Implications of Ownership in the U.S. and U.K.: An Exploration of ENERGY STAR® Buildings & the Energy Efficiency Accreditation Scheme

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ABSTRACT

The U.S. Environmental Protection Agency's ENERGY STAR benchmarking tool has been used to put building energy performance in a national context since 1999. Beyond energy performance, little 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. Previous work (Janda & Brodsky 2000) described the range of firms and institutions involved in owning and managing the very first 90 ENERGY STAR labeled office buildings. This paper: (1) revisits and builds upon the initial work, and (2) creates a comparative context by including information about organizations participating in the U.K. Carbon Trust's Energy Efficiency Accreditation Scheme (EEAS). Both ENERGY STAR and EEAS recognize buildings and organizations of many different types (e.g., offices, banks, universities, schools, and hospitals). This paper explores organizational contexts that favor the adoption of energy-efficient technologies and practices by identifying and comparing participants in these programs, with a particular focus on firms and organizations in the office sector. The results provide insights about the pathways that different types of organizations represent in transforming the market for energy-efficient technologies and practices in the U.S. and the U.K. Future energy efficiency efforts 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 may lead to an understanding of the role that such firms could play in changing the international market for low-carbon commercial buildings.

Why Focus on Ownership?

Energy research worldwide has often followed a physical, technical, and economic approach to increasing the level of energy efficiency in the building sector (Lutzenhiser 1993). 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 space type, these studies allow energy efficiency advocates to determine the technical potential for cost-effective energy efficiency improvements. Differences between the technical potential for energy efficiency and efficiency levels achieved in practice have persisted for decades and are commonly estimated to be 30-50%. Recent work on global carbon abatement costs show that energy efficiency measures continue to be some of the most cost-effective opportunities to reduce carbon (Enkvist, Nauclér & Rosander 2007). With proposed targets for carbon reduction set as high as 80% by 2050, closing the gap between what is technically possible and what is achieved in reality is ever more important.

Another way to subdivide the building stock is to focus on different ownership types. Social and institutional factors have been understudied relative to technologies, yet they hold the

key to significant market transformation in practice (Biggart & Lutzenhiser 2007). 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 two sets of buildings to empirically explore the effect of ownership type on energy efficiency adoption: (1) buildings that have earned a U.S. Environmental Protection Agency's ENERGY STAR label, and (2) those that have been certified by the U.K. Carbon Trust's Energy Efficiency Accreditation Scheme (EEAS). 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 review the distribution of ownership types initially present in first 90 ENERGY STAR office buildings, which we call the "Class of 1999", followed by a discussion of changes in this distribution over the last eight years. We then discuss the EEAS and compare the distribution of organizations involved in each program. Finally, we suggest some ways in which differences in program design may affect participation rates, 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.

Approach

For the purposes of this paper, achieving the ENERGY STAR label or belonging to the EEAS serve as a proxy for an organizational commitment to adopting energy efficiency. There are several methodological issues which arise from this approach. First, not all organizations interested in energy efficiency belong to one or the other of these programs, so the studied distribution reflects only a part of the market. Second, different programs 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. Additionally, we gathered data on participation rates through publicly available websites, rather than through qualitative interviews. As a result, key drivers for program participation cannot be deduced from our data on participation, although we anticipate further work on this topic.

ENERGY STAR: Then and Now

What Is ENERGY STAR?

The brand name "ENERGY STAR" refers to a set of voluntary partnerships between the U.S. government 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 expanded the ENERGY STAR program to include office buildings. The commercial buildings branch of ENERGY STAR relies on a web-based benchmarking tool to compare the energy performance of an applicant building to the energy performance of a peer group. 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 Energy Information Administration's *Commercial Building Energy Consumption Survey*, and the comparison scale ranges from 1 to 100. Those buildings receiving a score 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) certified by a professional engineer that the building satisfies 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.

By the end of 1999, ENERGY STAR had 90 labeled buildings in its database, all offices. Roughly eight years later, ENERGY STAR has expanded the program to include 4,319 buildings across eleven different building types (EPA 2008b). Table 1 describes the types, numbers, and percentage of the labeled buildings in the March 2008 database. These data show that office buildings are still the largest proportion of the ENERGY STAR labeled buildings, representing 37% of the participants on a per building basis. Supermarkets are the next largest category (31%), with K-12 schools a close third (21%). Together, these three building types represent almost 90% of the labeled buildings.

Table 1. List of 2008 ENERGY STAR Labeled Buildings

Building Type	Number in Database	Percent of Total
Office	1606	37%
Supermarket/Grocery	1339	31%
K-12 School	894	21%
Hotel/Motel	277	6%
Bank/Financial Institution	68	2%
Hospital (Acute Care or Children's)	68	2%
Courthouse	28	1%
Medical Office	13	0%
Residence Hall/Dormitory	13	0%
Warehouse (Unrefrigerated)	9	0%
Retail	4	0%
Total: 11 types	4319 buildings	

Data from www.energystar.gov

Office Buildings and Ownership

Office buildings 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, whether that is making widgets or practicing corporate law. 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"[1] 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.

Distribution of Ownership Types

Ideally, looking at a distribution of ownership types in the ENERGY STAR portfolio would sketch how willingly different types of owners adopt (or can be encouraged to adopt) a commitment to energy efficiency. As we discussed in a previous paper (Janda & Brodsky 2000), the initial distribution of ENERGY STAR buildings were not entirely self-selected. Accordingly, the initial distribution may have reflected the ability of EPA staff to target and reach various ownership types. Although these initial distributions may have influenced the subsequent development of the program, market actors in the office building sector have had ample time in the past eight years to learn about and voluntarily participate in ENERGY STAR programs and practices. As Table 2 shows, however, the distribution of ownership types within the office sector has not changed dramatically between 1999 and 2008.

Table 2. Distribution of ENERGY STAR Office Ownership Types 1999 & 2008

Office Building Ownership	Percent of Total 1999 (# of buildings = 90)	Percent of Total 2008 (# of buildings = 1606)
Owner-Occupied	7%	14%
Government	19%	11%
Commercial Real Estate	74%	75%

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

[1] 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.

Although the overall percentage of owner-occupied office buildings in the March 2008 database has doubled since 1999, only about 14% of the labeled buildings are owner-occupied. A few of these owner-occupiers are notable iconic buildings, such as the Chesapeake Bay Foundation's Merrill Center. This building was one of the first to receive the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) platinum rating. Other owner-occupiers of note include organizations such as Nike (4 labeled buildings), Blue Cross Blue Shield (3 buildings), eBay (5 buildings), and Verizon (10 buildings).

Government. Seventeen buildings from the 1999 sample were government-owned. Twelve of these buildings were U.S. General Services Administration (GSA) buildings. 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 was very low, considering that close to 150 of the 700 GSA buildings had scores that qualified them for a label, according to a batch data dump. The numerical results of the batch data 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.

In 2008, there were 101 GSA labeled buildings in the office database. While this number is much higher than the initial twelve, it falls short of the 150 that could have been certified based on 1999 data. About 75 of these GSA buildings were certified during or before 2000, and an average of 7 per year trickled in through 2003. Only one additional GSA office building was certified between 2004-2006, although a number of courthouses were added during this time. In 2007, however, seven more GSA office buildings were labeled, as well as six courthouses that were either certified or recertified. In comparison, the number of state, county, and city buildings that have been certified has been steadily increasing throughout the 2000-2007 period. The number of state and local buildings in the office database is now approximately equal to the number of labeled federal buildings.

Commercial real estate. The largest proportion of the Class of '99 buildings (74%) were in the commercial real estate (CRE) sector. These 67 buildings were owned and/or managed by a total of 14 companies (see Table 3). Almost half of the Class of '99 CRE buildings were 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.

In 2008, the largest proportion of buildings in the database (75%) are in the CRE sector, but the number of firms participating in the program has expanded dramatically from less than twenty to over one hundred different property management companies and hundreds of different property owners. There are many firms that have only benchmarked a building or two, and the ten property management with the highest program participation rates account in total for less than 50% of the labeled office buildings.

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 and identify 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 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).[2] 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 service offerings, operating styles, geographic coverage, and property portfolios. CRE firms control millions to tens of 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 3 shows the ENERGY STAR labeled buildings in 1999 and 2008 that are owned and/or managed by the 14 CRE firms that initially joined the ENERGY STAR buildings program. Most of the companies that started with ENERGY STAR stayed with the program and have increased the number of labeled buildings in their portfolios. These firms include Cushman & Wakefield; Hines; Jones Lang LaSalle; PM Realty; Douglas Emmet; Equity; Mack-Cali; Prentiss; and Arden. One of the initial participants, Amerimar Realty, has not increased the number of labeled buildings in its portfolio, but it has recertified its single labeled building every year between 1999 and 2006. Typical for the volatility of the commercial real estate market, two of the smaller companies—Mile High Properties and Arden Realty—were acquired by other firms. Mile High's portfolio was absorbed by Transwestern, a company that has continued and expanded its ENERGY STAR participation. Transwestern currently owns and/or manages 75 ENERGY STAR properties, which is the fourth largest number held by any single firm in the office data set. Arden was acquired in 2006 by GE Real Estate, which at present has no additional ENERGY STAR labeled properties cited in the database. Although Arden was acquired by a larger firm, it still retains its identity and strong participation with ENERGY STAR. Two firms, Harwood International and Tarantino, are still in operation but are no longer active with the ENERGY STAR Buildings program.

In summary, 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

[2] 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).

energy efficiency in different ways. In 1999, we found that there were differences between the ways in which private firms and REITs adopted energy-efficient technologies and practices (Janda & Brodsky 2000). The private firms tended to have higher benchmarking scores than the REITs. Additionally, smaller firms were quicker to become ENERGY STAR partners, but the larger firms have a greater potential for actually transforming the market. In 2008, the larger firms show more Energy Star activity than the smaller firms, with new entrants like super REIT CB Richard Ellis. CB Richard Ellis has the second highest number of labeled office buildings in a single portfolio (106) and was named ENERGY STAR Partner of the year in 2008.

Table 3. Selected CRE Firms with ENERGY STAR Labeled Offices in 1999 & 2008

Ownership type & firm size	Firm Name	1999 Energy Star Labeled Offices (n=90)		2008 Energy Star Labeled Offices (n=1606)	
		# of Buildings	% of Buildings	# of Buildings	% of Buildings
Private > 20 Msf	Cushman-Wakefield	2	2.2%	44	2.7%
	Hines	14	15.6%	90	5.6%
	Jones Lang LaSalle	4	4.4%	52	3.2%
	PM Realty Group	2	2.2%	15	0.9%
Private < 20 Msf	Amerimar	1	1.1%	1	0.1%
	Douglas Emmet	2	2.2%	28	1.7%
	Harwood International	1	1.1%	—	—
	Mile High Properties (absorbed by Transwestern	1	1.1%	—	—
	Tarantino	1	1.1%	—	—
REIT > 20 Msf	Brandywine Realty	4	4.4%	8	0.5%
	Equity Office	2	2.2%	56	3.5%
	Mack-Cali	1	1.1%	7	0.4%
	Prentiss	1	1.1%	12	0.7%
REIT < 20 Msf	Arden Realty (acquired by GE Real Estate in 2006)	31	34.4%	128	8.0%
Totals		67	74.4%	441	27.3%

Data from www.energystar.gov

In the next section, we introduce a comparative context for considering the types of firms that practice energy efficiency by characterizing the participants in the Energy Efficiency Accreditation Scheme (EEAS) a voluntary U.K. government program that is similar to ENERGY STAR.

What Is the Energy Efficiency Accreditation Scheme (EEAS)?

The U.K. Energy Efficiency Accreditation Scheme (EEAS) started in 1993 and became part of the Carbon Trust's portfolio of offerings to the U.K. business and public sector in 2004. Currently, there are approximately 200 organizations that have met the requirements of the EEAS (Carbon Trust 2008c). Table 4 shows a list of the ten types of organizations that have been accredited. The EEAS is open to any organization from the industrial, commercial or public sectors, with single or multiple sites. Whole organizations, separately identifiable units within them, or single premises (e.g. a headquarters building) can be accredited. The first two

categories—Government and Commerce & Industry—account for 62% of the organizations involved in the EEAS.

Organizations seeking accreditation must demonstrate three things. First, that the organization's management has a commitment to energy efficiency. Second, that the organization has invested in energy efficiency measures. Third, that the organization has improved its energy efficiency performance over time. Like ENERGY STAR, the EEAS has made a series of benchmarking tools available online. EEAS has benchmarking tools for offices, government buildings, hospitality, schools, and sports centers (Carbon Trust 2008b). Unlike ENERGY STAR, however, organizations seeking EEAS accreditation need not use these online benchmarking tools for their assessment. Evaluations are carried out by independent assessors, and organizations must prepare a report to demonstrate they have met each of the three criteria. In this respect, EEAS is a little more like the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) process.

Table 4. List of 2008 EEAS Accredited Organizations

Organization Type	Number in Database	Percent of Total
Government	89	36.3%
Commerce & Industry	63	25.7%
National Health Service Trusts	17	6.9%
University & Education	16	6.5%
Retail	15	6.1%
Financial Services	10	4.1%
Hotels, Catering & Leisure	9	3.7%
Other	9	3.7%
Utilities	8	3.3%
Museums	4	1.6%
Total: 10 types	240 organizations	

Data from http://www.carbontrust.co.uk/energy/takingaction/accredited_organisations.htm

Also unlike ENERGY STAR, there is a fee for accreditation. This fee pays for the independent assessor (assigned by the Carbon Trust) to accredit the organization, and it pays for the EEAS program administration. The fee is based on the size of the organization's annual energy bill, and there are three price bands. For organizations with energy bills exceeding £1 million (about $2 million), the accreditation cost is £5,550 ($11,000). For organizations with energy bills between £100K and £1 million ($200K-$2M), the cost is £3800 ($7600). For organizations with energy bills under £100K, the cost is £1500 ($3000). Given that organizations undergoing accreditation commonly report energy bill savings averaging 3% as a result of the process, the Carbon Trust estimates that the accreditation payback is on the order of a couple of months (Carbon Trust 2008a).

Comparative Context

Because ENERGY STAR and EEAS have common goals and similar methods (e.g., relying on recognition & information rather than regulation or incentives to create efficiency improvements), we expected that the programs would appeal to similar sets of organizations. We also hypothesized that ENERGY STAR participants that are U.S. multinationals operating in

the U.K. might also be drawn to the EEAS, as well as the converse. The following section shows that neither of these hypotheses are supported by the data. Instead, and perhaps more interestingly, these two programs seem to attract and repel two almost entirely distinct groups of participants, particularly in the office sector. First, we look at organization types overall and then focus on the office building sector. In the concluding section, we discuss these findings and propose directions for further research.

Comparing Participants

Comparing the participants in ENERGY STAR and the Energy Efficiency Accreditation Scheme is complicated by the fact that ENERGY STAR counts buildings and the EEAS counts organizations. It is difficult to aggregate the ENERGY STAR database from buildings into organizations because details about each building are entered by over 4,000 different applicants, each of whom use acronyms, proper firm names, or even the dictionary a little differently. It is even more difficult to disaggregate the EEAS data from organizations into buildings, except in circumstances where the data clearly refer to a single building rather than to a group. Efforts are underway to resolve discrepancies within the ENERGY STAR data and to obtain EEAS data at a higher level of resolution that will allow a more nuanced "apples to apples" comparison. Despite these difficulties, Table 5 provides a comparison of the organizational categories and participation rates for each program.

Table 5. Comparing ENERGY STAR & EEAS Participation

ENERGY STAR 4319 buildings		**EEAS 240 Organizations**	
Organization Type	**% of Total**	**% of Total**	**Organization Type**
Supermarket/Grocery	31.0%	2.1%	Supermarkets[3]
Hotel	6.4%	3.7%	Hotel, Catering & Leisure
Bank/Financial Institution	1.6%	4.1%	Financial Services
Retail	0.1%	4.2%	Retail[4]
Health Care	1.9%	7.0%	National Health Service Trusts
Hospital (Acute Care or Children's)	1.6%		
Medical Office	0.3%		
Education	21.0%	6.6%	University & Education
Residence Hall/Dormitory	0.3%	6.6%	
K-12 School	20.7%		None
Office	37.2%	37.9%	
Commercial Real Estate	27.9%	.08%	Commercial Real Estate
Public Sector	5.2%	36.5%	Public Sector[5]
Courthouse	0.6%		
Owner-Occupied	4.1%		
Commerce & Industry	0.2%	25.4%	Commerce & Industry
Warehouse (Unrefrigerated)	0.2%		

Data from www.energystar.gov and
http://www.carbontrust.co.uk/energy/takingaction/accredited_organisations.htm

[3] Listed in EEAS retail sector.
[4] EEAS Retail, minus supermarkets
[5] Assuming public sector is mostly office buildings

ENERGY STAR uses 11 categories to differentiate participants and EEAS uses 10 categories; these categories overlap somewhat but not completely. Table 5 groups the buildings into eight categories that attempt to match both programs. In doing so, it splits some EEAS categories and concatenates some ENERGY STAR categories. It also ignores three EEAS categories (utilities, museums, and other) which together account for 8.6% of the EEAS participants. The first four participation categories in our typology—supermarket/grocery, hotel, bank/financial institution, and retail—occur fairly comparably in both programs. The last four organizational categories (health care, education, offices, and commerce & industry) are not as comparable, as we discuss below.

- Supermarkets account for approximately 31% of ENERGY STAR labeled buildings, but only about 2% of EEAS labeled organizations. In the EEAS, supermarkets are a subcategory of the retail sector, but an easily identifiable one which we have pulled out of the retail data for detailing here. The five grocery organizations with EEAS accreditation are some of the largest grocery chains in the UK.
- About 6% of labeled buildings are hotels, and about 4% of the EEAS labeled organizations are hotels.
- Both ENERGY STAR and EEAS have a category for banks/financial institutions, and these account for less than 5% of both program participants.
- Only 0.1% (4 buildings) in the ENERGY STAR database are in the retail sector, and these buildings are all owned by one organization: JC Penney. In comparison, about 4% of EEAS organizations are in the retail sector, and these stores include all the major UK department chains.
- ENERGY STAR labels two types of hospitals and medical offices, which we have concatenated into a "Health Care" sector to equate with the EEAS "National Health Service Trusts" category. Less than 2% of the ENERGY STAR buildings are in this sector, whereas 7% of the EEAS organizations are in this sector.
- We formed an "Education" sector to account for ENERGY STAR's activities in both K-12 schools and universities. Most of the ENERGY STAR participants in the education sector (20.7% of the total) are K-12 schools. None of the EEAS participation occurs in this area, it is all at the university level. Universities account for just under 7% of the total EEAS participants.
- The office sector accounts for 37.2% of the ENERGY STAR participants, and an almost identical number of EEAS participants (37.9%). However, the ENERGY STAR office participation is almost all in the private sector (75% of the subcategory), whereas the EEAS participation is almost all in the public sector (99% of the subcategory). Even adding ENERGY STAR labeled courthouses to the mix does not increase the percentage of public space in the labeled building data beyond 6% of the total, compared to more than 36% of the total EEAS participants. The differences between participation and organizational types will be discussed further in the following section.
- Commerce & Industry is the EEAS sector that contains the second highest amount of participants (about 25%), just behind the public sector. This EEAS category contains the only two commercial real estate properties participating in the program. On the ENERGY STAR Buildings side, the program only accounts for industry via warehouses, which are 0.2% of the labeled buildings. A related program, ENERGY STAR Plants, labels auto manufacturing plants, cement plants, petroleum refineries, and wet corn milling plants

(EPA 2008c). Since 2001, ENERGY STAR has also given annual awards to other industries and manufacturers, including Pepsi, 3M, Raytheon, and Merck (EPA 2008a). The ENERGY STAR for Industry program is a better fit for EEAS's participants in the Commerce & Industry area, which comprise a diverse array of participants too numerous to mention but include: auto supply manufacturers, pharmaceutical firms, defense contractors, a bakery, and a dairy. Because the focus of this paper is on buildings rather than industry, however, a detailed comparison of the participants in ENERGY STAR for Industry and the EEAS Commerce & Industry sector is beyond the scope of this analysis.

Comparing Offices

The previous section shows that in general, the types of organizations that participate in ENERGY STAR and the EEAS may not have that much in common. This is particularly true in the office sector, where most ENERGY STAR participants are engaged in commercial real estate, and almost all EEAS office participants are public entities. Only two properties in the entire EEAS database are identifiable as commercial offices, listed in the "Commerce & Industry" section. Both are high-profile office buildings in London. The first, "Tower 42" is the tallest skyscraper in the City of London, a signature building designed in the 70s with a new energy and environmental policy on its website. The second, "One London Wall" was designed by Foster + Partners, completed in 2003, and managed by CB Richard Ellis.

Our second hypothesis was that multinational firms involved in a government-sponsored efficiency program in one country would be likely to be involved in the other. There are a number of multinational firms involved in ENERGY STAR. Of the top ten ENERGY STAR office owners and/or managers, five of these companies have international portfolios: CB Richard Ellis, Hines, Equity, Jones Lang Lasalle, and Cushman & Wakefield. All five are headquartered in the U.S. and have a presence in the U.K. Of these companies, only CB Richard Ellis has any direct link with the EEAS, through its management of One London Wall. In terms of U.K. firms operating in the US, there is no evidence of an EEAS organization in the office sector participating in ENERGY STAR. There is, however, at least one non-EEAS certified U.K. company that is an ENERGY STAR participant. Grosvenor is a group of privately-owned international property development, investment and fund management businesses, headquartered in the U.K. One of Grosvenor's U.S. properties is ENERGY STAR labeled, and it is managed by CB Richard Ellis.

Commercial real estate is alive and well in the U.K.'s office sector, but these firms are not participating in the EEAS. CB Richard Ellis is the only firm that exhibits evidence of program participation in both countries, but its involvement in the EEAS is miniscule compared to its participation in ENERGY STAR. Understanding why CRE firms in the U.K. are nonparticipants in the EEAS would be a useful topic for further research.

Conclusions

An exploration of the organizations and firms involved in ENERGY STAR and EEAS suggests that no one kind of firm is "the type" that adopts energy efficiency in both countries. Moreover, significant differences exist between the types of organizations that participate in each program. In the office sector, for-profit firms are likely to participate in ENERGY STAR and seem to avoid the EEAS. Government entities, on the other hand, are more likely to participate in the

EEAS and not in ENERGY STAR, particularly at the federal level. Although there are adoption opportunities for all, some sectors are more or less attracted to ENERGY STAR than to the EEAS. Exploring differences in program design and focusing on sectors other than offices might help reveal why the patterns discussed here exist, as well as offering opportunities for attracting more participation from under-represented sectors.

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