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HOW GREEN IS YOUR PROPERTY PORTFOLIO? THE ENVIRONMENTAL PERFORMANCE OF COMMERCIAL REAL ESTATE

By

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How Green is Your Property Portfolio?
The Environmental Performance of Commercial Real Estate

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Introduction

For many firms, corporate social responsibility (CSR) is manifest in the use of corporate real estate. Firms increasingly demand “green” buildings to house their activities. This ranges from Chevron’s “green” campus in Louisiana to the “eco stores” of Wal-Mart. Indeed, while the U.S. commercial property sector has experienced a sharp downturn during the recent economic crisis, with property values down by as much as 50 percent in some cities,¹ “green” buildings are on the rise all over the nation.

The choice for more environmentally-friendly buildings by corporations may partially reflect concern with climate change, but it may also be a path towards increased shareholder value. The real estate sector accounts for more than a third of global greenhouse gas emissions and thus offers great potential for carbon abatement. Improving the energy efficiency of buildings and of the appliances installed therein could offset some 85 percent of the projected incremental demand for energy in 2030. To a large extent, the investments needed to improve energy efficiency in buildings have positive net present values.²

To measure the sustainability and energy efficiency of buildings, a number of building rating schemes have recently been developed, such as the Leadership in Environmental and Energy Design (LEED) scheme initiated by the U.S. Green Building Council and the Energy Star program, jointly administered by the U.S. Environmental Protection Agency (EPA) and the Department of Energy. The rapid diffusion of these labels offers an interesting perspective on the geography of “green” office buildings across the U.S.

Figure 1 is a “green” map, where the greenness of the state reflects the fraction of “green” office buildings relative to the total commercial office stock in that state, as of October 2009. Clearly, California and other West coast states are among the early adopters of green building practices. Incentives and climatological characteristics may partially explain the relatively large fraction of green space in these states, although some

¹ According to MIT’s Moodys/REAL Commercial Property Price Index. See <http://web.mit.edu/cre/research/credl/rca.html>.

² J. Creyts et al., “Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?,” McKinsey & Company (2007).

evidence also points at political ideology: green products tend to cluster in environmentalist communities.³

-- Insert Figure 1 here --

In this paper, we first provide a basic framework explaining the role of “green” buildings in corporate housing decisions, including a synthesis of the empirical evidence on the financial implications of “green” certification for commercial buildings. We then develop an environmental scorecard for property portfolios, measuring the environmental performance of professional property owners: listed property companies and private property funds. These organizations form the connection between institutional capital invested in real estate and corporate real estate users. The scorecard is based on a global survey, and provides corporate real estate users with a transparent and easily comparable measure on the environmental performance of their landlords.

This information is relevant for two reasons. First, corporations increasingly outsource the ownership of their property holdings: the last two decades have seen a systematic decline in global corporate real estate ownership.⁴ Firms in the services sector generally have very limited ownership of the corporate real estate in which they operate, and for these firms, real estate consumption determines a large part of their ecological footprint. Firms that engage in “ecological responsiveness”⁵ should thus be concerned with the environmental performance of the buildings they lease from their landlords.

Second, institutional investors around the globe have been moving away from direct ownership of real estate assets, and increasingly channel their real estate exposure through listed property companies (such as real estate investment trusts, REITs), and

³ M.E. Kahn and R.K. Vaughn, "Green Market Geography: The Spatial Clustering of Hybrid Vehicles and Leed Registered Buildings," *B.E. Journal of Economic Analysis & Policy*, 9/2 (2009).

⁴ See for example: D. Brounen and P.M.A. Eichholtz, "Corporate Real Estate Ownership Implications: International Performance Evidence," *Journal of Real Estate Finance and Economics*, 30/4 (2005): 429-45; Y.H. Deng and J. Gyourko, "Real Estate Ownership by Non-Real Estate Firms: The Impact on Firm Returns," Working Paper, Zell/Lurie Real Estate Center, Wharton, PA (1999).

⁵ P. Bansal and K. Roth, "Why Companies Go Green: A Model of Ecological Responsiveness," *Academy of Management Journal*, 43/4 (2000): 717-37.

private property funds. Institutional investors that engage in socially responsible investing (“SRI”) therefore need detailed and standardized measures of the environmental performance of the property companies and funds they invest in.

While there are now established metrics to measure the environmental performance of individual buildings, there are no such benchmarks for property portfolios managed by corporations and dedicated property investors. Data providers that supply information on environmental, social, and governance (“ESG”) characteristics of firms, such as Asset4 (Thomson Reuters) and RiskMetrics (MSCI), only cover a very limited selection of property companies. They do not provide in-depth information on the environmental performance of the broader global universe of institutional property owners, who are the landlords for many of the world’s leading corporations.⁶

Based on an objective set of environmental survey data, we construct an “Environmental Real Estate Index”, which may assist institutional investors in making informed decisions regarding property investments and may also assist corporate real estate users in making decisions regarding their consumption of real property. The Index also provides professional property investors with an easy comparison among peers, thus publicizing information on the environmental performance of the real estate industry.

Using a sample of about 200 property companies, scattered across the globe, we find that knowledge of the current state of sustainability in the property sector is quite rudimentary. For example, less than 20 percent of the survey respondents were able to report the environmental performance of their properties -- such as energy consumption, water consumption, or CO₂ emissions.

In our comparisons, Australian property investors are the global leaders in understanding the environmental performance of their properties, with Sweden and the U.K. following closely. The underperformers are located in Asia, the U.S. and Southern Europe. Generally, scores are higher for listed companies than for their less transparent private counterparts. In the group of listed survey respondents, good environmental performers are large companies with strong financial performance. We also document that implementation of environmental management strongly lags environmental policy

⁶ A. Chatterji and D. Levine, "Breaking Down the Wall of Codes: Evaluating Non-Financial Performance Measurement," *California Management Review*, 48/2 (2006): 29-51.

and communication; most property companies “talk the green talk” rather than “walk the green walk.” Using a “green” four-quadrant matrix, we find that few professional property investors can be classified as “green stars.”

The results of this survey can help corporations to assess the environmental performance of their landlords. Since that performance is quite weak for the vast majority of property owners surveyed here, corporations searching for ways to improve their own “ecological responsiveness” can use the survey results to engage their landlords and help steer them on a path towards improved environmental performance. For institutional investors, the survey results help to evaluate, and possibly improve, the “greenness” of their property investments.

The remainder of this paper is organized as follows: we first discuss the rationale for corporations to locate operations in more energy efficient or sustainable office space, followed by some evidence on the financial implications of green building. We then turn to the environmental real estate survey and to the results. The paper ends with practical recommendations for real estate investors and their tenants, and a discussion of strategic implications.

Green Building and Corporate Housing Decisions⁷

In strategic considerations on corporate housing decisions, there are four motives for corporations to consider the choice for more sustainable, energy efficient space, rather than conventional space. First, there may be direct economic benefits resulting from the occupancy of buildings with a green label. For tenants of commercial buildings, energy represents approximately ten percent of the total housing costs, and these costs can be decreased through energy efficiency measures that are often integral to green building design. Anecdotal evidence shows that LEED-certified buildings on average consume less energy than conventional buildings,⁸ and the EPA estimates that Energy-Star

⁷ A more elaborate discussion of factors influencing the adoption of green space by private firms and public organizations can be found in P.M.A. Eichholtz, N. Kok, and J.M. Quigley, "Who Rents Green? Ecological Responsiveness and Corporate Real Estate," Working Paper, UC Berkeley, CA (2010).

⁸ A recent analysis of the thermal properties of LEED-certified building concluded that these buildings consume less energy, on average, than their conventional counterparts. However, 18-30 percent of LEED buildings used more energy than their counterparts. G.R. Newsham, S. Mancini, and B. Birt, "Do Leed-Certified Buildings Save Energy? Yes, But....," *Energy and Buildings*, 41 (2009): 897-905.

qualified office buildings are up to 30 percent more efficient.⁹ These considerations are reflected in the recent choice of firms like Adobe, Microsoft, and Texas Instruments to locate energy-intensive operations in green, LEED-certified buildings.

Second, there is a general perception that green buildings have a healthier indoor environment. Although the scientific basis for this assertion is still quite weak, several studies have claimed to find a link between improved employee well being (through better indoor air quality) and enhanced productivity.¹⁰ The potential gains of reduced sick leave and productivity gains are substantial, as employee costs constitute the majority of total expenditures for the average firm. Firms seem to take this seriously: Genzyme, a biotech company, recently relocated operations to a building in Cambridge, Massachusetts, that is awarded a LEED Platinum label. Reportedly, this has led to substantially lower employee sick leave. The choice of green space may also arise from efforts to enhance corporate reputation in environmental stewardship, which appears to be an important determinant of job choice for prospective employees.¹¹ As human capital is considered the key source of value creation in modern firms, and skilled employees are still inelastically supplied in some industries, green-rated corporate space may facilitate the attraction and retention of a high-quality labor force.¹²

Third, green space may reify the social and environmental awareness of a firm and signal the ecological responsiveness of the corporation. On the one hand, this can help offset a negative environmental corporate image for firms in notorious industries (e.g., Chevron has recently constructed a LEED-certified “green campus” in Louisiana). The choice of green space may also enhance the ethical reputation of a firm, which may

⁹ See http://www.energystar.gov/index.cfm?c=business.bus_bldgs.

¹⁰ M.G. Apte, W. Fisk, J., and J.M. Daisey, "Associations between Indoor Co2 Concentration and Sick Building Syndrome Symptoms in US Office Buildings: An Analysis of the 1994-1996 Base Study Data," *Indoor Air*, 10 (2000): 256-27; W. Fisk, J. and A.H. Rosenfeld, "Estimates of Improved Productivity and Health from Better Indoor Environments," *Indoor Air*, 7 (1997): 158-72.

¹¹ Several studies have documented that independent ratings of a firm's corporate social responsibility are positively related to the reputation and attractiveness as employers. See for example: D.B. Turban and D.W. Greening, "Corporate Social Performance and Organizational Attractiveness to Prospective Employees," *Academy of Management Journal*, 40/3 (1997): 658-72; D.W. Greening and D.B. Turban, "Corporate Social Performance as a Competitive Advantage in Attracting a Quality Work Force," *Business and Society*, 39/3 (2000): 254-80.

¹² A more general discussion can be found in: M.E. Porter and C. Van der Linde, "Green and Competitive: Ending the Stalemate," *Harvard Business Review*, 73/5 (1995): 120-34.

appeal to a certain segment of customers. For example, Wal Mart has opened several “green” stores over the past years, as part of their broader strategic considerations on environmental issues. Indeed, it is asserted that “customers drive corporations green”.¹³

Fourth, for some firms, but especially for governmental and non-profit organizations, environmental ideology may dictate the strategic choice for green space. Examples abound, such as the recently developed Academy of Sciences Building in San Francisco, which is certified by the U.S. Green Building Council with a LEED Platinum label, and owned by the City of San Francisco. More far-reaching is the decision by the State of California (now followed by other states) to consider only commercial space certified at the LEED Gold level (or higher) for leasing. This “leading by example” is an alternative to regulation, may be politically less challenging, and has been replicated by several countries around the globe, such as Australia and the Netherlands.

The Financial Implications of Green Building

The number of newly constructed “green” buildings and existing buildings that have been registered for certification has increased exponentially during the past few years; recent evidence suggests that more than a quarter of some central business districts (CBDs) in the largest U.S. metropolitan areas are now labeled by one of the two main labeling programs -- Energy Star or LEED.¹⁴

-- Insert LEED Text Box here --

The increased popularity of “green” rating schemes is not confined to the U.S.: the U.K. has adopted the BREEAM certification scheme, Australia uses both NABERS and the GreenStar certification scheme, and Greenmark is the label of choice in Singapore.¹⁵ The global rise of “green” building reflects not only the shifting preferences

¹³ S. Vandermerwe and M.D. Oliff, "Customers Drive Corporations Green," *Long Range Planning*, 23/6 (1990): 10-16.

¹⁴ P.M.A. Eichholtz, N. Kok, and J.M. Quigley, "Doing Well by Doing Good: Green Office Buildings," *American Economic Review*, forthcoming (2010a).

¹⁵ China, France, Germany, Japan, and many other countries have adopted “green” rating schemes as well. In addition, the European Union is working on an EU-wide labeling scheme.

of corporate and public tenants, but also a change in the investment preferences of some of the major institutional property investors, such as CalPERS and TIAA-CREF in the U.S., Hesta and GIC in Asia-Pacific, and Hermes and APG in Europe.¹⁶

These preferences are reinforced by recent empirical evidence, which shows that environmentally-certified buildings enjoy rents and asset prices that are significantly higher than those documented for conventional office space: tenants and investors financially reward both energy efficiency and measures of sustainability. For a large sample of Energy Star and LEED-rated office buildings, Piet Eichholtz, Nils Kok, and John Quigley document that rental rates are roughly three percent higher per square foot than in conventional buildings, while controlling for differences in quality and location. Premiums in effective rental flows are higher by about six percent, whereas the selling prices of green buildings are some 16 percent higher.¹⁷

A more recent study by the same authors investigates the financial performance of green buildings during the recent economic downturn. The sharp deterioration in property markets and the simultaneous growth in the supply of green buildings have not significantly affected the returns to green buildings relative to those of comparable conventional ones. Buildings with a higher sustainability score (as measured by LEED or Energy Star) command correspondingly higher rents and values in the market place. Also, commercial property investors seem to evaluate energy efficiency quite precisely when considering investments in real estate – one dollar of annual savings in energy costs increases the asset values of buildings at the market capitalization rate.¹⁸

Given the current financial crisis and its effects on the property industry, it would not be surprising if property investors would pay more attention to their immediate financial health than to the energy efficiency of their portfolios. However, that appears not to be the case. According to survey evidence, investors claim that environmental issues are a high priority, even in the aftermath of the financial crisis. Environmental

¹⁶ As part of the “Environmental Investment Initiatives” of CalPERS, specific “Real Estate Environmental Strategies” have been developed, including energy reduction targets and sustainable procurement policies. TIAA-CREF has developed similar initiatives.

¹⁷ P.M.A. Eichholtz et al. (2010a), *op. cit.*

¹⁸ P.M.A. Eichholtz, N. Kok, and J.M. Quigley, "Sustainability and the Dynamics of Green Building," Working Paper, UC Berkeley, CA (2010).

management is not considered a short-term hype, and most investors anticipate that the incentives for environmental conservation will be stronger in the long term.¹⁹

The Greenness of Property Portfolios: the Environmental Real Estate Survey

To investigate the current “green” performance of institutional real estate investors, we develop a global environmental real estate survey. It inquires into the environmental performance of listed property companies and private property funds. The survey is comprised of two parts: *Management & Policy*, focusing on environmental policies and reporting of respondents, and *Implementation & Measurement*, which deals with the actual energy, water, and waste consumption of the real estate portfolio, and with the infrastructure needed for superior environmental performance.

The survey was sent to 688 investors, 198 of which responded. Response rates were relatively high among property funds in Europe and Australia, but low among property funds in the United States, and very low among property funds in Asia. We find that the variation in response rates across countries is associated with the Jones Lang LaSalle Transparency Index, a yardstick for the transparency and investor-friendliness of national real estate markets: investors from transparent markets are more likely to respond. Appendix A provides more information on the sampling procedure and discusses possible explanations for the variation in response rates (such as differences in climatological conditions).

Environmental Key Performance Indicators

In the main survey report, we document the responses to a wide selection of individual questions.²⁰ Here, we will just highlight the most important questions -- the environmental key performance indicators (KPIs) measured by the respondents. (Collecting information on these indicators is necessary for benchmarking purposes and to reduce resource consumption.) For example, we address energy and water

¹⁹ N. Kok et al., "Environmental Performance: A Global View on Commercial Real Estate," European Centre for Corporate Engagement, Maastricht University, Netherlands (2010).

²⁰ A detailed online Appendix that provides all individual survey questions is available at <http://www.corporate-engagement.com>.

consumption, waste treatment, and CO₂ emissions. Table 1 summarizes the results. We find that only 37 (19 percent) of the respondents were able to document the energy consumption for their total property portfolio in 2007 or 2008. The percentage of respondents who reported information on other environmental metrics, such as water and waste, is even lower (16 percent and 12 percent, respectively). With the notable exception of Australia, property investors' knowledge regarding their CO₂ emissions is also limited: only 14 percent of respondents are able to report information on this key environmental metric.²¹

The last column of Table 1 provides evidence on the use of “smart meters.” The information collected by such meters is essential to establish a baseline measurement of energy consumption across buildings, to set targets for energy reduction, and to measure the immediate effect of resource efficiency measures. Even though utility companies all over the world (such as PG&E in California) are actively installing smart meters, the results show that this basic infrastructure to obtain information on environmental KPIs is present in the property portfolios of just 76 respondents (38 percent). The lack of such measures may substantially hinder the optimization of energy performance in commercial buildings.

-- Insert Table 1 here --

The Environmental Real Estate Index - Listed Property Companies

Based on the responses to the individual survey questions, we develop a simple rating scheme in which a positive or confirming answer is assigned one point, and a negative response or non-answered question is assigned zero points.²² The maximum score for *Management & Policy* is 23 points, and the maximum score for *Implementation & Measurement* is 35 points. To facilitate comparisons, these scores are standardized on a scale from zero to 100. The result is a global “Environmental Real Estate Index” that consists of two components –policy, and implementation. This environmental scorecard

²¹ We note that the technology to measure these environmental metrics is now readily available across the sampled countries. However, it seems that there is considerable variation in the diffusion and uptake of these technologies.

²² On a few questions, respondents were awarded more than one point if they gave a positive answer.

enables institutional investors to compare existing real estate investments based on environmental performance and to assess the environmental performance of future investments. It also facilitates the implementation of corporations' corporate social responsibility (CSR) policies with respect to their corporate housing decisions.

A score of 100, the maximum score, is attainable with currently available technology, and it can be reached without jeopardizing the investment performance of a property fund or company. Real estate investors that reach the target can mitigate environmental risks, and, to the extent that the additional investments have a positive return on investment, can increase shareholder value. This provision of a public good (i.e., reducing carbon emissions) while enhancing value is not inconsistent with the fiduciary duty of pension funds.²³

Figure 2 provides the frequency distribution of the scores on the subcategories *Environmental Management & Policy* and *Implementation & Measurement* of the Environmental Real Estate Index for listed property companies in each of the regions. The figure shows that Australian property companies come closest to the maximum environmental score, but European and American property companies reach a 50 percent score on *Management & Policy*, and just a third of the maximum score on *Implementation & Measurement*. Obviously, there is considerable room for improvement in the "green" management practices in the property sector.

-- Insert Figure 2 here --

Table 2 provides an overview of the scores on the Environmental Real Estate Index for the top-three listed property companies in different regions.²⁴ The environmental scores of the best performers show that a maximum score on the current environmental benchmark is realistic. The global number one is the GPT Group, with an total score of 86. GPT is a well-established, diversified property company with a strong reputation in

²³ M.J. Kotchen, "Green Markets and the Private Provision of Public Goods," *Journal of Political Economy*, 114/4 (2006): 816-34.

²⁴ We note that the survey was executed under a privacy agreement. Ex-post, we requested authority to publicize the aggregate scores of the highest-ranked entities. This protocol was adopted to preclude strategic considerations in filling out the survey.

environmental management. The company is currently leading the Dow Jones Sustainability Index for the real estate sector.

Another “green” leader is the U.K.-based Big Yellow Group, with a total score of 83. This property company is specialized in self-storage and makes extensive use of renewable energy sources. Also, it is currently the only survey respondent that operates “zero carbon” buildings in its real estate portfolio.²⁵ The best performing U.S. property company is Vornado Realty Trust. Relative to the top-3 in other geographic areas, the score of 55 is still low: if we were to create a global ranking, Vornado would only be 21st on the list.

The performance gap of respondents not listed in Table 2 suggests that most property investors are not yet aware of the potential for shareholder value creation associated with energy efficiency or environmental investments in their buildings, that is, there appears to be untapped potential to increase shareholder value. The top “green” performers provide the clear examples that the property industry needs, if it chooses to improve environmental performance. Emulation of leading industry peers is an effective way to encourage the adoption of new technology and management practices in any industry, and this approach can also hold for the adoption of environmental management practices in the property sector.

-- Insert Table 2 here --

We further investigate the cross-sectional variation on the environmental scores employing a regression analysis.²⁶ The results (not reported here) show that among listed property companies, the investors with the largest property portfolios are significantly more likely to have a strong environmental performance. Thus, scale seems to matter in “greening” real estate portfolios. We document that environmental performance is significantly and positively related with financial performance, measured by return on

²⁵ Zero carbon buildings are defined as buildings where, as a result of the very high level of energy efficiency of the building, the overall annual primary energy consumption is equal to or less than the energy production from renewable energy sources on site.

²⁶ We include country-wide fixed effects to control for unobserved differences between countries (such as weather conditions, energy costs, and national politics).

assets (ROA), although we cannot establish a causal link. This finding is in line with earlier evidence on added value of ESG-factors for general corporations.²⁷

We also document that companies that invest in residential or non-core property types, such as health care and hotel properties, score substantially lower on the *Implementation & Measurement* index. Apparently, it is more difficult to implement environmental policies in multi-family and single-family rental units. Compared to large, scalable office and retail properties, the small size of individual units may hinder the measurement of current environmental performance and investments to enhance energy efficiency. Also, the net lease contracts prevalent in the residential sector may provide fewer incentives for a building owner to invest in energy efficiency: a recent study shows that landlords tend to under-invest in energy-saving appliances, as tenants reap the benefits of those investments.²⁸

The Environmental Real Estate Index – Private Property Funds

We analyze separately the survey results for private property funds. Figure 3 provides the aggregated scores for the 126 respondents. The variation in the scores is comparable to those for listed property companies: scores for *Management & Policy* are higher than those for *Implementation & Measurement*, and Australian funds outperform their European, Asian, and American peers. It is clear that property investors from all over the world can learn from the Australian best practices in environmental management. A comparison with Figure 2 reveals that unlisted property funds have a substantially weaker environmental performance as compared to their publicly listed peers, in both subcategories. In part, the low scores may arise from the limited disclosure requirements for private funds and, consequently, the inadequate public scrutiny of property funds that operate in the private market. Moreover, the finite life of some private funds may lead to a more short-term focus and thereby hinder investments in energy efficiency. Clearly, private funds should consider their listed counterparts as benchmarks for best practices in environmental performance.

²⁷ See for example: N. Guenster et al., "The Economic Value of Corporate Eco-Efficiency," *European Financial Management*, forthcoming (2010).

²⁸ L. Davis, "Evaluating the Slow Adoption of Energy Efficient Investments: Are Renters Less Likely to Have Energy Efficient Appliances?" Working Paper, UC Berkeley, CA (2010).

The figure also reports on Asian funds. On average these funds score poorly, with an average score on *Management & Policy* of 25, and a score on *Implementation & Measurement* of 16. These low scores suggest that environmental management is not high on the agenda in emerging property markets, or that it is considered a lower priority. The lagging implementation of energy efficiency and sustainability measures in these markets is problematic, as energy insecurity, water scarcity, and climate change pose growing risks for the real estate sector in South and Southeast Asia. Our findings are confirmed in a recent research report: “the connections between these trends and financial impacts are not well understood by analysts, investors, companies, and governments in the region.”²⁹

-- Insert Figure 3 here --

Table 3 provides the scores for the best performers among private property funds on the Environmental Real Estate index. In general, most funds score well below the maximum on the environmental benchmark. The GPT Group, leading among listed property companies, ranks number one among private funds as well. Also, the “green” leaders in Australia outperform their peers in any other region. Contrasting the results for listed property companies, U.S. funds do well relative to their global peers. The leading U.S. property fund, a fund managed by Principal Global Investors, is even among the global “green” leaders.

Further analysis shows that in explaining the existence of an environmental policy and its further implementation, the location of the property holdings by the fund is more important than is the country of origin of the fund manager. Local regulations, building codes and environmental infrastructure thus play an important role in the ultimate “sustainability” of property portfolios. Also, dedicated office funds have the highest environmental scores, both on *Management & Policy* and on *Implementation & Measurement*. Indeed, most of the environmental metrics and energy efficiency

²⁹ S. Venugopal et al., *Surveying Risk, Building Opportunity: Financial Impacts of Energy, Water and Climate Risks on Real Estate in Asia* (Washington, DC: World Resources Institute, 2010).

technology that initially appeared on the market were aimed specifically at office buildings.

-- Insert Table 3 here --

Walking the Green Talk?

For some property investors, there are substantial discrepancies between their environmental *Management & Policy* and the actual *Implementation & Measurement*. This suggests that the costs of formulating an environmental investment policy are relatively low. To address the relation between environmental policies (“the talk”) and environmental management practices (“the walk”), we map for every respondent how their score on *Management & Policy* relates to their score on *Implementation & Measurement*. Figure 4 provides the results.

If all intentions of the respondents were reflected in their actions, then the dots in the figure should either be lying on, or very close to, the 45-degree line. If respondents were to outperform their intentions, then the dots should be above the line. However, this is not the case. Our results provide incontrovertible evidence of “green talk”, rather than “green walk”: performance on environmental *Management & Policy* is much better than performance on *Implementation & Measurement*. Clearly, property companies do not necessarily practice what they preach when it comes to environmental management.

We then divide Figure 4 into four quadrants, each of which depicts a special set of environmental performance characteristics. Property companies and funds that appear in the lower left-hand quadrant are classified as the “green laggards”. These respondents are underperformers when it comes to environmental performance: they neither have the environmental policies nor the implementation, thus do not take environmental metrics into account. We note that this quadrant is the most densely populated, with about 133 of the respondents (67 percent) in this area.

In the lower right-hand quadrant are the property companies and funds that “talk the talk”, but do not “walk the walk”. Their performance on *Management & Policy* is relatively high, but these respondents do not execute these policies equally well, which is reflected by a low score on *Implementation & Measurement*. We call this quadrant “green

talk”. The respondents in this quadrant show at least some awareness of the fact that energy-efficiency investments in buildings are often good business, but the large number of observations in this quadrant also suggests that PR still plays an important role in explaining the environmental credentials of property investors. This quadrant is the second most densely populated of the four quadrants, containing 41 (21 percent) of all respondents.

The quadrant in the upper left corner contains the property investors that do not talk, but rather act. We call this quadrant the “green walk”. For these property companies and funds, action speaks louder than words. As we can see from Figure 4, this quadrant is the least populated, with only three property investors, a mere 2 percent of the respondents. This finding suggests that implementation of environmental management only happens on the basis of an explicitly formulated policy. This finding also implies that companies and funds in the “green talk” quadrant have the potential to improve environmental implementation, based on their current scores on environmental policies.

In the upper right-hand corner are the environmental top performers, the so-called “green stars”. These companies and funds have set ambitious environmental targets, actively implement measures to improve the environmental performance of their properties, and regularly assess the effects of these measures. Only 20 respondents (10 percent) can be classified as “green stars”, with relatively high scores on both environmental *Management & Policy* and *Implementation & Measurement*.

-- Insert Figure 4 here --

Market Barriers to Optimizing Environmental Performance

For institutional property investors and corporate real estate users, there are direct and indirect economic benefits to be reaped from improving environmental management practices. But in order to reap these benefits, some hurdles need to be cleared first. We define three market barriers to optimizing environmental performance: absence of environmental metrics, the existing incentive structure in the market, and lack of proper financing mechanisms.

First, the current lack of information on actual energy consumption implies an information deficit at the micro level. Building owners, managers and tenants cannot make well-informed changes in their environmental management if they do not have established a baseline measurement of energy use across the property portfolio. For example, if they cannot measure directly the energy cost reductions of more efficient lighting or heating, then they are not likely to install more energy efficient lighting or an advanced environmental management system (EMS). We note that, under all circumstances, it is necessary to exactly measure the source of an energy saving by using “smart” metering or “smart” building software. Such technology is developing rapidly, is already available at low prices, and is becoming more commonplace among property investors.³⁰

The second reason the property sector has been reluctant to invest in energy efficiency is the existing incentive structure in the market. To increase the environmental performance of the property sector, the relationship between investors, landlords, and tenants would have to be structured in such a way that it offers both owners and users the incentives to behave in a more energy-efficient way. Neither of the two main contract forms that are currently used (gross and net leases) is optimal in this regard. Under net lease contracts, which are common in most European commercial property markets, the energy bill is paid directly by the user. Since the savings derived from economic behavior flow directly to the user, this creates an incentive for users to economize on energy costs. However, this type of lease contract provides no incentive for a building owner to invest in energy efficiency. A possible design to resolve this issue could be a gross rental contract in which the tenant receives the utility cost savings that result from its own efficient energy consumption, while the owner receives the cost savings from his energy investments. The Greenhouse Guarantee of the Australian Investa Property Group is an example of such a structure.³¹ The property sector would have more incentives to make profitable energy-saving investments, if “green” rental contracts were adopted for commercial property.

³⁰ See <http://www.buildingiq.com> for but one example.

³¹ See www.investa.com.au/Common/Pdf/Sustainability/GreenhouseGuarantee.pdf.

Third, property owners must self-finance investments in insulation, better environmental management systems, and renewable energy generation. The resulting capital constraint is a problem that can be solved by financial markets, but banks and institutional investors have not yet created the financial instruments and infrastructure to deal with investments in energy efficiency improvements in buildings. There are two main types of financing vehicles for investments in energy improvements. The first is stand-alone, i.e., the investment is funded separately from the building to which it pertains. And in fact some innovative funds have been created. For instance, APG Asset Management has created and co-funded a dedicated fund to finance energy efficiency retrofits. Together with energy performance contractors, who guarantee units of energy savings, this fund offers property investors the opportunity to improve the environmental or energy performance of their property portfolio without any capital requirements. It is fair to assume that other market participants will increasingly adopt this example, with for instance the London-based Climate Change Capital Property Fund as an example.

The second approach is to make the financing of energy efficiency investments either part of the mortgage that is written on the building, or a separate lien on the building that is senior to the existing mortgage, for example in the form of a property tax. Financing as a part of the mortgage has not yet materialized. However, researchers have started to analyze possible designs for such mortgages.³² One of the main obstacles is lack of information, because banks generally do not yet take energy costs into account when making mortgage loans, despite the fact that these costs affect the cash flows pertaining to the buildings. Lower and less volatile energy costs improve the value of these buildings, and therefore increase the lender's financial security. So, in principle, banks should welcome investments to improve energy efficiency. Experiments with such mortgages are under way. For example, Rabobank has recently launched a climate mortgage that takes energy expenses into account.

A third way to finance energy improvements is by means of a senior lien or property tax has been implemented under the Property-Assessed Clean Energy (PACE)

³² D. Jaffee and N. Wallace, "New Channels for Financing Green Real Estate Investments," Working Paper, UC Berkeley, CA (2009).

program in California. Various market participants, most notably the Clinton Global Climate Initiative, are actively pursuing market alternatives to this government program.

Conclusions and Practical Implications

For corporations, a large part of their ecological footprint arises from their consumption of commercial space. Most corporate space is now leased rather than owned, so the “greenness” of the corporate property portfolio is mostly determined by the environmental performance of professional property investors. For institutional investors, the environmental credentials of their allocation to real capital is also determined by the performance of dedicated property investors, as pension funds and insurance companies increasingly invest in real estate via listed property companies or private property funds.

We map the environmental performance of some 200 listed and private property companies using a detailed survey. Based on the survey results, we create an environmental scorecard for each company. The main component is an Environmental Real Estate Index, and the results reported in this paper suggest that the environmental performance of the global property investment industry can be substantially improved. The results of our survey provide clear benchmarks for the real estate industry: property investors have to look to their Australian peers for guidance to improve environmental performance. Many investors have only taken a few small steps on the road to optimizing environmental performance.

The results in this paper have important managerial implications. Green buildings are rapidly transforming the property sector. Besides providing a public good through carbon abatement, institutional property investors and corporate property users are the ultimate beneficiaries of the current transformation, because of the shareholder value that can be created by “greening” the property stock, and because of the efficiency gains in occupier costs. The results of this survey can help corporations to assess the environmental performance of their landlords. Since that performance is quite weak for the vast majority of property owners surveyed here, corporations searching for ways to improve their own “ecological responsiveness” can use the survey results to engage their landlords and help steer them on a path towards improved environmental performance.

For institutional investors, the survey results help to evaluate, and possibly improve, the “greenness” of their property investments.

Creating informational transparency to assess the “greenness” of the property portfolio is just the first step towards reaping these benefits. For corporations and property investors, improving the energy efficiency of commercial buildings does not necessarily require massive capital investments. The Environmental Protection Agency proposes a “sequenced approach” to ensure that investments lead to the biggest energy savings and achieve the highest returns. This includes “quick wins”, such as installing smart meters and smart building software to implement strategies for improving the performance of the various building systems.³³ Also, lighting consumes, on average, 30 percent of a building’s energy and has a significant impact on other building systems (*e.g.*, by affecting heating and cooling loads). Improving lighting systems can save substantial on resources, for example by replacing existing lights with fluorescent light bulbs. A more rigorous retrofit is replacing the existing heating-cooling-ventilation system with one that is properly sized or retrofitting the existing system. Ultimately, building occupants are the second most important contributors to energy consumption in buildings and tenant engagement can substantially improve a building’s total energy consumption.

³³ A “smart” meter is a digital meter that records electricity, water or gas consumption with a high frequency and periodically transmits the readings via a dedicated radio frequency, Bluetooth, or network, back to the building manager. “Smart” building software is an automated supervisory control system for HVAC systems in buildings, designed to reduce energy consumption, operating costs and CO₂ emissions. It connects to existing building management and control systems using industry standard interfaces.

Appendix: Survey and Survey Response

The global environmental real estate survey addresses the environmental practices of listed property companies and private property funds. The survey covers 43 questions in two main categories. The first category is *Management & Policy*; it focuses on the environmental policies of respondents. This category also includes questions on the integration of environmental criteria into asset management practices and refurbishment decisions, and on external reporting of environmental policies and management. The second category is *Implementation & Measurement*; it is comprised of questions related to the formal environmental certification of existing and recently acquired properties, the actual energy, water, and waste consumption of the real estate portfolio, the use of “smart meters”, and staff training and remuneration according to environmental performance.³⁴

The sample of property investors surveyed consists of 688 listed property companies and private property funds: 426 from Europe, 194 from the U.S., 50 from Asia, and 18 from Australia. Of this total, 211 are publicly listed. The sample was obtained from the constituents of the Global Property Research Index, in combination with information from the European Public Real Estate Association (EPRA).³⁵ The sample of private property funds includes the aggregate of the current investments of three pension funds that funded this research, plus the funds covered by the European Association for Investors in Non-listed Real Estate Vehicles (INREV).

Table A1 shows the response rates, and reports substantial variation between regions and types of property investors. The overall absolute response is 198 respondents (29 percent of the surveyed sample): 72 listed companies, and 126 private funds. Among listed respondents, we identify high response rates for European and Australian property companies, especially when we weigh these response rates by the market capitalization of the surveyed companies. The response rate of 20 percent for the U.S. is relatively low. The zero response for Asian listed property companies is disappointing (especially since a survey in Japanese was made available to investors in Japan).

³⁴ The survey was adapted to each region, and to private funds and listed property companies, to address institutional differences.

³⁵ Global Property Research is one of the leading global real estate index providers.

A simple analysis shows that the variation in response rates is related to the transparency of the local property market. We correlate the *Jones Lang LaSalle (JLL) Real Estate Transparency Index* to the response rates in each country. This index measures and aggregates the transparency factors related to the legal and regulatory environment, performance measurement, the transaction process, and market fundamentals in 82 markets. We find that the correlation is negative (-0.52) and statistically significant: a strong ranking on the *JLL Transparency Index* increases the response rate. For instance, Japan and Greece rank 26th and 33rd on the *JLL Transparency Index*, and both have a response rate of zero. But in contrast, Australia and the U.K. rank 2nd and 5th on the *JLL Transparency Index*, and both have high response rates of close to 66 percent.

**Table A1.
Survey Response Rates**

	Universe (# of funds)	Response (# of funds)	Response Rate (by # of funds)	Response Rate (by market cap)
Survey Listed				
Europe	84	45	54%	80%
U.S.	102	19	19%	31%
Australia	12	8	67%	88%
Asia	13	0	0%	0%
Survey Private				
Europe	342	64	19%	-
U.S.	92	37	40%	-
Australia	6	5	83%	-
Asia	37	20	54%	-
Total	688	198	29%	-

To make inferences based on the results of this survey, it is important to address the possible sources of a response bias.

First, the variation in the response rates across countries may be due to the lack of familiarity of respondents with the pollster and the sponsoring entities. Indeed, the investment exposure of the pension funds is not exactly equal across the various regions. However, invitations to participate in the survey were sent out by the local offices of the

pension funds (i.e., New York for North America, and Hong Kong for Asia-Pacific) to increase awareness of the survey among respondents.

Second, the response rate may be an indication for the attention paid to environmental management by the property investment industry: these response rates may simply reflect the fact that environmental management is a relatively new issue for property investors. For example, a recent study of Japanese property companies shows that environmental issues not directly affecting the safety and convenience of a building do not concern property investors. Energy and water use, recycling, and garbage reduction were all deemed unimportant.³⁶ These considerations may partially explain the low response rates in Asia and the U.S.

Third, a referee pointed out the possible influence of local factors, like weather and energy costs, on the relevance of energy efficiency and sustainability for property companies, and thus the likelihood to respond to the survey. However, simple correlations between national response rates and average total degree-days are low.³⁷ To illustrate: the average number of total degree-days is comparable in Japan (2,797), the U.S. (3,041), and the U.K. (2,876), whereas there is considerable variation in response rates across these countries.

³⁶ J. Yoshida, "Survey on real estate investors' emphases on environmental issues," ed. Japan Real Estate Institute (Tokyo: Japan Real Estate Institute, 2009).

³⁷ Climate data obtained from <http://www.wri.org>.

LEED **(Text-Box)**

The Leadership in Energy and Environmental Design (LEED) rating system was created by the U.S. Green Building Council (USGBC) to provide a framework for meeting sustainability goals and assessing building performance. LEED is a nationally accepted benchmark for the design, construction, and operation of green buildings and neighborhoods. Most recently, the LEED 2009 family of rating systems increased emphasis on climate change-related strategies, encouraging project teams to focus on opportunities to reduce greenhouse gas emissions.

LEED promotes a whole-building, integrative approach to sustainability that strives to reduce the total life-cycle cost of ownership and operations. LEED encourages a range of performance-based and prescriptive sustainability strategies in categories including:

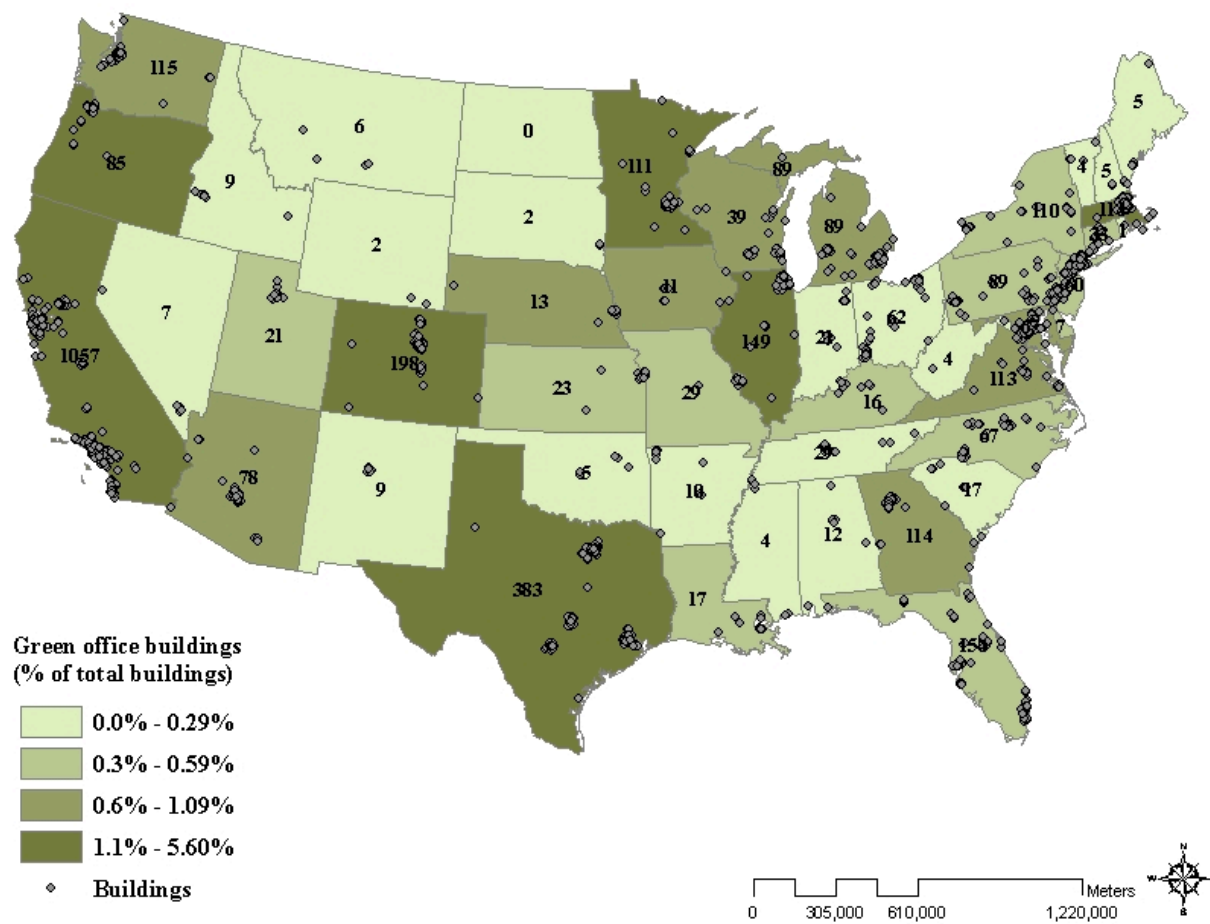
- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality
- Innovation in Design
- Regional Priority



LEED provides an explicit and consistent structure for the documentation and third-party review of strategies, policies, and performance through the Green Building Certification Institute. LEED buildings have achieved reductions in energy use, water consumption, and greenhouse gas emissions. They have also helped drive demand for green products such as less toxic paints and renewable materials. The integrative use of green building strategies has helped owners to reduce carbon emissions at a property and portfolio level, capture increasing demand for sustainable buildings, address current and pending environmental regulations, reduce operating expenses, and support socially responsible corporate policies.

www.usgbc.org

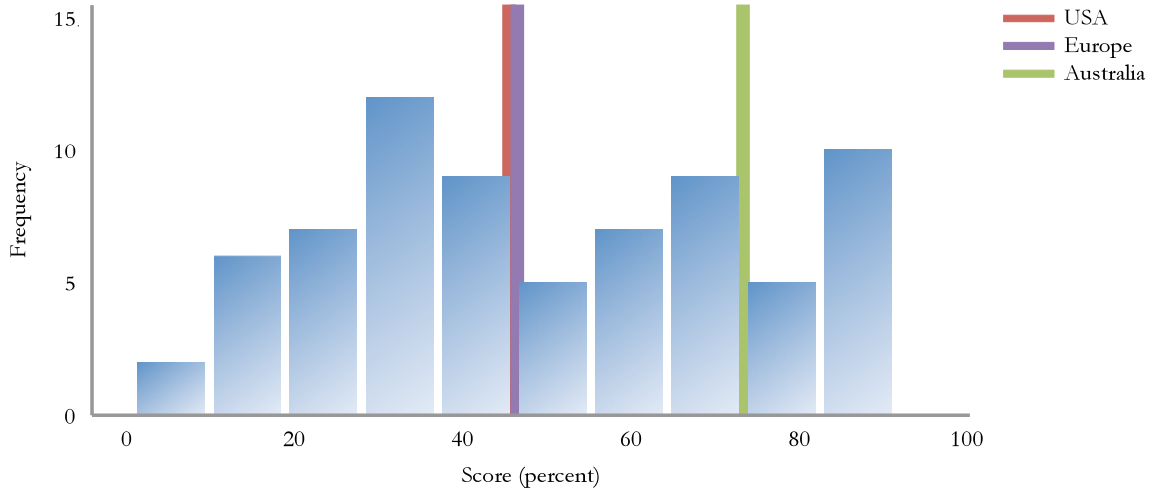
Figure 1.
The U.S. Geography of Green Buildings
LEED and Energy Star-rated Office Buildings
(as a fraction of the total office stock, October 2009)



Source: CoStar Group, USGBC, EPA

Figure 2.
Environmental Real Estate Index: Global Listed Sample

A. Environmental Management & Policy



B. Implementation & Measurement

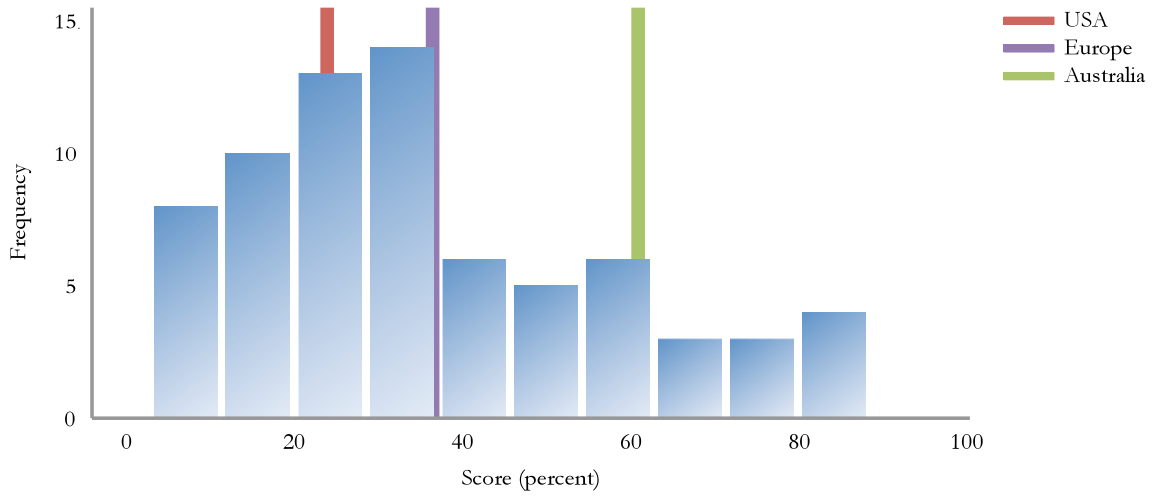
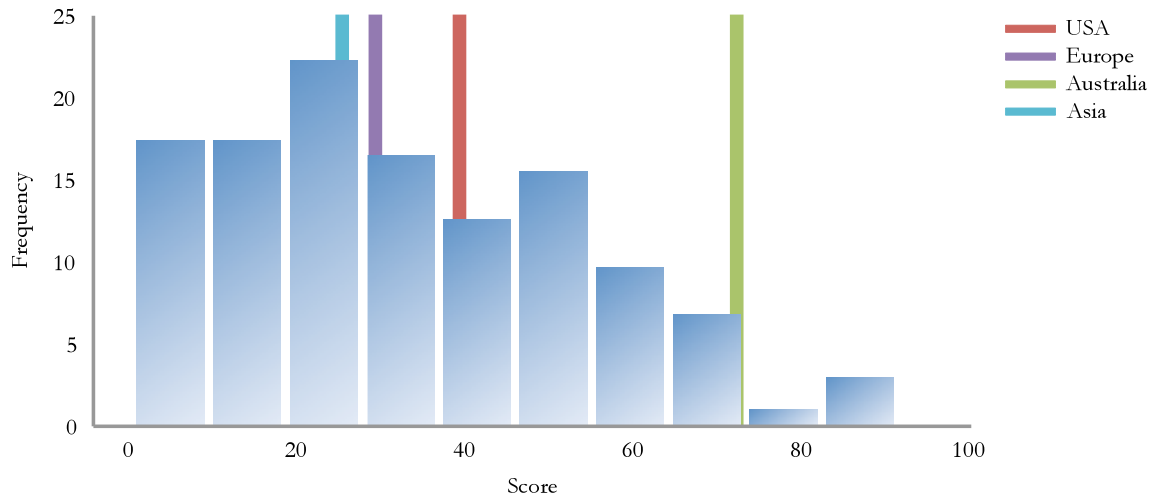


Figure 3.
Environmental Real Estate Index: Global Private Sample

A. Environmental Management & Policy



B. Implementation & Measurement

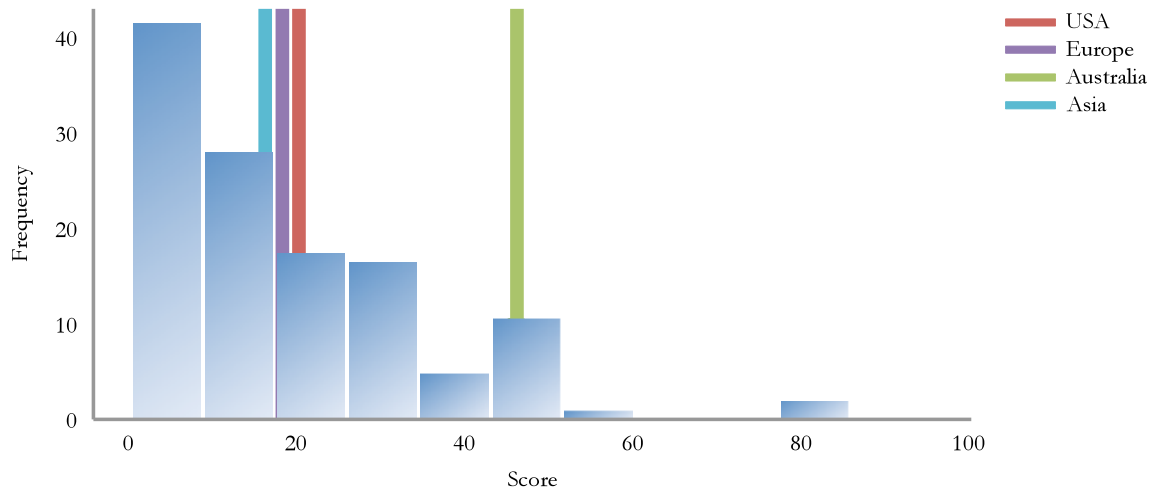


Figure 4.
Environmental Policies and Implementation
Talking the Talk or Walking the Walk?



Table 1.
Environmental Metrics Measured by Property Investors
Respondents with Information on:

Region		Total energy consumption	Total water consumption	Total waste collected	Total waste recycled	Total CO ₂ emissions	Percentage of Sample With Smart Meters
Europe	Listed	31.1%	24.4%	20.0%	17.8%	28.9%	60.0%
	Private	6.3%	7.8%	4.7%	4.7%	4.7%	28.1%
U.S.	Listed	26.3%	5.3%	5.3%	10.5%	10.5%	42.1%
	Private	5.4%	5.4%	0.0%	0.0%	0.0%	27.0%
Australia	Listed	62.5%	62.5%	50.0%	37.5%	62.5%	87.5%
	Private	80.0%	80.0%	80.0%	80.0%	60.0%	100%
Asia	Private	15.0%	15.0%	15.0%	10.0%	5.0%	21.4%
Total		18.7%	15.7%	12.1%	11.1%	13.6%	38.6%

Table 2.
Global Environmental Leaders
Listed Property Companies

Rank	Company	Country	Management & Policy	Implementation & Measurement	Total
Continental Europe					
1.	Unibail-Rodamco	France	83	67	73
2.	Castellum	Sweden	87	59	70
3.	Hufvudstaden	Sweden	83	46	60
United Kingdom					
1.	Big Yellow Group		83	83	83
2.	Hammerson		70	89	81
3.	British Land Company		61	79	72
United States					
1.	Vornado Realty Trust		83	37	55
2.	Liberty Property Trust		43	56	51
3.	Douglas Emmett		74	34	50
Australia					
1.	GPT		83	89	86
2.	Stockland		83	80	81
3.	Commonwealth Property Office Fund		91	66	76

**Table 3.
Global Environmental Leaders
Private Property Funds**

Rank	Company/Manager	Fund Name	Management & Policy	Implementation & Measurement	Total
United Kingdom					
1.	Capital & Regional	CRM Fund	57	51	53
2.	PRUPIM	M&G Property Portfolio	57	49	52
3.	Grosvenor	Grosvenor Shopping Centre Fund	43	43	43
Continental Europe					
1.	ING REIM	Dutch Office Fund	52	43	47
2.	ING REIM	ING RPF1	70	29	45
3.	Pramerica Real Estate	TMW ImmobilienWeltfonds	52	37	43
United States					
1.	Principal	[anonymous]	57	51	53
2.	USAA Real Estate Company	USAA Real Estate Funds (overall)	52	44	47
3.	Normandy Real Estate Partners	Normandy Real Estate Funds (overall)	61	31	43
Australia					
1.	GPT Funds Management	GPT Wholesale Office Fund	87	86	86
2.	Investa	Investa Commercial	91	80	84
3.	GPT Funds Management	GPT Wholesale Shopping Centre Fund	87	54	67
Asia					
1.	CapitaLand	CapRet China Incubator	61	51	55
2.	Lend Lease Property Investment Services	APIC II	74	33	49
3.	ING REIM Korea	ING Korea Fund	65	34	47