The Structure, Ownership, and Energy Use Characteristics of the Retail Sub-Market of the US Commercial Buildings Market

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ABSTRACT

This paper explores the structure, operation, and decision making in the retail market and how they relate to energy efficiency. The retail market is comprised of retail and service establishments located in malls, strip malls, multi-use structures, and standalone buildings. The paper is based on a larger study of the commercial building market completed for the US Department of Energy. The findings are based on extensive analysis of secondary literature and data as well as analysis of Commercial Building Energy Consumption Survey (CBECS) data. Among other things, the study finds that there is a high degree of concentration of ownership and decision-making in the retail submarket. Fifty large national firms own and/or manage between 28 and 32 percent of the floor space in strip malls and regional malls. These firms lease to many of the large national retailers.

The large retail chains dominate the mall and big box markets. The design and implementation of these stores tends to be based on standard architectural designs that are maintained by "image architects" that work for the chains. If the large national chains lease the space, they are usually able to control the design and characteristics of the space through the lease. Thus, large retailers and their design organizations are key targets for energy efficiency programs.

The paper also explores the smaller independent owner operated retail segment. It presents data about the frequency with which retail stores are remodeled. It discusses the decline of regional malls that account for about 20 percent of regional mall floor space.

Introduction

The Department of Energy, Office of Building Technology, State and Community Programs, contracted with Innovologie, LLC, to characterize the commercial new construction market in order to better understand the needs and operation of this market, to more effectively identify technologies needed by the market, and to suggest ways to improve the effectiveness with which technologies are diffused to it (Reed, 2004). As part of that study extensive descriptions of several commercial submarkets including the retail sub-market were developed. This paper presents of some of the data from that study for the retail sub-market. In this paper we briefly describe the retail and service buildings, the players, the decision-making process, and strategies for addressing energy efficiency issues in this sub-market.

Data Sources

The data for this study are from three principal sources: published data from the 1999 Commercial Building Energy Consumption Survey including the analysis of the 1999 CBECS

public use sample, interviews conducted with commercial building operators from various projects that have been completed over the last several years, and information gathered from the Internet. The information from the Internet is primarily survey and study results compiled by trade associations and industry-specific publications.

The Retail Service Buildings Market

Physically, the American retail market is housed in four basic types of buildings:

- General mercantile establishments[1] in multi-use buildings or standalone structures usually found in central business districts or "main street" locations but also at dispersed locations
- Service establishments outside of malls and strip malls
- Retail and service in enclosed malls
- Retail and service establishments in strip malls

There are approximately 1.29 million retail and service buildings in the United States representing approximately 27.5 percent of all commercial structures. About 89 percent of these are locations outside of malls and are roughly split between retail and service business. About 10 percent of retail and service establishments are housed in strip malls and about one percent of retail and service businesses are located in enclosed malls.[2]

Retail and service establishments occupy 12.7 billion square feet or 19 percent of all commercial floor space. Establishments in strip malls account for approximately one-quarter of commercial retail space while establishments in enclosed malls account for approximately 14 percent. The remaining 63 percent of space is accounted for by general mercantile and service establishments with general mercantile establishments tending to dominate.[3] Thus, the largest number of retail establishments and the largest amounts of retail and service space are found in buildings outside of malls and strip malls.

The Ownership, Size and Age of Retail Establishments

Analysis of the CBECS public use sample provides some insight into the ownership and size of retail establishments. Establishments in enclosed malls (62 percent) and strip malls (74 percent) tend to lease their space (Table 1). By contrast, general mercantile (60 percent) and ser-

[1]CBECS uses the term "mercantile" to refer to all commercial establishments including establishments found in malls and strip malls and the term "other retail" to refer to commercial establishments found outside of malls and strip malls. Because of the awkwardness of talking about "other retail", we have adopted the term "general mercantile" to refer to retail establishments outside of malls. These include department stores, furniture stores, car dealerships, and stores that rent items. We have adopted the term "service" to refer to service establishments found outside of malls and strip malls. Service establishments include copy shops, barbers, beauty parlors, laundromats, kennels, and gas stations.

[2]US DOE, EIA, CBECS, 1999, Table B-11. The International Council of Shopping Centers (ICSC) describes malls or enclosed malls as a "climate-controlled walkway between two facing strips of stores. The term represents the most common design mode for regional and super-regional centers and has become an informal term for these types of centers." Strip malls are typically described as being a "coherent retail entity" with parking in front of stores, perhaps having canopies, and configured in a straight line, 'L', or 'U' shape.

[3] Source: EIA, CBECS, Table B12, 1999

vice (63 percent) establishments tend to own the space they occupy. Fifty-one percent of general mercantile and service establishments are solely occupied by the owner. Another ten percent of such spaces are owner occupied but have one or more lessees (Figure 1).

Most of the general mercantile and service establishments have small footprints (Table 2) with approximately sixty percent occupying less than 5,000 square feet. Eighty-six percent of general mercantile and 97 percent of service establishments have 25,000 square feet or less. These buildings are predominantly low-rise buildings. Seventy-three percent of the service buildings and 53 percent of the general mercantile buildings are single story buildings. Ninety-nine percent of all such establishments are in buildings of three floors or less.

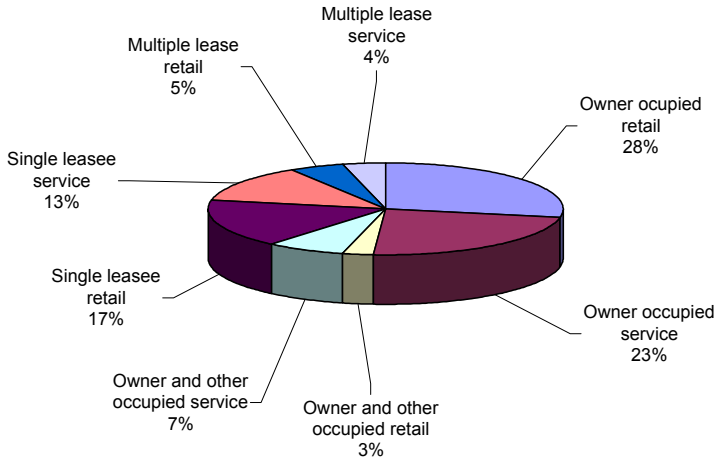
Slightly more than half of the general mercantile buildings are more than 40 years old (Table 3). Service buildings are newer; only 39 percent are more than 40 years old. However, 54 percent of the enclosed malls and 79 percent of the strip malls are less than 40 years old. Strip malls were mostly built in the 1970s and 1980s. In the 1990s, the number of general mercantile and service establishments that were constructed was about half that of the 1970s and 1980s. Malls continued to be constructed at about the same pace as in the 1980s, but strip malls were constructed at about a third of the pace as in the 1980s.

Table 1. Percentage of Retail and Service Establishments That Are Owner-Occupied or Leased

	General mercantile	Service	Enclosed malls	Strip malls
Percent owner occupied	60	63	38	26
Percent leased	40	37	62	74
N	526,729	462,142	2,771	130,569

Source: USDOE, EIA, 1999 CBECS Public Use Sample,
As analyzed by Innovologie, LLC.

Figure 1. Percentage of Owned and Leased Space in the General Mercantile and Service Submarkets



Source: USDOE, EIA, 1999 CBECS Public Use Sample,
As analyzed by Innovologie, LLC.

Table 2. Percentage of General Mercantile and Service Establishments by Category of Square Feet

Total square feet	General mercantile	Service
Less than 5,000	58	61
5,001 to 10,000	19	27
10,000 to 25,001	19	9
25,001 to 50,000	2	2
50,001 to 100,000	1	1
100,001 to 200,000	1	0
Greater than 200,001	0	0
Total	100	100
N	533,589	478,211

Source: EIA, 1999 CBECS public use sample,
As analyzed by Innovologie, LLC.

Thus, the bottom line is that owners mostly occupy general mercantile and service establishments. These buildings have relatively small amounts of square footage and the buildings tend to be older. The data also suggest that buildings that fall into the categories of general mercantile and services probably house businesses such as new and used auto dealers, health and personal care businesses, hardware, other building materials, and lawn and garden care stores. They are also quite likely to house financial and insurance businesses, other professional business services (i.e., lawyers), rental services, arts, and entertainment.

Table 3. Percentage of Retail and Service Establishments By Year Constructed

Year constructed	General mercantile	Service	Enclosed malls	Strip malls
Before 1920	17	4	11	<1
1920-1945	9	16	16	11
1946-1959	26	19	8	11
1960-1969	8	14	20	12
1970-1979	15	19	18	26
1980-1989	17	19	13	30
1990-1995	6	9	6	9
1996-1999	2	1	7	2
Total	100	100		
N	533590	478211	2771	130,658

Source: EIA, 1999 CBECS Public Use Sample,
As analyzed by Innovologie, LLC.

The Mall Sub-Markets

In the previous section we explored the general mercantile and services submarkets in some detail. In this section we explore malls and strip malls in more detail. According to the International Council of Shopping Centers (ICSC), there were approximately 48,400 of these malls in the United States in 2003. The ICSC definitions include only about 36 percent of the malls and strip malls that EIA captures in its definition. Many small strip malls are excluded. Table 4 displays median square footage and average annual sales for different categories of stores by type of mall according to the ICSC definition. Generally, all types of stores can be found in all types of malls. Certain types of retail operations have a much larger presence in some types of malls than others. Gray-shaded cells indicate the largest median square footage for a specific type of retail operation among the different mall types. Large general merchandise stores tend to be found in super regional malls and grocery stores tend to be found in community and neighborhood malls. Large clothing stores tend to be found in community, regional, and super regional malls. Large shoe and home furnishings stores tend to be found in community malls. Food and liquor stores are found in community and neighborhood malls. Gift and jewelry stores do not vary much in size by the type of mall.

Similar comparisons can be made by sales per square foot. The super-regional and regional malls, with their large marketing areas, tend to dominate in terms of sales per square feet for most types of retail operations (cells with bold numbers). The exceptions are food and drug retail operations where the sales per square foot are relatively constant across the mall types. Automotive sales tend to be highest at regional malls.

Eighty-six percent of the malls (mostly strip malls) are less than 200,000 square feet (Table 5). However, these malls account for slightly more than half of the gross leasable area and half of annual sales in the mall category. Two percent of the malls with 14 percent of the leasable space generate 17 percent of mall sales.

Table 4. Median Square Footage and Annual Sales per Square Foot by Type of Retail Operation and Type of Mall

	Super-regional		Regional		Community		Neighborhood	
	Median square feet	Sales per square foot (dollars)	Median square feet	Sales per square foot (dollars)	Median square feet	Sales per square foot (dollars)	Median square feet	Sales per square foot (dollars)
General merchandise	82,025	**155**	59,252	**144**	30,142	**133**	8,700	100
Automotive	8,340	140	4,400	**184**	5,654	146	4,532	136
Clothing and accessories	3,120	**229**	3,000	**209**	3,091	167	1,651	201
Building materials/ hard-ware	n/a	n/a	8,508	**178**	4,340	131	4,886	111
Hobby/special interest	2,555	**274**	3,000	**234**	2,287	156	1,841	163
Drugs	7,993	229	10,102	228	11,153	247	9,176	241
Other retail	1,220	**371**	1,207	**288**	1,800	172	1,500	143
Shoes	2,035	**291**	2,421	**241**	3,000	168	2,042	145
Home furnishings	2,593	**257**	2,605	**234**	4,982	158	3,390	160
Food	1,008	340	1,090	303	27,715	310	26,176	312
Food service	746	**406**	935	289	1,810	229	1,733	183
Liquor	n/a	n/a	n/a	n/a	2,648	**250**	2,800	217
Home appliances/ music	2,451	**312**	2,473	**282**	2,400	189	2,125	175
Gifts/specialty	2,464	**267**	2,500	**197**	2,673	146	2,250	149
Jewelry	1,129	**748**	1,078	**549**	1,263	264	1,006	280

Source: International Council of Shopping Centers, National Research Bureau Shopping Center Database and Statistical Model, 2003, as modified by Innovologie, LLC.

Table 5. Number and Percent of Malls, Leasable Area, and Annual Sales by Size Category

Size category in square feet	Number	Percent of malls	Total gross leasable area in millions	Percent gross leasable area	Total annual sales in millions	Percent of gross annual sales	Average dollars per square foot
Less than 100,001	28,819	62	1,424	25	$370,564	29	$260.16
100,001 to 200,000	11,220	24	1,552	27	$324,369	25	$209.04
200,001 to 400,000	4,137	9	1,120	19	$195,307	15	$174.54
400,001 to 800,000	1,507	3	836	14	$165,127	13	$197.60
800,001 to 1,000,000	332	1	299	5	$81,273	6	$271.75
More than 1,000,000	424	1	544	9	$140,570	11	$258.18
Total	46,439	100	5,774	99	$1,277,210	99	$221.19

Source: International Council of Shopping Centers, National Research Bureau Shopping Center Database and Statistical Model, 2003, as modified by Innovologie, LLC.

Some Malls Are Ready For Redevelopment

A key finding in our study is how dynamic the mall sector is in terms of the life of a mall. A study by Price Waterhouse Coopers (PWC) (2001a; Sobel et. al., 2001) for the Congress for the New Urbanism suggested that within the next five years there would be as many as 300 to 400 regional malls nationwide that are economically obsolete and in need of redevelopment. We have now nearly reached the end of that five-year period, but it appears that this trend in the decline of some malls continues. Currently, "Greyfield Malls" are about seven percent of the regional mall population (malls greater than 350,000 square feet), which is estimated by the authors of the PWC study at between 1,689 and 2,076 malls.[4] The PWC study predicted that within the five-year period (by the end of 2004), Greyfield Malls might represent just under 20 percent of the total population. A good example of this is the situation in Des Moines, Iowa, where a mall in the southeastern part of the city is struggling and now houses churches and other nonretail activities. At the same time a large new mall is being constructed in the western area of the city that is just a few miles from another existing mall that was constructed in the late 1950s or early 1960s. The new mall may undermine the viability of this mall as well.

Greyfield Malls share a number of factors in common. The majority are privately owned. They have annual sales of less than $150 per square. The average annual sales for the currently identified Greyfield Malls is $114 per square foot. They have significantly lower occupancy rates than viable or healthy malls. They have gross leasable areas under a half million square feet. They are typically eight to ten years older than other malls and have been renovated much less recently than viable or healthy malls. They compete with an average of 22 retail centers within a five-mile radius representing an average of 2.33 million square feet of space.

The main concern with these malls is that they are no longer economically viable as malls and the buildings or the sites require adaptive reuse. The alternatives to adaptive reuse will be introduce significant areas of blight in highly visible and/or important locations or to remove the buildings and use the land for other purposes. From an energy efficiency standpoint, there are significant opportunities to increase the energy efficiency of these buildings if they undergo adaptive re-use or capture energy savings by building more energy efficient buildings on these sites.

The Top Firms Owning and Managing Retail Properties

Earlier we noted that as many as 61 percent of buildings are owner occupied and that most of these are small buildings. This means that for a very large number of buildings the target market is a very large number of small owners. However, there is a fairly significant concentration of property ownership in the retail lease (mostly mall) sub-market and this represents an opportunity to target a relatively small number of firms and individuals to influence a substantial amount of space.

The top 50 national firms that deal in commercial retail lease space own about 1.3 billion square feet which, relative to the total area of malls and strip malls, is 28 percent of the total (Shopping Center World; See also Reed, et. al., 2004). The largest holder of commercial retail floor space is the Simon Property Group with 183 million square feet. The management of retail

[4]PWC points out that there is little consensus on the number of regional malls. Using several sources they arrive at various estimates that vary from 1,689 to 2,500 malls. Regional malls including super-regional malls are distinguished from neighborhood and community malls (See Table 4).

space is fairly concentrated as well. The top 50 firms that manage retail space manage approximately 1.5 billion square feet. That is about 32 percent of the floor space of mall and strip mall properties. Not all of this property is necessarily mall and strip mall property but much of it is.

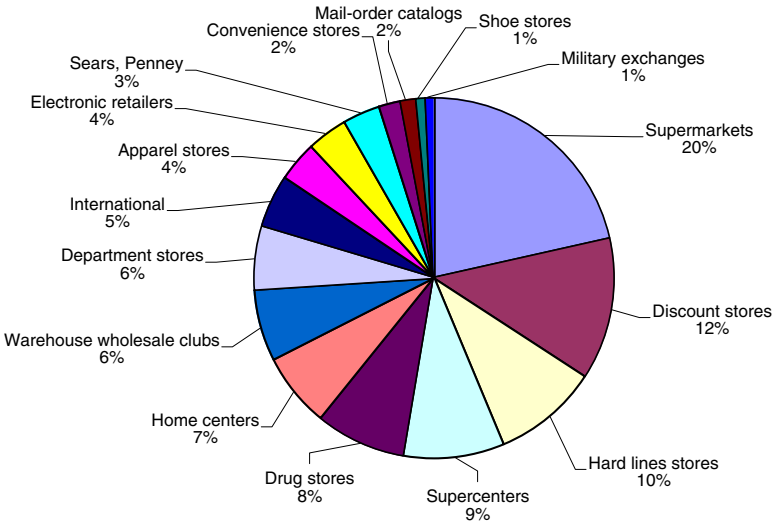
If one compares the top 50 owner and management companies that own or manage lease space, seventy percent or more of the largest owners manage nearly 100 percent of their own retail space. Approximately 10 of these top owners manage space in addition to their own space, and five or six of them manage significantly more space than they own. There are about a half dozen of the 50 large owners that have others manage a significant proportion of their properties. Some of these are insurance companies and investment firms for whom property management is not part of their core business. In some instances, these firms may use large national firms or may select smaller regional or local firms to manage their investment property. Finally, there are a number of firms that focus on managing retail properties for others and do not own enough property to be placed among the top 50 owners. There are about a dozen of these firms.

The bottom line is that about 70 percent of the large owners manage their own properties, about five or six percent manage large amounts of property in addition to the property they own, and about 20 percent of the top retail management firms mostly manage rather than own property.

The Top Users of Retail Space

There are the owners/managers of lease space, and then there are the retailers who lease the space. Many of the top retailers are the clients of the large owner/manager group identified in the previous section. The top 100 retailers have revenues of approximately $1.2 trillion or 34 percent of the total of $3.4 trillion in annual retail revenue (Chain Store Age, 2002). Figure 2 shows how the revenues distribute across different categories of retail. Supermarkets, which we treat in detail elsewhere (Reed, et. al., 2004), discount stores, hard line stores, and super centers account for about half of all annual retail revenues.

Figure 2. Breakout of Revenues by Category for the Top 100 Retailers



Source: Chain Store Age, August, 2002, www.chainstoreage.com

Wal-Mart is the largest retailer accounting for $219 billion in sales or slightly more than one-sixth of the total of the top 100 retailers. The next largest retailer is Home Depot with $54 billion. The top 10 retailers include three grocery stores, a home center, three super-center discount stores, two department stores, and a wholesale club. Because the operations of these retailers span multiple categories, it is difficult to discreetly place them in one or another of the categories.

Some of these retailers own their own space, some lease space, and some own and lease space. At the present time, we cannot separate the top retailers by whether they own or lease. The important point is that these 100 firms control 25,000 retail spaces and significant amounts of space. Whether they own or lease they basically control the physical characteristics of the space including how energy is used in that space. If they own the space, they make decisions affecting energy directly. If they have what amounts to a ground lease, they make decisions affecting energy use directly. If they lease in a build to suit arrangement, they still influence energy use decisions. Thus, these players along with the owners and managers of lease space control large amounts of retail space.

Trends in Retail Construction

An assessment by the Urban Land Institute (ULI) suggests that the retail market has suffered serious setbacks in the past few years that signal fundamental changes in the ways that customers shop. In the short term, ULI believes that retail construction will continue to decline due to slowing growth in retail sales, an abundance of retail space, and cautious lenders and investors[5]. However, the demand for new retail space in selected consumer target markets, specifically grocery stores and discount stores, will grow. Construction of neighborhood shopping centers is expected to remain strong. Traditional retailers and chain stores face steady declines that may lead to a downturn in these types of retail establishments.

The Physical Characteristics of Retail Construction

Our research indicates that some types of buildings in the retail market are increasing in size (Table 6). This shift toward larger spaces is most apparent in the home center and department store sub-sectors where the average square footage of stores has increased by more than 9,500 square feet or 21 percent and by 12,000 square feet or 10 percent respectively. In the specialty apparel sub-sector, store size remains constant at about 7,000 square feet. Larger buildings are likely to use more energy or if the new buildings are

Table 6. Comparison of Average Square Footage between Existing and New Retail Stores

Category	Existing stores square feet	New stores square feet	Percent change in square feet
All stores	54,949	58,254	6
Drug stores	14,600	15,962	9
Supermarket	55,955	57,549	3
Department stores	127,118	139,286	10
Home center	44,095	53,600	21
Specialty apparel	7,410	7,389	0
Big-box store	84,667	88,188	4

Source: Chain Store Age/Leo J. Shapiro, "Building Big," *Chain Store Age Magazine*, July 2001, p. 92

[5]Urban Land Institute Forecast

made efficient, the increased size will offset savings over what their energy use would have been.

It takes just about six months to construct most types of retail stores (Table 7). The shell of the average building takes about 3.5 months and the interior 11 weeks. There is some variation by type of store. Department stores and supermarkets typically take longer than other types of stores. Size and complexity of the operation in the space appear to be factors in the amount of time it takes to construct a building.

Table 7. The Average Number of Months to Construct New Stores

	Months to erect building shell	Months to complete interior with fixtures, lighting, flooring
All stores	3.53	2.87
Drug stores	2.87	2.10
Supermarket	3.67	3.56
Department stores	4.61	4.25
Home center	3.16	2.26
Specialty apparel	2.09	2.09
Big box store	3.85	2.86

Source: Chain Store Age/Leo J. Shapiro, "Building Big," *Chain Store Age Magazine*, July 2001, p. 92

The rapidity with which construction is completed has implications for implementing energy efficiency. Lead times required for ordering materials are weeks and even months in advance of actual construction. With a six-month construction timeline, decisions about materials are mostly made before construction starts. Thus, once construction has started, it is too late to incorporate energy efficiency into designs in a holistic way. Site acquisition and planning typically precede construction by months. Retail space acquisition typically involves negotiating with the owner of lease space about the improvements that will be made and who is responsible for them. Thus, many decisions including decisions about energy efficiency are foreclosed at the acquisition phase.

Table 8. The Average Number of Years Before Stores Are Remodeled By Type

Type of store	Average number of years
Drug stores	9.4
Department stores	9.3
Supermarket	8.2
All stores	7.5
Big box store	6.3
Home center	6.2
Specialty apparel	6.0

Source: Chain Store Age/Leo J. Shapiro, "Building Big," *Chain Store Age Magazine*, July 2001, p. 92

The average store is remodeled between seven and eight years (Table 8). Home centers, specialty apparel, and big box stores have a six-year cycle, while department stores, supermarkets, and drug stores are on eight- to nine-year cycles. The cycle time is probably driven by several factors. One factor is likely to be the investment involved. Supermarkets and department stores probably involve greater capital investments. A second factor is the "life-time of the look." Big box and apparel stores may need to freshen their look more often than supermarkets and department stores. The important point is that one does not have to wait through the lifetime of a retail building for the opportunity to change its energy use characteristics. There are opportunities to change the building when the building is remodeled and when there is tenant turnover. The data suggest that the characteristics of a building are not fixed over the lifetime of the building.

Malls are dynamic with a constantly changing set of retailers. This leads to constant changes within the building. There are different reasons for these changes. Developers target their retail space to certain groups of people and recruit retailers with that in mind. Locations become more or less important as transportation networks change. Retailers develop brands and stores to serve different customer segments and/or are careful to choose locations to capture the customer segments they intend to serve. These practices recognize the dynamics of the market-

place and the impact of the changing nature of neighborhoods, communities, and road networks on markets and retail spaces. In this view of the market, at least some building shells are a carrier for image and branding. The shells are the scaffolds on which and within which brands are displayed and goods are sold. They are necessary but they can be changed or torn down and rebuilt in different forms if the requirements of retail change.

Leasing and Decision-Making

Decisions regarding owner-occupied buildings are heavily influenced by the needs and demands of the owners. In contrast, decisions regarding how space can be used and modified in leased buildings are subject to negotiation between the tenant and the owner or the owner's representative.

The degree to which a tenant in a lease situation controls amenities can range from constructing a building of the tenant's design on a plot of leased ground (a ground lease) to accepting a space and the amenities within it more or less as is. The equivalent of a ground lease in a retail setting is being able to modify anything between the floor and ceiling and within the walls of a leased area. The degree to which a tenant can control the design and features of a space is largely a function of what the tenant is willing to pay. The owner may place some constraints on the external appearance for reasons of consistency, for example, within a mall or group of buildings. There are instances where landlords have sued retailers because the retailers repainted the exterior of a big-box store in the retailer's colors setting it apart form other buildings on the site.

The structure of the lease depends on tenant requirements and whether the owner or the lessee is to meet the requirement. A tenant may have a complex design that incorporates the image that the tenant wants to project to the public or special requirements that the tenant needs to conduct business from the space. These designs and requirements may include electrical and mechanical requirements such as raised floors in computer rooms, special air conditioning or air filtering units, and lighting such as indirect lighting in areas where employees are using computer screens. Most of the national retailers have architects and designers or consulting architects and designers who design and build the space to specification. These national image architects may make use of local architects to smooth the way with local zoning boards and code officials. As an engineer for one national retailer that monitors and controls the environment in their mall stores from a national center told us not long back, "We haven't met an owner who would not let us do what we need to do as long as it is in the lease." Alternatively, the owner may build to suit, or each party may be responsible for parts of the construction.

Although we do not have data to demonstrate this, it appears that lessees are more likely to do their own design and construction if they require complex changes, particularly if they are brand related. In other cases, owners may bring the space to a predetermined standard and the tenants then add their own fixtures and signage.

The lease will spell out the special conditions as well as who is providing the designs and doing the construction. It may also specify who is to dismantle features that are incorporated into a space when the feature has reached its useful life or when the lease is terminated. For instance, the lease may specify that data cable should be retrieved from the plenum upon termination of the lease. The lease will clearly spell out the cost and who is to pay for the improvements and for the operation of the improvements.

The assumption is often made that the costs of energy efficiency upgrades are a cost to the property owner and that the benefits accrue to the lessee who pays the energy bills. It is fur-

ther assumed that landlords are reluctant to make efficiency improvements. The reality is somewhat different than this.

As noted above, leases are always open to negotiation and the conditions of the lease may vary with conditions in the market or even with the nature of the space involved. In tight markets, the tenant may get a less advantageous lease. When energy costs are volatile, the tenant may be required to pay for energy costs above a certain threshold. When competitive space is widely available, the terms of the lease may favor the tenant and some portion of energy costs may be included. The terms of leases within the same building may vary quite substantially from tenant to tenant. Without reviewing the leases it is difficult to know who may be paying for the energy or other amenities even within the same building.

Who pays for the energy may be influenced by other factors including the relationship of the lease space to the structure of the building. In large structures with centrally conditioned air, the "landlord" is likely to pay the bill for the air conditioning while lighting and plug loads may be separately metered and may be paid by the tenants. What that means is that the landlord builds air conditioning energy costs into the lease along with a threshold above which the tenant pays the costs on a per square foot basis.

In smaller structures with package units or other types of space conditioning, there may be a one-to-one association between the space conditioning equipment and the lease space. In these cases, the lessee may pay directly for the energy associated with all uses within the space.

There are three basic types of leases:

- A gross lease in which the landlord pays for everything
- A fixed base lease in which the landlord pays for the energy costs to some specified level (the base) after which the tenant is responsible for the energy costs
- A net lease in which the tenant pays for everything

In the case where the landlord pays for everything, the return from energy savings investments go entirely to the landlord. In the case of a fixed base lease, there is a threshold above which the lessee pays the additional cost of energy. If an energy savings investment lowers the energy cost per square foot well below the threshold, then the owner receives direct benefits from the amount of the cost reduced below the threshold and the tenant benefits from not having to pay for the cost of energy above threshold. If the costs are sufficiently reduced under the base, the landlord has incentives to improve energy efficiency. In addition, Jewell points out that energy efficiency improvements can increase net asset value and that this, in turn, is of substantial benefit to the landlord (Jewell). Finally, if the lessee pays everything and the lease is of sufficient length, it is to the lessee's advantage to make efficiency improvements. Many national retail chains are quite concerned with the comfort of shoppers and the shopping experience and want to control the environment. The bottom line is that the benefits of the saving can and will flow to the firm making the investments and paying for the energy.

Summary and Conclusions

This paper points to a number of features of the retail market that should influence the strategy for promoting energy efficiency in the retail market.

First, there are basically two segments in the market, a national retail market and a local or regional retail market. Within the national retail market there are three major groups of players. There are the large retail property owners, the top 50 of whom own the equivalent of 28 percent of enclosed mall and strip mall space. There are the large retail property managers, the top 50 of whom manage the equivalent of 32 percent of enclosed and strip mall space. And there are the major retailers, the top 100 of whom have about $1.2 trillion in annual revenues or about one-third of total U.S. retail revenues.

A substantial percentage of the space in the national commercial market is lease space. The national retailers are quite likely to control the design and layout in this space through their image architects. They are also frequently responsible for energy costs. The important point is that for large retailers and/or large developers, decision-making about design and therefore energy efficiency tends to be centralized. An implication of this is that promoters of energy efficiency can potentially influence the efficiency of large amounts of commercial space by working with a relatively small number of players at either the regional or the national level. The data suggest that a basic strategy might be to work with the large retailers, the retailers' image architects, the large owner developers, and the large building managers specializing in retail recognizing that they influence each other. The size of this target audience is relatively small, a few hundred players. Because of the small size of this group they can be effectively addressed using one-to-one strategies. Because their interests are dispersed across jurisdictions, it makes sense that efforts to influence the energy efficiency of the buildings needs to be regional and national in scope. DOE, EPA, and the national and regional energy efficiency and market transformation organizations can potentially play the lead roles reaching and promoting energy efficiency among these players.

The second segment is the regional and local market. Both in terms of number of establishments and the amount of space, this is the largest market. The retail spaces in this market are small, tending to be 5,000 square feet or less. These spaces also tend to be solely occupied by the owner. Only a small percentage of these spaces are leased to others exclusive of owner occupancy. Thus, in the regional and local retail markets, one is dealing mostly with large numbers of small owners. Further, because of the size of the space, one is likely to be dealing with residential scale technologies. There is a broad base of trade allies, HVAC contractors, and others who are players in the market and who can potentially be organized to promote energy efficiency. Addressing this market will require the efforts of local and regional energy efficiency organizations and utilities. DOE, EPA, and other national market transformation organization can potentially help by providing market research, design, and technical support but the market clearly requires local resources for outreach and deployment.

If we examine these markets in a larger context, the data suggest that split incentives are not a major issue in this market. In the major retail market, many of the retailers pay their own energy costs and they are also in a position to dictate the selection of equipment. Thus, they are in a position to obtain the benefits from energy efficiency. As we have shown, in the general mercantile and service sub-markets, owners are in the majority and are directly in a position to obtain the benefits from energy efficiency. The data we have presented suggest that the incentives may truly be split for as little as 15 to 20 percent of retail space.

Another important finding from our research is that the decision to incorporate energy efficiency into a building has to be made very early in the life of a project. Construction timelines for retail projects are relatively short, roughly six months. Once construction has started, it is generally too late to influence projects because the specifications and the purchasing are largely

complete. For the major retailers, it is important to influence the design basis used by their "image architects" for retail projects. The design basis is used in the negotiations for lease space and/or for laying out space once a lease is anticipated.

We generally think of buildings as having long life times bit, depending on the type of retail space, remodeling may occur as often as every six to nine-year years. The remodeling cycle presents opportunities to change the energy characteristics of a building. Potentially an important strategy is to target remodeling efforts.

Another important finding is that as many as 20 percent of regional malls, which are mostly enclosed malls, are marginal and may need to be redeveloped or the land reused for other purposes in the next three to five years. Whatever new uses the buildings or land take, there is opportunity to influence the energy efficiency of the buildings that will occupy the space.

In the current environment, especially for some retail buildings built in the last 20 to 30 years, it may be more appropriate to think of retail buildings as having a shorter lifespan, perhaps in the range of 20 to 30 years.

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