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Renovation and Remodeling A Qualitative View

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Executive Summary

E1.1 Introduction

The California Energy Commission is interested in better understanding the commercial building remodeling and renovation market and the policy options that are available to it to improve the efficiency of commercial structures that are being remodeled and renovated. This report concludes the first phase of a larger project. The goal of this report is to provide a broad qualitative understanding of the renovation and remodeling market, and the potential for increasing energy efficiency in this market. To do this requires understanding both the unique characteristics of the nonresidential remodeling and renovation market as well as those characteristics that overlap with other markets so that programs may be designed more effectively.

The basic objectives of this study are to:

- Identify the size of the market
- Understand how players in the market define the market
- Identify the key players¹
- Identify the factors that influence remodeling and renovation
- Assess the extent to which energy issues are considered in remodeling and renovation projects

The report is based on a series of focus group and interviews conducted with architects, engineers, and building owners in California in late September and October 2000, and analysis of secondary data, principally, F. W. Dodge data. Focus groups are an exploratory method that allows one to understand what is happening in an area of interest. The results of the study are best viewed as a set of hypotheses that need to be assessed and confirmed through quantitative methods to be used later in this project.

¹ There is a variety of terminology used to name players in the commercial buildings market. Generally the term *developer* refers to firms whose primary business is to develop land, build buildings, and/or buy and renovate existing buildings. The term *commercial real estate firm* is typically used to describe firms that own buildings for the purpose of leasing space to others. Commercial real estate firms are different than *real estate agencies* whose job it is to match sellers and buyers of commercial buildings or lessors and lessees with each other. There are *property management firms* whose primary business is to handle the day-to-day business of running a commercial property for an owner. There are *maintenance firms* who maintain and manage the physical aspects of buildings for owners on a day-to-day basis. The standalone term *owner* is generally reserved for those who hold property for their own use.

Many firms engage in more than one of these activities. A large commercial real estate firm may secure the largest share of its revenue from owning and leasing space but it may also develop and sell property, manage commercial properties for itself and/or others, and engage in real estate sales and leasing activities. The revenues from the other activities may be almost as large as the revenues from owning and leasing space. Likewise a development firm may gain the largest share of its revenues from developing or redeveloping property, but it may also own, lease, and manage property. Put differently, the developer function can be done by a commercial real estate firm, a developer, or an owner.

This report is primarily about developers, commercial real estate firms, and owners. It is not about property management, property maintenance and real estate firms unless those firms are engaged in developing or owning and upgrading property.

E1.2 The basic findings

Using the F. W. Dodge data to assess the size of the market, we found that:

- There were about 25,000 commercial building projects initiated in California in 1997 and 1998 or about 12,500 projects per year.
- Just under half (47 percent) of the projects are renovation and alteration projects. Forty-four percent are new construction projects. Additions represent four percent of the total. The remainder of the projects had mixed classifications.
- Considering the top 22 owners with the most projects, we found that chain stores, commercial property developers (office space), grocery stores, and department stores were the most frequent types of commercial spaces that were renovated.

Among professionals in the field, there is no consensus on the terminology used to describe renovation and remodeling projects. Building professionals tell us that they typically apply whatever term the client uses to describe a project. Building professionals such as architects, engineers and contractors saw few differences between what they do in renovation and remodeling projects and new construction. On the other hand, developers and commercial real estate firms indicate that developer/commercial real estate firms or divisions of commercial real estate firms that do development tend to specialize in market niches that involve either remodeling and renovation or new construction. Furthermore, developers can identify firms by their specialties. Thus, developer/owners potentially represent the best target for addressing remodeling and renovation issues.

The most significant opportunities to improve energy efficiency in buildings undergoing renovation are:

- Redesigning, configuring and installing ducting and piping to improve the efficiency of the HVAC system and the comfort of building occupants
- Introducing advanced controls to better manage control of the HVAC system and to enhance user comfort
- Introducing advanced lighting and lighting controls to provide lighting that is more comfortable and efficient
- Placing insulation under roofing materials and coating the roof with high albedo materials
- Affixing insulation to walls and ceilings
- Applying film to windows

There are six basic segments in the renovation and remodeling market:

- developers who *buy, renovate, and sell* who specialize in adding value to a building in order to turn a profit when they sell. These developers, and their active investor partners, choose improvements that enhance the value of the building in the eyes of prospective buyers or that will payback with a profit within the timeframe in which they hold the building, 1 – 3 years. Their goal is to add perceived value to the building in order to maximize the sales price of the building relative to the purchase price.

- developers/commercial owners who *buy, renovate, and hold* buildings and recoup their investments through lease payments. These developer/owners are looking for improvements that will enhance lease rates in the eyes of prospective lessees. They may make investments that have paybacks of 4 – 5 years. These developer/owners may incorporate efficiency improvements if they can capture the benefits through higher lease rates or lower operating costs. They may make improvements for reasons other than profit, for example, to burnish their image as good corporate citizens.
- *triple net operators* who lease property, taking responsibility for all aspects of the property, and then release it to others. Their primary goal is to make selected improvements to a building or its management in order to maximize their returns from lessees while minimizing dollars invested in the building. Because they typically lease a building for five years or less the payback period has to be less than the length of the lease.
- *owners* occupying a building for their own use have many of the characteristics of the buy, renovate, and hold segment except that the owner segment is able to capture the benefits of reduced costs associated with energy efficiency measures because they pay the bills. Owners may make longer-term investments for reasons other than energy costs, for example, employee comfort.
- lessees are the key decision makers in the *ground lease* segment. Within the constraints imposed by the lessor about how the ground is to be used, lessees make the decisions about the characteristics of the building and its operation. The ground lease segment may be more responsive to energy efficiency concerns in the early part of what are often 20-year leases than in later years when the ground and the building revert to the landowner.
- the *replacement market* is the universe of existing commercial buildings. Owners typically rely on contractors, specialty or general, with whom they have had experience for recommendations about replacement decisions.² In some instances, property management firms may be involved in these decisions. Replacement decisions are an arena in which specialty contractors may have a great deal of input into decision making.

We will have to await the results of the quantitative survey to further characterize these segments and to assess their size and importance.

The following are key recommendations and findings:

² Throughout this document we use the terms *contractors, specialty contractors, general contractors* and *design/build contractors*. In our parlance, *contractors* and *specialty contractors* are the same and refer to contractors who specialize or are doing work in a particular discipline such as framing; electrical work; mechanical work; and heating, ventilation and cooling. *General contractors* are contractors who have the skills and knowledge to organize and manage other contractors to complete a job requiring a variety of disciplines. Typically, they are hired to oversee construction based on designs provided by architects or engineers. A general contracting firm may have several construction disciplines within its own organization but that is not necessarily the case. Depending on the role they are playing, a contractor may be a specialty contractor on one job and a general contractor on another. A contractor from any discipline can play the role of general contractor. As per their name, *design/build contractors* manage the design as well as the construction of buildings. The main difference between a design/build contractor and a general contractor is how the design component is handled.

- Program planners need to recognize that there are different renovation market segments and that the different segments respond differently to different program initiatives. Initiatives need to be tailored to the segment.
- The segments break down along the lines of ownership and investment strategy. Program planners and implementers should view the market in this way.
- Developers and commercial real estate firms target niches and it is possible to identify firms that are mostly associated with remodeling and renovation. Other building professions such as architects and engineers do not operate in the market on the basis of distinctions between new construction and renovation.
- General contractors and design/build contractors are frequent key players in the market and they should probably be key targets of program planners and implementers.
- In many instances architects and engineers play a consulting role rather than lead roles. They report that the methods and techniques that they use for renovation and remodeling are largely the same as those they use in new construction. It is important to generally target architects and engineers with information about efficient products and designs recognizing that other actors play equal or more important roles in decision-making. Information activities can probably be shared with program planners and implementers doing new construction.
- Larger owners and developers, franchises, and chains have in-house staff that are key decision-makers. Many of these firms also have “house” architects or “house” contractors who lead their efforts. Both of these groups should be targets for program implementers. In some instances this may mean working with firms outside of California.
- The effectiveness of program strategies varies by segment.
 - Standards are appropriate to all segments.
 - Rebates will work with most segments.
 - Some of our focus group participants suggested that more of the resources for the Savings by Design Program, a utility sponsored design assistance program, be focused on remodeling and renovation projects. Design assistance may work best for owners and commercial operators who hold buildings for the longer-term.
 - Energy service contracts that include assistance with efficiency and performance contracts are effective strategies for owners who hold buildings and who are responsible for energy costs assuming the paybacks are of reasonable length.
 - Program strategies that will effectively influence triple net operators and commercial operators who buy, renovate and sell are limited.
- Efforts to make the cost of efficient products and designs, for example, lighting and HVAC products, competitive with less efficient products and designs can reduce the need for rebates and significantly increase the penetration of efficient technologies and products. This is a neglected area that needs serious attention.
- The replacement market tends to be dominated by specialty contractors as opposed to general or design/build contractors. This is the one area in which

contractors have substantial influence. Contractors should be made aware of rebates if they are available. Contractors could benefit from information and training about ways to improve the efficiency of systems when systems are replaced. There may be techniques and technologies that would substantially improve the efficiency of current practice without significantly increasing cost. This area needs to be more thoroughly investigated.

- It is widely believed that many HVAC systems are poorly functioning because buildings have been remodeled without concomitant changes to HVAC systems. This goes beyond issues that are normally considered in building commissioning. There is a need to determine if this is true, to determine the energy effects of poorly functioning systems, and to develop methods and programs designed to address the problems if they are significant.
- In the short run, power shortages may tend to focus building owners' attention on having reliable power and detract from energy efficiency efforts.

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Chapter 1. Introduction and Methods

1.1 Purpose of the Study

Despite the fact that as many as half of the estimated 12,500 commercial construction projects that are completed annually in California are remodeling and renovation projects, the remodeling and renovation market has not been much studied relative to the new construction market. The goal of this project is to identify the unique characteristics of the remodeling and renovation market as well as the characteristics shared with other markets, such as the new construction and replacement markets, to provide a foundation for identifying initiatives and activities that might lead to an improvement in the energy efficiency of the existing building stock.

The purpose of this qualitative study is to gain insights into the structure and functioning of the nonresidential remodeling and renovation market so that the market can be analyzed more rigorously in Phase II of this study. The key activities in Phase I are to examine secondary data sources to obtain a better general understanding of the market and to conduct a series of focus groups and interviews to identify the unique aspects of the remodeling and renovation market, to identify categories of key decision-makers and to determine the criteria they use in decision-making.

1.2 Literature Review

An examination of the literature reveals very few studies that address renovation and remodeling. The several studies that have been done were mostly completed in the late 1980s and the early 1990s. Nearly all of these studies attempted to address the issue of energy efficiency measure life.³ In that context, there was concern that renovation and remodeling activities might result in the removal of energy efficiency measures and perhaps the installation of less efficient measures. Several of these studies describe the

³ Robert Bordner, Mark Siegal and Lisa Skumatz, *The Application of Survival Analysis to Demand-Side Management Evaluation*, International Energy Program Evaluation Conference, Chicago, 1995.
Lisa Skumatz and Curtis Hickman, "Measure Life Study: The Effect of Commercial Building Changes on Energy Using Equipment." *ACEEE Summer Study of Energy Efficiency in Buildings*, Berkeley, California, 1992.
Lisa Skumatz and Curtis Hickman, "ECM and Equipment Lifetimes: Results and Implication of Recent Measure Life Studies." *ACEEE Summer Study of Energy Efficiency in Buildings*, Berkeley, California, 1994.
Lisa Skumatz and Curtis Hickman, "Effective ECM Measure Lifetimes in Commercial Buildings: Calculations and Analysis of Impacts." *ACEEE Summer Study of Energy Efficiency in Buildings*, Berkeley, California, 1994.
Rich Kunkle and C. Johnson, *Building Changes and Conservation Measure Problems*, Bonneville Power Administration, Portland, Oregon, 1991.
R. G. Lucas, et. al., *Characterization of Changes in Commercial Building Structure, Equipment and Occupants*, Bonneville Power Administration, 1990.
Marian McRae, Michael Rufo and D. Baylon, *Service Life of Energy Conservation Measures, Final Report*. Bonneville Power Administration, 1987
Frances Petersen, and Stu Sandler, "Changes to IBP Buildings," *International Energy Program Evaluation Conference Proceedings*, Chicago, 1991.

effects of remodeling and in that sense provide insight into remodeling and renovation activity. The most important findings are as follows:

- In general the tenant turnover rate in commercial buildings is high. Studies showed rates ranging from 10 to 95 percent per year with most rates being well above 10 percent.
- Tenant turnover was found to be highest for small office, small retail, and restaurant sectors.
- Changes to buildings are also high. Studies showed changes sometimes occurred in 50 percent of buildings annually and in some buildings as often as every 1.2 years.
- Permits were most often issued for the office and retail sector remodels.
- The changes can significantly affect energy efficiency measure life. The studies reported that lighting was almost always affected and HVAC systems were frequently affected.
- Field studies that attempted to determine if equipment was in place had a difficult time locating the equipment because of problems with the lack of detailed records and knowledge of occupants who were often different than those who were present when the equipment was installed.

1.3 Methods Used in this Study

The findings in this study are primarily based on the secondary analysis of F. W. Dodge building permit data and an analysis of data collected from a series of focus groups and interviews.

1.3.1 Analysis of the F. W. Dodge Data

In order to develop a general picture of the market, TecMRKT Works analyzed F. W. Dodge permitting data for all commercial building projects that were initiated in 1997 and 1998 in California. These data were used to characterize the renovation and remodeling market and to develop a population from which to draw a sample of focus group participants. As we shall discuss in the next chapter, these data tend to underestimate renovation and remodeling activity. At this preliminary stage of the project, these are the most detailed data that are available for analysis. They are also the most accessible way to identify specific renovation and remodeling projects in the early stages of this project. In the quantitative study, samples of records from permitting offices will be randomly drawn.

The F. W. Dodge data was analyzed using a combination of Access and SPSS. Most of the analysis involved selecting and sorting data and constructing frequency distributions.

1.3.2 Focus Group Procedures

TecMRKT Works conducted five focus groups involving 19 participants and a series of interviews with nine additional persons (see Appendix A for a detailed discussion of the focus group procedures). The purpose of the focus groups was to obtain information about key decision-makers, the decision criteria used by decision-makers and the operation of the remodeling and renovation market.

Based on our preliminary analysis of the literature and an analysis of the F. W. Dodge data, we identified three target groups, architects and engineers; general contractors and contractors; and developers, owners/investors. We grouped the disciplines in this way because we felt that the professions represented within the groups shared common understandings and would be able to participate in the focus group without spending a great deal of time focusing on definitional issues.

The areas where the focus groups were conducted, the target groups by location, the number of focus groups participants, the number of interviews, and the disciplines of the participants and respondents are shown in Table 1.

Table 1 Focus group locations and target groups

Location	Target group for the location	Focus group participants	Interviews
San Diego	Architects and engineers	4 architects	1 owner 1 architect
Irvine	Owners and developers	4 owners	2 owner
Los Angeles	General contractors and contractors	5 contractors	1 contractor
San Francisco	Owners and developers	3 owners	2 architects 1 owner
San Jose	General contractors and contractors	3 contractor	1 owner developer

We also conducted one-to-one interviews with people whom we had contacted during our focus group recruitment efforts who indicated that they would attend but were not available to participate at the time of the focus group. We contacted these people by telephone. We slightly modified the focus group guide (See Appendix B) to be an interview protocol for these interviews. The interviews ranged in length from about 30 minutes to an hour and fifteen minutes depending on the respondent. In order to make the interview more like the focus group, we asked questions and after receiving a response reported focus group comments to respondents and asked for their response in return.

Chapter 2. A Statistical Profile of the California Renovation and Remodeling Market

2.1 Purpose of This Chapter

The purpose of this chapter is to provide an overview of remodeling and renovation activity based on F. W. Dodge data for building projects that were initiated in 1997 and 1998. Although there are caveats about the F. W. Dodge data, these data are useful to get a preliminary understanding of the size and scope of the remodeling and renovation market.⁴ Also, as we shall see in the next sections, there are a substantial number of projects for which we do not have complete data.

Even with the limitations, it is useful at this preliminary stage in the project to analyze the data to get a better understanding of the remodeling and renovation market. The data give us some clues about the size of the renovation and remodeling market, its importance relative to the new construction market, and the relative size of segments within the market. The size of the remodeling and renovation market relative to the new construction market is likely to change in response to economic conditions. In a good economy, the renovation market is likely to be smaller relative to the new construction market.

2.2 Analysis of the Building Data

We obtained F. W. Dodge data on permits for 39,778 commercial construction projects that were initiated in 1997 and 1998 in California. In examining the data, we found that 14,083 of these were swimming pools that were most probably installed at residences. These projects were eliminated from consideration leaving a total of about 25,000 projects for which commercial permits had been filed. Most of these projects are now complete.

The Dodge data identifies projects in terms of four basic classifications: *new construction*, *alteration or renovation*, *addition*, and *interior completion*. *New construction* refers to a new structure or building shell, *alteration and renovation* refer to changes to an existing structure, *addition* represents the expansion of an existing space in either a horizontal or vertical direction, and *completion* refers to construction to finish previously uncompleted spaces.

Table 2 shows how the roughly 25,000 projects fall into the basic classifications and the combinations of classifications used by F. W. Dodge.

⁴ Industry observers have noted that the Dodge data may under report the remodeling and renovation activity. The under reporting of remodeling activity is largely in small to medium building jobs. See Joe Salimondo, "Construction 2000: No Boom, No Bust...Maybe Not Even 'An Ebbing'", *ACEOnline*, January/February 2000. When compared with data collected by the California Construction Industry Research Board (CIRB) data, four years of F. W. Dodge data between 1995 and 1998, reported the total value of alterations and additions to be between 66 and 99 percent of the values reported by CIRB. Donald Dohrman and Taghi Alerza, *Nonresidential Remodeling And Renovation Study*, California Energy Commission, January 2001.

Table 2 1997 Construction projects in the F. W. Dodge Data categorized by whether the project is new construction, alteration or both

Row	Type of construction	Count	Percent of all commercial sector projects	Percent of all projects classified by type of construction
1	Unknown type	10,082	25	-
2	New	6,836	17	44
3	Additions	596	1	4
4	Alterations/Renovations, Additions	550	1	4
5	Alterations/Renovations, Interior Completions	7,311	18	47
6	New, Additions	62	0	0
7	New, Alterations or New, Interior Completions	217	1	1
8	New, Additions, Alterations or New, Additions, Interior Completions	40	0	0
9	Total	25,694	100	100
10	Count of labeled projects (N)		25,694	15,612

Using the list of F. W. Dodge commercial sector projects (25,694), we found that 25 percent of these projects, the largest group of projects, were classified as being of unknown type. Slightly less than 7,000 projects, about 17 percent, were new construction. Row 4 represents alterations done in conjunction with additions, slightly more than 500 projects. Row 5 includes alterations and renovations to existing buildings as well as build-outs to recently constructed structures where some or all of the interior was not completed at the time the shell was constructed, slightly more than 7000 projects. The remaining rows display other groupings. F. W. Dodge provides no further separation of categories.

The last column is the percentages based on the 15,612 cases where the project type is known. For these cases, the largest category (47 percent) is for alterations and renovations or build-outs of a previously completed shell. The next largest category is new construction (44 percent of the classified group). Pure additions account for about four percent of the projects. The remaining categories are for mixed types of projects, for example, alterations and additions, and represent about five percent of the overall total of the classified projects.

We also examined the project types by commercial sector (i.e., office, retail, etc.). The columns of Table 3 show the distribution for four types of projects: all projects, new construction only projects, projects listed in categories 4, 5, 7 and 8 in Table 2 and projects of unknown type. For our purpose, we defined projects in rows 4, 5, 7 or 8 as "renovations." The counts of these projects vary slightly from the first table because of the availability of certain pieces of information.

Table 3 Construction projects by commercial sector

	Percent of all projects	Percent of new construction projects	Percent of renovations	Percent of unknown type
Office	34	17	30	48
Retail	18	20	18	18
Educational	7	9	15	2
Warehouse	6	11	2	5
Leisure	5	7	8	3
Medical	5	4	7	4
Transportation	5	7	3	3
Manufacturing	4	5	4	4
Religious	2	3	2	1
Hotel	2	3	2	1
Municipal	2	2	3	0
Other	8	10	6	10
Total	98	98	98	100
n	27,111	8,223	7,389	11,499

These data show that offices are the most common type of renovation project (30 percent) followed by retail and educational projects. This differs from new construction projects (column 3) where the distribution is flatter and there is a smaller percentage of activity with respect to the construction of new offices and a larger percentage of warehouse projects. The latter makes sense because warehouses are less likely to be remodeled unless their function is being changed. New office and retail projects are about equal, 17 and 20 percent respectively. From a policy standpoint, these data suggest that the focus of renovation and remodeling programs might be directed to the office, retail and education segments.

Table 4 is a frequency distribution showing the number of projects with which each firm in the database was involved. The most striking finding is that the largest number of firms (6,637) is listed for just one project and 83 percent had no more than two projects during the two years covered by the data. There were only 154 firms that were involved in 10 or more renovation projects and most of these firms had between 10 and 20 projects. Having interviewed a sample of firms drawn from the Dodge data, we believe that the data tend to underreport the actual number of projects. However, we do not believe that the general shape of the distribution will change greatly if we have better data.

Table 4 Number and percent of projects initiated by building professionals

Number of projects	Number of building professionals	Percent of projects
1	6,337	68
2	1,391	15
3	583	6
4	242	4
5	182	2
6	131	1
7	82	1
8	65	1
9	47	1
10-52	154	2
Total	9,315	101

There are some differences in the number of projects completed by building profession (Table 5). Eighty percent of owners had one project. In general, unless owners have many buildings, they are probably not likely to be involved in more than one project per year. Engineers are most likely to be involved in multiple projects. Forty-one percent reported two or more projects. In part, we believe this is because there are fewer engineering firms than architects or owners. Thirty-six percent of architectural and general contracting firms were involved in two or more projects. Nine percent or more of these firms are involved in five or more projects. This suggests that a lot of smaller firms

Table 5 Percent of renovation and remodeling projects by type of building professional

Count of projects	Architects Percent	Engineers Percent	Owners Percent	General Contractors Percent
1	64	59	80	64
2	16	18	12	16
3	7	8	4	7
4	4	6	2	4
5	3	3	1	2
6	2	1	1	2
7	1	1	1	1
8	1	1	0	1
9	1	1	0	1
10+	1	2	1	2
Total	100	100	102	100
N	1,985	1,077	3,272	3,158

are doing a few projects and a few big firms are doing many big projects. This also suggests that if one's goal is to identify and target firms, one may want to look at several years of data rather than just one or two years. In any given year, some firms may not show up in the permitting data.

We analyzed the data for just the owners who were doing the most projects to see what kind of firms were most active. There were twenty-two owners that initiated more than 10 projects in 1997 - 1998 (Table 6). When we examined these by type of business, we found that 7 of the 22 most active firms were chain stores, six were commercial property developers, three were grocery chains, three were department stores and the remainder were in other categories. As a group, these 22 firms completed 351 projects. Among the categories, grocery stores are most active on average.

Table 6 Commercial sector and total number of renovation and remodeling projects for the Top 22 owners in 1997 and 1998

Commercial Sector	Count of firms	Total projects	Average number of projects
Chain stores	7	100	14
Commercial property developers	6	110	18
Grocery stores	3	78	26
Department stores	3	40	13
Health facilities	1	12	12
Bank	1	10	10
Oil company	1	11	11

2.3 Major Findings from the Building Data

The following are the main findings from our secondary analysis of the F. W. Dodge data. Keeping in mind that these data probably underestimate activity, we found that:

- There were about 25,000 commercial building projects initiated in California in 1997 and 1998. About 25 percent of these projects were not classified by type of project.
- For the 15,600 projects that were classified, about half were renovation and alteration projects and a slightly smaller percent were new construction. Additions represented four percent of the total. The remainder of the projects had mixed classifications.
- Thirty percent of the remodeling and renovation projects were in the office sector, 18 percent were in the retail sector and 15 percent were in the education sector. These data suggest a slightly different pattern than for the new construction market where activity in the retail and office sector is about the same. The office market appears to be a bit more dynamic in the renovation market than the retail space market. This finding is consistent with the bulk of the literature cited in Chapter 1. How active a sector it is may also depend on the economy.

- Considering the top 22 owners with the most projects, we see that chain stores, commercial property developers, grocery stores, and department stores were the categories with the largest number of projects.

Chapter 3. The Characteristics of Remodeling and Renovation

In this chapter we attempt to characterize how professionals perceive the remodeling and renovation market, the opportunities for improving energy efficient buildings undergoing remodeling and renovation, and the process by which market actors make decisions about what changes to make in buildings.

Usually, when we think of professionals dealing with the remodeling and renovation we think first of architects, engineers and contractors. We usually have a good idea of the roles of these professionals. However, there are other important actors and there is sometimes confusion between their role and what they call themselves. Functionally, the term *developer* refers to firms whose primary business is to develop land, build buildings, and/or buy and renovate existing buildings. The term *commercial real estate firm* is typically used to describe firms that own buildings for the purpose of leasing space to others. Commercial real estate firms are different than *real estate agencies* whose job it is to match sellers and buyers of commercial buildings or lessors and lessees with each other. There are *property management firms* whose primary business is to handle the day-to-day business of running a commercial property for an owner. There are *maintenance firms* who maintain and manage the physical aspects of buildings for owners on a day-to-day basis. The standalone term *owner* generally describes firms that hold property for their own use.

Some confusion arises because firms engage in more than one of these activities and may have names that are not reflective of their primary business activity. A large commercial real estate firm may secure the largest share of its revenue from owning and leasing space but it may also develop and sell property, manage commercial properties for itself and/or others, and engage in real estate sales and leasing activities. It may renovate its own commercial space to keep it current with market demands or it may renovate as a developer would. The revenues from the activities other than leasing may be almost as large as the revenues from owning and leasing space. Likewise a development firm may gain the largest share of its revenues from developing or redeveloping property, but it may also own, lease, and manage property. Put differently, the developer function can be done by a commercial real estate firm, a developer, or an owner.

When we discuss developers, commercial real estate firms, and owners in this report we are primarily using the labels to describe a type of activity although that is not always the case. We should also point out that this report does not deal with property management, property maintenance and real estate firms unless those firms are engaged in developing, owning and upgrading property.

3.1 Terminology Used to Describe Changes to Buildings

One of the objectives of this study is to see if there is common terminology that is used and understood by building professionals to describe remodeling and renovation activities. When talking about remodeling and renovation projects, building professionals often use the same terms but they frequently ascribe different meanings to

them. When communicating with each other they quickly adapt to variations in terminology.

Further, in talking about renovation and remodeling, building professionals ignore or quickly bypass the problem of general terminology, focusing instead on the practical aspects of projects where terminology may be more clear cut and more precisely understood. Architects, engineers, and contractors told us that the terminology they use to describe a specific project is usually the terminology the initiator applies to a project. Thus, nearly identical projects being done by different developers might be referred to as a remodel, renovation, or rehabilitation.

There appear to be some regional and cultural differences in the use of terminology depending on the area of the state and the professional disciplines involved. Terminology was used differently at each of the sessions, which were organized by discipline and separated by distance. Not surprisingly, owners and managers couch their discussion in financial terms. Architects speak in terms of layout, aesthetics, and usability. Engineers view and talk about buildings in terms of electrical and mechanical systems. Because of the small number of disciplines and sites involved, it is not possible to codify the differences either by discipline or by location.

Most practitioners place renovation and remodeling projects into one of two categories, tenant improvements or shell projects. *Tenant improvement* is probably the most universally used and understood term. It refers to a range of activities from relatively minor cosmetic changes to a complete remaking or completion of an interior. Activities associated with tenant improvements are generally understood to exclude changes to building shells.

The term *tenant improvement* is used in relation to construction activities in previously completed structures as well as in relation to new structures where the shell has been completed but the interior of the building is yet to be finished. An example of the latter situation is a building built for speculative purposes or a new structure that may have space left to be occupied. Thus, the term, *tenant improvement*, is inclusive of remodeling and renovation as well as some aspects of completing new construction.

Shell projects involve changes to the exterior walls and/or the roof of a project. They may involve changing or repositioning elements of the shell, such as windows and doors, and adding or removing elements to or from the facade. Tenant improvements are almost always completed in conjunction with shell projects. Conversely, the majority of tenant improvements involve only minor changes to the shell if any at all.

The term *tenant* in *tenant improvement* is used generically and can refer to an owner developing or redeveloping space for the owner's own use or for space being leased to another firm. Owners do not necessarily use the term *tenant improvement* to describe changes to their own space but it is used widely among other building professionals, for example, architects and/or engineers when they refer to an owner occupied space that they are changing. A contractor or an architect may refer to the work being done for an owner for the owner's use as a *tenant improvement*.

Additions are typically viewed as new construction that may include additional components involving tenant improvements in an existing structure and changes to an existing shell.

From an energy program and policy perspective, terms such as remodeling, renovation and rehabilitation are nearly universally recognized within the professional building community but their meaning varies with individuals and firms. Policy makers and researchers can use these terms to evoke a picture of a general set of circumstances or context but the terms are not useful for policy or research purposes without definition or without context that provides definition. The terms simply do not elicit a uniform set of images that relate to a specific set of field conditions. The terminology presented in Table 7 is widely used and has somewhat consistent meanings.

Table 7 Selected terms generally used by building professionals

Type of activity	Activity
Operations and maintenance	Routine cleaning, testing, repair, adjustment and/or replacement of components in lighting, HVAC, roofing, elevator, fire and safety systems.
Replacement	The one-for-one replacement or substitution of equivalent equipment in a major system or major components of a system such as HVAC, chiller, cooling tower, lighting, roofing, elevator, fire and safety systems.
Tenant improvement	Any change to the interior of a building ranging from cosmetic changes and reconfiguration of interior spaces as well as the replacement or reconfiguration of major systems. Applies to existing structures as well as to new buildings where interior space is still being completed.
Shell project	Any project involving alterations in the shell of the building including changes to windows, doors, facades, or structure. Shell projects usually include tenant improvements.
Addition	The completion of additional floors or the construction of additional connected floor space sharing common walls or floors with an existing structure.
New construction	Construction of an entirely new stand-alone structure.

3.2 Remodeling and Renovation as a Specialty

We asked the informants if they were aware of firms that specialize in remodeling and renovation and whether there were interest groups or subgroups within their professional or trade associations that primarily deal with remodeling and renovation. Such firms and groups would be appropriate targets for programs aimed at increasing the energy efficiency of existing buildings when they are renovated. The answers we received were

somewhat different depending on whether the respondents were architects and engineers or developers and representatives of commercial real estate firms.

3.2.1 Architects and Engineers

Architects and engineers said that a very small number of firms within their disciplines tended to mostly specialize in remodeling and renovation. The architects were able to name one or two firms that were known to them that had a reputation for mostly doing remodeling and renovation work. These were firms that had done one or two admired projects and had built their business based on similar projects. However, they were quick to point out that while firms may tend to work mostly in new construction or remodeling, both types of projects are almost always included in their portfolios because of client wishes or other considerations. More importantly, they contend that remodeling and new construction projects are largely the same because they apply the same techniques regardless of the type of project.

Similarly, construction professionals said that some firms do mostly new construction, some firms do a mix, and a few firms do mostly remodels and renovations but they too were quick to point out that most firms do both.

Much of this appears to be a function of how firms got their start, their reputation, and the way referrals operate among customers. The architects point out that even firms that prefer new construction will do a remodel or renovation when asked by a major client.

These preferences are also influenced by the economy. Architects, engineers and contractors who tend to specialize in new construction will take remodeling jobs when new construction activity is at an ebb. Apparently this was particularly true in the early 1990s during the downturn in commercial new construction in California. When the economy is robust, firms with a preference for new construction can bypass renovation and remodeling projects in favor of new construction projects.

We asked if there was any specialized knowledge that might differentiate new construction from remodeling projects. The architects told us that they provided the same services for new construction and remodeling and renovation. One or two of the contractors suggested that there are firms that develop special knowledge allowing them to be more competitive in bidding remodeling jobs. For example, they may develop specialized techniques for dealing with structural issues. Or, because they have had experience with buildings of different eras, they may be able to anticipate problems hidden by more recent renovations to the building. Because of their experience, we were told that these firms are able to submit better bids and anticipate the potential risks that are attendant to remodeling and renovation work.

None of our respondents indicated knowledge of specialized publications or specialized trade or interest groups that focused on remodeling and renovation. The architects did say that some of the mainline architectural journals, for example *Architectural Digest*, devote considerable attention to remodeling and renovation projects. This is not surprising if, as the Dodge data suggests, remodels and renovations may be close to half of all construction activities when there is low to moderate economic growth.

From a programmatic perspective, there does not appear to be any significant level of specialization among architectural, engineering, and contractor firms with respect to new

construction, remodeling and renovation. Effectively, the target audience for a program with a focus on remodeling and renovation is going to be all architectural, engineering and contractor firms.

3.2.2 Developers and Commercial Real Estate Firms

The situation appears to be somewhat different for developers and commercial real estate firms. Owner/developers target niche markets with different investment strategies.

Some developers buy, renovate and sell. Others buy and hold. Still other developers focus on new construction. Yet another developer may specialize in ground lease pad sites. Still another developer may target buildings where they can increase lease rates by improving the management.

For example, a developer may specialize in locating buildings with adjacent land that will allow the developer to add to the building or change the parking ratio thus allowing them to change lease rates. Another owner/developer may target spaces that can be upgraded, permitting the developer to raise lease rates.

From the perspective of this study, the importance of these findings is that there are developers or divisions of commercial real estate firms that focus almost exclusively on upgrading existing buildings. Further, it is possible to identify these firms because developers within the developer community know them. Unlike the architectural, engineering and design communities where there is little perceived separation of activity with respect to remodeling and new construction, the developer/owner community does specialize and a firm's specialties can be identified. **If one wants to target the renovation and remodeling market, the most direct path for directly addressing the market may be through the owner/developer community.** That community and the various market segments within that community are discussed in more detail in Chapter 4.

3.3 Unique Aspects of Remodeling and Renovation

We asked informants to identify unique aspects of remodeling projects either in terms of the approach to the project, the construction methods and techniques that are used, differences in materials used in the construction, or how decision-makers might make decisions, especially with respect to energy efficiency.

Most informants suggested that the opportunities for energy savings in remodels and renovations were limited for a variety of reasons:

- The orientation of the building is fixed limiting the potential for addressing issues such as patterns of light entering the building.
- Shell projects occur far less often than tenant improvement projects. Existing windows, casements, and doors are usually retained, limiting the opportunities to incorporate high-efficiency glass or more energy efficient casements.
- Shell projects seldom incorporate new exterior features such as shading devices.
- Unless a roof is near the end of its lifetime, the roof is unlikely to be changed except to address issues resulting from the removal or addition of equipment on the roof.

- Wherever possible boilers, chillers, other large equipment items, piping, and other items are salvaged if they are in reasonable condition thereby limiting opportunities for introducing new and more efficient equipment. Several informants said that major pieces of equipment less than 8 –10 years old are reused. Older equipment is likely to be replaced.
- Lighting equipment may or may not be changed depending on the vintage of the equipment and its condition. If the remodel is fairly extensive, lighting equipment is likely to be changed, especially if the lighting is of an older and less efficient direct type. Lighting is likely to be changed if the building is undergoing a change in its use, for example, from a warehouse to office space.

There are areas within existing buildings that are being renovated where there are significant opportunities to improve energy efficiency:

- Advanced controls can be introduced to better manage and control the HVAC system and to improve user comfort.
- Ducting and piping can be redesigned, configured and installed to improve the efficiency of the system and the comfort of building occupants.
- Advanced lighting and lighting controls can be introduced to provide lighting that is more comfortable and efficient.
- Insulation can be affixed to walls and ceilings when an interior is gutted.
- Insulation may be placed under roofing materials and the roof can be coated with high albedo materials.
- Film can be applied to windows.

One of the points made by our informants is that many buildings will have a series of modest tenant improvements. In these remodels, walls are often moved but system components such as controls, ducts and returns do not get repositioned. An attempt may be made at rebalancing an HVAC system but often it is not done or not successful. After a remodel it is not unusual to find a switch or light sensing control that is connected to lighting in another room, a thermostatic control that controls an area which has different thermal characteristics than the area in which the control is physically located, and/or areas of a building that have no returns.

Several informants said that such situations often result in high levels of complaints from users. HVAC contractors are well aware of these situations because they frequently get calls about them. These situations arise because qualified contractors may not have been involved in the renovation or the contractor may have been involved but unable to convince the owner to invest the money to reconfigure the systems. Owners may not have accepted advice because of costs or because they did not fully understand the implications of not reconfiguring a system.

The preceding observations suggest that effective programmatic initiatives for renovation and remodeling might focus on issues such as advanced window films, lighting and controls retrofits, and modifications to HVAC systems so that comfort and efficiency are optimized. Information addressing these issues might be placed on a website specifically for owners and contractors doing renovations or made available as publications. Although the specifics of the building science for new construction and remodeling may

be the same, having a specific remodeling and renovation site might help practitioners find information that is most relevant to them.

Additionally, there is probably a need to research the degree to which renovated buildings have HVAC systems that are not optimized for the current layout of the building. An examination of recently renovated buildings might be particularly helpful. An important part of this research would be to assess the issues, to determine how extensive and how costly any fixes might be, to see if additional technology might help, and to assess the interest of owners in making the requisite changes based on what is learned. There may be some evidence from the building commissioning literature that partially addresses these issues.

Depending on the results of the research, it might be useful to consider a service for owners that would help them address comfort issues in their buildings. Comfort is more likely to sell a project than energy efficiency. Because comfort and energy are closely linked and because they need to be optimized with respect to each other, there may be more potential for making buildings efficient by selling comfort rather than energy efficiency.

HVAC trade allies appear to be quite aware of these issues. It is important to work with them to see if research, information resources, technical and sales training can be brought to bear on the issue at the time of a renovation project. Armed with better information or better tools, they may be able to reduce the cost of making needed changes or convince an owner that the changes are important.

Finally, at least a couple of informants pointed out that the CEC may want to pay closer attention to the efficiency of internal connected loads. One of the informants has completed projects creating server farms. He noted that the potential for reducing energy use at server farms by improving the design and management of internal loads far outweighs the potential for reducing energy use through shell or HVAC improvements. Further, he observed that internal loads seem to be increasing in most buildings.

3.4 The Role of Value Engineering in Constraining Energy Efficiency Improvements

Despite the energy efficiency opportunities identified by participants, there is a risk that energy efficiency technologies and designs may not be implemented as a result of a process commonly referred to as *value engineering*. Most projects exceed their budgets and at some point the costs must be reduced to meet budget.

Value engineering is the changes made to projects to reduce costs. The goal is to implement alternative solutions that allow aesthetics and function to be maintained while reducing overall costs. Once budgets are fixed, offsets are often needed to deal with project design changes. Most often the reduction in scope is felt most sharply with respect to mechanical and electrical systems because they are designed and installed near the end of a project and their features may still be in play when cost reductions are needed.

In a situation where an owner/developer is making choices about where to cut costs to meet a construction budget, features that are mandated, such as some of the non-energy

requirements outlined in the next section, and features that contribute to higher lease revenues will remain in the budget while equipment and designs that do not significantly reduce costs or are nice but not mandated will be dropped.

Nearly all of our sources mentioned that controls and energy efficient equipment are a prime target of value engineering because they represent ways to reduce cost without reducing the basic functioning of the building. This has a significant impact on energy efficiency, as one person put it, “energy efficiency gets value engineered out.” In other words, energy efficiency may be in the plans but it becomes a victim of attrition.

3.5 Non-Energy Aspects of Remodeling and Renovation

Non-energy aspects of remodeling can and do indirectly and directly influence remodeling. Some of the informants argued that a significant difference between remodeling and new construction is the presence of constraints.

The participants in our focus groups generally believed that there are more constraints (i.e., physical constraints) in remodeling and renovation than in new construction projects although this view was not universally held. One architect said that he saw this as part of the creative challenge and welcomed it. In his view, remodeling tested his creativity to a greater extent than new construction because the potential options are more constrained by the structure and existing infrastructure. Requirements for parking and the Americans with Disabilities Act tend to impose further constraints and increase the challenge. In this vein, a representative of a permitting agency suggested that the fees for renovation and remodeling are higher than for new construction in his community because of the need for inspectors to visit the site more often and to address unusual issues.

What is clear is that the cost of the mandated constraints has to be dealt within the limitations of the budget. When the costs for these items increase, as they often do, optional items such as energy efficiency and controls are among the first items to be dropped. Thus, there is a strong tendency for constraints to result in a building being less efficient than it might be.

Some of the aforementioned architect’s colleagues and those in other disciplines expressed somewhat less enthusiasm for the creative challenges of existing buildings. Some were not convinced that the challenges of new buildings were that much less. One architect argued that the lack of open sites in built-up areas, the need for parking, ADA requirements, and the presence of nearby buildings that limit sight lines, often created limitations in new construction that operate to determine the location of a building on a site, its orientation, the use of shading devices, and its shape, all of which constrain options with respect to the organization of internal space. In either event, building professionals tend to view these constraints as a challenge that increases the financial risks.

Developers/owners tell us that the presence of fiber optic cable is becoming a must in office spaces. In some instances, developer/owners can enter into arrangements with telecommunication companies who install fiber optic cable in return for access to tenants once the building is renovated. In general, developers/owners place a higher priority on providing advanced communication features than on providing efficient equipment and

controls. The advanced communications technologies allow the owner to obtain higher lease rates. In this competition, efficient equipment and controls almost always lose.

A recent trend in leasing has been the demand for space with character. There has been an interest in what one might call the “loft-look” with open space and unusual architectural elements such as meeting rooms with garage doors. Such things compete for budget dollars and are frequently traded-off against efficient equipment and controls.

A priority for some within the developer/owner community is a building with an aesthetic or quality image. The payback that comes from creating an image is less a matter of the direct dollar return on the investment than the reputation gained from owning a high status building. Having marble in the lobby or a large atrium with a lot of glass, that increases cooling loads in the daytime and lighting costs at night, are examples of items that allow owners to increase lease rates. Building energy use may increase to meet the energy demands created by items installed for purposes of creating an image. Further, energy efficient equipment and controls have to compete against these items for budget dollars. Efficient equipment and controls almost always lose in such a competition.

In some instances tenants have an interest in quality lighting and greater control over the physical environment because of the need to attract and keep employees. Quality lighting is frequently synonymous with efficient lighting. Likewise, some owners want comfortable buildings. An energy efficient and healthy building is almost always a comfortable building. In both of these cases there is a potential synergy between what the owner is attempting to do with a building and potential for energy efficiency.

3.6 Some Conclusions

One of the key points in this chapter is that there is no standard terminology that is used to describe and discuss remodeling and renovation. The situation is probably most aptly summed up by the comment of a focus group participant who said that building professionals determine what to call a project based on the name given to the project by the client.

A second key point is that design and construction professionals see few differences between remodeling and renovation and new construction. The scope of remodeling and renovation projects may be more limited than the scope of new construction but there are often other challenges. Design and construction professionals say that they use the same techniques.

However, owners, developers, commercial real estate firms and others see renovation and remodeling and new construction through the filter of investment strategies. Among these professionals there are differences in how remodeling and renovation is approached and those differences directly affect whether energy efficiency equipment and designs are likely to be installed.

The current energy shortfalls in California and the potential for significant energy price increases may increase interest in energy efficiency. However, there is also a high level of interest in reliable power in at least some segments of the market. In the calculus of decision-making, the costs of power disruption in the form of lost time and productivity will, for many tenants, outweigh the cost of energy efficiency. The authors note that one possible response on the part of building owners and developers may be to focus on local

generation as a feature to secure and retain tenants and this may compete with dollars that might otherwise be spent for energy efficiency.

From a programmatic and policy perspective, energy efficiency must compete more effectively with other decision factors if it is to achieve widespread penetration. Energy efficiency equipment and designs need to be cost competitive with less efficient technologies. Cost competitiveness can be had either by reducing the cost of the equipment and/or good design or by offering incentives that reduce the cost of the equipment and designs. Nearly all of the parties with whom we talked recommended incentive programs. Throughout the interviews, the informants stressed the need to meet budgets and the use of “value engineering” which is cutting scope to meet budget. They viewed rebates as a way to be able to save or add energy efficient features to buildings and stay within budget.

Also, more emphasis is needed on the non-energy aspects of energy efficiency buildings. Well-designed and well-implemented energy efficient buildings result in comfortable, healthy, and productive environments. Some of our respondents noted that comfort is already an important issue for their clients. One of the contractors cited the example of one of his clients, a law firm, that owns its own building and will spare no expense to make sure that the partners and associates are comfortable. Developers, owners, and contractors can sell comfort, health, and productive environments if they can measure it and demonstrate the effect at the bottom line. From a programmatic and policy perspective, more information and research is needed to document the linkages between comfort, health and productivity, and energy efficiency and to help architects, engineers, contractors, developers and owners understand how to sell the comfort, health and productivity.

Chapter 4. Decision-making By Market Segment

In this section we identify and examine six market segments. These segments are based on an analysis of the discussions that took place during the focus groups and the interviews. For the moment, the reader should treat the material in this chapter as a set of hypotheses about the remodeling and renovation market. These “hypotheses” will be will be scrutinized more carefully using data collected during the survey which is a part of the second phase of this project.

Some key factors that differentiate the segments are whether the space is for the owner’s use or for lease by the owner, the degree to which the owner exerts control over the space, and the investment strategy that the owner follows with respect to the space.

4.1 Owner Occupied Properties

Owners who occupy the space they own are a prime target for energy efficiency initiatives. Because owners occupy space for the long-term and because they pay for the energy they use, their bottom line benefits directly from reducing energy costs. Because they expect to occupy the building for a long time, owners may accept paybacks as long as five years, perhaps as much as seven years, especially if there are other factors that influence the decision. The paybacks from energy savings measures will be evaluated against other opportunities to invest money in their business. If the business is operating in an environment where investments yield 20 percent, then paybacks need to be less than five years.

Payback is not the only criterion that owners factor into their decision-making. Owners who occupy their own buildings may have a greater interest in comfort and may use energy efficiency to address that issue. Owners can and often do use buildings to make statements about their firm. For example, an owner may install efficiency measures as a way to burnish the firm’s image as an environmentally conscious corporate citizen.

Depending on the size of the firm, a firm may have building professionals on their staff to manage their properties. When this staff exists, they are the key decision-makers and have an opportunity to influence energy efficiency decisions. When renovation and remodeling is required, owners are likely to go to a trusted general contractor to obtain design/build services or to an architect who may manage the project and other consultants using a more traditional architectural organizational model.⁵ The architects indicated that they are often able to do more with owner occupied buildings.

⁵ Throughout this document we use the terms *contractors*, *specialty contractors*, *general contractors* and *design/build contractors*. In our parlance, *contractors* and *specialty contractors* are the same and refer to contractors who specialize or are doing work in a particular discipline such as framing; electrical work; mechanical work; and heating, ventilation and cooling. *General contractors* are contractors who have the skills and knowledge to organize and manage other contractors to complete a job requiring a variety of disciplines. Typically, they are hired to oversee construction based on designs provided by architects or engineers. A general contracting firm may have several construction disciplines within its own organization but that is not necessarily the case. Depending on the role they are playing, a contractor may be a specialty contractor on one job and a general contractor on another. A contractor from any discipline can play the role of general contractor. As per their name, *design/build contractors* manage the design as

From a programmatic perspective, this segment is a rich target for energy efficiency programs. Because this segment pays for its energy directly, they may see energy as an area where they can reduce costs. Information directed to owners is likely to reach people who make decisions. Owners who use the space they own will weigh investments in energy efficiency against other types of investments they can make. This group will respond to rebates. Also, this group should be responsive to performance contracting initiatives. Performance contracting allows firms to use their own capital for other purposes while reducing their costs through an energy saving mechanism. Owners likely will still apply some investment criteria to judge whether or not to enter into a performance contract.

4.2 The Buy/Renovate/Sell Strategy

For convenience, we call buying, maintaining or changing the use, upgrading, and then selling a building, a buy/renovate/sell strategy. The goal of the developer is to buy a building, upgrade it and perhaps change the type of tenancy, raise the lease rate, and then sell the building at a premium price making money on the difference in the price of the building and of course, whatever returns are gained from leases during the period during which the developer holds the building. A developer following this strategy tries to renovate and sell the building within a period of one, two or perhaps three years. The objective is to get in, increase the capital value of the building and get out. Developers choosing this strategy are likely to:

- focus on upgrades that enhance the lease rate such as changing aesthetics, revamping the space, adding fiber optic cable, perhaps re-lamping to improve the quality of light, and increasing the availability of power.
- avoid improvements that do not add to the lease rate unless it can be shown that the improvements will pay back and show a profit during the period within which the developer is holding the building. For example, if window film has a two-year payback the developer might install film on the windows. If the pay back for window film is longer, then the developer is not likely to do it.
- avoid buildings where replacement of major systems may be necessary unless they believe that they can recoup their investment and make a profit through higher sales prices.
- modify major systems and add controls when they believe that these features will allow them to increase lease rates and cover costs and/or increase the selling price.

The developer organizes investors who provide the capital for the project. According to developers using this strategy, investors can be more or less active with respect to project decision-making. One developer pointed out that he has bi-weekly meetings with his project investors who go over decisions and costs associated with the project. These investors ratify decisions and make choices among alternative uses of funds. Their decisions have to do with how to allocate a fixed amount of resources among the

well as the construction of buildings. The main difference between a design/build contractor and a general contractor is how the design component is handled.

alternatives and that in turn has implications for equipment choices. This is part of the value engineering process described in the preceding chapter.

At the other end of the spectrum, there are investors who play little or no role in the decision-making. One of the roles of the developer is to organize the investor pool for a project. How active the investors are depends on factors including their level of trust of the developer, their level of investment in the project, how that level of investment relates to the investor's overall resources, the resources that the investor has for a project, and the investor's interest in being involved in the project. One of our respondents reported that large insurance companies were quite active in decision making for large projects he managed in downtown San Francisco. Others reported similar experiences.

The developer or the developer's support staff usually plays a key role in formulating the alternatives and are the key decision makers when investors are less involved in decision making. Whichever set of players is involved, the need to generate a high rate of return drives decisions. Things that do not or that are not perceived to generate high returns are targets to be value engineered from the project.

From a program perspective, it is very difficult to promote energy efficiency among developers/owners using this strategy for two reasons.

- Generally, energy efficient technologies are not perceived to have value that will translate to increased lease rates.
- Energy efficient designs and technologies generally do not have payback periods that are less than the period that the developer wishes to hold the building.

A developer using this strategy might install efficient indirect lighting if he is reasonably certain that indirect lighting is a feature that tenants, in the market segments he is trying to attract to the building, know about and for which they are willing to pay. The developer might include sustainable features because a tenant wants the image associated with sustainable features and the tenant is willing to pay for such features in a lease of sufficient length to realize payback. In the absence of some certainty about the return on the investment, the developer will likely do what minimizes cost with little thought given to efficiency.

The implication of this for energy efficiency programs is that it is difficult to increase the use of energy efficient designs and equipment for developers doing buy/renovate/sell projects. Energy efficient designs and technologies can get incorporated if they contribute to improved lease rates. For example, this could happen if the developer is able to sell the comfort that might come with a more efficient building. Energy efficiency may also get incorporated if the payback is within the time frame of the ownership of the developer.

Developers using this strategy do look for and accept incentives and rebates if those incentives and rebates offset or more than offset the cost of energy efficient equipment and designs. Design assistance is unlikely to be of interest to a developer pursuing this strategy unless it can increase lease value and the value of the property. Thus, the basic strategies for encouraging energy efficiency with this type of developer are rebates, competitive costs for energy efficient equipment and designs, and standards and regulations.

4.3 Buy/Renovate/Hold Strategy

The developer who buys, upgrades and holds property operates somewhat differently than the developer just described. There are at least two key differences.

The developer doing buy, renovate, and hold, likely places slightly less emphasis on maximizing short-term lease rates because he or she is in the project for the longer-term. The developer can consider longer, four to five-year, payback periods. Thus, if energy efficient designs and technologies have paybacks within that range, they may be considered by a developer with a buy and hold strategy.

Also, there is the issue of quality space. If the efficient designs and technologies make the space more desirable for long-term rentals or desirable tenants, the developer may implement them as a way to attract tenants who may stay for the long-term.

Several participants mentioned “ego” in discussing building ownership. Long-term holders of buildings may incorporate features into buildings to give a building status. Often these are visible aesthetic touches but they may include efforts to supply comfortable quality space and energy efficiency as part of that package.

What is or is not included in the lease rate also influences the decisions of longer-term holders. If energy services are included and the lease rate is fixed, then there is some incentive for the owner to reduce the cost of the services because the money goes to the owner’s bottom line. The more frequent case is that, utilities, at least electricity, are the responsibility of the lessee. Thus, there is no financial incentive for energy efficiency upgrades for the owner except for what can be recovered in the lease rate.

4.4 Triple Net Lease

Some commercial real estate firms do business using something called a triple net lease. In a triple net lease, the owner receives fixed payment for a fixed period of years, usually five, from the triple net operator. The triple net operator is completely responsible for the physical management of the property including improvements, leasing, paying taxes, maintenance, the utilities if the tenants do not pay them, and other activities. The triple net operator is also able to set lease rates at whatever level the market will bear. The goal of the triple net operator is to invest the optimal amount of money to maximize the difference between costs and the lease rate. Put differently, the firm doing the triple net lease makes a profit based on what it can charge third parties less expenses for renovating the building and the rents and costs of operating the building.

Triple net operators increase lease rates in a number of ways. They are often able to increase lease rates by changing the management of a building, reducing management costs and improving service to tenants. Triple net operators can and often do make physical improvements to the buildings. These changes that are made are changes that will affect high returns based on changing lease rates.

It is clear that the incentives for the triple net operator are to increase lease rates while reducing or keeping costs low. Further, there is no incentive to invest in quality equipment for the long-term because the lease is usually five years or less and the building is owned by others.

From a policy and program perspective, triple net buildings may be the most difficult segment of the market to penetrate with energy efficiency. Energy efficiency is unlikely to directly contribute to being able to increase lease rates and the indirect effects of energy efficiency such as comfort and productivity may be difficult for the triple net operator to sell. Rebates may not even be effective in this segment unless they provide a clear cost advantage over more traditional equipment and design when changes are being made. Standards may be the only way to influence buildings managed by triple net operators.

4.5 Ground Lease Properties

In a ground lease, the owner leases a site (no building) and the lessee enters into a long-term contract that allows the lessee to build, maintain and renovate a building as needed. Large chains and franchises often enter into such arrangements. A chain might take a 20-year ground lease and build a building anticipating that the ownership of the structure would revert to the owner of the ground at the end of 20 years. Such contracts typically spell out procedures for dealing with situations in which the lease does not go to term or there is a desire to extend the lease. The owner of the parcel may set some constraints on the size, style, location and physical appearance of the building in order to maintain continuity with other nearby structures. Beyond that, the lessee has nearly complete control over the building. Lessees can and do modify such buildings with some regularity.

Because lessees “own” the buildings they are able to modify them as they see fit. Large chain/franchise operators typically have in-house architectural design staff and a house architect who develops the image that the chain/franchise operator wants. These architects and property managers contract with a local architect, developer, or a design/build contractor to construct the building. The use of local architects and contractors makes it easier for the franchise or chain to deal with local regulations and customs. We should note that if a franchise or chain is doing a significant amount of business in an area, it will consistently return to the same contractors. When it comes time to renovate, the same group of players is likely to be active in decision-making. Here the key decision-makers are the in-house staff and the image architect.

Because of the long-term nature of the ground lease, the building owner is probably more like owners in general and may be willing to invest in efficient equipment to help reduce costs. Like other types of building owner operators, chains compare the return on investment from energy efficiency improvements with other investment opportunities in the business. A high percentage of these types of properties are fast food or retail operations and owners will consider energy efficiency options that may provide other benefits such as increased sales or productivity.

4.6 Replacement

At some point the owner of a building or a building manager determines that a major component of a system or system needs to be replaced. There can be any number of reasons for this. Perhaps the system has failed; perhaps it is determined that the system is in danger of eminent failure; perhaps the system is becoming difficult to maintain for lack of parts; perhaps system functioning needs to be upgraded; or perhaps the firm has

predetermined when it should replace equipment. It is easy to understand how failure or anticipated failure might drive changes to a system. However, the need to change a system is not necessarily a function of equipment lifetimes as is illustrated by the San Diego law school whose Dean ordered a change to the lighting systems because law students were using laptop computers in the classroom and the existing lighting systems caused glare which prevented their effective use. This exemplifies how difficult it is to separate maintenance and renovation and remodeling.

In the replacement situation, the owner or manager of the building will make arrangements to replace the equipment. The most probable scenario is that the owner or owner's representative will go directly to a specialty contractor, for example an HVAC or roofing contractor, with whom they have a working relationship. Alternatively, an owner or contractor may seek bids although our informants suggest that this happens less often than the more direct contact with contractors. In those rarer cases where there is some uncertainty about with whom a firm should deal, an owner may go to a general contractor or perhaps an engineering firm or architect with whom they have worked for a recommendation or ask them to manage the project for them.

Generally, in replacement situations, the goal is to maintain or increase functionality at an acceptable cost. The owner makes the decision but the contractor has significant input to the decision-making. Typically, the contractor will make a recommendation providing a cost estimate that may include some alternative equipment options and alternative cost estimates. Our informants tell us that their recommendations are the result of an assessment based on their understanding of the customer's needs, their understanding of the customer's business viewpoints, and what they think is most appropriate for the customer's situation.

For example, one of our HVAC contractor informants said that he partly bases his recommendations about equipment efficiency on what he understands about the micro-climate within which the customer's building is located and his judgment about whether higher efficiency equipment will pay for itself within a reasonable period. He also makes judgments about whether a customer can tolerate some variation in comfort levels and is interested in "value" solutions, that is, solutions that get the job done for less cost, or whether clients place a premium on comfort and controllability and are willing to pay for it. The contractor has clients whom he/she knows are sensitive to "green issues" and may recommend equipment and solutions to these customers that have longer paybacks.

In a bidding situation, the contractor has a choice of attempting to be the low bid or the contractor can identify and present alternatives that meet the customer's needs and business viewpoints. The contractor will choose a bid approach depending on how well the contractor knows the customer.

There are several key points about replacement situations. Customers select contractors they know and trust or on the basis of recommendations from people they know and trust. The contractor, either through the bidding process or his/her recommendations in a no bid situation, can influence or strongly influence the solution that the customer will choose as long as the solution is credible to the customer and consistent with the customer's expectation and values. Contractors make judgments about what customers' value, tailor solutions, and then sell to those values in order to get the deal and maintain the

relationship. When cost is the issue the contractor will sell to cost. When the customer's issue is comfort the contractor will sell comfort. The customer plays a significant role in decision-making in either instance. Thus, what gets used and purchased results from the contractor's perceptions of what the customer needs, the strength of the relationship between the customer and the contractor, and what the customer wants.

From a program and policy perspective, it is important to be realistic about what contractors will and will not do. They will sell efficiency when they believe that it is consistent with the customer's needs, with obtaining the job and with maintaining the relationship with the customer. They will not sell it when they are not comfortable with it, know that it will result in not getting the job or cause them to lose a customer. Program planners need to be realistic about this.

In this regard, it might be useful to develop information and tools for contractors to insure that they are knowledgeable and can quickly assess the potential full range of solutions for meeting customers' needs in replacement situations.

Owners may also need information resources. Owners could benefit from information that would allow them to quickly understand what the options and opportunities might be. To be effective, the resource needs to be designed to provide useful and detailed information in a matter of minutes. For planned maintenance, owners might find it useful to have a service that can help them assess their needs and identify replacement options in advance of dealing with contractors.

4.7 Summary and Conclusions

Based on the analysis of the focus groups, six renovation and remodeling segments have been identified. They are the owner occupied segment, a commercial developer segment where the investment strategy is buy/renovate/sell, a commercial real estate segment where the strategy is to buy/renovate/hold, the triple net lease operator segment, the ground lease segment, and the replacement market segment.

The possibility that these segments can be influenced to adopt energy efficiency given the equipment and designs in the market and the paybacks for those equipment and designs varies. The potential to influence owners in owner occupied buildings is quite high. The opportunity to influence commercial developers who buy/renovate/sell is low while the opportunity to influence commercial real estate firms that buy/renovate/hold is low moderate to moderate. It is very difficult to encourage energy efficiency among triple net lease operators. Because ground lease segment is similar to the owner segment in many ways, it is possible to influence this segment to undertake energy efficiency projects when they renovate. The opportunity to encourage efficiency in the replacement market is generally low.

Chapter 5. Program Strategies for Targeting the Renovation and Remodeling Market

Among the many different ways of promoting energy efficiency are rebates, standards, performance contracts, information, and design assistance. The effectiveness of these approaches in encouraging energy efficiency will vary by market segment. This chapter briefly describes these approaches and how effective these approaches might be based on the analysis of the material from the focus groups.

5.1 Rebates

When asked what could be done to increase the number of energy efficient designs and installations, our respondents unanimously said, “rebates.” Most of the respondents had a rebate story or cited examples of rebates that they had received from various California utilities. They clearly felt rebates were the most efficacious way to increase the penetration of efficient designs and products in remodeling and renovation situations. It was also clear that they felt that rebates would work better in some situations than others. For example, it was clear that rebates would probably work well with owners who occupy their own buildings, somewhat less well with developers who were renewing property, and perhaps not at all with triple net lease operators. In those circumstances where rebates can have an impact they can help to reduce the amount of value engineering.

5.2 Standards

There was quite a bit of discussion about Title 24. Most, if not all of the respondents, believe that Title 24 is helping to increase the efficiency of buildings. Respondent’s seemed to feel that standards level the playing field and make it easier to install efficient equipment. None of the informants seemed to have a problem with the concept underlying the regulations.

In one session there was a rather spirited discussion of the need to make Title 24 meaningful. One contractor contended that Title 24 compliance is mostly a formality of making sure the required forms are in the plans so that the local permitting authorities can “check-off” the fact that they are there. His rather emphatic comment was, “make it meaningful.” His argument was that if he was to be required to supply the data he felt that something meaningful should be done with it and that if that was not going to happen then the data should not be required. Others agreed with his position.

We probed to see if we could identify what he meant by meaningful. Clearly there was some sense that the calculations might need to be verified and/or that there might be some need to verify that construction is being completed in a manner that leads to results produced in the calculations or meets the standards. However, when we tested this there was little support for verification steps such as more on-site inspection or post construction testing of systems.

From a policy standpoint, there is support for standards. It is not clear how much support there may be for stricter standards. Attempts to make the standards less formulaic would be welcomed. Standards affect the behavior of all segments, especially segments such as

the triple net lease segment that has few incentives to undertake energy efficiency projects.

5.3 Information

Informants frequently mentioned the idea that the CEC might provide information. The specific types of information in which informants were interested were unclear. Information about materials, technology, applications, and experiences in implementing specific technologies were frequently mentioned.

Promoters of energy efficiency tend to emphasize the need for information about efficient technologies, proper installation, first cost, and payback. While these types of information are important, one of the messages from the focus group is that other criteria and information can and do significantly influence decision making. One contractor pointed out that comfort and not cost was a primary concern for one of his customers, a law firm. Indoor air quality is another factor that enters into decision-making and is an important issue about which information is needed. Firms that rent space desire features and systems that make their buildings attractive. Lighting can be a key feature in the attractiveness of a building. Some employers, whether they own or lease, want to give employees at least some control over their environment. Controls may be desired for reasons other than energy efficiency. A demonstrated and strong relationship between the building environment and productivity will be convincing for some decision-makers. The point is that information for a broader array of decision criteria is needed than is now typically available.

An underlying theme was the need for access to the right information on demand. The informants know that information is out there and they express the idea that they would use more if the overhead for obtaining it were not so high. Also, information needs to be presented in ways that meet the needs and requirements of different professionals. An owner may need an overview of a technology with a list of pros and cons presented from the owner's point of view. An engineer may need detailed design requirements for the same technology.

The issue is more than one of just accumulating and supplying information. It is also a matter of helping professionals to know where the resources are located. One of the informants, who attended the session held at the Pacific Energy Center and who works just blocks from the Center, was completely unaware that the Center and its resources were there and available to him until he attended the focus group. He used this as an example of why getting the word out about the location of information resources is very important.

Many of the building professionals believe that providing information is a proper role for the CEC and a good use of public goods charge monies. They are clear that energy information needs to be targeted, content appropriate, easy and quick to locate, and well publicized. Building professionals will use information if it can be located or determined with no more than a few minutes of effort. If not, building professionals are likely to use rules of thumb or get the opinion of a colleague. All segments can use information but it is likely to be used more by owners and commercial operators with longer-term commitments than by other segments.

5.4 Design Assistance

Several of the professionals felt that design assistance is a useful strategy for advancing energy efficient designs and equipment. There were several very positive comments about “Savings by Design” a program operated by utilities to encourage more efficient building designs. These comments came mostly from Southern California where we talked to architects who had substantial words of praise for the staff from San Diego Gas and Electric. Indeed, one of the problems that we faced in recruiting in San Diego was that respondents kept telling us that we did not need to talk to them but that we should talk to the SDG&E staff.

Architects were particularly sensitive to the fact that the “Savings by Design” program made money available to architects and engineers to complete design studies. They noted that there is seldom money available to do the kind of design studies that are needed to increase the energy efficiency of buildings.

One of the architects noted that he was aware that firms were making use of Savings by Design for new construction projects but he did not believe that remodeling and renovation projects were using the program. If this is the case, it may be because building professionals do not know that it is available for remodeling and renovation projects, because building professionals do not perceive it to be available for renovation and remodeling projects, or because professionals do not perceive that it is applicable to many projects. If any of these conditions are true, those marketing Savings by Design may want to place greater emphasis on the applicability of Savings by Design to remodeling and renovation projects.

From a policy perspective, design assistance will work reasonably well in environments where there is a long-term commitment to the building and the owner pays for at least some of the energy costs. Design assistance is not likely to be used at all by firms doing triple net leases or operators looking for profits from short-term turnover after renovating a building. Franchise and chains might be interested in Savings by Design in situations where they are piloting a new concept. If the pilot is successful, the investment from the Savings by Design program may be returned many times as the new design is replicated throughout the chain or franchise.

5.5 Energy Service Companies and Performance Contracts

The participants in these focus groups and interviews said very little about energy service companies and performance contracts. From other interviews that we have done in California, we know that some firms are working with energy service providers and performance contractors. Energy Service Companies offer commodity prices or commodity prices and energy services. Some owners are only looking for low commodity prices and therefore do not seek energy services. Others may seek services in addition to the commodity prices. Performance contracts and energy services associated with commodity contracts are likely to be of most attractive to owners who pay their own utility bills. They are not likely to be of interest to triple net operators or buy/renovate/sell investors because of the long-term commitments that the service or performance contracts imply

5.6 Post-occupancy Tenant Improvements

In one of the sessions during a discussion of value engineering, one of our informants described a situation in which some of the controls were value engineered from the project because of budget limitations. Other features simply took priority over the controls. The result was substantially higher than expected utility bills. This indicates a potential program opportunity.

In this large owner-occupied building, the facility manager worked with the utility, following occupancy, to meter loads and develop a plan for controls that would allow for more efficient use of chillers. The facility manager was able to sell the plan because the owners were somewhat stunned by the operating costs and the facility manager was able to demonstrate a competitive payback on investment. He reported that controls have been retrofitted and energy costs have been reduced, thereby quickly paying for the improvements. A key point is that the manager was able to do this because the building was owner occupied and the savings went directly to the owner's bottom line.

During a recent focus group on a different subject, a senior manager, for one of the largest energy performance contracting companies in the world, reported that that it is essentially the norm to meet construction budgets by substituting less energy efficient equipment for more energy efficient equipment during the course of remodeling and renovation projects. He suggested that performance contracts be used to make up the difference in order to keep the energy efficient equipment in the project. The problem is that it is difficult to identify projects with budget shortfalls early enough so that the performance contracting process will not delay the project. It is less risky to the timing of a project to change the equipment. This is not to suggest that a simplified performance contracting program the goal of which is to reduced the effects of value engineering on energy efficiency might not be welcomed and quite effective.

This experience points to an additional possibility, which is the potential for post-occupancy tenant improvements as a way to increase energy efficiency. The manager described above was able to get post-construction improvements because of the initial experience with initial costs and because the improvements came from a different budget. A manager of a public housing operation said that he too is sometimes able to increase energy efficiency by making changes subsequent to construction when he is able to tap different funds. Performance contracting may be more acceptable after there is some operating experience and when there is time to work out the details of a contract.

Potentially one could design a program that targets recently renovated buildings. The program might involve monitoring energy use in recently renovated buildings and reviewing the designs to identify opportunities to improve energy efficiency, especially if the building is owner occupied or a commercial operator has a long-term commitment to the building and is responsible for the energy costs. The goal of such a program would be to get the owner to commit resources or enter into a performance contract to fine tune the operation of the building early in its life. The idea is to identify dollars that were not in the capital budget. This might be a particularly effective strategy because the owner has refocused thinking to the long-term operational costs rather than capital costs. A relatively small outlay or, in the case of a performance contract, no outlay at all, might be a strong incentive to undertake efficiency improvements. This is not the same thing as

building commissioning which is oriented to optimizing the operation of existing systems.

Chapter 6. Summary and Conclusions

The California Energy Commission is interested in better understanding the commercial building remodeling and renovation market and the policy options that may be available to improve the efficiency of commercial structures that are being remodeled and renovated. This report concludes the first phase of a larger project. The goal of the report is to provide a broad qualitative understanding of the renovation and remodeling market, the potential for increasing energy efficiency in the market, and a description of how the renovation and remodeling market may differ from the commercial new construction market.

The basic objectives of this study are to:

- Identify the size of the market
- Understand how players in the market define the market
- Identify the key players
- Identify the factors that influence remodeling and renovation
- Assess the extent to which energy issues are considered in remodeling and renovation projects

6.1 An Overview of the Market

With respect to **the size of the market**, we found that:

- There were about 25,000 commercial building projects initiated in California in 1997 and 1998 or about 12,500 projects per year.
- For about 25 percent of these projects there was no classification of the project available.
- For the 15,600 projects that were classified, just under half (47 percent) were renovations and alterations. The next largest percent (44 percent) were new construction projects. Additions represented four percent of the total. The remainder of the projects had mixed classifications.
- Considering the top 22 owners with the most projects (more than 10 in the two year period), we found that chain stores, commercial property developers (office space), grocery stores, and department stores were the most active in remodeling and renovation.
- These numbers probably underreport renovation activity.

6.2 Constraints and Opportunities for Energy Efficiency

Our informants suggested that the **opportunities for energy savings in remodels and renovations were limited for a variety of reasons:**

- The orientation of the building is fixed limiting the potential for addressing issues such as patterns of light entering the building.
- Changes to buildings seldom include new exterior features such as shading devices.

- Existing windows, casements, and doors are often retained limiting the opportunities to incorporate high-efficiency glass or more energy efficient casements.
- Unless a roof is near the end of its lifetime, the roof is unlikely to be changed except to address issues resulting from the removal or addition of equipment to the roof.
- Wherever possible boilers, chillers, other large equipment items, piping, and other items are salvaged if they are in reasonable operating condition that limits opportunities for introducing new and more efficient equipment. Several informants said that attempts would be made to reuse major pieces of equipment less than 8 –10 years old. Equipment older than that would be replaced.
- Lighting equipment may or may not be changed depending on the vintage of the equipment and its condition. If the remodel is fairly extensive, lighting equipment is likely to be changed especially if it is of the direct type. Our informants reported that the general trend is to indirect lighting.
- Remodeling and renovation budgets are usually fixed. Most projects exceed their budgets. Because mechanical and electrical systems are typically designed last, because these systems are less visible, and because less efficient equipment and fewer controls can be substituted thereby saving money, efficient equipment and controls are often removed from projects through the value engineering process.

There are areas within existing buildings that are being renovated where **there are significant opportunities to improve energy efficiency:**

- Insulation can be affixed to walls and ceilings.
- Insulation may be placed under roofing materials and the roof can be coated with high albedo materials.
- Film can be applied to windows.
- Ducting and piping can be redesigned, configured and installed to improve the efficiency of the HVAC system and comfort of building occupants.
- Advanced controls can be introduced to better manage control of the HVAC system and user comfort.
- Advanced lighting and lighting controls can be introduced to provide lighting that is more comfortable and efficient.
- Systems that are changed can be integrated to leverage the improvements to make the whole building more efficient.

6.3 Defining Remodeling and Renovation

- Among building professionals there is no consensus on the terminology used to describe renovation and remodeling projects. **Building professionals tell us that they typically apply whatever term the client uses to describe a project.** Permitting authorities classify projects or parts of projects into the categories of new construction, alteration and renovation, interior completion, and addition. Although they may not explicitly use the terminology, we found that building professionals tended to distinguish between maintenance and operations, replacement, tenant improvements, shell projects, additions, and new

construction. **The major distinction is between tenant improvements and shell projects.** Tenant improvements include changes to existing structures as well as build-outs of unfinished shells. Tenant refers to anyone occupying space, owner or lessee.

Building professionals such as architects, engineers and contractors saw few differences between what they do in renovation and remodeling projects and new construction. They indicate that most firms do both types of projects although some firms prefer one type of project to the other. They had difficulty identifying more than one or two firms that tend to specialize in remodeling and renovation.

Developers and owners indicated that developer/owner firms or divisions of developer/owner firms clearly specialize in specific types of projects. If asked, individuals within the industry can identify whether firms deal with new buildings or remodel and renovate existing buildings. Programs will be most efficient and effective when the right resources are targeted to the right audiences.

6.4 Renovation and remodeling market segments

There are six basic market segments: the replacement market which affects the universe of buildings; the developer segment that buys buildings, adds value to them and then sells the buildings; the developer segment that buys renovates and holds buildings, the buy and hold segment, the triple net operators, the owner occupied buildings segment, and the ground lease segment. We will have to await the results of the quantitative survey to assess the size of the segments.

We can depict the location of these segment in terms of whether an owner uses or leases a building and the time horizon of the building holders investment strategy. As we can see from Figure 1, developers who *buy, renovate, and sell* are located in the upper left quadrant, triple net operators are located in the lower left with tenants in the middle left. Owners who use their own buildings are usually in the upper right as are commercial real estate firms who buy sell and hold. Ground leaseholders are in the lower part of the upper right quadrant. It is the segments in the upper right quadrant that are most amenable to making investments in energy efficiency. Segments in other parts of this graphic are less amenable and need something other than payback to motivate them to make efficiency investments.

The segments most amenable to energy efficiency are the owner occupied segment, the commercial real estate firms who renovate and hold property, and the ground lease segment. The triple net lease segment is probably the smallest and also the most difficult to penetrate. There are some opportunities in the commercial buy and sell market. There may be modest opportunities in the replacement market.

6.5 Remodeling and Renovation Program Approaches

Standards clearly influence all market segments. Likewise rebates can impact most segments although they may only be minimally effective with triple net operators. Energy service contracts that promote energy efficiency and performance contracts will be effective with owners and can be effective for national chains and franchises and commercial operators who hold their buildings and pay at least some of the energy costs.

Energy service contracts, except for commodity pricing, may be of little interest to commercial operators who buy, renovate, and sell. Information services will have little or no effect on triple net operators but potentially much more impact on firms that own and occupy and commercial real estate firms who hold property for a period of time. Design assistance is likely to be of most interest to owners who hold property for a period of time. There may be opportunities to gain significant leverage through design assistance when working with chains and franchises because good designs are likely to be replicated.

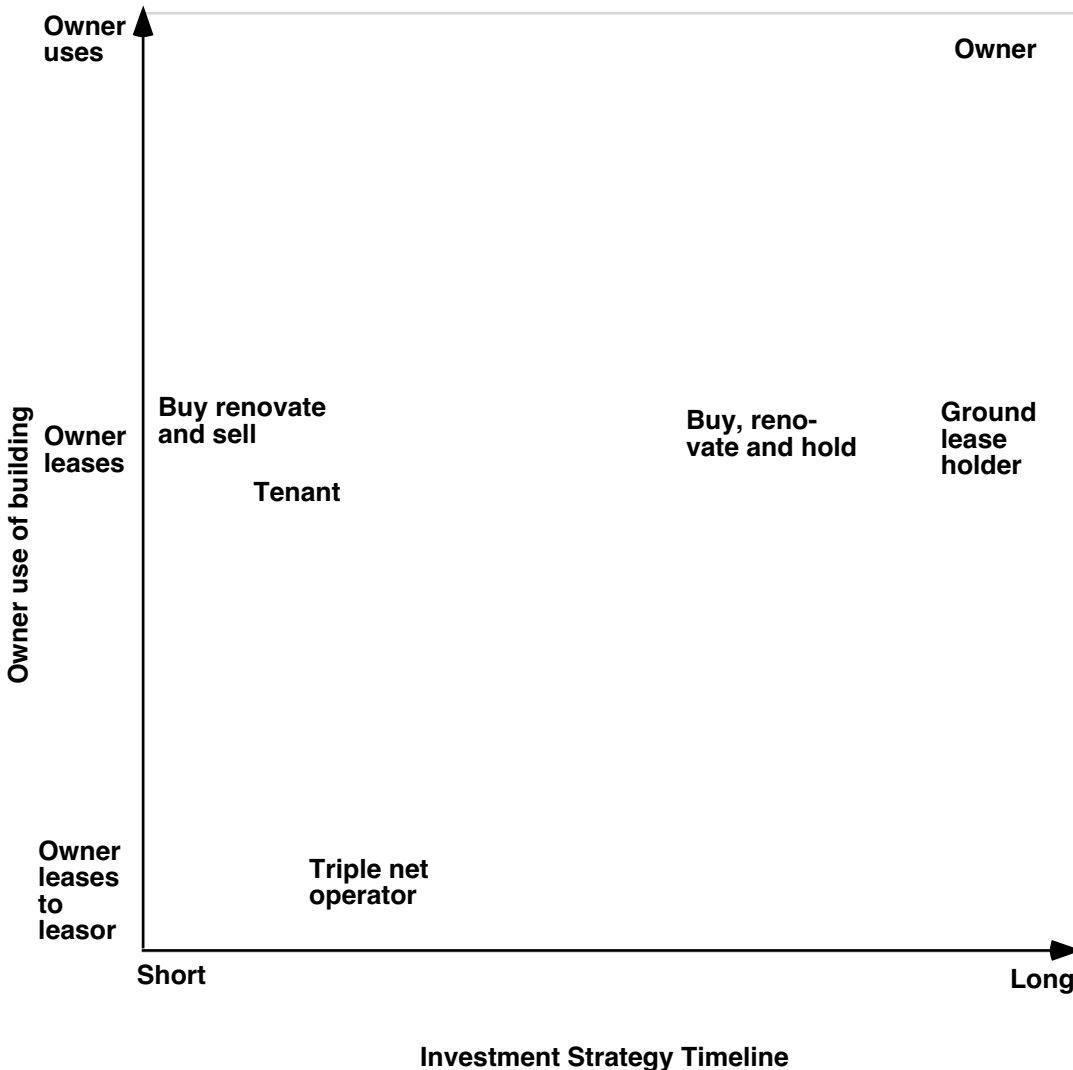


Figure 1 Remodeling and renovation segments in terms of investment time line and ownership pattern

6.6 Remodeling and Renovation Key Players

The key players vary depending on the situation. In replacement situations, contractors work with owners or building managers and can significantly influence equipment choices and design decisions. Typically, contractors make proposals to owners and managers based on their understanding of the owner's business practices and

philosophy and what they perceive to be cost-effective options given the environment in which the business is operating.

Developers and commercial property owners are arrayed along a continuum from developer/owners who buy, renovate and sell properties to developers/owners who buy, renovate and hold. **Those who buy, renovate and sell are almost entirely interested in improvements that will allow them to increase lease rates or that will payback with a profit within the timeframe in which they hold the building, which is 1 – 3 years. Energy efficiency improvements generally fall outside of this window.**

Developers, who buy, renovate and hold, make investments that have longer paybacks, 4 –5 years, and sometimes take a longer view and will incorporate energy efficiency improvements. They may also make improvements, such as energy efficiency improvements, for reasons other than profit, for instance, to burnish their image as a good corporate citizen.

Owners are much like developers who buy and hold and they can be encouraged to make energy efficient investments. Architects and engineers have the most influence in remodeling and renovation projects in those situations in which they have overall responsibilities for managing the project. Architects and engineers frequently operate more like consultants in design/build situations and are less able to influence equipment and design decisions that influence energy efficiency.

There are other investment strategies. Some firms get involved in triple net leases in which they assume all financial and management responsibility for a building, paying the owner a flat monthly rental. They will then improve the management of the building and make improvements that allow them to increase lease rates thereby making a profit. They are likely to invest in only those improvements that allow them to increase lease rates meaning that many energy efficiency improvements are excluded.

Many chains and department stores lease ground space and then build and manage their building on that leased space. Because they “own” the building and they have a longer-term commitment they can and will invest in energy efficiency when the returns justify it. The key decision-makers are corporate property managers and the architectural firms that they hire to develop buildings.

Tenants can influence decision-making in situations where the tenant is willing to pay for improvements through increased lease rates.

6.7 Differentiating Replacement, Remodeling, and New Construction

One of the issues in this study is how to differentiate between replacement, renovation and remodeling and new construction. As a result of the analysis of the information from the focus groups, we developed Figure 2 that depicts one way of thinking about the renovation and remodeling market. In this figure, there are two dimensions, the degree to which systems are designed or redesigned and the number of systems that are being changed. The design effort can range from collecting the information needed to replace a system or component with an identical or nearly identical item to a completely new specification or system design. The number of affected building systems can range from a component of a system to all building systems.

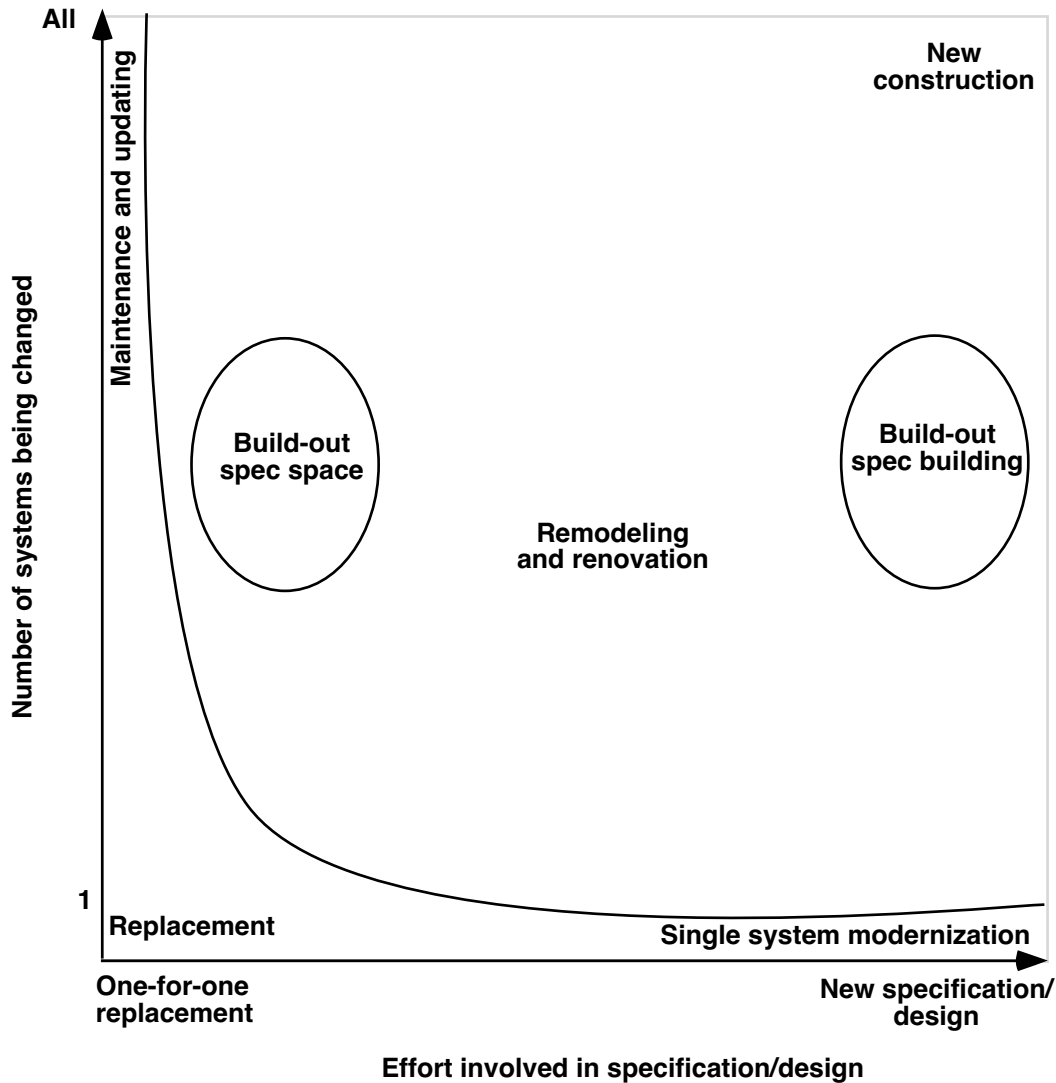


Figure 2 A concept for defining replacement, remodeling and renovation

In this scheme, replacement falls in the lower left corner, new construction in the upper right, and remodeling and renovation in the middle. Replacement can be thought of as generally focusing on one or two systems or components of systems and involving a relatively minimal design effort. A single system replacement with an extensive design effort, for example, replacing and upgrading an HVAC system, can be thought of as a single system modernization (lower right hand corner). Component system efficiencies can be changed but there is minimal opportunity to leverage this influence with other systems to achieve greater whole building savings.

Likewise, we might think of situations in which multiple systems are changed with a low level of design effort as maintenance and updating (upper left hand corner). The opportunities for efficiency in this situation are minimal.

Build-outs in new shells probably occur in two regions of the graph. In a case, where some of a building has already been occupied (spec space), build outs (middle left) are mostly a matter of completing areas with previously developed specifications (a middling

number of systems with a modest amount of specification and design). Where a shell has been completed but the interior has not yet been finished (spec building), a buildout may involve several systems and fairly substantial design work to complete the design (a middling number of systems near the right side).

The number of building professionals involved in a project, contractors, architects, and engineers, is a function of the number of systems and the complexity of design and generally increases as one moves from lower left to upper right. Replacement is more likely to be handled by a specialty contractor, for example, an HVAC contractor. As the design requirements increase for a single system, one may find a consulting engineer becoming involved or a consulting engineer managing the work of a contractor. As the number of systems increases, one is more likely to have a general contractor, a design build contractor or an architect serving as the project manager. At the upper right corner, a design/build contractor, an architect or a team typically manages projects.

This graphic reinforces how difficult it is to sharply define the differences between remodeling and new construction in terms of design and construction practices. From this perspective, renovation and remodeling is defined by the number of systems and the extent of specification and design activities rather than the nature of the activities that are undertaken.

Table 8 summarizes what we have learned from the qualitative study about market segments, their characteristics, the potential for encouraging energy efficiency, and the key players in those segments. The quantitative study will help to verify the presence of these segments, confirm their characteristics and estimate their size.

6.8 Key Recommendations and Findings

- Program planners need to recognize that there are different renovation market segments and that the different segments respond differently to different program initiatives. Initiatives need to be tailored to the segment.
- The segments breakdown along the lines of ownership and investment strategy. Program planners and implementers should view the market in this way.
- Commercial real estate operators target niches and it is possible to identify operators who are mostly associated with remodeling and renovation. Other building professions such architects and engineers do not operate in the market on the basis of distinctions between new construction and renovation.
- General contractors and design/build contractors are frequent key players in the market and they should probably be key targets of program planners and implementers.
- In many instances architects and engineers play a consulting role rather than lead roles. They report that the methods and techniques they use are largely the same as those they use in new construction. It is important to generally target architects and engineers with information about efficient products and designs recognizing that other actors play equal or more important roles in decision-making. Information activities can probably be shared with program planners and implementers doing new construction.

- Larger owners and developers, franchises, and chains have in-house staff who are key decision-makers. Many of these firms also have “house” architects or “house” contractors who lead their efforts. Program implementers should target both of these groups. In some instances this may mean working with firms outside of California.
- In terms of program strategies, standards are appropriate to all segments. Rebates will work with most segments. There were suggestions that some of the resources for the Savings by Design program be focused on remodeling and renovation projects. Design assistance works best with owners, developers, and commercial real estate firms who hold buildings for the longer-term. Energy service contracts that include assistance with efficiency and performance contracts are effective strategies for owners who hold buildings and who are responsible for energy costs as long as the paybacks are of reasonable length. Program strategies that will effectively influence triple net operators and commercial operators who buy, renovate and sell are limited.
- Efforts to make the cost of efficient products and designs competitive with less efficient products and designs can reduce the need for rebates and significantly increase the penetration of efficient technologies and products. This is a neglected area that needs attention.
- The replacement market tends to be dominated by specialty contractors as opposed to general or design/build contractors. This is one area in which contractors have substantial influence. Contractors should be made aware of rebates if they are available. Contractors could probably benefit from information and training about ways to improve the efficiency of systems when systems are replaced. There may be techniques and technologies that could lead to substantial improvement of the efficiency of current practice without significantly increasing cost. This area needs to be more thoroughly investigated.
- It is widely believed that many HVAC systems may be poorly functioning because buildings have been remodeled without concomitant changes to HVAC systems. This goes beyond issues that are normally considered in building commissioning. There is a need to evaluate whether adequate attention is being paid to HVAC systems during remodeling, to determine the energy effects of poorly functioning systems, and develop methods and programs designed to address the problems if they are significant.
- The current shortages of power in California may tend to focus building owners’ attention on having reliable power and detract in the short-run from energy efficiency efforts.

Table 8 The characteristics, key players, potential for energy efficiency, and effective programmatic approaches for six renovation and remodeling segments

Segment	Key features of segment	Ability to influence energy efficiency	Programmatic approaches for influencing the segment	Key players
Owner occupied	<p>Buys and holds property for own use. Customizes property to the needs of the firm. May incorporate features into the property to burnish image.</p>	Moderately high to high	<p>Information</p> <p>Promoting energy efficiency equipment and designs with energy paybacks of five years or less. Other factors such as comfort and productivity can enter into the decision.</p> <p>Energy service contracts where the goal is to reduce energy management issues, the amount of energy used, and the cost of it.</p> <p>Performance contracting where the firm wants to retain control of energy management.</p> <p>Performance contracts may be of considerable interest to smaller firms with constraints on working capital.</p> <p>Design assistance may find a particularly warm welcome here.</p> <p>Rebates (may not be necessary but will gladly accept)</p> <p>Standards</p>	<p>Large companies</p> <p>Owner</p> <p>Professional property management staff</p> <p>Property developer</p> <p>Architect for Design/Build Contractor</p> <p>Small firms</p> <p>Owner</p> <p>General contractor/Design build contractor</p> <p>Possibly an architectural or engineering firm</p>

Segment	Key features of segment	Ability to influence energy efficiency	Programmatic approaches for influencing the segment	Key players
Commercial developer buy/renovate/sell	<p>Buys, renovates and sells commercial properties. Makes money on increase in the value of the property. Will incorporate energy efficiency when that leads to increases in the value of the building or has a payback period that will payoff during the time the company is holding the building assuming the operator is paying for the energy.</p>	Low to low moderate	<p>Standards</p> <p>Rebates</p> <p>Promoting energy efficiency equipment (for example, lighting) if it will increase the lease rate and therefore the value of the building enough to make it worthwhile.</p> <p>Information about high payback opportunities, two years or less (low probability of success).</p> <p>Performance contracting not likely because of short turn around time and complications of transferring the performance contract when the building changes hands.</p>	<p>Developer</p> <p>Developer's staff</p> <p>Design/build contractor or design/build team</p> <p>Possibly an architectural firm</p>
Commercial developer buy/renovate/hold	<p>Buys, renovates, holds and leases commercial property. Makes money from the leases and changes in the value of the building when the building is sold. Will invest in energy efficiency when that is consistent with tenant needs or when developer pays for energy costs and can get a reasonable return on investment.</p>	Low moderate to moderate	<p>Standards</p> <p>Rebates that make equipment cost competitive with less efficient equipment.</p> <p>Promoting energy efficiency equipment designs with paybacks of five years or less when the return goes to the owner/developer bottom line.</p> <p>Design assistance if value of</p>	<p>Developer</p> <p>Developer's staff</p> <p>Design/build contractor or design/build team</p> <p>Possibly an architectural or an engineering firm</p>

Segment	Key features of segment	Ability to influence energy efficiency	Programmatic approaches for influencing the segment	Key players
Triple net lease	Triple net operator focuses on maximizing lease rates, reducing costs, and minimizing investment. Does not own the property	Very low to not at all	Standards Rebates but probably just for equipment that has to be changed for other reasons.	Triple net lease holder General Contractor / Design build contractor
Ground lease	Franchise or retail chains take long-term ground leases (15 –30 years) in high traffic areas. Build big box or other type buildings on pads to meet their needs.	Moderately high to high	Information Will incorporate energy efficiency if the return on investment is sufficiently high or energy efficiency features such as daylighting can be shown to affect sales or turnover. Some organizations are sensitive to their environmental image and look for ways to promote that.	Large franchises or retail chains In-house design staff National or regional architectural that does standard basic image design Smaller franchises or retail establishments

Segment	Key features of segment	Ability to influence energy efficiency	Programmatic approaches for influencing the segment	Key players
			<p>National or regional energy services contracts that supply commodity, energy efficiency services, and reduced management costs.</p> <p>Performance contracts are possible.</p> <p>Design assistance may provide significant leverage in this situation.</p> <p>Rebates can be used to encourage adoption of measures with really long paybacks.</p> <p>Standards</p>	<p>Property management staff</p> <p>Large regional or local architectural firm</p> <p>Design/build contractor</p>
Replacement market	<p>Most commercial building owners have to address replacement issues at one time or another. Replacement tends to focus on key components, subsystems, and occasionally an entire system. Often choose one-to-one replacement, if available, to avoid installation and redesign issues.</p>	Low	<p>Standards</p> <p>Rebates</p> <p>Information</p>	<p>Owner or owner's representative</p> <p>Contractor in the affected trade</p> <p>Sometimes general contractor, design/build contractor</p>

Appendix A: Focus Group Procedures

Because of budget constraints, we were limited to five focus groups. In selecting the participants for the focus groups, we had three objectives. The first was to capture a cross-section of the professions involved. The second was to capture a cross-section of projects in different parts of the commercial sector. The third was to choose focus group locations so that the amount of participant travel was minimized.

Using the F. W. Dodge data, we located all firms that had initiated one or more remodeling and renovation projects in 1997 and 1998 on a map. We also located the available focus group facilities on the same map. Because focus groups need to be held close to the participants, we looked for areas with large clusters of firms that were within a 10-mile radius of the focus group facility. We found six locations that had several hundred target firms within a 10-mile radius. For each of the target areas we selected all firms that fell within a 10-mile radius with a priority given to firms within five miles. We examined the characteristics of these firms and determined in which areas we had the greatest concentration of firms in each of the categories identified above. We then considered the characteristics of the area and the counts of firms and chose an area and the target group for the area. The goal was to get a diversity of experience from across the groups and the target areas. For example, we chose Los Angeles and San Jose for the focus groups with contractors so that Northern and Southern California and central city and more suburban developments would be represented.

We elected to conduct only one focus group with architects and engineers because we had previously conducted several hundred one-to-one interviews and surveys with architects. Based on what we felt we already knew, we believed that we would gain more insight by completing two groups with owners/developers and general contractors and contractors. We chose a sample of 50 firms from each of the five areas according to the preceding schedule.

Although the F. W. Dodge data provided contact information, those fields were sparsely populated. Thus, we had to develop a list of contact names for the companies. For each firm in our list, we interrogated the Dun and Bradstreet files for a list of contact names. These were usually the chief officers of the firms. In the case of the architectural and engineering firms and the contracting firms, we had few problems communicating with people about what we were trying to do. We did, however, have to work with these contacts to get to the right person. For developers and owners, we had the names of general managers who had no responsibility for or understanding of building related issues. In these cases, we had to work with the named contact or an administrative assistant to gain an understanding of what we were trying to do and then to identify the appropriate internal person.

The first contact with each firm was a letter of introduction sent by fax or by regular mail to the named contact explaining the focus group and its sponsorship. This was followed by a telephone call to each contact person. In many instances, we found that we needed to make contact with another person. In those instances, we usually sent one or more

additional faxes. We made as many as eight attempts to recruit someone from each of the firms.

If our contact agreed to participate, the contact was sent a letter of confirmation along with a map and instructions for reaching the facility. In addition, we made a courtesy call to remind the person of the meeting on the morning of the focus group.

In all, twenty-six respondents agreed to participate in the meetings. However, we had several dropouts. Subsequent to the focus group meetings we conducted one-to-one telephone interviews with additional respondents so that we had information from 28 respondents. Although we invited more owners and contractors than architects, many of the owners and contractors were trained as architects and engineers.

Architects/engineers, owners, and contractors were about equally represented in terms of their business affiliation. However, people trained as architects were the most common in terms of their training. However, owners and contractors trained as engineers and architects clearly represented the opinions of owners and contractors.

The San Francisco focus group was conducted at 12:30 pm. The other focus groups were held from 4:30 – 6:00 pm. In discussing the timing with several of the informants they indicated that they would have preferred a breakfast focus group.

We had anticipated giving the focus group participants a \$100 honorarium but the budget did not permit that. We did, however, give each participant a stud finder that elicited a very favorable reaction. We do not believe that the absence of the incentive altered the outcome of the recruiting effort. We did find that people were extremely busy because of the high volume of construction activity that is currently underway. Levels of commitment to participating in the groups varied tremendously. We had a substantial number of people drop-out at the last minute and we had people like the architect who treated his staff to dinner while he attended the focus group and who then went back to work to finish a project and the contractor who came on two different days because he had entered the wrong date in his calendar.

When the participants arrived at the focus group center they were greeted and offered refreshments or, in the case of the San Francisco group, lunch. All of the meetings were audio recorded and four were videotaped. Informants were informed that they were being taped prior to the start of the focus group. Informants were told that the tapes were purely for purpose of recall in order to produce a report and that no other use would be made of the tapes.

A TecMRKT Works staff member moderated the meetings. The moderator followed a discussion guide that had previously been reviewed by CEC staff and other participants in the project (See Appendix A).

Four posters were mounted on the wall. One poster contained a list of terms that are sometimes used to describe remodeling and renovation activities. Another contained a list of possible decision-makers. A third contained a list of decision criteria. Yet another poster contained a set of scenarios describing different ways in which buildings may be modified.

The focus groups largely followed the script that was laid out in the focus group guide. There were some variations when people veered into productive areas that were either not

in the script or were to come up later in the script. The script was sufficiently well laid out so that the participants almost always provided a segue to the next topic. The focus groups were managed in a conversational style. Materials had been prepared for recording votes and listings but those materials were not used because there was often clear consensus on the issues.

The focus groups lasted between one and a quarter and one and a half hours. Participation was lively and there were no situations that occurred where informants needed to be prompted to speak. In two cases we had late arrivals that resulted in some repeat but the other participants handled the repeat with graciousness.

Nearly all participants expressed the opinion that the focus group experience had been an exceedingly worthwhile experience and several suggested that the CEC needs to receive more input in this or other ways. All participants were interested in the outcome of the focus group.

Appendix B: Remodeling and Renovation Focus Group Guide

Prepared by TecMRKT Works for focus groups to be conducted for the California Energy Commission

This is a list of questions/ideas that will be addressed during the focus groups sessions. The choice of questions, the manner of presentation, and the order will vary with the audiences. In several places we present lists. These will be posted on large posters. We will also have check-off lists for use in rating lists of items. When items are rated, they will be summarized for the group with discussion of the overall ratings encouraged.

1. There are several terms that are used to describe activities that involve changes to existing structures?
 - Build-out
 - Alteration
 - Remodeling
 - Renovation

In your experience, what do building professionals mean when they use these terms? How do building professionals distinguish among these terms and these terms from new construction? Are there terms that you would add to the list?

2. Are there any practical ways to distinguish these types of projects? What are the critical differences? For example, are there differences in the types of permits that are filed, Title 24 compliance, or other features that distinguish such projects from each other?

Here is a list of actors that might participate in building activities?

- Investors
- Bankers
- Financiers
- Property managers
- Facility managers
- Developers
- Architects
- Lighting Designers
- Electrical Engineers
- Electrical Contractors
- Mechanical Engineers
- HVAC Contractors
- General contractors

- Lighting contractors
 - Commissioning specialists
 - Tenant users
 - Tenant building professionals
 - Tenant property managers
 - Owner-occupant users
 - Owner-occupant building professionals
3. Which of these actors are likely to be involved in decision-making for build-outs, alterations, remodeling, renovations, and new construction? What determines who gets involved?
 4. In your experience are there any groups or subgroups of these actors that deal almost exclusively in remodeling and renovation as opposed to new construction? If so, which ones? Do they have a separate market place or professional identity? Do they have their own trade association or interest group within a larger professional trade or organization? If I wanted to contact such a group of people, how would I go about doing it?

I am going to give you six scenarios and then a list of decision-makers and I would like to have you tell me for each scenario roughly how important decision-makers are with respect to choosing energy efficient designs, materials, lighting and HVAC equipment. Please base this on your own experience and what you have observed from others doing remodeling and renovation.

5. Here are some common scenarios. Are there other scenarios that are quite common that I have not identified?
 - Completion of an interior in an unoccupied recently constructed shell for a prime tenant
 - Completion of an interior in a partially occupied “new” building for a secondary tenant
 - An owner occupied building that is to be remodeled and renovated
 - A commercial property firm leasing space to a tenant who wants to change the space
 - A commercial property firm with a tenant who wants to reconfigure the space
 - A commercial property firm investing in and upgrading existing space
6. For each of these scenarios, tell me which actors are likely to be important in decision-making about efficient equipment. Let’s include only actors who you feel are important. If the actors are marginal lets not put them on the list.
7. Here is a list of factors that might enter into decision-making. Are there other factors?
 - First cost of the equipment and installation

- Reliability of the equipment
 - Payback through reduced operating costs
 - Ability to charge a premium for the space
 - Requirement identified by tenants and/or their professional design staff
 - Requirement identified by owner-occupants
 - Comfort of the occupants
 - Ability to raise capital
 - Ability to pass costs to tenant
 - Aesthetics of the building
 - Perception that the building is a quality building
 - Recommendation of architect
 - Recommendation of engineers
 - Title 24 requirements
8. Let's quickly walk through the scenarios and you tell me based on your experience or observations of the industry, which of the factors are most likely to be important. Within each list, which are the most important factors?
9. Think back to your last remodel or renovation project and imagine that you had recommended a more efficient lighting system or HVAC system but weren't able to get it? Why would that have been the case? What would have had to happen to make it a reality? What decision-maker or decision-makers would have had to be convinced? What would it have taken to get over the "hump?"
10. Is there anything about the fact that it was a remodel and renovation rather than a new construction project that made a difference?
11. Thinking about the important decision-makers in remodeling and renovation projects, what resources, information, software, money, product availability, experience with products, etc. would make it easier to sell energy efficiency? Are any of these unique to the requirements of remodeling and renovation as compared to new construction?
12. The California Energy Commission can do a wide variety of things to encourage more efficient buildings such as implement demonstrations, provide data about the effects of good environments on productivity, develop software, provide databases, provide training, change Title 24 regulations, etc. Are any of these things or other things that you can think of, things that the CEC should be doing that would increase the efficiency of buildings when they are remodeled and renovated?
13. Thinking back over all of the things that we have discussed this afternoon, can you identify technologies, audiences, and decision criteria that uniquely separate renovation and remodeling from new construction? Are any of these items things that the CEC should be addressing?