equipment for common areas, associations consider equipment reliability as the most important criterion. Ease of maintenance, energy cost when the association is responsible for utility bills, and energy efficiency also play an important role in equipment decisions. Energy cost when the homeowner foots the bill is slightly less important. Association guidelines, past experience with equipment, and first cost are in the upper middle range of the importance scale. Replacing the equipment with the exact same equipment is the least important criterion.

With respect to energy efficiency improvements for common areas, 40 percent of the associations reported making energy efficiency improvements to outdoor lighting and 19 percent made improvements to indoor lighting. Energy efficiency improvements to swimming pools or jacuzzis, common area boilers, laundry equipment, and heating and cooling equipment were reported for 13 percent or fewer of the developments.

Overall, the survey results suggest that associations are sensitive to energy costs when making improvements. However, the reason for making an improvement may differ according to the type of equipment being improved or changed. For example, associations cited improving energy efficiency as the most important reason for making changes for indoor and outdoor lighting. Reducing operating costs was cited as the most important reason for making changes to swimming pools or jacuzzis and heating and cooling equipment. Aging equipment was cited as the most important reason for laundry equipment and central boiler changes. Meeting reserve study[1] requirements was cited as a motivating factor for making changes to heating and cooling equipment, swimming pools or jacuzzis, and laundry equipment but not for the other efficiency measures. The reserve study apparently is not a motivation to make efficiency changes.

Role of Utility Programs

Association activities pertaining to selecting equipment for common areas have been largely untouched by utility-sponsored energy efficiency programs. An estimated 89 percent of the associations have not participated in a utility-sponsored energy efficiency program. However, utility programs could potentially play a role in influencing decisions regarding equipment changes and improvements when a reserve study is being conducted.

Barriers to Energy Efficiency Improvements

The most significant barrier to associations in choosing energy efficiency equipment is information on reliability. The next two most important barriers are the higher cost of energy efficient equipment and low or non-existent payback of energy efficient equipment. Capital, knowledge of options, and experience with equipment appeared to have neutral effects.

When asked about their improvement plans, decision makers representing 27 percent of the associations indicated they have plans to install energy efficient equipment in the

[1] A Reserve Study is an analysis of the common areas of a condominium or homeowners association to determine the current and useful remaining life of the components in these areas (e.g., roofs, swimming pool equipment, etc.) and to determine the replacement cost. The results of the analysis are used to determine a funding plan which helps assure that homeowners are adequately providing moneys for repair and replacement

common areas of their facilities within the next three years. The most frequently anticipated energy efficiency technologies are CFL installations (55 percent) and planning outdoor lighting installations (49 percent). High efficiency clothes washers (26 percent) also represent a sizable share of the planned energy efficient technologies. Some associations also have plans for improving pool-related equipment, with 19 percent considering solar heating and 15 percent considering heat recovery systems.

1. INTRODUCTION

This report presents and discusses the results from a survey of common areas for condominium/homeowner associations throughout California. The reasons for the survey and the methodology used are summarized here.

1.1 BACKGROUND

Compared to other market segments, there is relatively less information on the saturation of energy end-use equipment and their efficiency levels in the common areas for multi-family dwellings. Moreover, the attitudes and decision-making processes of multi-family building owners and managers have been less studied. Accordingly, a statewide survey of the multi-family common area/building owners market has been undertaken to provide more information about the levels of energy efficiency already being achieved in the multi-family housing market segment, about the decision-making processes among owners/managers of multi-family housing properties, and about the potential for programs to further improve energy efficiency in common areas of multi-family housing. The survey effort was directed at providing information for determining the baseline level of saturation of measures in common areas and for facilitating the preparation of retrofit and renovation/remodeling (R&R) market transformation programs for the California state market.

The focus of this report is on common areas owned or operated by homeowner associations. Such associations own, operate, and govern common areas and/or facilities for Common Interest Developments (CIDs), which include condominiums, community apartments, planned developments, and stock cooperatives. Condominium/homeowner associations (HOAs) are self-governing bodies for the homeowners within a Community Interest Development (CID).

The three main types of Common Interest Developments are condominiums, cooperatives and planned developments. While all of the CIDs can have either attached or detached housing units, condominiums and cooperatives generally contain attached units, and planned developments generally contain detached single family homes.

1.2 OVERVIEW OF STUDY METHODOLOGY

Because common areas of multi-family facilities and complexes have not received much attention in previous studies, performing this survey presented challenges. The characteristics of the common areas of multi-family facilities are less well known than for residential, commercial, or industrial facilities, and there are less data available to inform the design of a survey of common areas. However, several data sources were identified that permitted fine-tuning the sample design for surveying condominium/homeowner

associations in the state. These data sources were used to develop the sampling and surveying plan.

The data collection effort for the survey included the following:

- In-depth in-person interviews were conducted with 25 key professionals in the multi-family industry. The persons interviewed included large and small property owners, large and small property managers, heads of homeowners associations, on-site property managers, and building professionals such as architects, engineers, and others, serving the multi-housing industry. The interviews were conducted in different regions in California to capture indicators of regional differences.
- Data on the common areas for condominium/homeowner associations were collected on-site for a sample of 303 condominium/homeowner associations located in the service areas of Pacific Gas and Electric, Southern California Edison, Southern California Gas, and San Diego Gas and Electric throughout the state. Of the 303 HOAs for which data were collected on-site, 162 were condominium developments and 141 were planned developments.
- Decision-makers for the condominium/homeowner associations that were surveyed on-site were interviewed by telephone to obtain information on decision-making procedures and on their attitudes and perceptions regarding energy efficiency for their facilities. Interviews were completed with decision makers for 273 condominium or homeowner associations. Of the 273 associations for which telephone interviews were completed, 147 were condominium developments and 126 were planned developments.

For purposes of analysis, the data for the surveyed condominium/homeowner associations were statistically weighted to represent the population of condominium/homeowner associations in each of the utility service areas. The weighted data were used to develop characterizations of the market for common area equipment for condominium/homeowner associations, to determine the attitudes and behavior of market actors, and to prepare estimates of the saturations of common area energy-using equipment.

1.3 SUMMARY OF RESULTS

This report examines the characteristics of properties managed by homeowners' associations, how homeowners' associations make decisions, the degree to which homeowners' associations have adopted energy efficiency equipment in common areas, and the potential for their adopting energy efficient equipment in common areas in the future. Major conclusions from the study are briefly summarized here.

1.3.1 Market Structure

There are an estimated 25,660 associations for condominium and planned developments in the combined service areas of Pacific Gas and Electric, Southern California Edison, Southern California Gas, and San Diego Gas and Electric. About 68 percent of the associations are for condominiums, while 32 percent are for planned developments. These associations represent about 1.84 million housing units, with condominium associations accounting for 51 percent of housing units, while associations for planned developments account for 49 percent of housing units. Condominiums are more likely to have multi-family buildings, while planned developments are more likely to have single-family houses or townhouses.

1.3.2 Decision Makers and Decision Making

Associations can be self-managed or managed by a property management firm. Almost 60 percent of the developments are managed by property management firms and about 40 percent are self-managed. Smaller HOAs tend toward self-management, while larger HOAs tend to use property management companies.

The boards of directors were overwhelmingly identified as the key decision makers with respect to common area equipment decisions. Although many HOA organizations can be reached through management companies, these companies are not the decision makers. However, they are in a position to influence decisions.

1.3.3 Common Area Energy-Using Equipment and Efficiency Levels

Estimates of the amount of energy-using equipment installed in common areas of developments with condominium or homeowner associations were prepared for the following:

- Lighting for outdoor common areas;
- Lighting for indoor common areas;
- Common area laundry equipment;
- Swimming pools and hot tubs;
- Water heating equipment for common areas;
- Heating and cooling equipment for common areas; and
- Miscellaneous equipment in common areas.

Summary tables for these types of equipment are included in Chapter 5, with detailed tables included in Appendix C.

1.3.4 Energy Efficiency Improvements

In terms of making equipment selections for common areas, reliability was rated as the most important criterion. Energy efficiency, ease of maintenance and energy costs of the equipment when the association is responsible for paying for the energy, are also important.

Many HOAs have taken energy efficiency actions. About 40 percent have done lighting projects in outdoor areas such as parking areas. About 20 percent have done something with interior lighting. Smaller percentages have done things with swimming pools, boilers, laundry, and other equipment. The associations frequently took these actions to improve energy efficiency but they also reported that they took these actions to reduce costs.

Association activities pertaining to selecting equipment for common areas have been largely untouched by utility-sponsored energy efficiency programs. An estimated 89 percent of the associations have not participated in a utility-sponsored energy efficiency program. Moreover, energy services companies (ESCOs) have not really addressed the HOA market, although nearly half of the associations said that they would be interested in receiving proposals.

About 27 percent of the associations anticipate making efficiency improvements in the next three years. At the same time, only 11 percent anticipate making more general changes to the complex. Thus, market transformation program managers should not anticipate that they will have opportunities to promote energy efficiency in relation to other changes within HOA complexes.

Perhaps the most important finding in the study is where HOAs get the information they use in equipment selection. Three-quarters say they get their information from contractors. Utilities play a role only about 10 percent of the time. There are at least two important implications of this finding. The first is that for information to be effective with HOAs it must have very low search costs and it must be very easy to use. The second is that program managers might want to target more information to contractors and also design programs that encourage contractors to provide more information and perhaps more options when they deal with HOAs.

We conclude that this is a market that has some technical and market potential that has not been well addressed by existing utility, ESCO, and market transformation programs. It is a market that is best addressed by reaching the key decision makers, the boards of directors, through the channels of the property management firms and contractors who deal with HOAs. Potentially, this market might also be reached through the vehicle of the reserve studies.

1.4 ORGANIZATON OF REPORT

This report on the results of the survey of common areas for condominium/homeowner associations is organized as follows:

- The structure of the HOA market is described in Chapter 2. This includes a discussion of large, medium, and small companies that own and/or manage condominium/homeowner associations.
- The characteristics of condominium and homeowner associations are discussed in Chapter 3. Management characteristics are assessed, focusing on management style and types of on-site staff.
- Common area decision making for condominium and homeowner associations is analyzed in Chapter 4. This includes an analysis of key decision makers, drivers of common area decision making, market barriers, information sources, and the role of Energy Service Companies in the market.
- Estimates of the amount of energy-using equipment installed in the common areas of developments with condominium or homeowner associations and the efficiency levels for such equipment are presented in Chapter 5.
- Common area energy efficiency improvements are assessed in Chapter 6. The assessment covers the types of improvements made, the year improvements were made, reasons for improvement, role of energy efficiency programs, and future plans for improvements.
- Barriers to making energy efficiency improvements for common areas are identified and analyzed in Chapter 7.
- A summary of the study and the major conclusions are presented in Chapter 8.
- Appendix A is a description of the methodology used for the study.
- Appendix B contains copies of the data collection instruments.
- Appendix C provides detailed tables showing the amounts and characteristics of energy-using equipment installed in common areas of developments with condominium/homeowner associations.

2. OVERVIEW OF HOA MARKET

This chapter provides an overview of the market in which condominium and homeowner associations operate. The characterization of the market is based on data from in-depth interviews with key decision makers for condominium or homeowner associations, from on-site data collection, and from telephone interviews with decision makers at individual condominium or homeowner associations.

2.1 NUMBER OF CONDOMINIUM/HOMEOWNER ASSOCIATIONS

Data on the total number of condominium and homeowner associations in California are contained in the records of two state agencies: the California Department of Real Estate and the California Secretary of State. The data from these public agency records have been compiled by Levy & Company into a HOA Info™ Community Association Database. The focus of the survey was on two particular types of associations: for condominiums and for planned developments. The total population of such associations in the service areas of PG&E, SCE, SCG and SDG&E was about 25,660, of which 17,460 associations were for condominiums and 8,200 were for planned developments. The distribution of the complexes across service areas is shown in Figure 2-1.

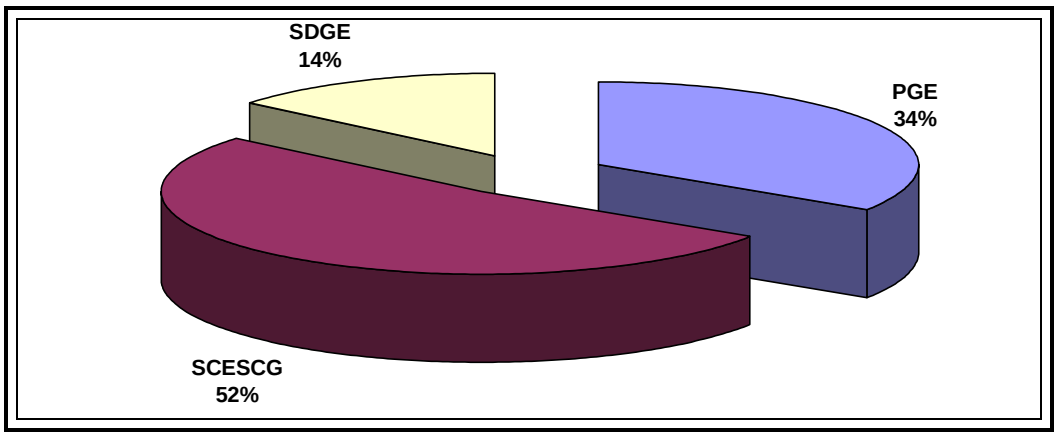

Figure 2-1. Percentage Distribution of Condominium/Homeowner Associations across Service Areas

Data were collected through the on-site survey on various characteristics of condominium/homeowner associations. Table 2-1 further characterizes the population of condominium/homeowner associations according to type and the number of units in a development. For the combined service areas, 68 percent of the associations are for condominiums, while 32 percent are for planned developments.

Table 2-1. Number of Condominium/Homeowner Associations by Size

Units per Association	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
	All associations			
All	25,660	8,780	13,330	3,550
100 or fewer	19,930	6,900	10,480	2,550
101 to 250	4,650	1,540	2,330	780
Over 250	1,090	340	520	230
	Condominium Associations			
All	17,460	4,540	10,270	2,660
100 or fewer	14,540	3,890	8,660	1,990
101 to 250	2,450	500	1,400	550
Over 250	480	150	220	110
	Planned Development Associations			
All	8,200	4,240	3,070	900
100 or fewer	5,390	3,010	1,830	550
101 to 250	2,200	1,040	930	230
Over 250	610	190	310	110

2.2 NUMBER OF HOUSING UNITS FOR HOAS

Table 2-2 shows the distribution of housing units for condominium/homeowner associations when the associations are classified by service area, size, and type. While condominium associations account for 68 percent of the population of the associations, Table 2-2 shows that they account for 51 percent of the housing units. Associations for planned developments account for 32 percent of the associations, but for 49 percent of the housing units.

Table 2-3 shows the average numbers of housing units per association for all associations and for condominiums and planned developments. For the combined service areas, there is an average of about 72 housing units per association. However, there is an average of 54 housing units for condominiums and of 109 housing units for planned developments. Associations in SDG&E's service territory tend to have more units per development compared to developments in the PG&E and SCE/SCG service territories.

Table 2-2. Number of Housing Units by Service Area and Type and Size of Association

Units per Association	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
All associations				
All	1,838,490	575,620	938,600	324,260
100 or fewer	526,300	194,070	246,050	86,180
101 to 250	725,460	227,760	389,110	108,590
Over 250	586,730	153,800	303,440	129,500
Condominium Associations				
All	943,430	225,250	517,930	200,250
100 or fewer	363,900	91,520	209,940	62,440
101 to 250	388,430	76,950	232,920	78,560
Over 250	191,100	56,780	75,070	59,250
Planned Development Associations				
All	895,060	350,380	420,680	124,010
100 or fewer	162,400	102,550	36,120	23,730
101 to 250	337,030	150,810	156,190	30,030
Over 250	395,630	97,020	228,370	70,250

Table 2-3. Average Number of Housing Units by Service Area and Type of Association

Units per Association	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
All associations	71.6	65.6	70.4	91.2
Condominiums	54.0	49.7	50.4	75.3
Planned developments	109.1	82.6	137.3	138.6

Developments with condominium or homeowner associations may have a variety of architectural types and styles, such as single family detached houses, two-story townhouses, garden style units with shared "party walls," and apartment-like, multi-storied high rises. Table 2-4 provides data on the types of building structures that are found at developments with condominium/homeowner associations. Condominiums are more likely to have multi-family buildings, while planned developments are more likely to have single-family houses or townhouses.

Table 2-4. Percent of Developments with Condominium/Homeowner Associations Having Different Types of Building Structures

Type of Building Structure	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
	All Associations			
All complexes	25,660	8,780	13,330	3,550
Single-family houses	19%	29%	14%	13%
Townhouses	19%	25%	13%	27%
2-4 units, 1 story	8%	13%	6%	3%
2-4 units, 2 stories	17%	15%	22%	1%
5+ units, 1-2 stories	20%	6%	25%	31%
5+ units, 3+ stories	10%	8%	10%	16%
Other	6%	8%	3%	10%
	Condominium Associations			
All complexes	17,460	4,540	10,270	2,660
Single-family houses	8%	17%	5%	2%
Townhouses	15%	12%	13%	28%
2-4 units, 1 story	10%	22%	7%	2%
2-4 units, 2 stories	19%	11%	26%	1%
5+ units, 1-2 stories	25%	5%	30%	41%
5+ units, 3+ stories	14%	14%	12%	21%
Other	7%	14%	3%	7%
	Planned Development Associations			
All complexes	8,200	4,240	3,070	900
Single-family houses	43%	43%	43%	44%
Townhouses	27%	38%	12%	24%
2-4 units, 1 story	3%	3%	1%	5%
2-4 units, 2 stories	13%	19%	8%	2%
5+ units, 1-2 stories	7%	6%	10%	2%
5+ units, 3+ stories	1%	1%	1%	1%
Other	3%	2%	1%	17%

2.3 AGE OF DEVELOPMENTS

Table 2-5 shows the distribution of associations by service territory and by year built. Seventy-four percent of the associations are for developments that were built in the 1970s and 1980s. Only seven percent of developments were built prior to 1970, and 18 percent were built in the 1990s. The low percentage in the pre-1970s era is an indicator of how recent the phenomena of high density housing with common property is in California and how rapidly it has grown. The low percentage in the 1990s reflects the economic downturn in California in the early 1990s.

Table 2-5. Number of Condominium/Homeowner Associations by Service Area and Year Development Was Built

Year Built	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
All associations	25,660	8,780	13,330	3,550
Before 1970	1,550	940	560	50
1970 through 1979	5,600	1,430	2,870	1,310
1980 through 1989	9,130	2,870	4,780	1,480
1990 through 1999	3,590	1,290	1,780	520
Year built not known	5,790	2,240	3,350	200

2.4 VALUE OF HOA PROPERTIES

In the telephone survey of decision makers for the associations, respondents were asked to identify the lowest and highest value units in the complex, the square footage of those units, and the estimated values. These values are reported in Table 2-6. Statewide the average values for lowest and highest value units were $205,791 and $491,339, respectively. The value per square foot for the lowest value units is $165 compared to $240 for the highest value units. Average total values are highest in PG&E's service territory, $213,000 for lowest value units and $638,000 for the highest value units.

Table 2-7 reports average values and values per square foot for different types of management arrangements. Values are highest in complexes where the HOA self-manages compared to complexes having property management companies.

Table 2-6. Mean and Median Values of Housing Units at HOA Developments by Service Territory

	Lowest value unit	Square feet of unit with lowest value	Lowest value per square foot	Highest value unit	Square feet of unit with highest value	Highest value per square foot
			Combined Service Territories			
Mean	$205,791	1,237	$165	$491,339	1,711	$240
Median	$170,000	1,200	$138	$260,000	1,500	$150
			PG&E			
Mean	$213,379	1,266	$163	$637,947	1,662	$317
Median	$200,000	1,300	$150	$240,000	1,600	$157
			SCE/SCG			
Mean	$198,423	1,234	$159	$444,816	1,837	$190
Median	$170,000	1,200	$137	$260,000	1,400	$145
			SDG&E			
Mean	$207,171	1,186	$180	$317,388	1,539	$202
Median	$180,000	1,200	$154	$200,000	1,400	$175

Table 2-7. Mean and Median Values of Housing Units at HOA Developments by Type of Management Arrangement

	Lowest value unit	Square feet of unit with lowest value	Lowest value per square foot	Highest value unit	Square feet of unit with highest value	Highest value per square foot
			Self-Managed			
Mean	$218,880	1,162	$186	$581,866	1,648	$303
Median	$192,000	1,100	$189	$275,000	1,500	$200
			Company Managed			
Mean	$173,752	1,351	$127	$270,415	1,712	$155
Median	$160,000	1,400	$111	$227,000	1,700	$143

3. MANAGEMENT OF CONDOMINIUM/HOMEOWNER ASSOCIATIONS

This chapter describes the management characteristics of condominium and homeowner associations.

3.1 ASSOCIATION MANAGEMENT

When a person buys a lot, home, townhome, or condominium in a Community Interest Development (CID), he/she automatically becomes a member of the condominium or homeowner association for that development. The most common type of association of homeowners is a nonprofit mutual benefit corporation, which is a corporation in which the members of the corporation vote for a board of directors that runs the affairs of the corporation. Some associations, usually older ones, may be unincorporated, but unincorporated associations are treated the same as mutual benefit corporations under California law.

For either condominiums or planned developments, the property owners in a development are in charge of the association. During the annual meeting of the association, members vote for all or part of the board of directors that operates the association. The board of directors' job is to preserve, enhance and protect the value of the development, but the board answers to the members. In practice, a board often contracts with a professional management company to run the day-to-day affairs of the association.

All condominium or homeowner associations for a CID share some general characteristics:

- The governing documents for a development create mutual obligations through the use of restrictions (covenants).
- Owners are automatically members of a community (property) association which governs the community.
- Owners are required to pay assessments to maintain common areas.
- Owners share a property interest in the community.

Associations can be self-managed or managed by a property management firm. Unlike apartment complexes, where more operators owned and managed properties than just managed properties, significantly more developments that have homeowner associations are managed by property management firms than are self-managed. Almost 60 percent of the developments are managed by property management firms and about 40 percent are self-managed. Table 3-1 shows the distribution by size for the two types of management. Smaller HOAs clearly tend toward self-management as opposed to the larger HOAs

which tend to use property management companies. The break point appears to be about 25 units.

Table 3-1. Type of Association Management by Size of Association

Type of Management	*1 – 25 units*	*26 - 100 units*	*101 - 250 units*	*Over 250 units*
HOA self manages	57%	20%	16%	6%
Property management company manages	24%	46%	24%	5%

3.2 CHARACTERISTICS OF COMPANIES THAT MANAGE HOAS

There are differences in the companies that manage HOAs. This section briefly describes some of those differences.

3.2.1 Number of Properties and Units Managed

As shown in Table 3-2, firms that contract to manage HOAs manage an average of 35 properties, with a median of 20 properties. The highest percentage of firms said that they managed 50 or more properties. The respondents all reported that the properties they manage are in California. In other words, HOA management is a local rather than a national business.

Table 3-3 reports data on the number of housing units managed. The management firms reported that they service an average of 2,991 units with the median number of units served being 1,500 units. Because the mean is much larger than the median it is clear that some firms manage many more units than others. The largest percentage of firms reported managing between 1,000 and 4,999 units.

Table 3-2. Number of Properties Managed

Number of properties		*Percent of firms that manage:*			
Mean	*Median*	*1-4 properties*	*5-14 properties*	*15-49 properties*	*50+ properties*
35	20	16%	22%	27%	34%

Table 3-3. Number of Units Managed

Number of units		*Percent of firms that manage:*			
Mean	*Median*	*1-249 units*	*250-999 units*	*1,000-4,999 units*	*5,000+ units*
2,991	1,500	26%	16%	35%	22%

3.2.2 Other business lines

About 21 percent of firms interviewed who manage HOAs have other business lines. The vast majority of these other businesses pertain to commercial real estate and residential rental properties.

The key finding is that firms that manage HOAs are basically local in contrast to apartment operators who are often national. An important implication of this is that decision makers are locally oriented and that policies can be influenced locally. With apartment operators, it may be more difficult to influence companies where policies and procedures are set nationally.

3.3 ON-SITE STAFF

While most apartment property owners maintain on-site management and/or maintenance staff, this is not the case for homeowner associations. More than 80 percent of the HOAs do not have on-site staff. Although there are some complexes with fewer than 100 units that have on-site staff, it is the associations for developments with more than 100 units that are more likely to have staff, and on-site staff are found most frequently at the largest sites, as shown in Table 3-4.

Table 3-4. Percent of Developments with Staff by the Size of Development

	1 – 25 units	*26 - 100 units*	*101 – 250 units*	*Over 250 units*
Percent of complexes with staff	7%	16%	36%	50%

For properties with staff, the number of staff range from 1 to 10 people per site. Table 3-5 reports data on on-site staff. The average number of on-site staff is 2.6 persons per property with a standard deviation of 2.6. The most probable person to be on site is a maintenance staff person, followed by a facility manager, followed by a maintenance supervisor, followed by someone with another title.

Table 3-5. Number of On-Site Staff

Management Style	*Total*	*Facility managers*	*Maintenance staff*	*Maintenance supervisors or facility engineers*	*Other*
Range	1-10	0-4	0-5	0-4	0-3
Mean	2.6	0.8	1.0	0.4	0.3
Mode	1	1	0	0	0

Information on on-site staffing according to management style is reported in Table 3-6. Associations that manage and maintain their own properties have about twice as many on-site staff as HOAs that contract these services. This is not surprising because management companies may use roving teams or hire contractors to take care of maintenance, landscaping, and other work requirements. Self-managed properties would not be able to share these services.

Table 3-6. Number of On-Site Staff by Management Style

Management Style	*Total*	*Facility managers*	*Maintenance staff*	*Maintenance supervisors or facility engineers*	*Other*
HOA self-manages	3.3	1.0	1.4	0.4	0.5
Property management company manages	1.6	0.8	0.5	0.2	0.1

3.4 HOA BOARDS OF DIRECTORS

A homeowner association has a board of directors that oversees the operation of the properties. The frequency with which these boards meet is one possible indicator of the degree of board involvement, with a higher frequency of meetings suggesting a board that is more active in decision-making. The data in Table 3-7 show that a majority of boards meet monthly with the next largest percentage meeting quarterly and the rest in other time frames.

Table 3-7. Frequency of HOA Board Meetings

Meeting frequency	*Percent of associations*
Monthly	61%
Semi-monthly	4%
Quarterly	19%
Semi-annually	5%
Annually	8%
As needed	3%

As shown in Table 3-8, the boards of HOAs meet more often when there is a management company than when the HOA is self-managed. This may be a function of the fact that someone at the management company may be available to organize and staff the meetings and therefore there is a tendency to meet more often.

Table 3-8. Frequency of Board Meetings by Type of Management

	Percent Self-managed	*Percent Management company*
Monthly	46%	72%
Semi-monthly or quarterly	28%	18%
Semi-annually, annually, or other	26%	9%

The more frequent meeting schedule may also reflect differences in the size of properties and the need for frequent meetings. Table 3-9 shows that the largest HOAs are more likely to have monthly meetings and that the majority of the smaller HOAs meet less frequently. The earlier finding that large HOAs are managed by management companies suggests size is the most likely explanatory factor.

Table 3-9. Frequency of Board Meetings by Number of Units in Development

Number of Units	*Monthly*	*Bi-monthly or quarterly*	*Semi-annually, annually or other*
1 -25 units	19%	43%	39%
26 - 100 units	75%	19%	6%
101 - 250 units	90%	9%	
Over 250 units	90%	9%	

Table 3-10 shows that association board members typically are elected to serve on the board for a one-year period. However, a few boards elect their members every two to three years.

Table 3-10. Frequency of HOA Board of Director Elections

Election Frequency	*Percent of associations*
Annually	89%
Bi-annually	6%
Every 3 years	4%
As needed	2%

Board meetings present opportunities for program managers to present program concepts and obtain association support for energy efficient practices. A slight majority of boards meet on a monthly schedule providing twelve opportunities to impact the board each year. The remaining boards meet less frequently with some meeting only once a year. For the boards that meet once a year program managers will find themselves needing to wait a full year before being able to address the board during a normal meeting. A small percent of associations meet on an as needed schedule.

3.5 ROLE OF RESERVE STUDIES

California law requires that homeowner associations conduct a review of the common area equipment condition and conduct a needs assessment at least every three years. This assessment is called a reserve study. When this study is conducted, managers of market transformation programs have an opportunity to influence the assessments to identify efficiency improvements and have them scheduled for installation.

Table 3-11 provides data that categorizes associations by the frequency with which they conducted reserve studies. On average, about 42 percent of associations conduct a reserve study every year and 41 percent conduct them every three years. However, in order to take the greatest advantage of this, market intervention programs must have something of value to add to the process.

Table 3-11.Frequency of Association Reserve Studies

Reserve study frequency	*Percent of complexes*
Annually	42%
Bi-annually	8%
Every 3 years	41%
Every 5 years	3%
As needed	6%

4. DECISION MAKING PRACTICES FOR COMMON AREAS

This chapter extends the discussion from Chapter 3 to describe the decision making practices pertaining to common areas of condominium/homeowner associations. Key decision makers are identified, the sources of information and the role of energy service providers are discussed, and factors affecting decision making for common areas are assessed.

4.1 KEY DECISION MAKERS

Developments with condominium or homeowner associations are similar in that they allow individual owners the use of common property and facilities. Decisions about equipment selection and replacement are almost entirely the provenance of the board of directors. As reported in Table 4-1, the board was identified as the key decision-maker 91 percent of the time. Property management companies, on-site managers, on-site maintenance staff, consultants, and other organizations or individuals were identified as decisions makers six percent of the time or less.

Because the boards of directors are the key decision-makers for almost all association held properties, they should be the target for program marketing efforts. Because these boards typically meet monthly or quarterly, approaches could be made at any time of the year. The most difficult problem will be identifying the officers and members of the board. In conducting this study, we found this to be a problem. Board presidents are identified in public records for some associations, and mailings were made to these individuals to obtain information on their associations.

Table 4-1. Key Decision Makers for HOA Common Area Equipment

Decision Maker	*Percent of complexes*[1]
Boards of directors	91%
Property management company	6%
On-site manager	3%
On-site maintenance staff	2%
Consultant (typically that also conducts the reserve study)	1%
Other	2%

[1] The percentage totals to more than 100 percent because some respondents identified more than one key decision

4.2 SOURCES OF INFORMATION

Perhaps one of the most striking findings in the HOA survey is where HOAs get their information about equipment. As shown in Table 4-2, contractors were identified as the key information source by 76 percent of all respondents. None of the other sources are cited by as many as 20 percent of the respondents. Utilities were identified only 10 percent of the time. These data probably mean that decision makers spend little time on information searches, trusting contractors to do this for them. Potentially utilities or energy services companies might provide information, but it is quite likely that knowledge of where to get the information would have to be made easily available and that the search costs associated with getting the information would need to be very low in order for decision makers to use it.

Table 4-2. Sources of Information for HOAs

Information Source	*Percent of HOAs Citing Source*
Contractors	76%
Trade publications	17%
Dealers	14%
Manufacturers	14%
Reserve study contractors	13%
Utilities	12%
Internal maintenance staff	11%
Distributors	11%
Others	4%

4.3 ROLE OF ENERGY SERVICE COMPANIES

Energy Service Companies (ESCOs) have made energy efficient product or service offerings to 10 percent of the HOA market in California. There is a wider interest on the part of the decision makers in receiving offers from ESCOs than these data would indicate have been received. Table 4-3 shows that 10 percent of the homeowners associations in California are very interested in receiving offers from ESCOs, and another 37 percent of the market is somewhat interested. About a third of the market has no interest in receiving offers from ESCOs.

Table 4-3. Interest of Condominium/Homeowner Associations in Receiving Proposals from ESCOs

Level of Interest	*Percent of associations*
Very interested	10%
Somewhat interested	37%
Mildly interested	19%
Not at all interested	34%

4.4 DRIVERS OF COMMON AREA DECISION MAKING

Just as with the apartment complexes, respondents to the telephone survey were given a list of nine decision criteria and asked to rate the criteria on a scale of 1 to 10 (where 1 was not at all important and 10 was very important). Table 4-4 shows the average ratings for the nine criteria. Equipment reliability is the most important criteria (9.8) for selecting equipment for common areas in HOA properties. This was the highest importance rating of any item in either the apartment or HOA surveys. Ease of maintenance, energy cost when the association is responsible for utility bills, and energy efficiency also play an important role in equipment decisions. Energy cost when the homeowner foots the bill is slightly less important. Association guidelines, past experience with equipment, and first cost are in the upper middle range of the importance scale. Replacing the equipment with the exact same equipment is the least important criterion falling nearest the middle of the scale.

Table 4-4. Importance of Equipment Selection Criteria for Common Areas

Equipment Selection Criteria	*Mean rating (1-10 scale)*
Reliability of new equipment	9.8
Ease of maintenance	9.2
Energy costs of equipment when the association pays energy costs	9.2
Energy efficiency of the new equipment	9.2
Energy costs when the tenant pays the energy costs	8.8
Company purchase guidelines or procedures	8.0
Past experience with the equipment	7.8
First cost or purchase price	7.6
Replace with identical equipment	6.4

As with the data reported by apartment operators, the importance criteria rated by the representatives of homeowner associations were factor analyzed. The factor analysis resulted in a three-factor solution. The first factor explains 26 percent of the variance, the second explains 23 percent and the third explains 15 percent of the variance.

The factor loadings on each of the three factors are reported in Table 4-5. These factors are not quite the same as those for the apartment operators, which means that HOA operators apply different decision criteria in making equipment selections than do apartment operators.

- We call the first factor the *pragmatic* factor because the variables that load on this factor are using an identical model of equipment, selecting equipment based on first cost, purchasing using HOA developed guidelines, and prior experience with equipment.

- The only two variables that load heavily on factor 2 are energy efficiency and energy cost. Note that the pragmatic factor variables have low negative loadings on this factor, indicating that those behaviors are the opposite of the energy efficiency and energy cost. We therefore named this the *energy efficiency and cost* factor.
- The third factor is an *ease of maintenance and reliability* factor. No other variables load heavily on this factor.

Table 4-5. Factor Loadings for HOA Operator Equipment Selection Criteria

Equipment Selection Criteria	*Pragmatic factor*	*Energy efficiency and cost factor*	*Ease of maintenance and reliability factor*
Replacing equipment with an identical or nearly identical model	0.747	-0.388	-0.162
Purchasing using company guidelines	0.580	-0.399	-0.348
Price or first cost	0.623	-0.276	0.130
Prior experience with the equipment	0.533	-0.244	-0.067
Reliability	0.513	0.238	0.523
Ease of maintenance	0.218	0.145	0.822
Energy efficiency	0.345	0.840	-0.246
Energy cost when the HOA pays for the utilities	0.387	0.833	-0.221

The factor analysis routine was used to create factor scores. That is, for each case in the sample, we created a new variable to reflect each of the three factors. These variables are standardized and have a mean of zero and a standard deviation of one. Using these variables we then examined the relationship of the factor to key variables that might help us understand the behavior of homeowner associations.

In Table 4-6, the average factor scores for HOAs that are self managed are compared with those of HOAs who use a property management firm. There is a statistically significant difference in the energy efficiency and energy cost factor, a difference approaching significance for the ease of maintenance and reliability factor, but no difference in the pragmatic factor. HOAs that use professional management firms are more likely to weigh energy efficiency and energy cost in their decision making than are self-managed HOAs. Likewise HOAs that used a property management firm were more likely to take ease of maintenance issues into account than self-managed HOAs. There was no difference in the pragmatic factor between the two approaches to management.

Table 4-6. Differences in Decision Factors for HOA by Management Method

Management Method.	*Pragmatic factor*	*Energy efficiency and cost factor*	*Ease of maintenance and reliability factor*
Self-managed HOA	-0.012	-0,005	-0.189
HOA using property management company	-0.005	0.221	-0.029
Significance	.965	.040	.185

We conducted a similar comparison to see how the number of units in a development with an HOA might influence decision factors for the HOA. The results of this analysis are reported in Table 4-7. HOAs for smaller developments are more likely to approach equipment selection from a pragmatic approach than are HOAs for larger developments. With the exception of the largest HOAs, attention to energy efficiency and cost increase with the size of the development. Concern about ease of maintenance and reliability do not appear to be related to size of the development.

Table 4-7. Importance of Decision Factors by Size of Unit

Number of units in development	*Pragmatic factor*	*Energy efficiency and cost factor*	*Ease of maintenance and reliability factor*
1 - 25 units	0.142	0.051	-0.088
26 - 100 units	0.113	0.117	-0.027
101 - 250 units	-0.262	0.314	0.090
250 units	-0.303	-0.172	-0.041

We also examined the application of decision factors by the year the complex was built. These results, reported in Table 4-8, show that organizations managing units constructed prior to 1970 are much less likely to attend to the pragmatic factors and much more likely to attend to energy efficiency and cost and ease of maintenance and reliability than HOA organizations in other decades. There were few other significant relationships in this table.

Table 4-8. Importance of Decision Factors by Year Development Was Constructed.

Year Development Constructed	*Pragmatic factor*	*Energy efficiency and cost factor*	*Ease of maintenance and reliability factor*
Pre-1970	-0.370	0.446	0.391
1970s	0.027	0.027	-0.147
1980s	0.106	0.209	-0.125
1990s	0.053	-0.081	0.015

5. COMMON AREA ENERGY-USING EQUIPMENT

The detailed data on common area energy-using equipment that were collected on-site at the sample of 303 condominium/homeowner associations have been weighted to represent the population of condominium/homeowner associations and used to calculate estimates of the saturation of the various types of equipment. Tables with the detailed saturation estimates are provided in Appendix C. A summary discussion of the saturation estimates is provided in this chapter.

Types of equipment for which saturation estimates are presented and discussed include the following:

- Lighting for outdoor common areas;
- Lighting for indoor common areas;
- Common area laundry equipment;
- Swimming pools and hot tubs;
- Water heating equipment for common areas;
- Heating and cooling equipment for common areas; and
- Miscellaneous equipment in common areas.

5.1 LIGHTING FOR OUTDOOR COMMON AREAS

Outdoor lighting is used at condominium/homeowner associations for parking lots, entries, walkways, stairways, and landscaping. Outdoor lighting serves both security and decoration functions. Detailed estimates of the number of complexes with different types of outdoor lighting fixtures, of the installed base of fixtures, and of the connected outdoor lighting load (measured by lamp wattage) are provided in Appendix C. A summary description of the characteristics of outdoor lighting is provided in this section.

Based on lamp wattages, the connected load for outdoor lighting at condominium/homeowner associations was estimated to be 72.6 mW. The connected load is distributed across service areas as follows:

- 14.65 mW in PG&E's service area;
- 43.84 mW in SCE/SCG service areas; and
- 14.14 mW in SDG&E's service area.

Relative to the number of associations and number of housing units those associations represent, the connected outdoor lighting load for PG&E's service territory might appear low. However, there are several reasons why the connected outdoor lighting load for PG&E's service territory is relatively lower.

As the data reported in Table 2-1 and Table 2-2 showed, nearly half of the associations and over half of the housing units in PG&E"s service territory are for planned developments, while condominiums are preponderant for SCE/SCG and SDG&E. The connected load per housing unit is lower for planned developments than for condominiums. For condominiums, the connected outdoor lighting load is about 52.5 watts per housing unit when calculated for the combined service areas. For planned developments, the connected load is 25.9 watts per housing unit.

Looking only at condominiums, the connected outdoor lighting load in PG&E's service area is lower than in the SCE/SCG and SDG&E service areas. Table 5-1 compares the connected outdoor lighting loads for condominium units in the different service territories, calculated in terms of watts per unit. As can be seen, the connected load per unit is lower for PG&E's service territory. The differences in load per unit across service areas is related to the type and density of condominium housing units in the different service areas.

- Table 2-4 showed that relatively higher percentages of condominium associations in PG&E's service area had lower-density housing units (e.g., single-family houses, townhouses, 2-4 unit one-story) buildings as the predominant housing type. For the service areas of SCE/SCG and SDG&E, relatively higher percentages of condominium associations had higher-density housing units (e.g., 2-4 units, two-story buildings; 5 plus units, 1 to 2 story buildings, and 5 plus units, three or more story buildings) as the predominant housing types.
- Table 5-1 provides data showing the housing density for condominium associations in the different service areas. Density is lower for PG&E's area than for the service areas of SCE/SCG and SDG&E. Moreover, higher density is associated with higher watts per unit.

Table 5-1. Comparison of Connected Outdoor Lighting Load for Condominium and Planned Development Units across Service Areas

	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
Condominium Associations				
Watts per housing unit	52.5	38.0	59.0	51.7
Housing units per acre		9.3	20.3	16.4
Planned Development Associations, All Associations				
Watts per housing unit	25.9	17.4	31.6	30.4
Housing units per acre		1.79	2.02	2.05
Planned Development Associations, Associations with Lighting				
Watts per housing unit	33.6	25.9	37.7	37.1
Housing units per acre		1.79	2.02	2.05

For planned developments, Table 5-1 shows that the connected outdoor lighting load for housing units in PG&E's service area is lower than for planned developments in the SCE/SCG and SDG&E service areas. Again, there appears to be an association between lighting intensity and housing density, with higher density developments in the service areas of SCE/SCG and SDG&E having somewhat higher lighting intensities for outdoor common areas.

Moreover, there are relatively more planned developments that do not have common area outdoor lighting in PG&E's service area than in the service areas of SCE/SCG and SDG&E. Developments without common area outdoor lighting account for 33 percent of housing units in planned developments in the PG&E service area, for 16 percent of such units in the SCE/SCG service area, and for 18 percent in the SDG&E service area.

Table 5-2 shows the connected outdoor lighting load accounted for by different types of lighting in the different service areas.

For the combined service areas, eight types of lighting account for about 90 percent of the connected outdoor lighting load:

- Incandescent 31.6 percent
- High pressure sodium 14.6 percent
- Compact fluorescent (pin) 14.0 percent
- Metal halide 8.8 percent
- 4-foot fluorescent 7.3 percent
- High intensity discharge 7.0 percent
- Mercury vapor 4.3 percent
- Low pressure sodium 2.7 percent

Table 5-2. Connected Outdoor Lighting Load by Service Areas and Types of Lamps (Load in Megawatts, based on lamp wattage)

Type of Lighting Equipment	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
Total Connected Load	72.6	14.7	43.8	14.1
Load by Lamp Type:				
2-foot fluorescent	0.4	-	-	0.4
4-foot fluorescent	5.3	0.7	3.6	1.0
8-foot fluorescent	1.3	0.3	0.6	0.4
Compact fluorescent (pin)	10.2	2.3	6.6	1.3
Compact fluorescent (screw)	1.1	0.7	0.4	-
CircleLine fluorescent	0.1	0.1	0.1	-
High pressure sodium	10.6	2.3	7.5	0.7
Halogen	1.8	1.7	-	0.1
High intensity discharge	5.1	0.1	4.5	0.5
Incandescent	22.9	4.2	12.4	6.3
Incandescent spotlight	1.6	0.1	1.5	-
Low pressure sodium	2.0	0.6	0.5	0.8
Metal halide	6.4	1.0	3.9	1.4
Mercury vapor	3.2	0.2	1.9	1.0
Quartz	0.6	0.2	0.2	0.2

5.2 LIGHTING FOR INDOOR COMMON AREAS

Based on lamp wattages, the connected load for lighting indoor common areas at condominium/homeowner associations is less than for lighting outdoor common areas. The connected load for lighting indoor common areas was estimated to be 32.0 mW for the combined service areas.

The connected load for lighting indoor common areas is distributed across service areas as follows:

- 6.0 mW in PG&E's service area;
- 21.1 mW in SCE/SCG service areas; and
- 4.9 mW in SDG&E's service area.

Table 5-3 shows the connected indoor lighting load accounted for by different types of lighting in the different service areas. For the combined service areas, incandescent and four-foot fluorescent lighting account for about 67 percent of the connected indoor lighting load. Four other types of lighting account for another 26 percent of the load.

The percentages of the connected indoor lighting load accounted for by different types of lighting are as follows.

- Incandescent 42.9 percent
- Four-foot fluorescent 24.4 percent
- Compact fluorescent (pin) 13.0 percent
- Eight-foot fluorescent 4.9 percent
- CircleLine fluorescent 4.1 percent
- Exit sign, incandescent 3.6 percent

For four-foot fluorescents, there is a split among standard efficiency T-12 lamps (40 watts per lamp), energy saver T-12 lamps (34 watts per lamp), and T-8 lamps (32 watts per lamp). For the combined service areas, standard efficiency T-12 lamps account for 68 percent of the four-foot fluorescent lighting load. Energy-saver T-12 lamps account for 12 percent of that load, and T-8 lamps for 20 percent.

Table 5-3. Connected Indoor Lighting Load by Service Areas and Types of Lamps (Load in Megawatts, based on lamp wattage)

Type of Lighting Equipment	*Combined Service Areas*	*Individual Utility Service Areas*		
		PG&E	*SCE/SCG*	*SDG&E*
Total Connected Load	32.0	6.0	21.1	4.9
Load by Lamp Type:				
2-foot fluorescent	0.4	0.1	0.3	-
4-foot fluorescent	7.8	1.5	4.7	1.6
8-foot fluorescent	1.6	-	0.9	0.6
Compact fluorescent (pin)	4.2	0.7	3.0	0.5
Compact fluorescent (screw)	0.2	0.1	0.1	-
CircleLine fluorescent	1.3	0.2	0.4	0.8
Exit signs, fluorescent	0.1	-	0.1	-
Exit signs, incandescent	1.1	-	1.1	-
High pressure sodium	-	-	-	-
Halogen	0.2	0.2	-	-
High intensity discharge	0.4	-	0.4	-
Incandescent	13.8	2.8	9.5	1.4
Incandescent spotlight	0.7	0.3	0.3	-
Metal halide	0.1	0.1	-	-
Quartz	0.1	-	0.1	-
U-tube fluorescent	0.1	-	0.1	-

5.3 COMMON AREA LAUNDRY EQUIPMENT

There is common area laundry equipment at about 19 percent of the condominium/homeowner associations found in the combined service areas. However, there is a difference between condominium and planned developments with respect to the presence of common area laundry equipment. For the combined service areas, common area laundry equipment is found at about 26 percent of condominium developments and at about 4 percent of planned developments. Table 5-4 shows the percentages of developments having common area laundry equipment for the different service areas.

The stock of laundry equipment for developments with condominium/homeowner associations consists of about 51,850 clothes washers and 51,420 dryers. The nearly one-to-one ratio between washers and dryers is in accord with the Laundry Room Guide Recommendations of the Multi-Housing Laundry Association that there be one single-load dryer for each washer.

Table 5-4. Condominium and Planned Developments with Common Area Laundry Equipment

	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
All Associations				
Number of developments	25,660	8,780	13,330	3,550
Percent with common area laundry equipment	18.6%	15.1%	18.4%	28.2%
Condominium Associations				
Number of developments	17,460	4,540	10,270	2,660
Percent with common area laundry equipment	25.5%	24.2%	23.5%	35.7%
Planned Development Associations				
Number of developments	8,200	4,240	3,070	900
Percent with common area laundry equipment	3.9%	5.3%	1.4%	6.1%

For the combined service areas, there is one common area clothes washer for every 8.20 housing units for developments that have common area laundry equipment. For individual service areas, the ratio is one clothes washers for every 10.4 housing units in PG&E's service area for developments having common area laundry equipment, for every 6.7 housing units in SCE/SCG's service area, and for every 13.0 housing units in SDG&E's service area. These ratios are comparable to the equipment guidelines of the Multi-Housing Laundry Association, which recommend one pair of washers/dryers for every 8 to 12 units for complexes where families are the predominant residents and one pair for every 10 to 15 units for complexes where young working adults are the predominant residents.

The distributions of common area clothes washers and clothes dryers by type are shown in Table 5-5.

- Most common area clothes washers are top-loaded, with vertical agitators. Most of the washers draw 1 kW or less (see Appendix C.)
- Most common area clothes dryers are front-loaded, with just over half using natural gas and just under half using electricity.

Table 5-5. Numbers of Different Types of Clothes Washers and Clothes Dryers Installed in Common Areas

Type of Clothes Washer or Dryer	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
	Clothes Washer			
All clothes washers	51,850	13,340	34,290	4,220
Top-loaded, vertical agitator	51,550	13,140	34,200	4,210
Front-loaded, horizontal agitator	300	200	100	10
	Clothes Dryers			
All clothes dryers	51,420	12,980	34,040	4,410
Natural gas, front-loaded	25,970	9,190	13,040	3,740
Electric, front-loaded	25,450	3,790	21,000	670

The age distributions for common area clothes washers and dryers are shown in Table 5-6. Across the combined service areas, about 6 percent of the washers and dryers are under one year old, about 60 percent are between one and five years old, and about 34 percent are over five years old.

Table 5-6. Age Distributions for Clothes Washers and Clothes Dryers Installed in Common Areas

Type of Clothes Washer or Dryer	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
	Clothes Washer			
All clothes washers	51,850	13,340	34,290	4,220
Under 1 year	3,320	290	1,790	1,240
1 to 5 years	30,920	8,930	19,390	2,600
5 to 10 years	15,910	3,420	12,300	200
10 to 15 years	1,330	420	720	190
Over 15 years	380	280	100	-
	Clothes Dryers			
All clothes dryers	51,420	12,980	34,040	4,410
Under 1 year	3,030	-	1,790	1,240
1 to 5 years	30,840	9,150	18,920	2,770
5 to 10 years	16,050	3,270	12,570	210
10 to 15 years	1,330	420	720	190
Over 15 years	180	140	40	-

5.4 SWIMMING POOLS AND HOT TUBS

Data were collected regarding the characteristics of swimming pools and hot tubs at developments with condominium/homeowner associations.

5.4.1 Swimming Pools

For the combined service areas, about 30 percent of the developments with condominium/homeowner associations have one or more swimming pools. Table 5-7 shows the numbers of developments in the different service areas that have swimming pools.

Table 5-7. Condominium and Planned Developments with Swimming Pools

	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
All Associations				
Number of developments	25,660	8,780	13,330	3,550
Percent with swimming pools	29.8%	29.5%	27.9%	37.7%
Condominium Associations				
Number of developments	17,460	4,540	10,270	2,660
Percent with swimming pools	28.1%	20.3%	28.0%	41.7%
Planned Development Associations				
Number of developments	8,200	4,240	3,070	900
Percent with swimming pools	33.4%	39.4%	27.4%	25.6%

There is a total of 16,130 swimming pools at the developments that do have swimming pools. All of the swimming pools are outdoors. As shown in Table 5-8, about three-fourths of the pools are heated, mostly with natural gas heating.

Table 5-8. Numbers of Swimming Pools at Condominium/Homeowner Associations by Type of Heating

Type of Swimming Pool	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
Total number of pools*	16,130	5,510	8,240	2,380
Not heated	4,330	2,820	920	590
Heated with natural gas	10,720	2,170	7,110	1,430
Heated with other fuel	1,080	520	210	360

*All pools are outdoors.

All of the swimming pools have circulation pumps. As shown in Table 5-9, these are generally rated at 2 horsepower or less, with total horsepower of the pumps estimated at 27,950 horsepower. A table detailing the distribution of circulation pumps by horsepower rating for individual service areas is provided in Appendix C.

Table 5-9. Numbers and Total Horsepower of Circulation Pumps for Swimming Pools at Condominium/homeowner associations (Combined Service Areas)

Size of Pool Pump (In horsepower	*Number of Pumps*	*Total Horsepower of Pumps*
Totals:	16,130	27,950
1 hp or less	4,830	4,530
1 to 2 hp	9,550	17,400
2 to 5 hp	1,360	4,270
Over 5 hp	220	1,750
Hp not known	170	-

Table 5-10 provides additional information on capacities and ages of the estimated 10,720 outdoor swimming pools across the combined service areas that are heated with natural gas. About 65 percent of the gas heating equipment has a capacity rating between 250 and 500 kBtu per hour. About 64 percent of the gas-heated swimming pools are 10 years old or less.

Table 5-10. Distribution of Outdoor Gas-Heated Swimming Pools by Capacity and by Age of Heating Equipment (Combined Service Areas)

Capacity of Pool Heating Equipment	*Number of Pieces of Heating Equipment*
Total number of outdoor pools heated by natural gas	10,720
By capacity	
250 kBtu/hour or less	1,510
250 to 500 kBtu/hour	6,930
Over 500 kBtu/hour	500
KBtu/hour not known	1,780
By age of equipment	
Under 1 year	310
1 to 5 years	2,330
5 to 10 years	4,270
10 to 15 years	1,790
Over 15 years	2,020
Age not known	10

5.4.2 Hot Tubs

Hot tubs are found at about 20 percent of the condominium/homeowner associations. There are hot tubs at about 13 percent of the complexes in PG&E's service area, at about 23 percent of the complexes in SCE/SCG's service area, and at about 31 percent of the complexes in SDG&E's service area.

Table 5-11. Condominium and Planned Developments with Hot Tubs

	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
All Associations				
Number of developments	25,660	8,780	13,330	3,550
Percent with hot tubs	20.5%	12.6%	22.8%	30.7%
Condominium Associations				
Number of developments	17,460	4,540	10,270	2,660
Percent with hot tubs	21.8%	13.0%	23.3%	31.2%
Planned Development Associations				
Number of developments	8,200	4,240	3,070	900
Percent with hot tubs	17.6%	12.3%	21.2%	28.9%

The estimated number of hot tubs across the combined service areas is about 8,380. These hot tubs are generally outdoors, and, as shown in Table 5-12, are heated using natural gas.

Table 5-12. Number of Hot Tubs at Condominium/Homeowner Associations by Location in Complex and Type of Heating

Type of Hot Tub	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
Total number of hot tubs*	8,380	1,610	5,240	1,530
Heated with natural gas	8,090	1,540	5,080	1,480
Heated with other fuel	170	40	140	-
Heating fuel not known	110	40	20	50

*All hot tubs are outdoors.

5.5 WATER HEATING EQUIPMENT FOR COMMON AREAS

The stock of water heating equipment at developments with condominium or homeowner associations is estimated to be 40,760 pieces of equipment for the combined service areas. About 26 percent of the stock is in PG&E's service area, about 62 percent in SCE/SCG's service area, and about 12 percent in SDG&E's service area.

The breakdown of the stock of water heating equipment by type is shown in Table 5-13. About 70 percent of the water heating equipment is fired by natural gas, while about 29 percent of the equipment uses electricity to heat the water.

Table 5-13. Water Heating Equipment for Common Areas by Heating Fuel and Type

Type of Water Heating Equipment	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
All water heaters	40,760	10,400	25,390	4,970
Electric-fired	11,760	580	10,960	230
Natural gas-fired boilers	6,080	650	4,390	1,040
Natural gas-fired tanks	22,520	8,820	9,990	3,710
Other water heating fuel	400	350	40	-

The type of equipment used most often to provide hot water to common areas of developments with condominium or homeowners associations is a natural-gas water heater with a tank. Such equipment accounts for about 55 percent of the installed stock of water heating equipment across the combined service areas. Electric-fired water heaters account for about 29 percent of the installed stock.

Information pertaining to the characteristics of water heaters with tanks is summarized here. (Similar information on other types of water heating equipment is provided in Appendix C.)

- Table 5-14 shows the distribution of natural gas and electric water heaters with tanks according to the size of the tank. About 44 percent of the natural gas water heaters with tanks have tanks of 80 gallons or less.
- Table 5-15 shows the distribution of natural gas water heaters with tanks when they are classified according to input heating capacity (measured in thousand Btu per hour). About 82 percent of the natural gas water heaters have input heating capacities of 150 kBtu per hour or less.

Table 5-14. Distribution of Natural Gas Water Heaters by Size of Tank

Size of Tank (Gallons)	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
Natural Gas Water Heaters with Tanks				
Total number, natural gas water heaters with tanks	22,520	8,820	9,990	3,710
40 gallons or less	4,020	1,170	2,150	700
40 to 80 gallons	5,860	2,740	1,930	1,190
Over 80 gallons	12,450	4,900	5,910	1,630
Size not known	190	-	-	190
Electric Water Heaters with Tanks				
Total number, electric water heaters with tanks	11,760	580	10,960	230
40 gallons or less	10,220	190	9,810	220
40 to 80 gallons	1,540	380	1,150	10

Table 5-15. Distribution of Natural Gas Water Heaters with Tanks by Input Heating Capacity

Input Heating Capacity	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
Total number, natural gas water heaters with tanks	22,520	8,820	9,990	3,710
75 kBtu/hour or less	8,370	3,250	3,790	1,340
75 to 150 kBtu/hour	10,030	4,250	4,500	1,290
Over 150 kBtu/hour	3,360	1,110	1,390	860
Capacity not known	760	210	320	220

Table 5-16 shows the age distribution of natural gas and electric water heaters with tanks. Across the combined service areas, about a third of the gas water heaters with tanks are 5 or less years old. About 45 percent of the electric water heaters are 5 or less years old.

Table 5-17 shows the distribution of natural gas water heaters with tanks according to the technical efficiency of the water heaters. As explained in Appendix A, the technical efficiencies were assigned by matching (where possible) against directories produced by the California Energy Commission.

Table 5-16. Age Distribution of Natural Gas and Electric Water Heaters with Tanks

Age of Equipment	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
Natural Gas Water Heaters with Tanks				
Total number, natural gas water heaters with tanks	22,520	8,820	9,990	3,710
Under 1 year	680	430	250	-
1 to 5 years	6,840	3,430	1,260	2,150
5 to 10 years	6,680	2,500	3,450	740
10 to 15 years	5,020	360	3,860	800
Over 15 years	3,290	2,100	1,170	10
Electric Water Heaters with Tanks				
Total number, electric water heaters with tanks	11,760	580	10,960	230
Under 1 year	120	80	40	-
1 to 5 years	5,230	80	5,150	-
5 to 10 years	5,740	40	5,490	220
10 to 15 years	80	70	-	10
Over 15 years	600	310	280	-

Table 5-17. Distribution of Natural Gas Water Heaters by Thermal Efficiency of Equipment

Thermal Efficiency of Water Heaters	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
Total number, natural gas water heaters with tanks	22,520	8,820	9,990	3,710
Under 0.75	630	630	-	-
0.75	20	20	-	-
0.76	9,220	1,540	5,650	2,030
0.77	2,390	1,720	560	110
0.78	120	20	90	10
0.79	180	90	40	50
0.80	4,930	1,890	2,630	410
0.81	690	-	530	160
0.82	1,360	980	-	380
0.83	-	-	-	-
0.84	160	-	-	160
Efficiency not known	2,810	1,920	490	410

5.6 HEATING AND COOLING EQUIPMENT FOR COMMON AREAS

Across the combined service areas, about 20 percent of the developments with condominium/homeowner associations have some type of package unit heating or cooling equipment. The percentage with package heating or cooling equipment differs among service areas, with package equipment being installed at 27 percent of the complexes in PG&E's service area, at 18 percent of the complexes in SCE/SCG's service area, and at 8 percent of the complexes in SDG&E's service area.

Table 5-18 shows the number of pieces of installed package HVAC equipment for different system configurations (e.g., heating and cooling, cooling only, heating only) and different types of heating or cooling equipment. Table 5-19 shows the distribution of DX units, heat pumps, gas furnaces, and room air conditioners by efficiency. Tables showing the distribution of DX units, heat pumps, gas furnaces, and room air conditioners by size and by age are provided in Appendix C.

Table 5-18. Installed Package HVAC Equipment by System Configuration

System Configuration	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
	Heating and Cooling			
Heat pumps	5,110	260	4,830	10
DX cooling, electric heat	240	130	110	0
DX cooling, gas furnace	3,140	1,650	1,270	-
Room AC, electric heat	240	-	240	-
Wall/floor Heat pumps	800	-	640	-
	Cooling Only			
Evaporative Coolers	70	-	70	-
DX cooling	760	220	530	20
Packaged Terminal AC	20	20	-	-
Room AC	230	-	40	-
	Heating Only			
Central gas furnace	780	660	100	10
Package unit gas furnace	480	260	160	60
Wall/floor electric heater, natural distribution	540	360	180	-
Wall/floor gas furnace, natural distribution	60	-	60	-

Table 5-19. Distributions by Efficiency for Major Types of Installed Package HVAC Equipment

Equipment Energy Efficiency Classification	*Combined Service Areas*	*Individual Utility Service Areas*		
		PG&E	*SCE/SCG*	*SDG&E*
	DX Cooling Units			
All DX Cooling Units:	4,150	2,000	1,910	240
SEER 8 or less	270	160	110	-
SEER 8 to 9	520	40	470	10
SEER 9 to 10	2,340	1,270	890	170
SEER 10 to 11	580	270	280	40
SEER 11 to 12	260	170	70	20
SEER Over 12	80	40	40	-
SEER not known	100	60	40	-
	Heat Pumps			
All Heat Pump Units:	5,900	420	5,470	10
SEER 8 or less	170	170	-	-
SEER 8 to 9	100	100	-	-
SEER 9 to 10	1,330	150	1,170	10
SEER 10 to 11	20	-	20	-
SEER 11 to 12	4,280	-	4,280	-
	Room Air Conditioners			
All Room AC Units:	470	160	280	30
SEER 8 or less	110	110	-	-
SEER 8 to 9	300	20	280	-
SEER 9 to 10	60	40	-	30
	Gas Furnaces			
All gas furnace units:	4,460	2,570	1,600	290
AFUE .79 or less	1,010	610	300	110
AFUE .80 to .82	2,540	1,580	790	170
AFUE Over .82	910	380	510	10

5.7 MISCELLANEOUS EQUIPMENT IN COMMON AREAS

Various types of miscellaneous and kitchen equipment may also be used in common areas of condominium/homeowner associations. The percentage of complexes using different types of equipment is shown in Table 5-20. Estimates of the number of pieces of each type of equipment are provided in Appendix C.

Table 5-20. Percentage of Developments with Condominium/Homeowner Associations with Specified Types of Miscellaneous and Kitchen Equipment in Common Areas

Type of Equipment	Combined Service Areas	Individual Utility Service Areas		
		PG&E	SCE/SCG	SDG&E
All HOAs	25,660	8,780	13,330	3,550
Fax machines	9%	5%	11%	17%
Copiers	8%	4%	8%	17%
Personal computers	9%	6%	11%	12%
Printers	9%	5%	10%	12%
Water coolers	5%	2%	6%	6%
Soda machines	2%	1%	2%	2%
Coffee makers	4%	0%	6%	4%
Microwaves	1%	0%	0%	4%
Vending machines	0%	0%	0%	0%
Refrigerators	6%	2%	6%	17%
Audio equipment	2%	2%	1%	6%
Television	5%	7%	3%	8%
Ceiling/portable fans	6%	9%	5%	4%
Portable heaters	1%	2%	0%	1%

6. COMMON AREA ENERGY EFFICIENCY IMPROVEMENTS

This chapter discusses the types of energy efficiency improvements that condominium/homeowner associations have made in their common areas, the year improvements were made, reasons for making improvements, the role of energy efficiency programs, and future plans for efficiency improvements.

6.1 TYPES OF IMPROVEMENTS MADE

Homeowner association operators were asked about six categories of energy efficiency measures that they may have been made at their developments. These measures included:

- Lighting in internal hallways, rooms or corridors;
- Outdoor lighting and lighting in parking areas;
- Heating or cooling equipment for common area rooms;
- Central boiler for water heating;
- Swimming pool, jacuzzi or spa; and
- Laundry equipment for residents' use.

Table 6-1 reports on the percentages of HOAs that have had energy efficiency improvements made to selected systems. The energy efficiency improvements most commonly identified were improvements to outdoor lighting (40 percent of the developments) and to indoor lighting (19 percent). Energy efficiency improvements to swimming pools or jacuzzis, common area boilers, laundry equipment, and heating and cooling equipment were reported for 13 percent or fewer of the developments. Apartment operators also identified lighting as the most common improvement, but the percentage of apartment operators identifying lighting improvements was much higher than for HOAs.

Table 6-1. Percentage of Developments with Condominium/ Homeowner Associations That Have Had Energy Efficiency Improvements to Selected Systems

Efficiency Measures Taken	*Percent of developments*
Outdoor lighting and lighting in parking areas	40%
Lighting in internal hallways, rooms or corridors	19%
Swimming pool, jacuzzi or spa	13%
Central boiler for water heating	7%
Laundry equipment for residents' use	7%
Heating or cooling equipment for common area rooms	3%

6.2 YEAR IMPROVEMENTS WERE MADE

As was the case with apartment operators, energy efficiency improvements made by HOAs have mostly been completed in recent years. Table 6-2 shows the median year improvements were made (i.e., the year that 50 percent or more of the complexes reported that the improvements were made). More than half the sites that reported indoor lighting improvements reported them being done since 1997. At least half of the sites reporting efficiency improvements to outdoor lighting, swimming pools or jacuzzis, and laundry equipment report those improvements being made since 1998, while at least half of the sites reporting efficiency improvements to boilers and heating and cooling equipment report those improvements being made since 1999.

As with the apartment operators, we are struck by the fact that such a high percentage of efficiency improvements have been made in recent years. As we suggested in the volume on apartment complexes, some of this may be due to respondents remembering or having experience with the more recent improvements and being relatively recent in their jobs. Some of it may be in response to program efforts in recent years, although it will be noted below that survey respondents indicated that the role of energy efficiency programs has been relatively limited.

Table 6-2. Year Efficiency Measures Were Installed

Efficiency measures taken	*Earliest year changes reported*	*Median year completed*
Outdoor lighting and lighting in parking areas	1984	1998
Lighting in internal hallways, rooms or corridors	1984	1997
Swimming pool, jacuzzi or spa	1981	1998
Central boiler for water heating	1990	1999
Laundry equipment for residents' use	1995	1998
Heating or cooling equipment for common area rooms	1995	1999

We did examine the age of HOA developments in relation to whether respondents reported having taken energy efficiency measures. We hypothesized that developments that were built more recently would be less likely to have installed measures than developments built in earlier years. Table 6-3 shows that for the most part, this hypothesis is correct. For five of the six categories of efficiency measures, the percentage of developments in which measures were installed is lowest in the 1990s. However, a fair amount of outdoor lighting has been installed in developments built in the 1990s. Also the installation of efficient laundry equipment is high in the 1990s. Efficient retrofit of swimming pools and boilers is quite low for pre-1970s developments. This may reflect the absence of those items for developments of that era.

*Table 6-3. Measures Installed by Year Development Was Built**

Efficiency measures taken	*Percent of developments with measure by year built*			
	Pre-1970	*1970s*	*1980s*	*1990s*
Outdoor lighting and lighting in parking areas	39%	50%	38%	30%
Lighting in internal hallways, rooms or corridors	39%	22%	16%	11%
Swimming pool, jacuzzi or spa	8%	16%	14%	5%
Central boiler for water heating	2%	15%	5%	1%
Laundry equipment for residents' use	0%	17%	1%	10%
Heating or cooling equipment for common area rooms	14%	6%	1%	0%

*Complexes can install multiple measures so that the percentages do not add to 100.

6.3 REASONS FOR IMPROVEMENT

If respondents indicated that an efficiency improvement for a category had been made, they were asked to respond to eight pre-established reasons as to why they had adopted efficiency changes and were given the opportunity to provide additional reasons that were not on the list. The eight motivations were equipment failure, poorly working equipment, aging equipment, the need for safety improvements, the need to make the complex more marketable, improving energy efficiency, reducing operating costs, and meeting reserve study requirements.

As shown in Table 6-4, respondents cited improving energy efficiency as the most important reason for making changes for indoor and outdoor lighting. Reducing operating costs was cited as the most important reason for making changes to swimming pools or jacuzzis and heating and cooling equipment. Aging equipment was cited as the most important reason for laundry equipment and central boiler changes.

With apartment operators, there was a pattern in which high percentages of those operators cited energy efficiency as the most important reason, with about half that number citing energy cost to the apartment complex. By contrast, HOA respondents cited the cost of energy more frequently than energy efficiency. The exceptions to this pattern are the reason for changing indoor and outdoor lighting which is similar to the pattern of apartment owners. The overall pattern suggests that HOA respondents are more sensitive to energy costs. Interestingly, meeting reserve study requirements was cited as a motivating factor for making changes to heating and cooling equipment, swimming pools or jacuzzis, and laundry equipment but not for the other efficiency measures. The reserve study is not a motivation to make efficiency changes.

Table 6-4. Reasons for Installing Measures

Efficiency measures	*Percent of complexes citing reason for installing measure*							
	Equipment failure	*Poorly working equipment*	*Aging equipment*	*Improve safety*	*Make complex more marketable*	*Improve energy efficiency*	*Reduce operating cost for HOA*	*Meet reserve study requirements*
Outdoor lighting and lighting in parking areas	17%	10%	8%	12%	7%	86%	59%	0%
Lighting in internal hallways, rooms or corridors	18%	8%	7%	8%	5%	84%	41%	0%
Swimming pool, jacuzzi or spa	11%	11%	25%	8%	12%	74%	78%	12%
Central boiler for water heating	5%	4%	59%	0%	0%	17%	44%	0%
Laundry equipment for residents' use	0	2	71	0	2	37	44	9
Heating or cooling equipment for common area rooms	0%	0%	50%	34%	34%	84%	92%	42%

6.4 ROLE OF ENERGY EFFICIENCY PROGRAMS

Common area equipment selection activities of developments with condominium/homeowner associations have been largely untouched by utility sponsored energy efficiency programs. An estimated 89 percent of the associations indicated that they have not participated in a California utility sponsored energy efficiency program.

In the telephone survey the decision makers for the 11 percent of the homeowners' association market that has participated in prior utility energy efficiency programs were asked in an open-ended question to identify the programs. Table 6-5 shows the percentages that participated in different types of programs. The highest percentage (58 percent) had participated in lighting programs. The small percentage of HOAs who have participated in energy efficiency programs is similar to the small percentage for apartment operators. The programs in which HOAs have participated have influenced a very narrow set of technologies. This suggests that there is potentially a large untouched market in the multifamily sector assuming that there are technical opportunities that can be addressed cost effectively.

Table 6-5. Type of California Utility-Sponsored Energy Efficiency Program Participated In

Type of program	*Percent of complexes that have participated in utility programs*
Lighting	58%
PG&E Program	30%
Solar program	27%
SMUD	23%
Water district program	6%
CAN	2%
Gas program	2%
Utility Cost Management	2%
Audit Program	2%
SCE Program	1%
Dryer rebate program	1%
Refrigerator program	1%
Condenser SDGE	0%
Don’t know	4%

7. MARKET BARRIERS TO PURCHASING ENERGY EFFICIENT EQUIPMENT FOR COMMON AREAS

This chapter identifies and analyzes barriers that might discourage condominium/homeowner associations from purchasing energy efficiency equipment. For example, associations may not know about efficient equipment options. They may perceive that efficient equipment may come with a cost premium. They may not have capital or they may perceive that efficient equipment is less reliable than standard equipment. These perceptions, beliefs and experiences represent potential roadblocks to transforming California's market for energy efficient equipment in condominium/homeowner associations.

7.1 ANALYSIS OF BARRIERS

We asked the representatives of the HOAs to rate six barriers that might prevent them from specifying energy efficient equipment. As shown in Table 7-1, the most significant barrier to choosing energy efficiency equipment is reliability, which had an average importance score of 8.1 on a 10-point scale where 10 is very important. There was a substantial drop in the average between this and the next two barriers, the higher cost of energy efficient equipment (average 6.5) and low or non-existent payback of energy efficient equipment (average 6.2). Capital, knowledge of options, and experience with equipment have average ratings close to five suggesting that they are neither important or unimportant. What stands out in this table is the importance of reliability and to a certain extent perceptions about the cost of equipment and payback. Once again the reliability issue is in the forefront suggesting the need for market transformation programs to address the issue vigorously.

Table 7-1. Barriers to Purchasing Energy Efficient Equipment for HOAs

Barrier	*Mean rating (1-10 scale)*	*Percent of respondents rating the barrier as very important*
Reliability concerns	8.1	45%
Higher cost of energy efficient equipment	6.5	15%
Low or non-existent payback	6.2	17%
Lack capital	5.6	16%
Lack knowledge of energy efficient options	5.4	12%
Lack experience with energy efficient equipment	4.8	14%

It is interesting to look at the average scores of these market barriers by whether homeowner associations are self-operated or operated by contract managers. These comparisons are reported in Table 7-2. The average scores for self-managed HOAs are nearly the same or lower than those of the contract managed HOA in every case. The average score for reliability is very much lower for the self-managed HOAs when compared to HOA developments that are contract managed. We suspect this means that the self-managed HOAs do not have great concern about these issues. The major barrier may be the amount of time it takes to make the decision. Increasing efficiency may be a hard sell if the amount of decision time is increased.

Table 7-2. Barriers to Purchasing Energy Efficient Equipment For HOAs by Management Style (Mean Ratings on 1-10 Scale)

Barrier	*HOA Self-managed*	*Property management company manages*
Reliability concerns	7.1	8.6
Higher cost of energy efficient equipment	6.5	6.4
Low or non-existent payback	6.0	6.3
Lack capital	5.4	5.7
Lack knowledge of energy efficient options	5.4	5.4
Lack experience with energy efficient equipment	4.4	5.0

7.2 PLANS FOR ENERGY EFFICIENCY IMPROVEMENTS

When asked about their improvement plans, representatives for 27 percent of HOAs have plans to install energy efficient equipment in the common areas of their facilities within the next three years.

The HOAs that have plans are considering a variety of technologies, as shown in Table 7-3. The most frequently anticipated energy efficiency technologies are CFL installations (55 percent) and planning outdoor lighting installations (49 percent). High efficiency clothes washers (26 percent) also represent a sizable share of the planned energy efficient technologies. Plans for improving pool-related equipment are prevalent, with 19 percent of developments considering solar heating and 15 percent considering heat recovery systems.

Table 7-3. Types of Energy Efficient Equipment Planned for Installation

Type of energy efficient technology	*Percent of developments with plans*
Compact fluorescent lamps (CFLs)	55%
High efficiency lighting in outdoor areas	49%
High efficiency clothes washers	26%
Solar heated or solar assisted pool heaters	19%
Heat recovery units for pool/spa heating	15%
High efficiency air conditioners	12%
High efficiency furnaces	10%
High efficiency central boilers	8%
Refrigerators	6%
Pool heaters	3%
Pool lighting	2%
Roofs	2%
Spa heater and filter pump	2%
Water regulator	2%
Dryers	1%
Water heater replacement	1%

7.3 PLANS FOR GENERAL IMPROVEMENTS

The number of HOAs with plans for general improvements contrast sharply with those planning efficiency improvements. As shown in Table 7-4, only 11 percent of the developments with HOAs are planning to make general changes in the next three years. The majority of these changes deal with the renovation and replacement of obsolete features at the developments. With the exception of complexes built prior to 1970, older complexes are more likely to have plans to make changes than newer complexes.

Table 7-4. Planned Changes to Development in Next Three Years: Overall and by Year Built

	Percent of developments planning changes		
	Renovate or replace obsolete features	*Work to change tenant population*	*No changes planned or Not sure*
Overall	9%	2%	89%
Pre-1970	0%	3%	97%
1970s	14%	6%	81%
1980s	9%	1%	91%
1990s	6%	0%	94%

8. SUMMARY AND CONCLUSIONS

In this volume we have presented and analyzed information pertaining to condominium/homeowner associations in California and the energy-using equipment for common areas of those complexes. Major conclusions are brought together in summary form in this chapter.

In this report we have examined the characteristics of properties managed by homeowners' associations, how homeowners' associations make decisions, the degree to which homeowners' associations have adopted energy efficiency equipment in common areas, and the potential for their adopting energy efficient equipment in common areas in the future.

About 40 percent of homeowners' associations represent owners of condominiums while about a quarter of the associations represent dwellings that are mostly townhouses or single family attached units. The modal number of units in a HOA complex is about 100 units. About a quarter of complexes have 250 or more units. Most of the complexes were built in the 1970s and 1980s. The preponderance of units in California complexes (55 percent) have two bedrooms. The average value of the lowest priced units in California is about $200,000 and the average of the highest priced units is around $490,000.

Homeowners' associations have officers and a board of directors. About 80 percent of the homeowners' associations have no permanent staff. It is the largest complexes that tend to have staff and they average 2.6 persons per complex. The most likely staff person is a maintenance person, followed by a facility manager and then a maintenance supervisor.

About 60 percent of HOA properties are managed by property management firms while the remainder are self-managed. Smaller complexes with more expensive units are much more likely to be self-managed.

The property management firms that manage HOAs manage an average of 35 properties serving an average of 2,991 units. The median number of properties that are managed is 20 and the median number of units managed is 1,500. HOAs that self-manage are much more likely to have on-site maintenance staff than HOAs that are managed by a company. The latter may use roving staff or contract for required maintenance.

The boards of directors were overwhelmingly identified as the key decision makers with respect to common area equipment decisions. Thus, if energy efficiency organizations wish to influence HOAs they must reach these directors. The majority of boards meet on a monthly basis. Boards of complexes with management companies are more likely to meet monthly than boards of self-managed HOAs. Also, the boards of large complexes

are more likely to meet monthly. Larger HOA complexes can be reached through management companies and there are likely to be monthly opportunities to contact and work with these boards. The boards of smaller self-managed HOAs will have to be contacted through officers which may prove difficult and opportunities to reach them when they are meeting are fewer.

The important implication of these findings is that market transformation organizations can reach many HOA organizations through management companies. However, the management companies are not the decision makers although they are in a position to influence decisions. Thus, the messages can be sent through management company channels, but the messages must be designed to pass the gatekeepers and they must have content that is tailored to the needs, understanding, and interest of boards of directors.

California law requires that HOAs complete a reserve study of common area equipment and needs every three years. The conduct of these reserve studies potentially represents a significant opportunity to influence decision making about equipment. Market transformation programmers may want to explore how they might do this. One way to do this might be to provide tools that focus on efficiency and the cost of operations. These studies are usually performed by consultants or management companies. The data that we have suggest that reserve studies are not presently influencing decision making about efficient equipment.

As was the case with the apartment operators, reliability was rated most important in terms of making equipment selections. Energy efficiency, ease of maintenance and energy costs of the equipment when the association is responsible for paying for the energy, are also important.

Using factor analysis, we grouped criteria to reduce the overall number of important factors to three. We found a pragmatic factor, which had to do with just getting equipment into place, a energy cost and efficiency factor, and an ease of maintenance and reliability factor. The pragmatic factor explained about 26 percent of the variance in the decision space, the energy cost and efficiency factor about 23 percent, and ease of maintenance and reliability about 15 percent. We found that HOAs using property management companies were more attuned to energy efficiency and cost factors and ease of maintenance and reliability than self-managed HOAs. In other words, HOAs with property management firms are probably more receptive to energy efficiency messages. We also found that smaller HOAs are likely to use the more pragmatic criteria, which suggests that energy efficiency information needs to be packaged to meet their needs.

We also found that many HOAs have taken energy efficiency actions. About 40 percent have done lighting projects in outdoor areas such as parking areas. About 20 percent have done something with interior lighting. Smaller percentages have done things with swimming pools, boilers, laundry, and other equipment. Unlike apartment operators who

reported taking actions for energy efficiency and only half as often for reasons of energy costs, we found that HOAs reported that they frequently took these actions to improve energy efficiency but they also reported that they took these actions to reduce costs. We cannot help but wonder if this difference is in the greater direct interest of the HOA decision makers.

The number of HOAs that had participated in energy efficiency programs is very similar to the percent of apartment operators that reported that they had participated. Utility programs are not necessarily geared to the multifamily sector and the utility programs have clearly not caught the attention or interest of HOA decision makers. We also found that ESCOs have not really addressed the HOA market although nearly half of the respondents said that they would be interested in receiving proposals.

When we asked respondents about barriers to selecting energy efficiency equipment, reliability was cited as the most important barrier. Reliability was much more important for HOAs managed by property management companies than for self managed HOAs. The differences in importance of other barriers when taking management into account were all minor. We should point out that the average importance attached to barriers, many of which were similar to decision criteria, was lower than the average importance attached to the decision criteria. This is consistent with the finding from the apartment operators and once again raised the issue of whether decision-makers really view the world in terms of barriers.

Many HOAs (about 27 percent) anticipate making efficiency improvements in the next three years. At the same time, only 11 percent anticipate making more general changes to the complex. Thus, market transformation program managers should not anticipate that they will have opportunities to promote energy efficiency in relation to other changes within HOA complexes.

Perhaps the most important finding in the study is where HOAs get the information they use in equipment selection. Three-quarters say they get their information from contractors. Utilities play a role only about 10 percent of the time. We suspect that the reliance on contractors is largely a function of the lack of time to search for information and the ready availability of information. HOA decision makers probably have very small amounts of time to deal with information. Thus, they get their information from the most convenient source which is contractors who bid or do their work.

There are at least two important implications of this finding. The first is that for information to be effective with HOAs it must have very low search costs and it must be very easy to use. The second is that program managers might want to target more information to contractors and also design programs that encourage contractors to provide more information and perhaps more options when they deal with HOAs.

We conclude that this is a market that has some technical and market potential that has not been well addressed by existing utility, ESCO, and market transformation programs. It is a market which is best addressed by reaching the key decision makers, the boards of directors, through the channels of the property management firms and contractors who deal with HOAs. Potentially, this market might also be reached through the vehicle of the reserve studies.