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HOW GREEN IS YOUR PROPERTY PORTFOLIO? THE GLOBAL REAL ESTATE SUSTAINABILITY BENCHMARK

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The real estate sector accounts for more than a third of global greenhouse gas emissions and thus offers great potential for carbon abatement. Energy efficient and green buildings are rapidly transforming the commercial property sector, and institutional investors can benefit from that transformation through the value created by the greening of their real estate holdings. This article develops a global survey for property portfolios, measuring the environmental performance of listed property companies and private property funds. Based on the objective set of environmental survey data, we construct an environmental scorecard – the Global Real Estate Sustainability Benchmark. The results reported in this article suggest that the environmental performance of the global property investment industry can be substantially improved. For institutional investors, the survey results and the scorecard metrics benchmark the current environmental performance of their property portfolio, and show the way to improving it.

Keywords: ESG, Energy Efficiency, Green Real Estate, Pension Fund, REITs

Measuring the Environmental Performance of Real Estate Investments

Pension funds and insurance companies continue to build up real estate exposure, often by participating in listed and unlisted specialized real estate vehicles. At the same time, institutional investors are experiencing broad societal pressure to assess and improve the performance of their investments on environmental, social and governance (ESG) factors, and that holds for their real estate allocations as well. Thus, institutional investors need to measure the environmental performance of their real estate investments, and that measurement needs to occur at the level of the vehicles in which they invest.

To date, institutional investors have struggled to find the appropriate tools to carry out these environmental assessments. The choice is either to develop in-house environmental scorecards, or to rely on one of the small number of proprietary evaluation methods, which generally have limited recognition in the real estate industry and usually just cover a small segment of the global market for real estate vehicles. This lack of an industry-wide and commonly accepted standard of environmental performance measurement continues to conflict with pressure on institutional investors to accelerate efforts to scrutinize the environmental performance of their real estate investment managers.

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% of the projected incremental demand for energy in 2030. Besides being a responsible citizen, assessing the environmental performance of real estate investments is all the more important because investing in more environmentally-friendly buildings may well be a path towards increased shareholder value. To a large extent, the investments needed to improve energy efficiency in buildings have positive net present values (Creyts, Derkach, Nyquist, Ostrowski, and Stephenson, 2007) and some recent evidence documents higher asset values for commercial buildings certified as *green* or energy efficient (Eichholtz, Kok, and Quigley, 2010a).

In a collaborative initiative with two Dutch (Algemene Pensioen Groep and PGGM) and one British (Universities Superannuation Scheme) pension funds, we develop a global survey for property portfolios, measuring the environmental performance of real estate investment vehicles: listed property

companies and private property funds. Based on the objective set of environmental survey data, we constructed the Global Real Estate Sustainability Benchmark (GRESB).[1] GRESB – an environmental scorecard – provides institutional investors with a transparent and easily comparable measure on the environmental performance of the real estate vehicles in which they invest, assisting institutional investors in making informed decisions regarding their property investments.

Summary of Survey Findings

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% of the survey respondents were able to report on the environmental key performance indicators (KPIs) of their properties – such as energy consumption, water consumption and greenhouse gas (GHG) emissions. In our comparisons, Australian property investors are the global leaders in measuring and managing the environmental performance of their properties, with Sweden and Britain following closely.

The underperformers are located in Asia, United States, 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 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*.

For institutional investors, the survey results and GRESB can help to assess the environmental performance of their property investments. The energy efficiency and sustainability of buildings is rapidly transforming the property sector and institutional investors may be the beneficiaries of that transformation due to the shareholder value created by greening their property portfolios. Using the benchmark, pension funds can engage in a dialogue with their real estate investment managers to evaluate and possibly improve their environmental performance.

In the remainder of this article,[2] we first discuss the rationale for institutional investors to invest in more energy efficient or sustainable properties by looking at the financial performance of these buildings. We then turn to the environmental real estate survey results. The article ends with practical recommendations for real estate investors and a brief reference to the upcoming 2011 survey.

Green Certifications On the Rise

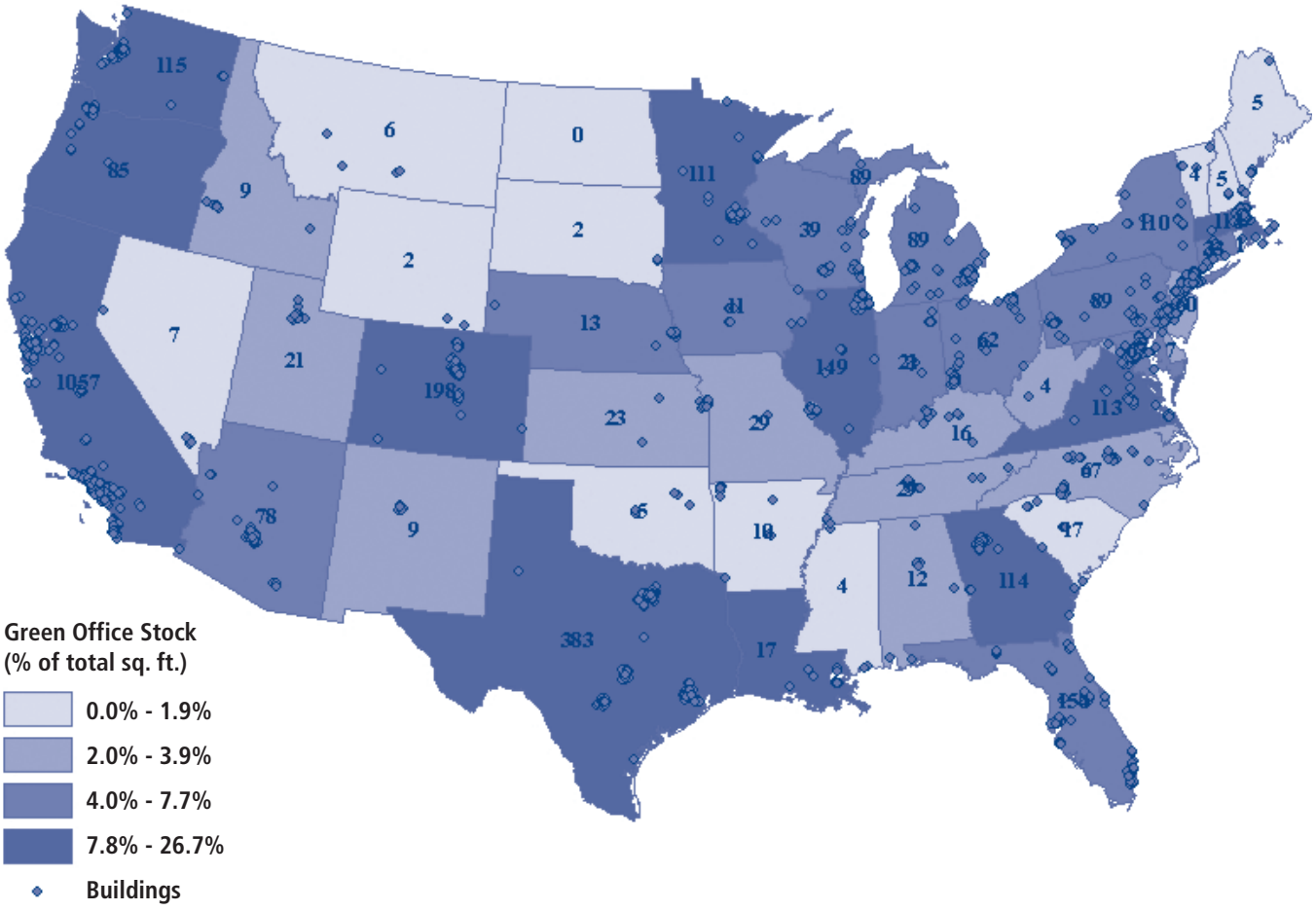
To measure the sustainability and energy efficiency of buildings, a number of building rating schemes have recently been developed, such as the Leadership in Energy and Environmental Design (LEED) scheme initiated by the US Green Building Council and the Energy Star program. LEED is jointly administered by the Environmental Protection Agency (EPA) and the Department of Energy, both in the United States.

The number of newly constructed energy efficient and green buildings and the number of 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 metropolitan areas of the United States are now labeled by one of the two main labeling programs – Energy Star or LEED (Eichholtz, Kok, and Quigley, 2010b). The rapid diffusion of these labels offers an interesting perspective on the geography of *green* office buildings across the United States.

Figure 1 is a green map of the United States, where the greenness of the state reflects the fraction of office buildings certified for energy efficiency or sustainability, 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. Economic geography, energy prices and climatological characteristics partially explain the relatively large fraction of certified space in these states, although some evidence also points at political ideology, incentives and building codes (Kok, McGraw, and Quigley, 2011).

The increased popularity of green rating schemes is not confined to the United States. The United Kingdom has adopted the BRE Environmental Assessment Method (BREEAM) certification scheme, Australia uses both the National Australian Built Environment Rating System (NABERS) and the GreenStar certification scheme, and Greenmark is the label of choice in Singapore.[3] The global rise of energy efficient and green building reflects not only the shifting preferences 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 United States, Hesta and GIC in Asia-Pacific, Algemene Pensioen Groep, Hermes, and PGGM in Europe.[4]

Figure 1: The Geography of Green Buildings in the United States: LEED and Energy Star-Rated Office Buildings (as a fraction of the total office stock, October 2009)



Source: Author Calculations: CoStar Group, US Green Building Council, Environmental Protection Agency (2009)

The Financial Implications of Greening

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, Eichholtz et al. (2010a) 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% higher.

A more recent study by the same authors (2010b) 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 energy efficient buildings relative to those of comparable non-green buildings. Buildings with a stronger environmental performance (as measured by LEED) command correspondingly higher rents and values in the marketplace. 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 prevailing market capitalization rate. Despite the recent financial crisis and its effects on the commercial property industry, survey results indicate that environmental issues remain a high priority for investors.

The Global Real Estate Sustainability Survey

To evaluate the current environmental performance of institutional real estate investments, we developed an extensive survey which looks 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 addresses environmental Key Performance Indicators (KPIs), such as energy and water consumption of the real estate portfolio, and the infrastructure needed for superior environmental performance.

The survey was distributed to 688 investors with 198 investors responding. There was a relatively high response rate from property funds in Europe and Australia, but the response rate from American property funds was lower, and even fewer Asian property funds responded. 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 significantly more likely to respond. Detailed information on the sampling procedure and possible explanations for the variation in response rates (such as differences in climatological conditions) can be found in the main benchmark report.[5]

In the main benchmark report, we also document the responses to a wide selection of individual questions. In this article, we highlight the most important questions – the environmental KPIs measured by the respondents. For example, we address energy and water consumption, waste treatment, and greenhouse gas (GHG) emissions. Table 1 summarizes the results. Only 37 of the respondents (19%) were able to document the energy consumption for their total property portfolio in 2007 or 2008. The percentage of respondents that reported information on other environmental metrics such as water consumption and waste treatment was even lower (16% and 12%, respectively). With the notable exception of Australia, property investors' knowledge regarding their carbon emissions is also limited. Only 14% of the respondents are able to report information on this key environmental metric.[6]

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 tool to obtain information on environmental KPIs is present in the property portfolios of just 76 respondents (38%). The lack of such measures may substantially hinder the basic optimization of energy performance in commercial buildings.

Table 1: Environmental Factors Measured by Survey Respondents (percentage of respondents with information on the listed factors)

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%
United States	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%**

Source: Author research

GRESB for Listed Property Companies

Based on the responses to the individual survey questions, we develop the GRESB 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.[7] The result is a benchmark that consists of two components: *Management & Policy* and *Implementation & Measurement*. To facilitate comparisons, these components are both standardized on a scale from zero to a hundred. The components form the basis for an environmental scorecard, enabling institutional investors to compare existing real estate investments based on their environmental performance. The scorecard also allows for assessing the environmental performance of future investments. For investments in regular equities, the scorecard facilitates the evaluation of corporate social responsibility (CSR) policies with respect to corporate housing decisions.

The maximum score of 100 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 reaching 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 consistent with the fiduciary duty of pension funds (Kotchen, 2006).

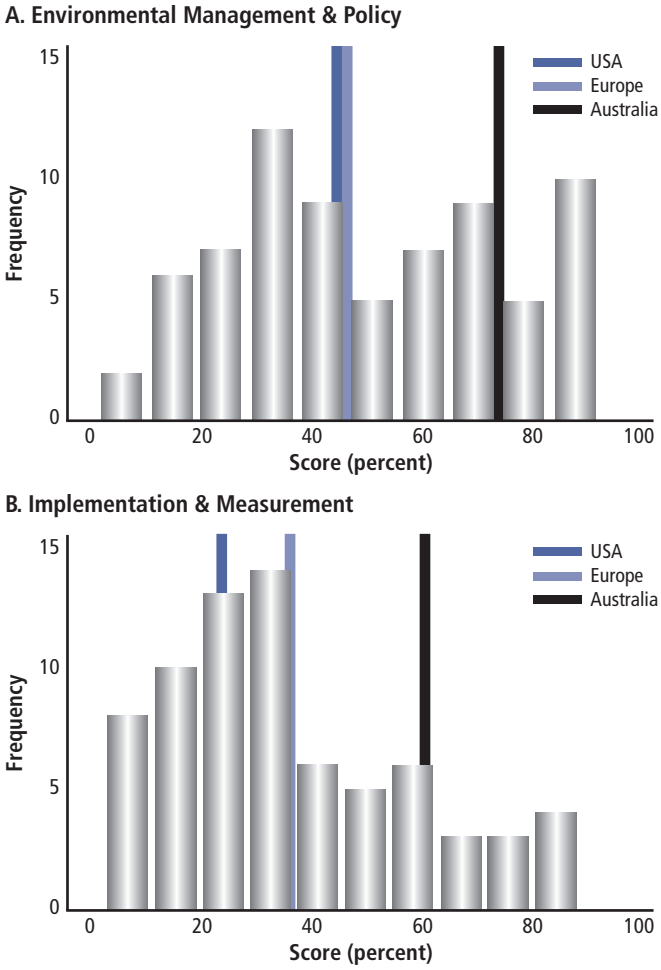
GRESB Scores for Listed Companies

Figure 2 provides the frequency distribution of the scores on the subcategories *Management & Policy* and *Implementation & Measurement* of GRESB 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% score on *Management & Policy*, and just a third of the maximum score on *Implementation & Measurement*. Obviously, there is considerable room for improvement of the environmental management practices in the property sector.

Table 2 provides an overview of the scores on GRESB for the top-three listed property companies in different regions.[8] The environmental scores of the best performers show that a maximum score on the current environmental benchmark is realistic. The global leader is the GPT Group, with a total score of 86. GPT is a well-established, diversified property company with a strong reputation in environmental management. The company is currently leading the Dow Jones Sustainability Index for the real estate sector. Another environmental leader is the British-based Big Yellow Group with a total score of 83. This property company specializes 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.[9] The best performing American property company is Vornado Realty Trust. Relative to the top-three in other geographic areas, the score of 55 is still low. If we were to create a global ranking, Vornado would rank only 21 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. In other words, there appears to be untapped potential to increase shareholder value. The top green performers provide the clear examples needed by the property industry 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.

Figure 2: Global Real Estate Sustainability Benchmark – Global Sample of Listed Companies



Source: Author research

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

Source: Author research

Characteristics of Green Leaders

We further investigate the cross-sectional variation on the environmental scores employing a regression analysis.[10] The results (documented in the main benchmarking report) 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 the optimization of environmental performance in real estate portfolios. We document that environmental performance is significantly and positively related with financial performance, measured by return on assets (ROA), although we cannot establish a causal link. This finding is in line with earlier evidence on the added value of ESG-factors for general corporations (Guenster et al., forthcoming).

We also document that property companies investing in residential or non-core types of property 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 (Davis, 2009).

GRESB for Private Property Funds

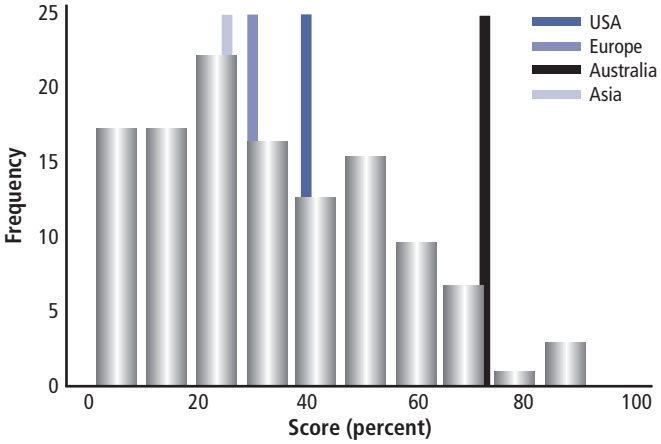
We analyze separately the survey results for private property funds. Figure 3 provides the aggregated scores for the 126 respondents. The variation in the scores is comparable to those for listed property companies. Scores for *Management & Policy* are higher than those for *Implementation & Measurement*, 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.

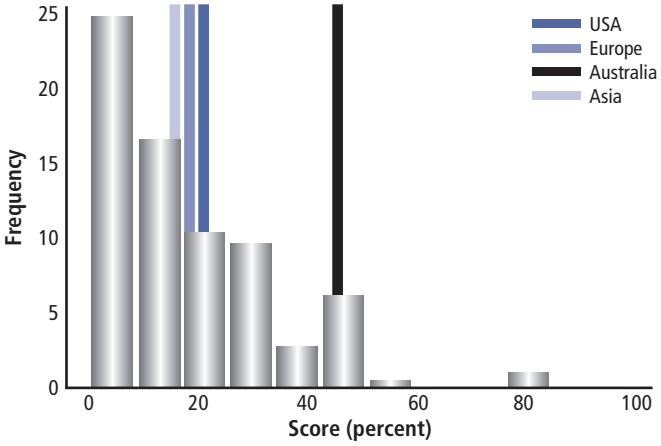
Note that Asian funds, on average, score poorly, with an average score on *Management & Policy* of 25, and a score on *Implementation & Measurement* of 16. These low scores suggest that environmental management is not high on the agenda in emerging property markets, or that it is considered a lower priority. 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 [environmental] trends and financial impacts are not well understood by analysts, investors, companies, and governments in the [Asian] region." (Venugopal, Krechowicz, Singh, Padamadan, and Shinde, 2010).

Figure 3: Global Real Estate Sustainability Benchmark – Global Sample of Private Funds

A. Environmental Management & Policy



B. Implementation & Measurement



Source: Author research

Green Leaders among Private Funds

Table 3 provides the scores for private property funds that perform best on GRESB. 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 environmental leaders in Australia outperform their peers in any other region. Contrasting the results for listed property companies, American funds perform quite well relative to their global peers. The leading American property 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 technology that initially appeared on the market were aimed specifically at office properties.

Walking the Green Talk?

For some property investors, there are substantial discrepancies between their environmental *Management & Policy* and their actual *Implementation & Measurement*. This finding suggests that the costs of formulating an environmental investment policy are relatively low. To address the relation between environmental policies talk and environmental management practices walk, we map for every respondent how their benchmark score on *Management & Policy* relates to their benchmark score on *Implementation & Measurement*. Figure 4 shows that the environmental *Management & Policy* scores are better than the *Implementation & Measurement* scores. Property companies do not necessarily practice what they preach when it comes to environmental management.

We divide the figure into four quadrants, each of which depicts a designated set of environmental performance characteristics. Property companies and funds that appear in the lower left-hand quadrant are classified as the *green laggards*. They neither have the environmental policies nor do they assess environmental KPIs. We note that this quadrant is the most densely populated, with about 133 of the respondents (67%) 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. *Management & Policy* scores are relatively high, but *Implementation & Measurement* scores are low. The large number of observations

Table 3: Global Environmental Leaders – Private Property Funds

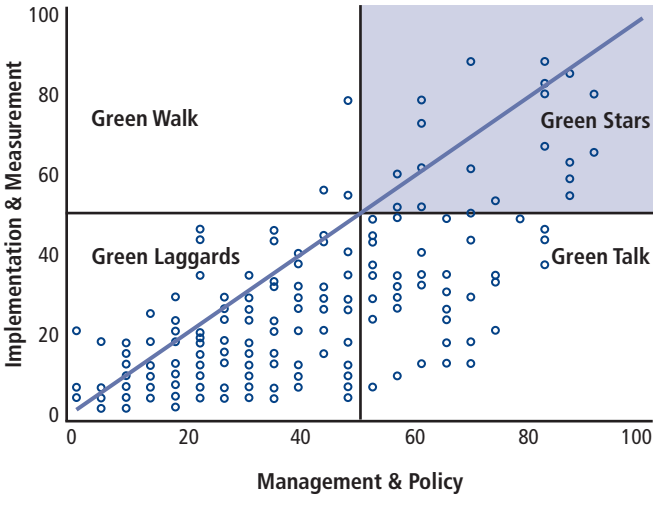
Rank	Company / Manager	Fund Name	Management & Policy	Implementation & Measurement	Total
United Kingdom					
1	Capital & Regional	CRM Fund	57	51	53
2	PRUPIM	M&G Property Portfolio	57	49	52
3	Grosvenor	Grosvenor Shopping Centre Fund	43	43	43
Continental Europe					
1	ING REIM	Dutch Office Fund	52	43	47
2	ING REIM	ING RPFI	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

Source: Author research

in this quadrant suggests public relations 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%) of all respondents.

The upper left quadrant contains the property investors that act rather than talk. For these property companies and funds, action speaks louder than words. This quadrant is the least populated, with only three property investors – a mere 2% of the respondents. This finding suggests that implementation of environmental management only occurs on the basis of an explicitly formulated policy. The upper right quadrant contains the environmental top performers, the 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%) can be classified as green stars, with relatively high scores on both environmental *Management & Policy* and *Implementation & Measurement*.

Figure 4: Environmental Policies and Implementation – Talking or Walking?



Source: Author research

Making Change Happen

In order to reap the benefits of improved environmental management practices in the property industry, our results suggest that there are hurdles that must be cleared. Three market barriers to optimization of environmental performance in the property sector are:

- Absence of environmental metrics.
- The existing incentive structure in the market.
- 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 and asset managers cannot make well-informed changes in their environmental management if they have not first established a baseline measurement of energy consumption across the property portfolio. For example, if investors cannot measure directly the energy savings of lighting or heating retrofits, then they are not likely to install more energy efficient lighting or an advanced environmental management system (EMS).

Second, the property sector has been reluctant to invest in energy efficiency because of the existing incentive structure in the market. To increase the environmental performance of the property sector, the relationship between investors (i.e. landlords) and tenants has to be structured in a way that offers both owners and users the incentives to behave in a more energy-efficient manner. Neither of the two main contract forms that are currently used (i.e. gross and net leases) is optimal from this perspective. Under net leasing contracts, which are common in most European commercial property markets, the energy bill is paid directly by the tenants. Since the savings derived from more efficient behavior flow directly to the tenant, there is a direct incentive for users to economize on energy costs. However this type of rental contract provides no incentive for a building owner to invest in more efficient equipment. A solution here could be a split-savings rental contract in which the tenant receives the utility cost savings resulting from economizing on energy consumption, while the investor receives the cost savings resulting from his investments in energy efficiency.

Third, property owners usually finance investments in insulation, better environmental management systems, and renewable energy generation on their balance sheet. The resulting capital constraint is a problem that can be solved by efficient financial markets. However, banks and institutional investors have not yet created the financial instruments and infrastructure to provide external capital with easy access to investments in energy efficiency retrofits of commercial buildings.[11]

Moving Forward: GRESB 2011

For most institutional investors, the environmental impact of their allocation to real estate assets continues to be determined by the environmental performance of real estate investment managers in listed property companies, and private property funds. Our findings suggest that the environmental performance of the global property investment industry can be substantially improved. Property managers should take a close look at their Australian peers for guidance on how to improve the environmental performance of property portfolios.

The results in this paper also have important implications for institutional investors such as pension funds. Green buildings are rapidly transforming the commercial property sector. Institutional investors can be beneficiaries of that transformation due to the shareholder value created by the greening of property portfolios. Our survey results and GRESB help to evaluate, and improve the environmental performance of their property investments. Improving the energy efficiency of commercial buildings does not necessarily require immediate and massive capital outlays. The Environmental Protection Agency in the United States has designed a sequenced approach to ensure that investments lead to the largest energy savings and achieve the highest returns. This includes quick wins ranging from installing smart meters and smart building software, to implementing strategies for improving the performance of building management systems.

Meanwhile, recent literature on energy efficient and green buildings supports the notion that aiming for strong environmental performance within the property holdings of pension funds is consistent with the exercise of fiduciary responsibilities. In that spirit, the second GRESB survey will be launched as this article goes to press. This renewed effort is backed by a substantially larger consortium of leading pension funds and industry associations.[12]

Based on the improved and extended data from the new survey and the GRESB Sustainability Scorecard, these institutions will be able to engage their property fund managers on their environmental performance and how to improve it. The ultimate goal of this collaborative effort is to make a difference in the energy consumption and carbon footprint of the global property sector, while at the same time improving the financial performance of the institutional investors' portfolios. Joining this 2011 survey initiative is a small step for individual funds, but the benefits for the industry and society can be substantial.

Endnotes

1. See www.gresb.com for more detailed information on the benchmark.

2. APG Asset Management, PGGM Investments, and the Universities Superannuation Scheme provided financial support for this research. We thank Sander-Paul van Tongeren, two referees, and the editor for helpful comments. Paulo Peneda provided excellent research assistance. The authors acknowledge financial support from The Foundation for Strategic Environmental Research (MISTRA). All errors are the authors.

3. 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.

4. 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.

5. The benchmark report is available on the website of the GRESB initiative – www.gresb.com.

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

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

8. 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.

9. 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.

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

11. This is not for a lack of effort. Various organizations, such as the Clinton Climate Initiative, the National Resource Defense Council and the Carbon War Room are working on standardized energy efficiency retrofit templates, to allow for an influx of private capital into this supposedly profitable investment.

12. The consortium currently includes: Algemene Pensioen Groep, ATP, Aviva, Bedrijfstakpensioenfonds Detailhandel, Hermes, Local Government Superannuation, Mn Services, Ontario Teachers' Pension Fund, PGGM, Universities Superannuation Scheme, Victoria Funds Management Corporation; and, the industry associations CERES, EPRA, Jones Lang LaSalle, MISTRA, and NAREIT.

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