

Implications of Ownership: An Exploration of the Class of 1999 ENERGY STAR® Buildings

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ABSTRACT

In January 1999 the U.S. Environmental Protection Agency (EPA) and the Department of Energy (DOE) expanded the ENERGY STAR program to include non-residential buildings. The ENERGY STAR Buildings Program includes two elements: a benchmarking tool and a label. The benchmarking tool puts office building energy performance in a national context, and the top 25 percent of benchmarked buildings that also maintain healthy, comfortable indoor environments are eligible to receive the ENERGY STAR label. In 1999, 90 buildings spanning almost 90 years of construction and operational practices were awarded the ENERGY STAR label. Beyond energy performance, little is known about the physical and operational composition of these ENERGY STAR labeled buildings.¹ Even less is known about the groups of people who own and manage these buildings, and whether they are planning to upgrade additional space (or develop new space) to meet this performance standard.

This paper describes the range of firms and institutions involved in owning and managing the first 90 ENERGY STAR labeled office buildings. The purpose of the study is to explore the organizational contexts that favor the adoption of energy-efficient technologies and practices. Focusing on the commercial real estate sector, the paper discusses structural and cultural characteristics of the firms involved. The results provide insight about the pathways that different types of real estate firms represent in transforming the market for energy-efficient technologies and practices. Future energy efficiency projects could take advantage of these findings in program design and evaluation as a means to target firms that are likely to adopt energy-efficient technologies and practices. On a broader level, these findings can lead to an understanding of the role that such firms play in the market for commercial buildings.

Why Focus on Ownership?

Traditional demand-side management research has used space types and physical characteristics to describe the potential benefits of widespread adoption of energy-efficient technologies and practices (e.g., OTA 1992). By dividing the building stock into homes, offices, hospitals, restaurants, and so forth, and considering the energy efficiency opportunities available for each type of space, these studies allow energy efficiency advocates to determine the technical potential for cost-effective energy efficiency improvements. Actual adoption rates of energy efficiency measures are, however, much lower than the technical potential suggests.

Another way to subdivide the building stock is to focus on different ownership types.

¹ A paper by Hicks & von Neida (2000) explores these characteristics.

Just as two space types represent different technical opportunities and challenges, two different ownership types represent various organizational opportunities and challenges. In the residential sector, for example, energy efficiency investments often look more attractive to a homeowner than to a renter. Therefore, we ask: How might the costs and benefits of energy efficiency appear to different kinds of commercial building owners? Is energy efficiency more attractive to some kinds of owners than to others? If so, for what reasons?

In this paper, we use the set of office buildings labeled in 1999 by EPA's ENERGY STAR Buildings Program to empirically explore the effect of ownership type on energy efficiency adoption. We begin by providing some background about the ENERGY STAR Buildings Program and the kinds of ownership categories that exist in the commercial sector, particularly for office buildings. Next, we discuss our approach and the selection bias in our sample by characterizing the recruitment methods used by EPA to build the database of buildings that have received the ENERGY STAR label. We then describe the distribution of ownership types present in first 90 ENERGY STAR office buildings, which we call the "Class of 1999". Because approximately three-quarters of these 90 buildings are part of the commercial real estate (CRE) sector, we focus the bulk of our analysis on different types of CRE firms. In the final section of the paper, we select four specific firms of different sizes and management structures and suggest some ways in which differences in firm type may affect energy efficiency adoption and diffusion. By understanding the similarities and differences in ownership among these buildings, we draw conclusions about the potential for additional owners to adopt similar practices.

What Is the ENERGY STAR Buildings Program?

The brand name "ENERGY STAR" refers to a set of voluntary partnerships between the U.S. government² and product manufacturers, local utilities, home builders, retailers, and businesses. These partnerships are designed to encourage energy efficiency in products, appliances, homes, offices, and other buildings. Partners help promote energy efficiency by labeling products and buildings with the ENERGY STAR logo and educating consumers about the benefits of energy efficiency. In addition to promoting efficiency, ENERGY STAR also offers tools to decrease operating costs, reduce air pollution, and save money for large and small businesses and organizations.

In January 1999 the EPA and DOE expanded the ENERGY STAR program to include office buildings. The commercial buildings branch of ENERGY STAR (administered by EPA) relies on a web-based benchmarking tool to compare the energy performance of an applicant building to the energy performance of a peer group.³ To benchmark a building, an applicant needs a year's worth of utility data and some basic information about their building's location, size, operating schedule, and number of computers and workers. The reference peer group for the tool is drawn from data provided by the Commercial Building Energy Consumption Survey (EIA 1995), and the comparison scale ranges from 0 to 99. Those buildings receiving a score

² The program is co-administered by the Environmental Protection Agency (EPA), the Department of Energy (DOE).

³ In early 2000, ENERGY STAR expanded the benchmarking tool to include schools. Other space types planned for future benchmarking efforts are industrial and retail buildings.

of 75 or higher are eligible to apply for the ENERGY STAR label for buildings. A complete application for the building label includes a statement of energy performance (generated by the benchmarking tool) that has been certified by a professional engineer that the building satisfies the American Society for Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE)'s ventilation and comfort standards. After submitting the necessary paperwork, the applicant receives a bronze plaque for the building, license to use the ENERGY STAR logo, and a spot on the ENERGY STAR website to publish a case study about the building. In this way, ENERGY STAR promotes recognition for the top 25% of the building stock.

Office Buildings and Ownership

Office buildings that have received the ENERGY STAR label can be put into one of three general ownership categories: owner-occupied, government-owned, or owned by commercial real estate investors (leased wholly or in part to other parties). These ownership types have different organizational goals and measures of success. Private owners strive to enhance corporate value or stock price through the operation of their core business. Governmental organizations administer public programs and functions while making the most of taxpayer dollars. Real estate investment firms want to maximize the asset value of their holdings.

Because the business goals and operating styles of these ownership types differ, the "barriers"⁴ to and opportunities for adopting energy efficiency are different. Accordingly, each ownership type may be differently motivated to adopt energy efficiency. In owner-occupied spaces, energy investments compete with core business investment. Profit margins vary by industry, and there is a wide range of decision-making processes related to the selection of new building-related technologies and management practices. In commercial real estate, the responsibility for energy-related decisions is fragmented between the owner, manager, and the tenant. Traditionally, there have been no quantifiable incentives that favor energy efficiency at the time of a property's sale, the holding time of the asset varies, and different lease arrangements affect energy issues differently. Finally, in the public sector, governments operate on a limited facilities budget. There is minimal image-related incentive to performing aesthetic upgrades (as compared to the private and investor sectors) that might incorporate efficiency improvements as a secondary benefit, and bureaucratic fragmentation often inhibits action (including financing for physical improvements). In many cases, a change in operating policy (like the pursuit of energy efficiency) must be part of a legislative mandate in order to be implemented.

Approach

For the purposes of this paper, achieving the ENERGY STAR label will serve as a proxy for an organizational commitment to adopting energy efficiency.⁵ There are several

⁴ The use of the term "barrier" has been contested by Shove (1998) and others because it evokes an image of usual practice getting in the way of energy policy. In a presentation at the National Building Museum on April 10, 2000, Bill Prindle suggested seeking gateways rather than trying to overcome barriers.

⁵ That is, we use achieving the label as an indicator of organizational interest in achieving energy-efficient buildings. This commitment to energy efficiency exists outside the context of the label; the label is a way of

methodological issues which arise from this research approach, mainly having to do with construct validity, anonymity, and selection bias, which we discuss below. Each of these issues limits the scope of applicability of our results, as does the small sample size. Because the program is still young, these early participants may not fully reflect the core of motivated organizations. Accordingly, our intent is to explore (rather than define) some ways in which different ownership characteristics may affect the adoption of energy-technologies and practices.

Validity

Using the ENERGY STAR label as an indicator of organizational action is potentially problematic because the benchmarking tool does not address specific technologies or practices. As a result, the label does not have a means to distinguish between those organizations and firms that are “low energy” rather than “energy-efficient.”⁶ Based on a recent survey, however, we believe low energy buildings to be the exception rather than the rule. The majority of the buildings in the Class of '99 have undergone energy efficiency upgrades of different kinds in the last three years, suggesting that the organizations and firms involved are actively choosing to pursue energy efficiency (Hicks & von Neida 2000).

Another potential difficulty to this approach is that the ENERGY STAR label simply recognizes the top 25% of the building population, rather than creating an incentive that leads to further market transformation. In this case, our construct might fail the validity test because we are looking at what has happened in the past and assuming it affects what will happen in the future. With only one full year's worth of data, it is difficult to discern trends in the overall market. Where possible, we compare actions taken by organizations in 1999 and in the first part of 2000 as examples of reactions to the ENERGY STAR label.

Anonymity

Because we wanted to treat the market(s) for office buildings empirically, we needed to decide whether to name names or withhold identifying information. Some of the information on which we base our analysis is publicly available, some of it is proprietary, and some firms participating in EPA's programs hold their proprietary information more dearly than others. In the interest of providing a rich description of the market, we decided to focus our discussion on a few firms with whom EPA has a good working relationship (and their concerns about anonymity are lower).

Selection Bias

For analytical purposes, it would be ideal if the sample Class of '99 was either a random or a representative sample, either of the physical building population or of ownership patterns across the nation. Although the program is designed to allow and encourage building owners

recognizing the commitment.

⁶ For instance, a naturally-ventilated, thermally massive building from the 1930s in San Francisco may have a low energy use intensity even though its lighting and heating equipment are inefficient.

or managers to apply for the label without EPA assistance, few of the buildings in the sample were completely self-selected. As part of their ongoing efforts to motivate the industry, EPA encouraged and trained organizations to benchmark their buildings. As a result, the actual composition of the sample reflects a mixture of recruitment efforts that led to voluntary submission of label applications from the private sector (owner-occupied and commercial real estate buildings) and involuntary applications from a large group of public sector buildings.

Recruitment. There are three ways in which EPA recruited applications for the building label. They targeted a few specific buildings, they motivated ENERGY STAR partners to benchmark their own buildings, and they encouraged energy service providers to benchmark their clients' buildings.

During an initial two month period of introduction and promotion of the benchmarking tool, a few buildings in the sample, like Occidental Chemical Center in Niagara Falls, were targeted by EPA staff as high-profile, low-energy buildings. In these cases, EPA staff approached the owners or designers of buildings lauded as environmentally responsible and energy-efficient and directly solicited their label applications. Responses to these targeted approaches were mixed. Sometimes the solicitation efforts were successful, other times they were not. One high-profile building (a corporate headquarters outside San Francisco) had already received a number of other awards for its green design, but its owners refused to benchmark the building's energy performance. Owners of another noted green building, headquarters to an environmentally conscientious non-profit in Washington DC, benchmarked their energy performance, but the building did not qualify for the label.

In addition to targeting a few specific buildings, EPA also encouraged program participants from its three market sectors (owner-occupied, government-owned, commercial real estate investor-owned) to benchmark their buildings. To register as a program participant, an organization signs a letter expressing its intent to assess its energy performance using software tools that EPA provides.⁷ One of the ways in which participating companies can fulfill their letter of intent is by benchmarking the buildings in their portfolio of properties.

The final way in which EPA recruited buildings was by leveraging its partnerships with another kind of company—energy service providers—to solicit label applications from their clients. When the benchmarking tool became available in March of 1999, EPA asked some of its energy service provider partners to benchmark buildings for which they had done energy upgrades.

Involuntary application. In addition to recruiting specific buildings and firms from the private sector, EPA also used its federal government connections to obtain a batch data file from the U.S. General Services Administration (GSA).⁸ This file contained utility data and basic building characteristics for about 700 federal buildings. These data were dumped into the benchmarking

⁷ One of these tools, called "QuikScope", is described in greater detail in Jewell (1998).

⁸ Under Executive Order 13123, federal agencies are required to improve the energy efficiency of the buildings they occupy over the next several years and use the Energy Star Benchmarking tool as a measure of energy performance. EPA, as an experiment in batch data processing, made the tool available to GSA in mid 1999, prior to GSA designing and implementing a national strategy to follow the Executive Order.

tool for performance analysis.

Distribution of Ownership Types

Ideally, looking at a distribution of ownership types in the Class of '99 would sketch how willingly different types of owners adopt (or can be encouraged to adopt) a commitment to energy efficiency.⁹ Because the buildings in the Class of '99 are not self-selected, however, this distribution also reflects the ability of EPA staff to target and reach these ownership types.

Owner-Occupied 7%

Often thought to be the most promising sector for energy efficiency improvements due to the lack of split incentives, the Class of '99 has fewer owner-occupied buildings than any other kind. Only six of the 90 buildings are owned and occupied by the same company. Most of these buildings were benchmarked by ENERGY STAR energy service provider partners.¹⁰

Government 19%

Seventeen buildings from the sample are government-owned. Twelve of these buildings are U.S. General Services Administration buildings. All twelve achieved the label as a result of the GSA batch data file with subsequent submission of the label application by GSA regional offices. The remaining five buildings belong to state or local governments. These buildings were benchmarked by a mixture of local government employees and ENERGY STAR energy service provider partners.

The number of GSA buildings in the Class of '99 is very low, considering that close to 150 of the 700 GSA buildings had scores that qualified them for a label. The numerical results of the batch data dump were sent back to GSA building contacts for them to follow up with label applications, where appropriate. For many of these contacts, the ENERGY STAR benchmark score was an unknown number linked to an unfamiliar program. In 1999, the GSA had not established protocols or delegated responsibility for applying for labels. In other words, there was little or no institutional buy-in: GSA building managers could take or leave their ENERGY STAR score and the rest of the application process.¹¹

⁹ Of course, this sketch is specific to ENERGY STAR. A different program with other attributes and incentives (e.g. where the "carrot" is a rebate instead of recognition), might have different levels of participation from different groups.

¹⁰ ENERGY STAR does have other owner-occupied partners, but many buildings from this ownership sector were not eligible for benchmarking because they were industrial buildings, retail stores, or hotels.

¹¹ By early 2000, many of the institutional kinks had been worked out and another 50 labels were awarded to GSA buildings.

Commercial Real Estate 74%

The largest proportion of the Class of '99 buildings are in the commercial real estate (CRE) sector. These 67 buildings are owned and/or managed by a total of 13 companies. Almost half of the Class of '99 buildings are owned by a single firm: Arden Realty. Among the CRE companies are many of the top names in real estate, as well as some regional niche market providers. Ten of these 13 companies are partners in EPA's CRE program.¹² Although the core business of these firms—commercial real estate—is the same, the ways in which they organize their work and the markets they pursue differ tremendously.

In the next section, we discuss some of the characteristics of commercial real estate companies by describing four different companies. Based on this discussion, we will explore some ways in which a CRE firm's organization might affect energy efficiency adoption.

Types of Commercial Real Estate Firms

Commercial real estate is an intensely regional activity, yet many firms have property portfolios that span different states and even nations. Firms may court special kinds of tenants or expect a variety of tenants to come to them. Some firms own property, some manage it, while others both own and manage. Some firms are known as ground-up developers, some purchase existing properties, and others may do a bit of both. Some firms have been owned by a single person or family for decades; others operate as stockholder investment vehicles.

The two characteristics of commercial real estate firms that we have selected to address are ownership structure and portfolio size. In terms of ownership, there are two basic types of firms: privately-owned, and publicly-traded. Traditionally, commercial real estate firms were privately held organizations; many of these centered around the holdings of a single family. In the early 90s, with the downturn in the real estate market, there was a surge of publicly traded firms known as real estate investment trusts (REITs).¹³ REITs are typically run in an aggressive growth mode. Private firms are responsive to the market, but they also have the flexibility to incorporate the particular interests of their owners.

In addition to ownership structure, CRE firms also differ in terms of their portfolio size. Most CRE firms control millions of square feet of office space, and they may have hundreds or thousands of employees. The distribution and number of properties one company controls could have implications for the levels and kinds of efficiency measures that are likely to be adopted in different markets. Table 1 shows a 2 by 2 matrix of different types of CRE firms represented in the Class of '99.

¹² In total, EPA's commercial real estate partnership program represents a commitment of over 1.6 billion square feet of office space.

¹³ REITs were created by Congress in 1960 but played a limited role in real estate investment for more than three decades. The National Real Estate Investment Trust (NAREIT) traces the 1992 increase in publicly traded real estate to the combined impact of the savings and loan crisis, the Tax Reform Act of 1986, overbuilding during the 1980s, and regulatory pressures on bank and insurance leaders (www.nareit.com).

Table 1. Commercial Real Estate Firms with ENERGY STAR Labeled Buildings in the Class of '99

		Ownership Structure	
		Private	REIT
Portfolio Size	20-350 Msf	Cushman-Wakefield Hines Jones Lang LaSalle PM Realty Group	Equity Office Mack-Cali Prentiss
	< 20 Msf	Amerimar Douglas Emmet Harwood International Mile High Properties Tarantino	Arden Realty

We have selected two REITs to profile (Equity Office and Arden Realty) and two private firms (Hines and Harwood International). The bulk of the ENERGY STAR labeled buildings in both the Class of '99 and those from the first half of 2000 are owned by these companies. Equity Office is the largest REIT and Hines is the largest private property owner. Both of these firms have more than 75 million square feet of office space in their portfolios, making them among the largest organizations of their ownership structures in the country. Harwood, which is privately held, and Arden, a REIT, represent niche rather than national markets, and both have less than 20 million square feet of office space in their portfolios.

Arden Realty, Inc.

Arden Realty, Inc., a Los Angeles-based REIT, is the largest landlord of office buildings in Southern California. Since its initial public offering in October 1996, Arden has acquired 142 properties, increasing its ownership square footage to over 18 million square feet in seven counties. Arden's in-house operations include leasing, property and asset management, re-development, and acquisition. Although not recognized as a ground-up developer, Arden recently embarked on several high profile development and construction projects. Most of the properties that Arden owns are multi-tenant, suburban, class A and class B buildings. A typical Arden property is between 100,000 and 300,000 square feet in size, but a few are smaller than 50,000 and some are in the 500,000 + range. (www.ardenrealty.com.)

Because Arden has acquired rather than developed most of its properties, upgrades and renovations represent its major contribution to its building stock. Arden operates in a mild climate zone but in a state that has a history of strong energy efficiency regulations and some of the highest energy prices in the country. Arden has an overall energy efficiency plan for its buildings and seems poised to invest in energy efficiency as an integral part of its corporate strategy. Twenty-two percent of Arden's portfolio (31 buildings, representing about 4 million square feet) received the ENERGY STAR label in 1999, and Arden earned a "Partner of the Year" award from ENERGY STAR. In early 2000, Arden benchmarked and labeled another ten of its properties.

Equity Office Properties

Equity Office Properties, headquartered in Chicago, is the nation's largest publicly held owner and manager of office properties, with a national portfolio of 380 buildings comprising 95.5 million square feet in 23 states and the District of Columbia (www.equityoffice.com). Founded in 1976, Equity has six regional offices and over 1,700 employees. Typifying its aggressive growth, Equity has merged with two other REITs within the last two years. Equity also pursues growth through expansion of tenant amenities, such as bulk purchasing of telecommunications office services. Equity's area of expertise includes property management, leasing, finance, tax, acquisitions, disposition, development, marketing, and real estate law. Equity's office portfolio matches the current benchmarking tool's service territory.

Like Arden, Equity has acquired (rather than developed) most of the buildings in its portfolio. Typically, Equity's buildings are class A spaces in the 300,000 to 600,000 square foot range. Equity's properties are located in suburban, urban edge, or central business district markets. At this stage in its corporate growth, Equity rarely makes single-building purchases. Asset expansion is achieved through purchasing multiple-building portfolios or merging with other companies. In either case, Equity looks to reducing operating costs and increasing income streams through, among other things, energy efficiency upgrades. Equity believes that their experience in building management and engineering, as well as marketing, make their buildings more attractive to tenants and profitable and valuable to the company. Two of Equity's properties, one in Atlanta and one in Denver, qualified for the Class of '99. By the first half of 2000, Equity had benchmarked and labeled twenty more of its properties, representing approximately 9 million square feet.

Harwood International

Harwood International is a Dallas-based, international real estate company that provides "total occupancy solutions" for its tenants. (www.harwoodinternational.com) The company was founded in 1988 by a Swiss real estate investor who continues to own the company. In comparison to Equity, Harwood is, by choice, a small company. Harwood has less than 2 million square feet of premier office space in its portfolio. Its typical property is a class A building in the range of 200,000 square feet, located in an urban area but not necessarily the central business district. Most of Harwood's tenants are referrals and repeat customers. Harwood's primary growth strategy is to develop new properties to suit the expanding needs of existing clients.

Harwood's commitment to energy performance is demonstrated by the buildings with energy monitoring systems that assess consumption on a minute by minute basis, down to individual plugs, if requested. The corporate philosophy that supports such a highly detailed level of analysis attracts clients with similar views, such as a European manufacturer of precision timing instruments. This corporate philosophy also extends to environmental issues. For instance, on land the company owns but has not yet developed, Harwood has planted a nursery that provides trees and other plantings for the abundant landscaped areas around the company's properties. To complete the site development at one of its Dallas buildings, Harwood used its nursery stock to plant a formal 1.5 acre garden in an urban context. The publicity this effort

generated was so great that it was not necessary to produce any customary marketing brochures and the building was fully leased upon completion of construction. In effect, the company spent their marketing budget on landscaping. As a result of efforts like this, the company has received awards from the Associated Landscape Contractors of America and the Texas Forest Service.

One of Harwood's 30 properties has qualified for a label, but this single building received one of the highest scores in the Class of '99. Harwood also received a "Partner of the Year" award from ENERGY STAR.

Hines

Founded by Gerald Hines in 1957, Hines is a private commercial real estate development company—based in Houston—that handles most aspects of real estate development, including site selection, rezoning, design, construction bidding and management, and financing. Hines owns, has controlling interest, and/or manages approximately 99 million square feet of class A office space in the United States. In addition to its US portfolio, the company represents a comparable amount of office space distributed amongst 13 foreign countries. One of the world's largest real estate firms, Hines has more than 2800 employees and a portfolio that includes premier corporate headquarters, mixed-use centers, industrial complexes, and master-planned resort and residential communities. Of approximately 130 office buildings in the U.S., almost half are greater than 500,000 square feet each, and several are over a million square feet in size. They are located in both suburban markets and central business districts.

Like Harwood, Hines has a clear corporate philosophy. Hines believes that better tenants are attracted to buildings of superior quality and architectural merit. When backed by responsive management, these buildings command higher rents and retain their value longer despite the ups and downs of real estate cycles (www.hines-ww.com). Like Harwood, Hines develops buildings for status and market penetration through attractive design. The list of architects behind their ENERGY STAR labeled buildings is a veritable who's who of signature design firms since the company's founding. As impressive as the list of designers, the list of tenants (many of which are often equity partners hired by Hines to develop and manage the properties) include major financial institutions as well as major pension funds and luminary law firms. In the Class of '99, Hines had 14 ENERGY STAR labeled properties representing 10 million square feet of space. In the first half of 2000, Hines benchmarked and labeled twelve more of its properties, equaling over 7 million square feet.¹⁴

Firm Types and Efficiency Opportunities

As described in the previous section, the commercial real estate firms with ENERGY STAR labeled buildings have different service offerings, operating styles, ownership structures, geographic coverage, and property portfolios. The wide variety of firm types suggests that no one kind of firm will benefit most from adopting energy efficiency. There are, however,

¹⁴ Just over half of the buildings to have received the label were developed by Hines to their own specifications. The rest were purchased and qualified for the label through either upgrades or refinement in management practices.

differences between the ways in which these firms adopt energy-efficient technologies and practices. The private firms (e.g., Harwood and Hines) tend to have higher benchmarking scores than the REITs (Equity and Arden). The smaller firms (e.g., Harwood and Arden) have been quicker to become ENERGY STAR partners, but the larger firms have a greater potential for actually transforming the market. With the small number of buildings benchmarked in the class of 1999 and the few firms profiled here, we cannot draw robust conclusions about the effects of firm types on energy efficiency adoption. However, based on our exploration of the data available, we can suggest some possible directions for future program development.

We suggest that the most successful strategy for market transformation is to emphasize the direct contributions that energy performance improvements can make to core business goals. When done correctly, improving the energy performance of a building can have both quantitative benefits (e.g., cost savings leading to increases in net operating income) and qualitative benefits (e.g., improved thermal comfort, enhanced health and safety).¹⁵ Experience with the Class of '99 shows that both REITs and private firms respond to the quantitative benefits of energy efficiency. We believe, however, that private firms are more likely than REITs to respond to the qualitative benefits of energy efficiency, particularly if these benefits coincide with the owners' corporate philosophies. Qualitative benefits are not currently the focus of ENERGY STAR, but they may become more important in the future. As the market for energy-efficient technologies and practices develops, energy efficiency programs that match their messages and offerings closely to the business needs of different kinds of participants may be more effective than programs that take a one-size-fits-all approach.

Conclusion

Although some owner-occupied and government-owned buildings were awarded the ENERGY STAR label in 1999, almost three-quarters of the labels were awarded to buildings in the commercial real estate sector. An exploration of the portfolio size and ownership structure of the firms in this group suggests that no one kind of real estate firm is "the type" that adopts energy efficiency. Although there are adoption opportunities for all, different types of firms do practice energy efficiency in different ways. Learning more about these differences would be a useful topic for further research.

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¹⁵ These benefits are "qualitative" in the sense that they are difficult to accurately quantify, measure, and replicate.

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