RESEARCH REPORT

Building Labels vs. Environmental Performance Metrics: Measuring What's Important about Building Sustainability

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The property sector is fixated on earning environmental plaques for good intentions – often at the expense of actually improving sustainability through informed capital planning. A lack of clear standard metrics is a key obstacle. Achieving consensus on simple sustainability metrics would be an important step to refocus the property sector on performance and highlight the considerable industry progress already made.

Abstract and Executive Summary

The real estate sector needs robust, reliable metrics to measure the sustainability of properties and portfolios; ensure regulatory compliance; drive organizations to greater achievement and raise industry accountability; and gauge the efficacy and financial returns of environmental enhancement projects. Despite these and other important goals, industry participants have yet to agree on common standards. Instead, investors face a bewildering multitude of systems and tools, each with its own metrics, approach, technical requirements, and priorities, reflecting the needs and biases of their adherents.

To be sure, the failure to reach consensus provides some fleeting benefits by allowing almost everyone to claim some measure of sustainability, albeit with little accountability. But the lack of standards imposes significant costs on organizations, which must undertake multiple and often contradictory environment assessments, while not providing clear guidance for effective and efficient improvement. Importantly, the void undermines achieving more substantive progress by rewarding efforts over results. Instead, the leading rating systems often send misleading or inadequate signals to those charged with greening their assets. The lack of standards also inhibits funding for energy efficiency initiatives as lenders and investors cannot fully assess projects risks and returns. Perhaps the greatest cost might be on the industry itself, which suffers from a reputation of environmental indifference, despite over a decade of concerted and meaningful efforts to improve its record.

On the other hand, new initiatives and systems are underway to both simplify and unify sustainability data collection and reporting. Notable efforts include those from the Greenprint Foundation (focusing on greenhouse gas emissions), the Global Real Estate Sustainability Benchmark (fund performance and policies), and the Green Property Alliance (a reduced set of key outputs). These and other programs are finding growing adherents, though none approaches the adoption of fuel efficiency standards in the automotive industry.

Adopting standards will not be simple, with the many conflicting goals and priorities of industry stakeholders: investors and owners, tenants and residents, environmentalists and regulators. But these challenges need not be overwhelming. Real estate is hardly the first industry to face the need to bridge industry consensus, even if it does operate under some unique constraints. In the interim, there are some simple metrics that most participants should be able to endorse, for the collective good of the industry and the planet.

We recommend some basic principles including a reduced set of key performance indicators, standardization across regions, alignment with sustainability drivers, and specificity to major user groups. Thought also should be given to how to best tap into standard data reporting systems, to minimize duplication and reduce costs. That said, sustainability is sufficiently new for most organizations that existing systems inevitably will need to be modified or adapted to capture the required raw data. Such efforts should be amply rewarded in the returns from more efficient building operations and more effective capital planning.

Introduction

The real estate industry is slowly suffocating under an avalanche of metrics and tools designed to measure the sustainability of assets and industry participants. These systems are as varied in scope and approach as are the buildings, owners, and managers they seek to quantify. Despite more than a decade of discussion and false starts, the commercial real estate sector is still far from coalescing around common standards. By now, few should doubt the importance of both measuring and reducing real estate's environmental impact. Buildings account for about 40% of global energy and a quarter of global water use, and generate approximately one-third greenhouse gas ("GHG") emissions.[1] Yet progress is being undermined by the industry's failure to reach consensus on the fundamental issues of what to measure and how to quantify.

Regional differences in environmental concerns invites disputes in what should be measured

Why has agreement among commercial real estate users and investors been so elusive? Foremost are legitimate disagreements over what is important to measure, attributable in part to regional differences in environmental concerns and issues. Despite some overlap, the issues confronting India and Japan cannot be easily compared with those in the European Union and the United States. Also significant are the technical difficulties of quantifying some sustainability measures such as GHG emissions. Estimating GHG emissions, for example, requires knowing not only the amount of energy consumed onsite but also the ultimate energy source – which even motivated building owners often cannot determine with certainty, though workarounds enable building managers to make educated estimates of GHG emissions. The complexity of this challenge can be seen in the daunting list of GHG emissions attributable to the many different types of energy, as shown in Appendix A.

The multitude and diversity of industry stakeholders makes consensus-building difficult

Second, the very notion of "sustainability" is fundamentally a subjective determination. With the possible exception of zero-emission buildings, structures generally cannot be defined as being unequivocally green or not, yet almost all rating systems are based on just such a binary "green or not" determination. In reality, the cutoff between green and brown buildings is ultimately arbitrary, no matter how grounded in analytical rigor, with buildings (and portfolios) arrayed along a spectrum of varying sustainability. Only broad consensus among industry participants – including those who use the product, as well as those who create, own, and manage the product – can generate meaningful standards. The multitude and diversity of industry stakeholders, and the lack of truly dominant producers makes consensus building that much more difficult.

Perhaps most daunting of all are the difficulties inherent in establishing appropriate benchmarks for different types, uses, and locations of property. How to compare the Energy Use Intensity of a high-rise office building to a suburban warehouse? An owner-occupied headquarters building (where the owner has full operational control) to a net-leased facility (where the landlord has no maintenance responsibility)? An office building in Anchorage, Alaska versus one in Miami, Florida? Clearly, appropriate benchmarks must take stock of a property's function (retail versus office), intensity of use (occupancy, hours of operation), degree of landlord control, and climactic zone, among other factors, if the metric is to provide a suitable frame of reference for assessing sustainability performance.

[1] "Buildings and Climate Change: Summary for Decision-Makers," United Nations Environment Programme (UNEP), Sustainable Buildings & Climate Initiative (SBCI), 2009.

Standardization begets accountability, particularly when coupled with transparency

Other explanations for the limited progress are less benign. Part of the failure to establish standards seems deliberate, even self-serving: standardization begets accountability, particularly when coupled with transparency. In the absence of clear, accepted standards, many can claim the green mantle, using their own, personalized definitions. There is ample precedent in the real estate industry, in which definitions proliferate. Such commonly-used terms as “building area” and “market value” can have different definitions in different circumstances or regions, while “Class A building” is a largely subjective, self-reported designation that also varies by geography and property type. In this context, it seems perhaps natural, if unsatisfying, that sustainability would be defined in the “eye of the beholder” (whether the owner or tenant or other user).

The complexity and difficulty of establishing appropriate standards for real estate sustainability has propagated a cottage industry of systems and tools for measuring (and rewarding) effort and intermediate outputs (e.g. installing energy efficient windows and HVAC systems) rather than performance (energy saved, carbon emissions eliminated). This approach is understandable but ultimately misguided and counterproductive, again fueled by the industry’s desire to trumpet successes rather than establish accountability. Perhaps good deeds translate into good results; perhaps not. But with such a broad range of laudable behavior rewarded in different systems, it's hard to translate good effort scores into actual results in any accountable way.

Too often systems and tools measure (and reward) effort and intermediate outputs rather than performance

This situation is at once unfortunate and ironic, as any objective review of the property sector’s sustainability record would reveal considerable progress, both absolutely and relative to other industries. Buildings are far more efficient than they were a decade ago, with much of this improvement attributable to the encouragement provided by the leading rating systems such as LEED, BREEAM, and Energy Star. These achievements are not easily demonstrated however, because the sector lacks the simple metrics and reporting systems to tell the story. Moreover, further progress is limited by the lack of data and standards investors and lenders need to fund needed capital improvements that would increase sustainability.

With organizations devoting ever more time and resources to these often conflicting demands, we have reached a critical point for decisive collective action. Our industry needs to agree upon and adopt the measures, data systems, and reporting frameworks that can drive performance, enhance transparency and accountability, and provide decision-makers with the information and reference points that enable them to take appropriate actions. Anything short of this is make-work with unintended consequences that can be misleading to industry consumers and regulators; inefficient for participating firms; and, worst, distracting the industry from achieving the very goals these measures seek to advance.

In this paper, we assess where the real estate sector stands now in terms of sustainability metrics and outline some simple principles the industry might adopt for advancing standardization. As a foundation for our analysis, we begin by identifying the major drivers of sustainability and the need for supporting metrics. We then proceed to an accounting of the major systems and tools being used now in commercial real estate industry, with an analysis of their scope and scale. The paper closes with recommendations of the key attributes of effective sustainability metrics and next steps for the industry.

The Importance of Sustainability Standards

Drivers of Sustainability

The need for metrics ties to the factors that are driving the commercial real estate industry to strive for more sustainable products and operations. Our prior research has identified several main drivers of sustainability,[2] each with its own set of metrics required to measure and improve performance.

- Enhanced Operating Efficiency: Increasing the operating efficiency of portfolios and minimizing costs generates incremental cash flow. The old management adage that "you can't manage what you can't measure" applies well to sustainability performance. To improve operating efficiency, the industry needs metrics that can be consistently and accurately measured over time – and facilitate the kinds of investment decisions required to improve sustainability performance.
- Investor Criteria: A growing number of investors consider sustainability performance when selecting investment managers and funds. Labels and ratings, and strong environmental performance more broadly help investors make these decisions.
- Regulatory Compliance and Incentives: Government policies to measure and disclose resource consumption, carbon emissions, and other sustainable metrics for buildings are growing in both scale and scope. Building owners will increasingly need to report metrics and government ratings to comply with regulations. Similarly, governments, utilities, and public-private partnerships offer a variety of incentives and other resources to encourage green building and energy efficiency retrofits. Metrics must be reported and often verified to take advantage of incentives.
- Tenant Demand: Tenants increasingly consider the total cost of occupancy including utility costs in their location decisions, and many seek space with strong sustainability ratings or certifications, in part to bolster their own environmental reputations with clients, customers, shareholds and other constituencies.[3] Property owners who can deliver may reap higher rents and occupancy.[4] Standardized performance metrics and ratings would better enable tenants to incorporate sustainability into their leasing decisions and ensure facilities meet their requirements.
- Competitive Positioning: Building owners must be as concerned with the value of their investments upon future resale as they are with current cash flow. Market standards for new and existing buildings evolve with technological advances in building construction and operations, as well as exogenous factors such as energy prices, government regulations, and tenant preferences. The prudent investor seeks to manage these risks, anticipate market changes, and avoid functional obsolescence which requires the appropriate building performance metrics for effective decision making.

[2] Andrew J. Nelson and Oliver Rakau, "Green Buildings – A Niche Becomes Mainstream," RREEF Real Estate Research, April 2010.

[3] "2011 Energy Efficiency Indicator: Global Results," Johnson Controls, International Facility Management Association, and the Urban Land Institute.

[4] Gary Pivo and Jeff Fisher, "Income, Value, and Returns in Socially Responsible Office Properties," *The Journal of Real Estate Research;* July-September 2010.

The Spectrum of Data and Metric Needs

More sophisticated sustainability solutions requires more strategic decision-making

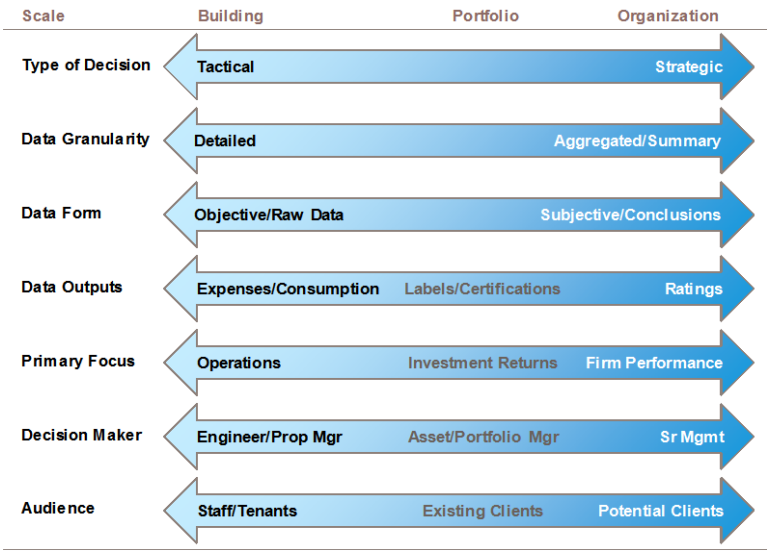
While some of the foregoing drivers share broad types of informational needs (e.g. relative energy use), the range of specific sustainability metrics in use today vary significantly in the types of decisions they support (tactical versus strategic); the level at which the metrics are collected or analyzed (ranging from building data to portfolio summaries); and the degree of subjectivity embodied within the metric (from relatively objective raw data to much more subjective ratings and certifications).

Until fairly recently, sustainability largely languished in the boiler rooms of real estate organizations, the province of engineers and property managers engaged in essentially tactical decisions: how to operate buildings more efficiently, largely through tweaking existing systems or undertaking upgrades requiring only minor capital investments. The most strategic decision was when to replace significant building systems nearing the end of their useful life.

As sustainability gained greater traction in the property sector, however, the technology has begun to produce ever more sophisticated sustainability solutions and the options have become more material, requiring more strategic decision-making: should building systems be replaced with more efficient, smarter systems, and if so, when and at what cost? Accordingly, key sustainability decisions are moving up the organizational food chain to asset managers and portfolio managers charged with taking a longer-term, investment view of properties, with equal focus on the revenue and value implications of decisions, in addition to the expenses. Finally, in just the past few years, sustainability has emerged as a key guiding principle for organizations, requiring strategic direction from the highest levels of the firm setting the vision for investment and operating policies.

Sustainability decisions are moving up the organizational food chain, taking a longer-term, investment view of properties

From Boiler Room to Board Room: Gradients of Sustainability Metrics



The range of decision-making when applied to the breadth of sustainability drivers requires a broad spectrum of metrics appropriate to each level of performance evaluation as the decision-making process and the data required vary widely, as suggested in the adjacent graphic. For example, engineers and property managers operate at the most tactical level and require granular, often raw data, such as energy consumption. A decision might be how to operate the HVAC system most efficiently. At a more intermediate level are the asset and portfolio managers, who make investment-based decisions, such as whether building systems should be replaced before the end of their useful life in order to reduce energy expenses, or whether to pursue green certification. Their data needs are at a higher level and introduce

more financial analysis. Finally, senior managers operate at the most strategic level, tackling issues such as acquisition strategy and organizational branding, and require still different types of data, typically at a more aggregated level.

Thus, operating sustainably at the building, portfolio or fund, and organizational levels each involves different types of decision-making and requires different types of sustainability measures. A key question for this paper is assessing how well the metrics in use now have kept up with the evolution of data needs.

The Current Status of Industry Metrics

A key question: how well have green metrics kept up with evolving data needs?

With no governance or umbrella group representing the property sector across the globe, a bewildering range of systems and platforms for measuring sustainability have been developed from both within and outside the sector. Some are very narrowly focused on one element, while others are much more comprehensive.

Whatever their individual or collective merits, this multiplicity of systems in service around the globe has created a balkanized hodgepodge of rating systems, which is unfortunate on at least two grounds: First, it restricts the ability to compare buildings and green ratings across jurisdictions. Second, with each system using its own terminology, measurement schemes, and reporting systems, investors operating in multiple countries must learn different systems and develop duplicate multiple data collection and reporting systems, yet most share comparable objectives and similar approaches. With the rising globalization of property ownership, this condition wastes resources and misallocates scarce capital investments – undercutting economic sustainability.

We classify four broad types of metrics in use or development today: voluntary sustainability certification systems; government energy benchmarking and rating systems; portfolio- and firm-level metrics; and a broad catch-all of other systems being advanced by industry groups, private entities, or non-governmental organizations.

Sustainability Certification Systems

Private programs to certify building sustainability are the most comprehensive rating systems. Though relatively limited in use – fewer than 15,000 labels have been issued worldwide – they are growing quickly and they tend to have more cache both within and especially beyond the commercial real estate industry. The most prominent ones are shown in the table below. Most are unique to particular countries, though LEED and BREEAM have a more global reach than do others. These schemes generally have multiple versions for specific product categories such as new construction, existing buildings, interior space design, operations, and other varieties. While each scheme has its unique design and point system, and thus weights each category differently, they all consider the same general factors:

- Energy efficiency
- Carbon emissions / pollution
- Water efficiency
- Waste and recycling
- Building materials
- Indoor comfort and air quality and
- Site quality and access to public transit

Despite their limitations, green rating systems have been instrumental in advancing sustainability

These systems, individually and collectively, have been instrumental in advancing sustainability foremost by encouraging property owners and operators to assess and reduce their environmental footprints, but also by promoting broader awareness of the contributions of buildings to climate change. Local governments have expanded the use and impact of these systems either by requiring new projects to meet certain environmental standards as defined by these systems, or by providing financial incentives to developers who meet these standards, such as expedited approvals or greater density.

Volumes and Types of Certifications
Select Green Building Certification Systems

			Schemes[2]									
Label	Country/Region	Labels Issued[1]	NC	Refurb	EB	CS	CI	Ret	Ind	HC	ND	Other
LEED	USA / International	11,440	X		X	X	X	X		X	X	
Green Globes	Canada / USA	1,444	X		X		X					X
BREEAM	UK / International	788	X	X	X						X	X
DGNB	Germany / International	285	X	X	X		X					X
Green Star	Australia	395	X	X	X		X	X	X	X	X	
CASBEE	Japan	190[3]	X	X	X						X	X

1. For all versions; as of 2011 / 2012 (dates vary by label).
2. NC = New Construction; Refurb = Refurbishment / Renovation; EB = Existing Buildings / In-Use; CS = Core & Shell; CI = Commercial Interiors / Fit-Up; Ret = Retail; Ind = Industrial; HC = Health Care; ND = Neighborhood Development / Communities.
3. 190 third-party certifications and 6,700 self-certifications.

Sources: Websites for referenced ratings system and RREEF Real Estate.

As of July 2012.

A key drawback: rating systems tend to focus more on design (inputs) rather than performance (outputs)

Nonetheless, these third-party labels suffer from many drawbacks that limit their utility and acceptance within the sector. Most importantly, these systems tend to focus more on design (inputs) rather than performance (outputs). This priority of inputs over outputs reflects the origins of these rating systems, which initially were much more concerned with new construction rather than existing buildings. Though in some way new buildings are easier to rate, this focus was misplaced. Existing buildings are obviously much more numerous – in advanced economies no more than 2% of the building stock is added in a typical year – and thus are much more fertile grounds for improving the sustainability of the built environment. Moreover, studies demonstrate that improving an existing building is much more sustainable for the planet than is new construction, whether greenfield or an infill replacement structure (though renovation sometimes may be less financially feasible than new construction).

The focus on design over performance also reflects that the early systems were largely developed by engineers, architects, and materials suppliers, with little input from the real estate community, particularly developers, property managers, and investors. Such a bias implicitly gives short shrift to the economic component of sustainability, that of financial feasibility. For example, the ratings fail to place standards within a market context, implicitly assuming that the same standards of environmental sustainability are appropriate for all markets, regardless of local conditions, regulatory environment, tenant demands, or other sustainability drivers.[5]

Some components of environmental impact (embedded carbon, sustainability of building materials) are best measured through design assessments, but the signature environmental

[5] LEED at least acknowledges "regional priorities," though these credits are meant only to "incentivize the achievement of credits that address geographically specific environmental priorities," and do not localize scoring or reward adherence to either local market conditions or regional design standards.

impacts (energy and water use, waste production) are better measured by actual performance.

After much criticism, these systems are finally evolving to focus more on performance, but the progress is slow, and the mindset of these ratings is still firmly oriented on design (inputs) rather than performance (outputs). Even when performance data is incorporated into the rating, the designation itself (e.g. "silver") does not highlight operating efficiency, thereby masking its significance. Further, green ratings can be achieved even when actual performance is merely average. Clearly the LEED-NC system, the USGBC's original and flagship program for rating the sustainability of new construction, is very centered on building design. But even the LEED-EB system for existing buildings, whose very goal is "maximizing operational efficiency while minimizing environmental impacts," primarily rates building location, design, and management practices, rather than actual environmental impacts.[6]

Rating systems often do not address the very factors driving sustainability

Moreover, these systems largely fail to provide the kinds of actionable data needed to support decision-making, such as considering the value of achieving standards or the financial returns associated with alternative levels of environmental standards. In this way, the systems often do not address the very factors driving sustainability, as outlined previously. Crucial issues such as the tenant's total utility charges are ignored. While sustainability labels may help some tenants with their leasing decisions, such ratings provide an incomplete picture for tenant and landlord alike. Both of these issues – market-specific benchmarking and metrics more focused on decision making – are critical for securing more industry buy-in.

These systems also suffer from a lack of credibility among a wide swath of constituencies in the property sector who feel – rightly, in our view – that the rating protocols, and especially the point systems, do not reflect a consensus view of practitioners regarding the relative importance of the sundry sustainability attributes nor how they should be graded. Too much thought and research has gone into developing these systems to call the entire enterprise arbitrary. Nonetheless, the fundamental premise of these sustainability certifications systems – to separate green buildings from brown – is dubious. Distinctions between sustainable and conventional buildings are ultimately artificial. The reality is that all buildings can be arrayed along a continuum of less and more sustainability, with none definitively green or brown.

Distinctions between sustainable and conventional buildings are ultimately artificial

Finally, the complexity of these systems has material financial implications. The direct costs of seeking certifications are significant in their own right, including fees paid to the certifying organization and fees paid for consulting to verify or obtain information. But these expenses pale in comparison to the much greater costs of developing information systems to meet submission requirements; training staff in the nuances of the programs; allocating sufficient resources to collect and report the data; and myriad related expenses. Organizational costs multiply when operating in regions across the globe, requiring firms to develop duplicate information systems performing comparable but ultimately distinct data tasks, train staff in multiple systems, etc. These added costs undermine the potential benefits associated with global property ownership, such as sharing best sustainability practices across the platform.

[6] "LEED 2009 for Existing Buildings Operations and Maintenance, US Green Building Council, Approved 2008 (Updated July 2012).

Costs and Time Required to Obtain Sustainability Certifications
Select Green Building Certification Systems

Label	Country/Region	Estimated Costs of Certification			Typical Time Required to Obtain**
		Certification*	Consulting	Total	
LEED	USA / International	$15,000 - $30,000	$40,000 - $100,000+	$55,000 - $130,000+	NC: ~3 Months Post-Occupancy; EB - 10-18 Months
Green Globes	Canada / USA	$3,000	$13,500	$16,500	Utility Data Collection + 2-4 Weeks
BREEAM	UK / International	$9,500 - $11,000	$8,000 - $15,000	$17,500 - $26,000	NC & Refurb: ~3 Months Post-Occupancy; In-Use ~ 2 Months
DGNB	Germany / International	$50,000 - $125,000	$15,000 - $60,000	$65,000 - $185,000	NC 2-6 Months; EB is new and TBD
Green Star	Australia	$27,000 - $33,000	N/A	$27,000 - $33,000+	Not Available
CASBEE	Japan	$13,000	$50,000 - $88,000	$63,000 - $101,000	3 to 5 Months following project completion

* Maximum Fees. Range due to member and non-member rates.

** NC = New Construction; EB = Existing Buildings.

Sources: Websites for referenced ratings system and RREEF Real Estate.

As of July 2012.

Ironically, rather than advancing sustainability, the very comprehensiveness of these programs can have the unintended effect of actually discouraging more widespread (if targeted) assessments by fostering the notion that anything short of a full-scale certification is meaningless, i.e., if you can't do everything, then why do anything?

In summary, the importance of these certification systems in promoting environmental awareness and sustainable behavior in the property sector should not be minimized. But their focus on bragging rights over actual performance can be viewed as ultimately counterproductive by:

- distracting building owners and managers from more productive sustainability activities;
- producing questionable ratings at the expense of actionable data for decision-making;
- draining scarce resources to obtain the certifications with little tangible value beyond marketing; and
- driving up costs to organizations for information systems required to document regulatory compliance and environmental performance.

Government Energy Ratings

Differences in EPC methods and definitions has created a confusing range of assessment schemes

Government rating systems are more limited in scope, examining only energy consumption, but their use is much more widespread. The Energy Star program alone has benchmarked over 185,000 U.S. buildings representing more than 21 billion square feet as of the end of 2010, more than ten times the coverage of LEED. Energy ratings are growing especially fast in the European Union ("EU"), where the Energy Performance of Buildings Directive ("EPBD") enacted in 2002 outlined a general methodology for calculating the energy performance of buildings, though member countries were given considerable discretion in applying this mandate.

This discretion has resulted in a confusing range of assessment schemes, as shown in the nearby table. EPCs in Germany and Poland use a sliding scale to rate both performance and building quality, while in most other EU countries, the EPC rating is a letter grade and based

entirely on building quality, i.e., the quality of construction design, materials, and technologies deployed at the building.

Government Energy Benchmarking and Rating Schemes in Selected Countries

				Normalize for…	
Label*	Country/Region	Physical Quality	Actual Performance	Weather	Occupancy
ENERGY STAR	USA & Canada		X	X	X
Asset Rating Program*	USA	X			
EPC ** - Letter Grade	Austria, Czech Republic, Denmark, France***, UK, Hungary, Ireland****, Netherlands, Portugal, Spain	X	Varies	Varies	Varies
EPC – Sliding Scale	Germany, Poland, Belgium	X	X	X	X
DEC	UK		X	X	X
NABERS	Australia		X	X	X
Energy Smart	Singapore	X	X	Not Relevant	X

* The Asset Rating Program is under development.
** Energy Performance Certificate.
*** In France, EPCs are called DPEs (Diagnostic de Performance Énergétique).
**** Ireland has categories within each letter rating.
Sources: Websites for referenced ratings systems; The Buildings Performance Institute Europe; and RREEF Real Estate.
As of July 2012.

In the United Kingdom, an additional rating called the Display Energy Certificate ("DEC") is based on actual energy performance, so in theory the EPC and DEC could be used together to provide a more complete assessment. But in practice, DECs are rarely used outside of some public buildings because legislation has focused on the EPC.

Adding additional complication, it is not only the rating methodology that differs across EU states, but also the process by which buildings are assessed. Buildings with equivalent "B" ratings in the United Kingdom and France are not comparable across borders. An independent analysis of EPCs concluded the following:

> Different national backgrounds and circumstances in Member States lead to varying implementation solutions, particularly with respect to the chosen calculation methods, the registration procedures, promotional activities undertaken, quality control mechanisms, and enforcement systems. This inevitably leads to significant differences between countries in the ultimate effectiveness of Energy Performance Certificates in bringing about real change in energy efficiency in the building stock.[7]

The melange of often conflicting methods inhibits inter-country comparisons and drives up costs for property owners

To repeat a now familiar theme, whatever the merits of localizing the application of EPCs in each country, the result is a melange of often conflicting methods, inhibiting inter-country building comparisons and driving up system and training costs for the many property owners that operate across borders.

In the United States, several major cities including New York City, Seattle, San Francisco, and Austin have adopted ordinances in recent years mandating most commercial building owners to conduct regular energy usage audits. Fortunately all specify use of the EPA Portfolio Manager benchmarking tool, which calculates Energy Star scores. The ordinances vary in the scope of buildings covered, and the New York City ordinance also mandates tracking water

[7] *Energy Performance Certificates across Europe: From design to implementation,* The Buildings Performance Institute Europe (BPIE), December 2010.

use, but these ordinances should further cement Energy Star scores as the standard comparative methodology in the United States.

Green building and energy rating systems largely ignore the market-based language of the property sector

Notwithstanding their utility in providing important benchmarks, these systems, like the broader sustainability certification programs, largely disregard the market-based language of the property sector. For example, these benchmarks rarely take account of either the costs associated with achieving higher scores or the savings that might result. Also, by design, they narrowly focus on only one element of environmental sustainability, that of energy usage, and thus miss many of the important sustainability drivers of concern to property owners and users. Most systems are also silent on the sources of energy for the power consumed, making no distinction between consumption and cost (which are not perfectly correlated), nor between renewable energy and conventional power, and thus cannot provide estimates of GHG emissions. Still, in their specificity, these systems can at least provide users with meaningful metrics that can be compared across buildings or portfolios. In this way, these metrics can be more useful for decision-making than the much more elaborate and expensive certification labels. Comparable programs for water use and waste production would be useful complements to the energy metrics.

Portfolio and Firm-Level Metrics

Beyond building labels and ratings, other indices and ratings are gaining traction in certain regions or among particular groups of investor types. The Greenprint Performance Index is a member-based initiative to anonymously benchmark building energy use and carbon emissions among members. While promising, its use is still limited, with a total of only 1,600 buildings benchmarked in its second annual report worldwide from about 40 property owners in the first two years of operation. This small pool of properties clearly limits the veracity and breadth of the benchmarks, though this concern would decline as more properties are added to the pool. Greenprint's recent move into the Urban Land Institute should enhance its standing and expand its reach.

The Global Real Estate Sustainability Benchmark ("GRESB") also operates at the portfolio level, benchmarking entire funds based not only on their environmental performance, but also the policies and procedures behind their operations, among other factors. In the last year, the number of firms and funds participating grew 30% to over 440 (up from 340 in 2011), while the number of properties covered jumped an impressive 70% to 36,000 buildings (from 21,000 in 2011). Despite this growing recognition and industry participation in this program, the product is better viewed as a gauge of environmental engagement at the fund level, and does not provide actionable building-level metrics. In fact, actual building performance accounts for only a quarter of the overall score, down from 37% last year, placing even more emphasis on efforts and systems instead of actual results. As noted in the 2012 GRESB Report, and consistent with our argument, "this change reflects the difficulty faced by landlords in collecting and reporting appropriate data on energy consumption, GHG emissions, water consumption, and waste management."[8]

GRESB does provide perspective for improving portfolio-wide sustainability performance, and is to be commended for expanding sustainability awareness and especially for motivating institutional property owners to act more sustainably in their property operations. However, GRESB's focus on efforts over results – given the challenges it highlighted in its own 2012

[8] "2012 GRESB Report," Global Real Estate Sustainability Benchmark. September 2012.

report – could ultimately limit its potential to raise sustainability in the industry. Further, while both GRESB and Greenprint both have mechanisms in place for flagging suspicious data, the lack of independent auditing to verify data submitted by the firms being rated is a known drawback of these rating systems.

There are also a variety of rating systems that evaluate the environmental efforts of organizations in one form or another. Among many others these include:

- the Carbon Disclosure Project ("CDP"), in which firms report their total carbon footprint from all activities (not just property operations);
- the Global Reporting Initiative ("GRI"), which sets a framework for firms to report on their environmental performance, and policies on social and governance issues (again, not focused on property operations per se);
- the United Nations Principles for Responsible Investment ("PRI"), which has set forth a 28-element set of ESG measures for firms in the property sector; and
- third-party assessments of environmental efforts and performance from firms such as Sustainalytics, Bank Sarasin, Sustainable Asset Management ("SAM") and others.

The data rarely helps support operating decisions at the building level

All of these systems can provide useful feedback for firms, investors, and other stakeholders. But as with the Greenprint and GRESB reports, little of the reporting data drive operational decisions at the building level. And virtually all of these metrics are more focused on efforts rather than actual environmental performance.

Other Initiatives

Finally, it is worth noting that various groups have taken up the cause of proposing industry metrics, to little apparent effect. These include the Green Property Alliance (GPA), a working group of some 15 major UK-based investors and property organizations under the leadership of Paul Edwards of Hammerson. In a 2010 paper, the group proposed a set of common metrics in four key categories: energy use, water use, waste production, and carbon emissions.[9] Despite potent arguments and the collective power of the constituent parties, this proposal has not yet been widely implemented by property firms, although both the European Public Real Estate Association ("EPRA") and European Association for Investors in Non-Listed Real Estate Vehicles ("INREV") reference these metrics as "best practice recommendations."[10] The GPA approach also was adopted by the GRI's Construction and Real Estate Sector Supplement ("CRESS") reporting standard, which was finalized in 2012 and presents a specific GRI reporting format for property firms. Since GRI is the leading global standard for sustainability reporting at the organizational level, the GPA approach may well gain further traction in the industry.

Among the most ambitious proposals was advanced by a team including Galley Eco Capital, Arup, and the Responsible Property Investing Center of Boston College, which outlined a comprehensive set of Responsible Property Investing (RPI) performance indiciators. [11] However, after developing a paper and presenting the methodology to the Urban Land

[9] "Establishing the Ground Rules for Property: Industry-wide Sustainability Metrics," Green Property Alliance, October 2010.

[10] *INREV Sustainability Reporting Recommendations,* European Association for Investors in Non-Listed Real Estate Vehicles, January 2012; EPRA Best Practices Recommendations on Sustainability Reporting, European Public Real Estate association, September 2011; and *Sustainability Reporting Guidelines & Construction and Real Estate Sector Supplement,* Global Reporting Initiative, 2011.

[11] Lisa Michelle Galley (Galley Eco Capital), Jean Rogers (Arup), and David Wood (Responsible Property Investing Center, Boston College), "Metrics for Responsible Property Investing: Developing and Maintaining A High-Performance Portfolio," 2009.

Institute's Sustainable Development and RPI councils in 2009, the proposal was never developed into a workable system.

Another effort to benchmark energy use and GHG emissions in buildings is being advanced by the Sustainable Buildings and Climate Initiative ("SBCI") of the United Nations Environment Program ("UNEP"). SBCI developed standards called the Common Carbon Metric ("CCM"),[12] which were pilot tested on 150 buildings between 2010 and 2011 and then submitted to the International Organization for Standardization ("ISO") for consideration as a worldwide standard.[13] However, formal adoption is several years away, so the future of this approach is uncertain.

The lack of clear standards imposes significant costs on organizations that must develop multiple data collection and reporting systems

Conclusions

The property sector is still far from embracing a common set of sustainability metrics. This is unfortunate. The lack of clear standards imposes significant, if often hidden, costs on organizations that must develop multiple data collection and reporting systems to comply with ever-growing data requests from both internal and external stakeholders. Further, most of these systems are "stovepiped," with no way of feeding data directly from one system into another. Rather, data must be manually ported from one system into another, often requiring considerable data manipulation to make data from one system compatible with another. Many of the rating systems ask for similar information, but in different formats with unique inputs.

These drawbacks might be overlooked if the metrics provided more meaningful benchmarks. But too often the existing rating systems implicitly reward effort over output, and building design over actual performance. Despite the considerable resources devoted to collecting, massaging, analyzing and reporting the data, major data gaps still remain, notably the major market drivers that property owners consider in their investment decisions related to sustainability, as summarized in the following table.

Correspondence between Key Sustainability Building Drivers and Leading Rating Systems

Driver	Role of Metrics	Green Building Ratings	Government Ratings
Operating Efficiency	Measure and report	Varies	Yes
Investor Mandates	Risk mitigation, capital preservation	Partial	No
Regulations and Incentives	Demonstrate compliance	No	Varies
Tenant Demand	Total cost of occupancy; green label	Partial	No
Market Positioning	Identify value within local market	No	No

In the absence of robust analytics and benchmarks, organizations resort to case studies, anecdotes, and similar soft analysis

In the absence of more robust analytics and benchmarks, organizations must resort to case studies, anecdotes, and similar soft analysis. Even simple questions from prospective investors and tenants and other stakeholders regarding energy efficiency and sustainability rarely can be answered directly from the reports or outputs of the major rating systems. Nor do most owners and lenders have sufficient data with which to value potential sustainability investments, assess risks, or underwrite properties and projects. Instead, all such tasks

[12] Common Carbon Metric (CCM) Protocol for Measuring Energy Use and Reporting Greenhouse Gas Emissions from Building Operations, United Nations Environment Program Sustainable Buildings and Climate Initiative, 2009. ISO currently addresses sustainability only at the organizational level and assesses only the processes organizations undertake to improve their environmental management, under the ISO 14000 family of standards.

[13] UNEP website: http://www.unep.org/sbci/Activities/CCM_Pilot.asp.

require labor-intensive and often subjective manual analysis. The lack of transparent, comprehensive reporting standards also invites reporting that "cherry picks" results, where firms select the data elements that best fit their agenda rather than most fairly represent actual performance.

Owners and lenders lack the data needed to assess risks, value sustainability investments, and underwrite projects

The situation will become more problematic unless the proliferation of ratings and labels is curbed and data systems enable owners to automate reporting to reduce the time required to meet data needs. Addressing this issue would help industry participants gain a deeper understanding and actual measurement of the risks and opportunities that sustainability presents and enable the industry to better integrate sustainability into every day operations, reporting, and decision-making.

New Directions

The foregoing analysis demonstrates the need for robust, reliable sustainability metrics, as well as some of the challenges in developing these metrics. In this final section, we outline some of the key principles for establishing these metrics.

Labeling in the Automotive Industry

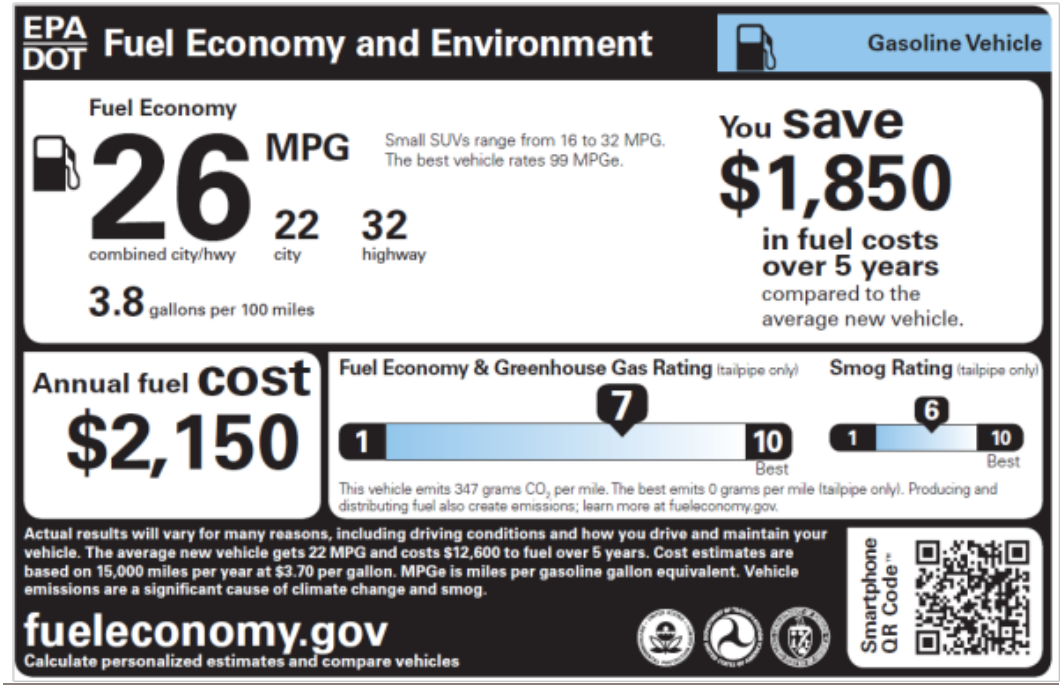
In considering how the property sector went astray in its approach to assessing environmental sustainability, the automotive industry provides a useful point of comparison. Like buildings, automobiles are a major source of GHG emissions and energy consumption. In fact, road transportation is the third leading source of GHGs after buildings and deforestation, accounting for more than 10% of emissions globally.[14] Also like buildings, their environmental footprint is highly visible, inviting public scrutiny and government oversight.

While the actual rate and cost of fuel consumption vary based on local fuel costs, driver behavior, climate, and other factors, the auto industry has long used one common metric to measure energy efficiency: the ratio of distance traveled to fuel consumed, whether miles per gallon ("MPG") or kilometers per liter ("km/L").[15] This metric is simple and widely applicable across types of vehicles across the globe. In most countries, every manufacturer must test their cars using standard methodologies specified by federal law and display the results prominently on vehicles for sale.

Shown on the next page is an example of the window sticker for automobiles in the United States, which has expanded to provide three key metrics associated with operating the vehicle: MPG, energy costs, and GHGs. As with buildings, there are thousands of parts and systems in a car, not to mention the energy consumed in manufacturing the vehicle, but industry efficiency ratings center on operational elements of the finished product. Again, it is well known that these metrics can vary significantly for individual users and locations; consumers know that their "mileage may vary." Nonetheless, these simple metrics provide a common and easily understood basis for comparison. Over time, consumers have learned the benchmarks as well: what constitutes good gas mileage for a hybrid versus a small compact versus a fully-loaded luxury sedan. In conjunction with other simple metrics (e.g. horsepower, torque, braking distance), these fuel estimates provides the precise data consumers and other interested parties need for decision-making.

[14] Time Herzog, *World Greenhouse Gas Emissions in 2005,* World Resources Institute, July 2009. Note that "road transportation" includes trucks and motorcycles and other types of vehicles, though automobiles are the largest share by far.

[15] Some countries use the reciprocal ratio, fuel consumption, such as liters per 100 kilometers ("L/100 km").



For illustrative purposes only.
Source: fueleconomy.gov
As of July 2012.

It is worth noting – and praising – the introduction of simple financial metrics here in the form of operational costs and savings relative to average vehicles. This vital perspective is missing from virtually all sustainable building metrics, but is fundamental to all decision-making with regard to building operations and especially capital improvements.

The property sector needs comparable operating and financial data and benchmarks

Also worth highlighting is that auto manufacturers are not judged on how hard they try to meet standards, what type of tires or carburetors they put on their cars, or even the kinds of automobiles they make. Rather, performance and operational cost are all that matter, and these simple metrics tell the story. In their simplicity, these metrics are also perfectly scalable. Knowing the fuel efficiency of each car model and their sales, the overall fleet efficiency can be calculated. The property sector needs and deserves comparable data and benchmarks.

However, success will not come easily. The property sector faces several constraints relative to the automotive sector: To start, buildings are much more complex “machines” than are cars, with more components, more mass, and just more to measure. Second, there is a much greater variety of buildings than cars, and this variety complicates comparisons across different building types and impedes scalability.

Beyond physical differences in the product, perhaps the greater challenge to the property sector in establishing standards is its disaggregated industrial structure. The top ten institutional real estate firms account for only 8% of global assets under management, while the top ten automobile manufacturers account for 70% of the new cars produced in 2010 (Appendix B). Adding in the next ten largest players brings the share of the property market to barely 12%, while the automotive share rises to 89%. Clearly consensus will be much more difficult to reach in the property sector with its decentralized structure. Nonetheless, it seems clear that the benefits to consumers from finally agreeing on metrics are manifest.

Key Attributes for Sustainability Metrics

The property sector must reorient sustainability metrics from inputs to outputs

Our analysis suggests the most important principle for effective sustainability metrics in the property sector is to reorient measurement from inputs to outputs, that is, from building design to operational outputs. In this way, the objective changes from recognizing efforts to rewarding results.

Beyond this foundation of outcome-oriented metrics, we see six key attributes for metrics to be adopted and useful:

- Limited and Focused: The industry needs to focus on fewer simple, clear metrics that can be easily understood and accepted by investors, property managers, and other stakeholders.
- Standardized Across Dimensions: While local variation is inevitable and necessary, metrics should align as closely as possible across regions, product types, and functions to deliver information that is both relevant to users within each dimension but can be compared easily across other dimensions.
- Aligned with Sustainability Drivers: For data to be actionable, the data elements must correspond directly to the major factors driving sustainability, identified previously, not just generic notions of sustainability.
- Specific to User Groups: The property sector has a broad range of stakeholders, and each has specific data needs that must be satisfied.
- Data Connectivity: Where possible, ratings, labels, and indices should tap into enterprise software systems that property management companies already use for common functions such as measuring consumption and paying utility bills.
- Adaptable: Data must be scalable, easy to extract from data systems, and amenable to simple calculations. This quality alone would help satisfy the data needs across various user groups, e.g., enabling the building engineer to track energy efficiency at the same time that senior management can track compliance.

Meaningful benchmarking is critical for effective decision making

Finally, and perhaps most importantly, is the necessity of providing sufficient context for these metrics in the form of meaningful benchmarking. As discussed previously, rating systems too often rely on arbitrary designations of “sustainability,” backed by neither hard science nor broad industry consensus. Far better for the property owner, manager, or other user is to understand the relative building performance across an array of sustainability metrics.

Such an assessment requires appropriate benchmarks. Developing these benchmarks inevitably involves tradeoffs between the specificity and breadth of metrics. Benchmarks are the most useful when the comparisons are very similar to your building in terms of type, size, use, location, etc., but this benchmark loses its value when there are not a sufficient base of comparable buildings from which to development reliable data. On the other hand, broadening the sample invariably introduces buildings that are less comparable to one being analyzed.

A related challenge concerns the degree to which building owners or managers control the tenant space. Otherwise comparable buildings – with the same style of construction, similar location, and intensity of use – may nonetheless vary in their measured sustainability due to differences in data availability (e.g. whether the tenants provide their landlords with detailed energy usage data). “Green leases” that specify tenant reporting requirements should reduce

this issue over time, but for now access to tenant data remains an obstacle to robust sustainability reporting.

Similarly, the integrity of sustainability reporting at the portfolio level is hindered by wide differences in the range of buildings that participants chose to include, which can undermine comparisons across companies having different standards. For now, the minimum threshold should be for firms to at least be consistent from year to year to facilitate meaningful comparisons of performance over time.

Although significant issues, these hurdles will be easier to overcome as more buildings are assessed using common methodologies. For example, the Energy Star program in the United States certainly has made great headway in profiling energy use among office buildings in leading metropolitan areas (though the disparity in European standards seems to be a step in the wrong direction). There is no reason that others metrics, such as carbon and water, cannot attain equal benchmarking capacity.

Substantive Recommendations

What metrics might be included in a robust sustainability assessment system? A good starting point for a common set of metrics would be those recommended by Green Property Alliance. GPA proposed four sets of green building metrics as outlined in the following table:

Green Property Alliance – Recommended Common Metrics

Category	Criterion	How Measured	Metric	Performance Indicator
Bulding Energy	Electricity	Energy for landlord services and any tenant supplies	kWh	kWh / m^2 Net LettableArea (NLA) or occupancy / year
	Fuels	Energy for landlord services and any tenant supplies	kWh	kWh / m^2 NLA or occupancy / year
	Imported thermal heating or cooling	Energy for landlord services and any tenant supplies	kWh	kWh / m^2 NLA or occupancy / year
Carbon (associated with building energy)	Greenhouse gas emissions	Defra Reporting Factors	Metric tonnes/CO_2e	kg CO_2e / m^2 NLA or per occupant / year
	Emissions saved	Defra Reporting Factors	Metric tonnes/ CO_2e	kg CO_2e / m^2 NLA or per occupant / year
Water	Total water used	Utility bills	Cubic metres (m^3)	m^3 / m^2 NLA or occupancy / year
	Water saved	Utility bills	Cubic metres (m^3)	m^3 / m^2 NLA or occupancy /year
Waste	Total waste produced	Direct measurement or survey	Tonnes	Tonnes / by reference to occupancy or m^2 NLA / year
	Wasted disposed to landfill	Direct measurement or survey	Tonnes	As a ratio of total waste
	Waste disposed by other routes	Direct measurement or survey	Tonnes	As a ratio of total waste

Source: "Establishing the Ground Rules for Property: Industry-wide Sustainability Metrics," Green Property Alliance, October 2010.

Focus on four key categories: energy use, carbon emissions, water use, and waste

Certainly there are many other possible metrics on which buildings may be graded, including renewable energy use, indoor air quality, and embedded energy used in the construction materials. However, these four categories arguably are the key output metrics around which most sustainability discussions center and could be the basis for broad industry consensus.

Thought also should be given to how to best tap into standard data reporting systems, minimize duplication and reduce costs. That said, sustainability is sufficiently new for most organizations that existing systems inevitably will need to be modified or adapted to capture the required raw data. Such efforts should be amply rewarded in the payback from more efficient building operations and more effective capital planning.

Appendices

Appendix A – Energy Typologies

The table below was published by the UK government for its Carbon Reduction Commitment requirements.[16] This presents a detailed list of energy source types and their calculated emissions factor.

UK CRC Energy Efficiency Scheme Order
Table of Conversion Factors

Fuel Type	Units	Emissions Factor kgCO2 / per unit
Aviation Spirit	tonnes	3128
Aviation Turbine Fuel	tonnes	3150
Basic Oxygen Steel (BOS) gas	kWh	0.996
Blast furnace gas	kWh	0.996
Burning Oil/Kerosene/Paraffin	litres	2.532
Cement industry coal	tonnes	2373
Coke Oven Gas	kWh	0.146
Commercial/Public Sector Coal	tonnes	2577
Coking Coal	tonnes	2932
Colliery Methane	kWh	0.184
Diesel	litres	2.639
Electricity	kWh	0.541
Fuel Oil	tonnes	3216
Gas Oil	litres	2.762
Industrial Coal	tonnes	2314
Lignite	tonnes	1203
Liquid Petroleum Gas (LPG)	litres	1.495
Peat	tonnes	1357
Naphtha	tonnes	3131
Natural Gas	kWh	0.1836
Other Petroleum Gas	kWh	0.2057
Petrol	litres	2.3035
Petroleum coke	tonnes	2981
Scrap tyres	tonnes	1669
Solid smokeless fuel	tonnes	2810
Sour gas	kWh	0.2397
Waste (other than waste oil or waste solvents)	tonnes	275
Waste oils	tonnes	3026
Waste solvents	tonnes	1613

[16] "CRC Energy Efficiency Scheme Order: Table of Conversion Factors," UK Department of Energy and Climate Change, 2012. http://www.decc.gov.uk/publications/basket.aspx?FilePath=What+we+do%5CA+low+carbon+UK%5Ccrc%5C1_20100122101538_e_%40%40_crcconversiontable.pdf&filetype=4.

Appendix B – Industrial Structure: Property Sector vs. Automotive Industry

Commercial Real Estate and Automobiles
Global Market Size and Industry Disaggregation

	Institutional Commercial Real Estate			Automobiles*	
Category/Rank	AUM ($Millions)	Share of Top 50	Global Share	Automobiles	Market Share
Global Rank: 1-10	$575,283	50%	8%	51,967,531	70%
Global Rank: 11-20	$293,287	25%	4%	13,704,555	19%
Global Rank: 21-30	$161,916	14%	2%	5,435,360	7%
Global Rank: 31-40	$81,862	7%	1%	1,972,414	3%
Global Rank: 41-50	$45,858	4%	1%	708,477	1%
Total: 1-50	**$1,158,206**	**100%**	**17%**	**73,788,337**	**100%**
Total Global Market	**$6,900,000**	**N/A**	**100%**	**73,788,337**	**100%**
Global Rank: #1**	**$107,052**	**9%**	**2%**	**8,557,351**	**12%**

* The IOMVM listed 47 manufacturers in 2012.

** For real estate, #1 is Brookfield Asset Management; for automobiles #1 is Toyota.

Sources: IPD; LaSalle Investment Management; IREN Investment Managers Guide, 2011; International Organization of Motor Vehicle Manufacturers, 2010.

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