



# Quantifying “Green” Value: Assessing the Applicability of the CoStar Studies

June 2008

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## Acknowledgements

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The conclusions and observations in this report are those of the author, Scott Muldavin, CRE, FRICS, Executive Director of the Green Building Finance Consortium. I would like to acknowledge the assistance and advice of a group of real estate valuation and academic experts who have assisted me in my review including Dr. David P. Lorenz, M.Sc., MRICS, of Lorenz Property Advisors; Chris Corps, BSc, MRICS, of Assets Strategics Ltd.; Maren Haus, Jennifer Senick, and others at the Rutgers Center for Green Building; Steve Laposa, PhD, Loveland Commercial Endowed Chair in Real Estate at the University of Colorado and Global Real Estate Research Director for Price Waterhouse Coopers; John D'Andrea, PhD, GBFC; Timothy Lowe, CRE, MAI, of Waronzof; Brent Palmer, CRE, MAI, FRICS, of New Tower Trust; James Finley, Appraisal Manager, of Wells Fargo; Leanne

Tobias, Principal, Malachite LLC; and Molly McCabe of Hayden Tanner, LLC.

In addition, the work is made possible by members of the Green Building Finance Consortium including BOMA International, the National Association of Realtors, the Pension Real Estate Association, the Mortgage Banker's Association, The Urban Land Institute, Principal Real Estate Investors, Cherokee Investment Partners, Swinerton Builders, Real Foundations, the Northwest Energy Efficiency Alliance, EPA's EnergyStar Group, Kennedy Real Estate Counsel, New Tower Trust, Paul Hastings, Davis Langdon, Revival Fund Management, CTG Energetics, and the City of Seattle.



# Introduction

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**The purpose of this report is to provide guidance to the real estate industry on the interpretation and use of data and research supporting green building investment.**

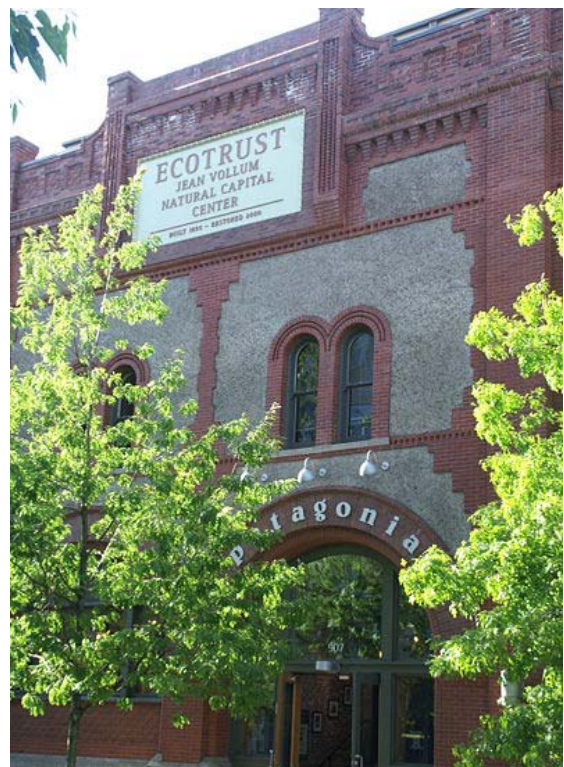
I am taking this opportunity to write this report as a result of numerous requests by Consortium members and others to comment on the results of the CoStar Study following the most recent presentation of their results on March 28, 2008. However, this report is not just an independent critique on how to interpret and apply the results of the CoStar Study, but, consistent with the Consortium's mission, an attempt to more broadly educate investors on some of the foundational issues in sustainable property decision-making.

Ever since the advent of computers and higher quality real estate databases, statistical analyses have gained stature over traditional real estate analysis practices driven by the qualitative judgment of real estate professionals. Nowhere has the reverence of "quantitative" analysis been more prominent than in the green building industry. Green building advocates and detractors alike wait for the "killer app" quantitative study to finally prove up the value of green buildings.<sup>1</sup>

As discussed below, and in more detail in the Consortium's report "Underwriting Sustainable

Property Investment" due out in the next few months, traditional real estate underwriting practices are well suited, precisely because of their qualitative nature, to evaluating sustainable property investment. Quantitative studies are key as inputs into the evaluation process, but no single, or even multiple quantitative studies, can definitively answer the "value" question.

To better understand the role of quantitative studies within the broader decision-making context for sustainable property investments, this report provides an independent critique of the methods, technical execution, and presentation of the findings of a recent CoStar Group study evaluating the financial



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<sup>1</sup> In this report, I use the term "green" and "sustainable" interchangeably. As discussed further in the Consortium's other work, there is a wide disparity and inconsistency in the use of, and meaning of, these terms, which the financial analysis process must address.



performance of EnergyStar and LEED (Leadership in Energy and Environmental Design) certified buildings. The CoStar Study provides an excellent vehicle to address the application and use of statistical data in sustainable real estate decision-making due to its quantitative emphasis, important conclusions, and broad distribution.

The CoStar Study represents itself as the “...first systematic study, as opposed to case studies, that addresses questions on the benefits of investments in energy savings and environmental design.”<sup>2</sup> The conclusions most frequently cited from their most recent work in March 2008 were that LEED buildings sold for \$171 per square foot, or 64% more than comparable non-LEED buildings and rented for \$11.33 per square foot, or 36% more than non-LEED buildings. These conclusions were communicated strongly, without further qualification, and widely disseminated.

Before I begin my critique, I want to thank Jay Spivey and Andrew Florance of the CoStar Group and Norm Miller of the Burnham-Morres Center for Sustainable Real Estate at the University of San Diego for their significant commitment to further the exploration of the financial benefits of sustainable buildings. Their

study is one of the first efforts to address “green” value and rent premiums on a systematic basis from a database of hundreds of properties, as compared to generalizations that have typically been made anecdotally from a few case studies.

CoStar, the leading real estate information provider in the industry, has made a broad commitment to sustainable property research through adaptation of their sales, leasing and related databases to enable the identification and evaluation of sustainable properties. This fundamental change in the infrastructure of real estate databases will continue to pay dividends to the industry far into the future. Their work provides a critical first step in promoting an energetic and independent assessment of the financial costs and benefits of green buildings.

**This report is presented in five sections:**

- 1. Summary Conclusions**
- 2. The CoStar Study**
- 3. Critique of the CoStar Study**
- 4. Interpretation and Use of Data in Sustainable Property Investing**
- 5. Conclusion**

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<sup>2</sup> “Does Green Pay Off?” Norm Miller, Jay Spivey and Andrew Florance, Nov. 19, 2007.



## Summary Conclusions

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My critique of the reliability and appropriate use of the CoStar Study does not represent a repudiation of the study's fundamental conclusion: that sustainable buildings are more valuable, which I have also found based on the Consortium's research to date, but on the reliability and communication of some of the study's specific quantitative results.

The CoStar Study provides support for the broad positive relationship between buildings with a LEED or EnergyStar certification and occupancy levels, rents, and value. The Study's presentation of leasing activity by tenant type and company provides interesting new insights

and support for increasing tenant demand for sustainable properties that has not been quantitatively presented elsewhere. Also, the methodology and findings provide a basis for refining further work as the number of LEED and EnergyStar buildings grows.

An important point for users of the CoStar Study to understand is that its methodology is designed to provide broad general conclusions about the relationship between LEED or EnergyStar certification and value. Accordingly, the study results are applicable to strategic decisions, but are of limited use for tactical or property specific decisions.

Methodologically, the study also does not directly address its stated objective – Does Green Pay Off? While the Study did discuss cost issues, in order to directly address the issue of “net” investment benefits, a more direct link between costs and value on specific projects would have to be established.

In future work, some attention to a more differentiated description of sustainability or performance could also benefit the industry.

The key numerical results of the Study's Peer Building Selection Approach (such as the conclusion that LEED buildings sold for \$171 per square foot more, a 64% premium, and rented for 36% more than comparable non-LEED buildings), are still too preliminary and uncertain to be relied upon. Small sample size and difficulties inherent in selecting truly “comparable” peers are particular areas that



need to be improved to increase the reliability of this approach.

The results from the author's alternative approach to estimating the contribution of LEED certification to sales prices, the Hedonic Pricing Model Approach (a \$24 per square foot or 9% premium), appeared more plausible and statistically supportable, and reliability of the approach should increase as sample size grows, and other statistical issues are refined.

Despite the relevance of the results of the Hedonic Pricing model Approach, the model itself and results were not presented in the *CoStar Advisor* article nor highlighted or discussed in the supporting documentation. By focusing solely on the results of the Peer Building Selection Approach users did not get the full benefit of the work done, limiting their ability to appropriately interpret the results of the Study.

It would have been very useful to users of the study to have had the \$24 conclusion from the Hedonic Pricing Model Approach contrasted to the \$171 conclusion from the Peer Building Selection Approach. It would also have been helpful to provide similar tests for rents or occupancy premiums due to LEED certification and testing of the EnergyStar results.

Industry readers and academics would have also been assisted by a more thorough overall presentation of the Study's data and methods. Despite clear methodological and statistical limitations, and the fact that the study was substantially focused on large office buildings, the study presented conclusions without appropriate discussion of statistical caveats or basic facts about the database that would help a user interpret and understand the results.

## The CoStar Study

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CoStar is the nation's largest provider of commercial and multi-family information with over 58 billion square feet of commercial space and nearly a million for sale and for lease property listings in the United States, the United Kingdom and France (Costar.com, May 2008). As part of its commitment to improving the industry's ability to analyze the energy and environmental performance of properties, CoStar added data fields to its extensive property by property database to enable researchers to identify properties with LEED or EnergyStar certifications. Not only did they begin this process in 2006 for new properties

moving forward, but they went back to their existing database of properties and identified and marked all properties historically that had EnergyStar or LEED ratings.

The CoStar Study is actually an ongoing study whose results have been presented three times to the public during the last year. The first results were presented in the summer of 2007, followed by another presentation in the fall of 2007 in a paper authored by Norm Miller, Jay Spivey, and Andy Florance called "Does Green Pay Off?" (Norm Miller is a professor at the Burnham-Morres Center for Real Estate at the University of San Diego, Jay Spivey is the



Research Director at CoStar, and Andy Florance is the CEO of CoStar.) The most recent presentation of the CoStar Study was published in the March 26, 2008 *CoStar Advisor*, a newsletter of the CoStar Group. This article was supported by a 61-page presentation of results based on an analysis of the 1,328-property CoStar Green Database as of March 2008, as presented below.<sup>3</sup>

CoStar's Green Database		
<b>Green Buildings</b>	<b>Buildings</b>	<b>Square Footage</b>
Energy Star	973	284 Million
LEED	355	67 Million
<b>Totals</b>	<b>1,328</b>	<b>351 Million</b>

Energy Star Breakdown		
<b>Energy Star Breakdown</b>	<b>Buildings</b>	<b>Square Footage</b>
Office	859	271 Million
Industrial	16	5 Million
Retail	98	8 Million
<b>Totals</b>	<b>973</b>	<b>284 Million</b>

The stated purpose of the CoStar Study, as most clearly presented in the “Does Green Pay Off?” report in the Fall of 2007, was to address “...questions on the benefits of investments in energy savings and environmental design.” As further stated in the March 26, 2008 article, “The group analyzed more than 1,300 LEED and EnergyStar buildings representing about 351 million square feet in CoStar’s commercial property database of roughly 44 billion square feet, and assessed those buildings against non-green properties with similar size, location, class, tenancy and year-built characteristics to generate the results.”

For the purposes of the review and critique in this report, we will focus our analysis on the

<sup>3</sup> All three presentations can be accessed from section 7.0 of the Research Library at [www.GreenBuildingFC.com](http://www.GreenBuildingFC.com).

March 2008 presentation, which is based on CoStar’s most comprehensive database and additional statistical analysis by Norm Miller that was not available in the earlier reports. While the March 2008 study provided a variety of analyses and conclusions, this critique focuses on the sales price and rent conclusions.

As shown in the two exhibits from the March 2008 study (exhibits 1 and 2), based on their Peer Building Selection Approach, LEED-rated buildings nationally were found to sell for \$171 per square foot more than non-LEED buildings, representing a premium of 64%. EnergyStar buildings sold for \$61 per square foot more than non EnergyStar certified buildings, or a premium of 27%.

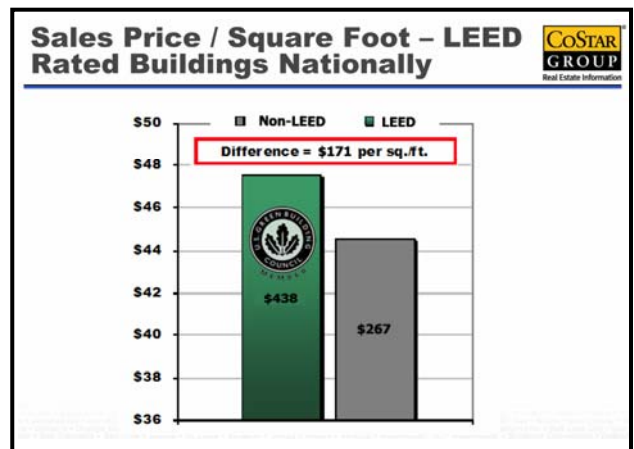


Exhibit 1<sup>4</sup>

<sup>4</sup> This chart, pulled directly from the March 26, 2008 supporting exhibits, has an incorrect scale for rents when it should be sales price/square foot.





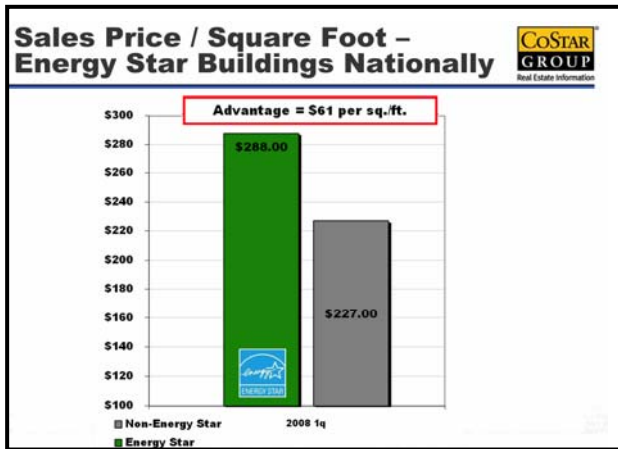


Exhibit 2

The results from the rental rate analysis as presented in the March 2008 CoStar Study are presented in exhibits 3 and 4. LEED buildings rented for \$11.33/SF/yr more than non-LEED buildings, a premium of over 36%. EnergyStar buildings rented for \$2.40/SF/yr more, a premium of approximately 9%.

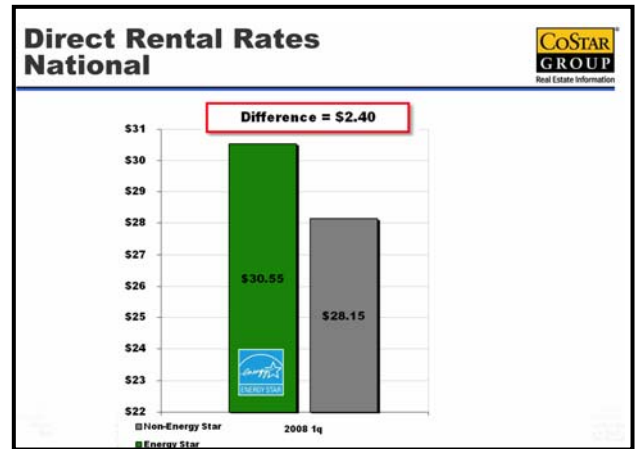


Exhibit 4

Both the \$171 sales price and \$11.33 rent premiums for LEED certified buildings were calculated based on comparing the averages for LEED buildings and the averages from “peer” non-LEED buildings. While the LEED peer selection process was not presented or discussed in the study, the authors provided me some additional detail which I have incorporated into my critique.

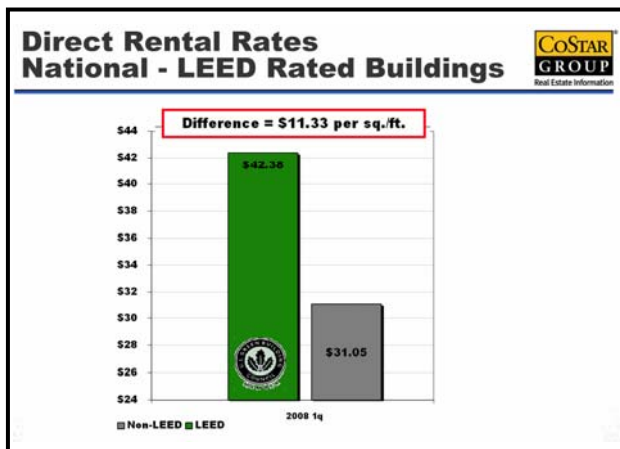


Exhibit 3

The analysis started with a database of 355 LEED buildings. The database was then reduced to 218 properties by applying a filter to exclude anything but office buildings built after 1990. Next they selected non-LEED peer buildings in the same submarket and same class (A, B, C, etc.) built within plus/minus five years of the individual LEED property. In this process they were able to find sufficient peers for 77 of the 218 LEED properties. On average each LEED property was compared to 27 peers. In a final step, they kept the same age and class controls, and expanded the location radius to five miles. Eighty-nine additional LEED properties were “peered” with an average of twenty-nine peers for each LEED property. This final database of 166 LEED properties and their peers was used for all the LEED sales, rent and occupancy analyses.



To calculate rent and occupancies, they used simple averages of the LEED properties and peers. For their calculation of sales price, they had approximately 15-20 LEED property sales. They took the average sales prices for those properties sold. To select peer sales, they gathered sales from the same year from the pool of peers for each LEED property. They indicated that there were approximately two to four peer sales that were compared to each LEED sale.

The EnergyStar peer selection process was outlined on pages 33 to 35 of the 61-page supporting document. They attempted to control for age, size, location, number of stories and a few other variables through a ten step selection process.

The CoStar Study also included a Hedonic Pricing Model Approach for estimating the contribution of LEED certification to sales prices. This model is presented on page 57 of the 61-page supporting document as shown in exhibit 5.

**Testing Results In Hedonic Model**

Sales price per square foot as the dependent variable the following model was tested:  
 $Sales\ Price/Sq\ Ft = \alpha + \beta_1(Age) + \beta_2(ES) + \beta_3(LEED) + \beta_4(Size) + \beta_5(CBD) + \beta_6(Yr\ dummy) + \beta_7(City\ Dummy) + \epsilon$   
 Where  $\alpha$  is the constant,  $\beta$  is the regression coefficient for each variable and  $\epsilon$  is the error or residual term.

			T-Stat
R SQ =	.478	Intercept =	201.39
Adj R SQ =	.468	Age =	-4.66
Std Error =	105.42	ES =	13.99
Observations =	927	LEED =	24.14
		Size =	0
		CBD =	64.05
		2003 =	-6.92
		2004 =	20.97
		2005 =	51.73
		2006 =	75.82
		2007 =	103.04
		Boston =	161.26
		LA =	95.17
		NYC =	250.14
		Wash DC =	160.39
		San Fran =	121.51
			11.03***
			-11.88***
			1.41*
			.835
			8.52***
			18.59***
			17.87***
			17.52***
			17.10***
			17.98***
			18.17***
			13.31***
			21.70***
			11.22***
			19.19***

Source Dr. Norm Miller \* Significant at the 85% level  
 \*\*\* Significant at the 95% level or above

Exhibit 5

The Hedonic Pricing Model Approach concluded that LEED certification contributed \$24 to sales prices per square foot, approximately a 9% premium over non-LEED properties. No similar alternative calculation was performed to estimate rent or occupancy premiums for LEED certification, nor to estimate sales price, rent, or occupancy premiums for EnergyStar certified properties.

## Critique of the CoStar Study

**My critique of the CoStar Study, and related observations on the interpretation and use of data to support green building investments, is presented in three sections:**

- a. Methodological Issues**
- b. Technical Considerations**
- c. Presentation**

### a. Methodological Issues

The primary methodological limitation of the study is that its design limits its ability to accurately address its stated objective of quantifying the benefits of investments in energy savings and environmental design.

While some general background information on costs is discussed, the report does not directly link the costs and risks undertaken to achieve the stated rent or value “premiums.”



An alternative interpretation of the “methodological” limitation stated above is that the problem is not methodological, but a presentation problem due to a mis-statement of the study’s objectives, as illustrated by the title of the November 2007 presentation: “Does Green pay off?” which implies assessing net benefits as the purpose of the work. Clearly linking the work done to its appropriate application would have assisted users in the interpretation of the results.

The CoStar Study methodology focuses broadly on LEED and/or EnergyStar certification compared to buildings without such certifications. While this is less a problem with EnergyStar certification, it limits the use of the LEED results. For example, even if all the criteria to select peer properties were met, LEED Building A is not the same as LEED Building B. For example, Building A achieving the same LEED rating may have gone after different points to achieve that rating than Building B and therefore possesses a very different set of design elements and technologies, which in turn may impact the building’s environmental and economic performance in different ways. By focusing simply on a LEED rating generally, without differentiation for the level or type of LEED certification, or the specific sustainable features within a building, limits the Study’s applicability.

While a more difficult task, and not the intent of the CoStar Study, the industry will benefit in the future if a more direct link between building performance or specific features can be established.

The kinds of limitations of a study that focuses broadly on LEED or EnergyStar certification were recently highlighted in a recent New

Building Institute study.<sup>5</sup> As the New Building Institute study pointed out, on average, LEED buildings performed 25% to 30% better than non-LEED certified buildings in terms of energy use. The study also demonstrated that there is a strong correlation between increasing levels of LEED certification and increased energy savings. However, the authors noted that:

“The results show a level of spread within building types and certification levels that can’t be explained solely by the building characteristics data available. While differences in averages suggest possible relationships, the variance in the data is too large for statistically significant confidence in the size of those differences.”

This suggests that something more granular than EnergyStar or LEED is needed to capture the green design elements (features and technologies) that contribute to enhanced environmental, economic and social performance (sustainability metrics) which, in turn, link to a building’s value.

## b. Technical Considerations

The database and modeling used to generate the conclusions in the CoStar Study have select technical challenges that need to be understood in order to properly interpret and apply the results of the study. Some of those key considerations are discussed below.

**Description of Data and Methods:** It would have been helpful to both academic and business users if the Peer Building Selection Approach and the Hedonic Pricing Model Approach, along with the resulting database

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<sup>5</sup> Turner, C. and Frankel, M., “Energy Performance of LEED for New Construction Buildings,” New Building Institute, March 2008.



and statistical models, were presented in a detailed enough manner to enable replication by third parties and a full understanding of the data and methods used. Additionally, given the difficulties inherent in the work presented in the CoStar Study, and its importance, an independent review by third parties of the results and presentation prior to its dissemination would have increased the validity of the results.

**Peer Building Selection Approach:** In order for conclusions about the differences between LEED and non LEED buildings to be reliable, green and non-green buildings would need to be closely similar buildings in near identical locations appealing to the same markets leased at close to the same time, with buildings of the same age, configuration and so forth. The bundle of leasing attributes would need to be nearly identical and the landowner would have to be presumed to be not unduly pressured to lease. Tightly controlling for age and dates of sale would be critical.

In the normal valuation or due diligence process for a commercial property, this selection of “comparables” or peers, and the adjustments made to peers to enable comparisons, requires detailed information about all aspects of the building, its location, tenant mix and other factors. Even then, the weighting as to which comparables are most important is a critical judgment that appraisers or due diligence analysts must make. Typical comparables analysis involves 5-10 buildings with a select few weighted heavily. It is the difficulty and specificity of the qualitative judgment required in the comparables analysis process that limits the accuracy and applicability of studies like the CoStar Study in property-specific analysis.



For the purposes of critiquing the CoStar Study results, the question is whether the peer selection process done at a macro level, based on limited property-specific information, can result in a selection of comparables that are properly adjusted for age, size, location, tenant mix, sales date, and the scores of other factors critical to determining rent or value in a property.

In order for a building to be a true peer, it would typically be located in the same submarket and would likely be located even closer to the subject property. In the CoStar Study, a substantial number of the 991 EnergyStar peer buildings and 164 LEED buildings were not even in the same submarket, with the majority of peers up to five miles away.

Better control for the time of sale and building age also would have improved the Study’s results. While it is good that LEED peers were within plus/minus five years in age and sales dates were controlled for on an annual basis, given the high concentration of new LEED



properties in the database, and sales prices that were rising dramatically on a monthly basis, future studies may need to tighten the controls for these factors.

The concern about careful peer selection related to sales date is due to the tremendous increase in sales prices for commercial properties during the relevant time frame. As shown in exhibit 6 prepared by Heitman and based on Real Capital Analytics data, it is clear that capitalization rates dropped rapidly and consistently (with sales prices rising dramatically as a result) between 2002 and 2007.

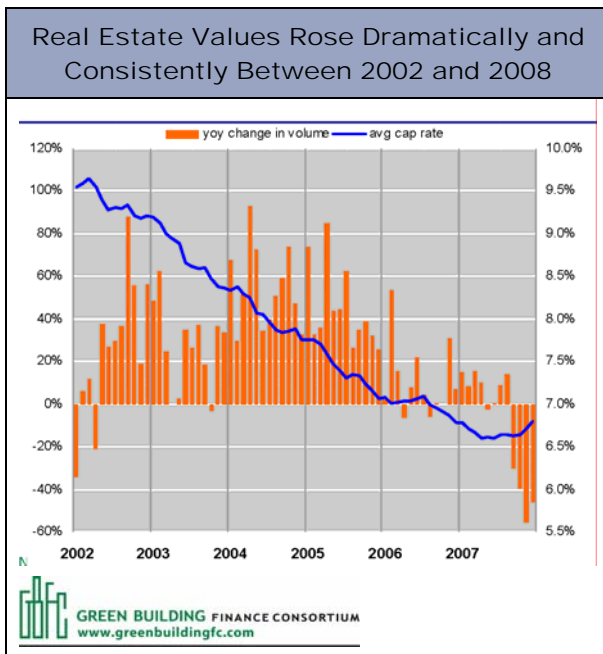


Exhibit 6

Rents have also risen dramatically during this time frame. Given the substantially higher capitalization rates, and rents, in 2007 versus prior years, and the preponderance of private LEED properties in the database from 2007 and 2008, insufficient control of sales dates (annually versus monthly, etc.) alone could explain a significant amount of the 64% value premium that CoStar found for LEED certified projects.

Small sample sizes used in the peer selection process – an average of two to four peer sales per LEED property – are particularly problematic given the significant volatility of sales prices generally. This issue should be mitigated in future studies as sample sizes grow.

**Hedonic Pricing Model Approach:** As discussed earlier in this report, the sales price per square foot premium for LEED certified projects was calculated based both on the Peer Building Selection Approach and a Hedonic Pricing Model Approach. In the hedonic model approach, they use data on sales prices to estimate the significance of a number of independent variables including age, EnergyStar status, LEED certification, size, and metropolitan area in explaining sales prices.

While the \$24 premium for LEED certification estimated from their hedonic model has some statistical limitations, due to small sample size and other issues, it controls better for age, size, and location, among other factors, than the \$171 premium estimated from their Peer Building Selection Approach.

Small sample size reduces the confidence in the reliability of the results from the Hedonic Pricing Model Approach. With only 15-20 LEED sales and a limited number of peer sales, as well as the significant variability in sales prices, and the discussion earlier about the dramatic increases in sales prices and rents during the 2002 to 2007 time period, any problems with the sample size, particularly over time, reduces the validity of the results.

Fortunately, the volume of sales and LEED properties overall has increased dramatically since March 2008, so reliability of future studies should improve. While the R-squared of 48% for

the hedonic model is low, and many factors that influence sales prices were not included in the model, the authors did not construct the model to predict sales prices, but only to measure the contribution of LEED certification to sales prices, independent of other factors. In this regard, they conducted an analysis of the residual error to check for systematic bias. They did not find any systematic bias that skewed the results and thus have some confidence in their conclusion of a \$24 contribution of LEED certification to value.

### c. Presentation

The most important limitation in the ability of the marketplace to interpret and use the results of the CoStar Study is the way it was presented.

The results of the Peer Building Selection Approach, including the 64% sales price premium and 36% rent premium for LEED certification, were presented in the March 26, 2008 *CoStar Advisor* article as strong results based on a study of thousands of properties, controlling for size, location, class, tenancy, and year built. It would have been helpful to users for the *CoStar Advisor* article and the 61-page supporting document to provide caveats as to possible limitations or statistical issues related to the conclusions, and provide further discussion on how to interpret and use the data.

Most importantly, by not presenting the results of the Hedonic Pricing Model Approach, or discussing the dramatic conflict in the results of their two alternative approaches to calculating the contribution of LEED certification to sales

price, users of the study were unable to accurately assess the results of the Peer Building Selection Approach, which were fully presented.

Better information to assist the reader in understanding whether this was a study of new versus existing buildings, what property types were covered, and other information to guide the reader in assessing the reliability of the results and determining how to use the information, was also needed.

The incomplete presentation of the basis for, and results of, the CoStar Study becomes more problematic in today's world where information moves at the speed of light. For example, the results, as directly presented in the *CoStar Advisor* article, were cited in hundreds of documents, news stories, and other sources throughout the world based on a cursory search I conducted on the Internet.

Finally, it would have also been helpful in the *CoStar Advisor* article and the accompanying 61-page supporting document to provide more complete information on the methodology employed, the nature of the peer building selection process (particularly for the LEED buildings), and the sample sizes for each of the sub-analyses and calculations. Such additional information would enable a more complete assessment of the quality of the information by academics, real estate underwriters, appraisers, and other users.



# Interpretation and Use of Data in Sustainable Property Investing

The issues with the interpretation and use of the results of a study like the March 2008 CoStar Study highlight important issues confronting the sustainable property investment sector. Scores of studies evaluating health benefits, productivity benefits, rent increases, and other types of potential benefits are regularly and inappropriately cited and misused by both knowing and unknowing participants in the sustainability industry. As will be discussed in more detail in the Consortium’s report “Underwriting Sustainable Property Investment,” the appropriate use of data and analysis is largely determined by the type of decision that is being made.

As shown in exhibit 7, one of the most important frameworks for understanding the types of decisions made is the difference between strategic decisions, tactical decisions and property specific decisions.

Strategic decisions are those made by pension fund boards, corporation boards, CEOs, and other leaders who must make decisions about how they are going to respond to the broader issue of sustainability, and the more specific issue of sustainability within their real estate portfolios.

Once a strategic decision is made that sustainable real estate is an important consideration, implementation is passed down to corporate real estate heads, pension fund portfolio managers, and others who are charged with the tactical responsibility to determine the nature of the organization’s response. Should sustainability investments be phased? How should they be phased? Should we just work on our office portfolios, or are all property types of concern? Which properties should we focus on? Which sustainability attributes? How do we measure and assess where we currently stand and track progress moving forward?

Property specific decisions are quite different than either tactical or strategic decisions. Key questions include: How do we underwrite the risks and returns of specific investments in sustainable features for a given property? Are the benefits (returns) sufficient to compensate for the risks taken for investment in a particular property? How do we modify our current practices to underwrite potential health or productivity benefits, or potential increases in tenant demand?

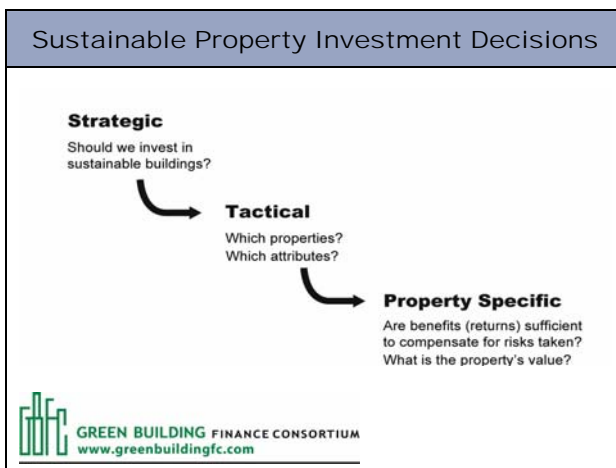


Exhibit 7



The type of decision—strategic, tactical, or property specific—is the starting point for understanding the type of data and analysis you need to employ. For the last three or four years, the green building industry has been focused at the strategic level, using business case analysis and case studies to present a general case for the importance and potential benefits of occupying or investing in sustainable buildings. The majority of cost benefit and other financial studies in recent years are directly applicable to strategic decisions. However, due to the general nature of the analyses, and insufficient presentation of risks, rewards, and financial or building results, most of the data and analysis is not useful or appropriate for tactical or property specific decisions.

Fortunately, and due to the persistent efforts of thousands of sustainable building proponents, the strategic question has been asked and answered, in the affirmative, for most major real estate owner-occupiers and investors in the marketplace. Today most major organizations with substantial real estate portfolios are actively engaged in answering the tactical questions, determining the appropriate way to audit existing facilities and reorganizing their acquisition and leasing policies to reflect consideration of future real estate commitments. As the variety, complexity and number of tactical questions is quite large, and undergoing constant change, this phase will continue indefinitely. Performance measurement, monitoring and benchmarking are critical considerations as organizations struggle to determine appropriate measures to assist them in their allocation of resources to sustainability.

The final types of decisions—property specific valuation and due diligence on particular properties—require much more specific and

granular information at the property level than either the strategic or tactical analyses. Fortunately, based on the Consortium’s findings to date, the fundamental underwriting and valuation methods and practices do not have to change, but new information, analytic procedures, and organizational changes are required to properly value and underwrite sustainable properties.

Relative to interpreting and understanding how to use information like that presented in the CoStar Study, the strategic-tactical-property specific framework is helpful. Given the methodology of the CoStar Study, its conclusions are primarily applicable to the general strategic decisions related to the importance of LEED or EnergyStar certification to value. Given the broad general nature of the analysis (limited breakout by property type, existing or new buildings, etc.), its lack of focus on specific building performance, or particular






sustainability features and value, and its technical limitations, the results of the CoStar Study do not have specific applicability in either tactical or property-specific decisions.

As the volume of data becomes greater, and some of the statistical and modeling issues are refined, the type of analysis presented in the CoStar Study could have significant applications in tactical decisions regarding allocation of resources by property type and metropolitan area, and other such strategic uses. However, the type of analysis presented in the March 2008 CoStar Study has never been used by appraisers, mortgage underwriters or due diligence analysts in evaluating occupancies, rents or value for specific properties. This is largely due, as shown in exhibit 8 below, to the statistical difficulty in dealing with the many factors that influence tenant demand and value.

For a specific property, the selection of comparables, for either setting rents in a discounted cash flow analysis, or for making adjustments in the market comparables approach, is a much more detailed and specific analysis of those key competitors to a specific property. The selection, weighting, and the adjustment of comparables to determine what a subject property will rent or sell for involves scores of qualitative judgments by a professional real estate appraiser or due diligence analyst with experience in the market and a clear understanding of the factors influencing the tenants specific to a particular building.

**Sustainability Just Part of Factors Influencing Tenant Demand**

<p><b>Location Specific</b></p> <ul style="list-style-type: none"> <li>• <b>Proximity to executive housing</b></li> <li>• Proximity to qualified employees</li> <li>• Proximity to nearby amenities (restaurants, shops &amp; services)</li> <li>• Proximity to public transportation</li> </ul> <p><b>Building Specific</b></p> <ul style="list-style-type: none"> <li>• Paid versus free parking</li> <li>• Age of building</li> <li>• How modern is building</li> <li>• Adequacy of building systems</li> <li>• Operating expense costs</li> <li>• Building ceiling heights</li> <li>• <b>Floor plate size &amp; configuration</b></li> <li>• Level of property mgmt service</li> <li>• Level of building security</li> </ul>	<p><b>Space Specific</b></p> <ul style="list-style-type: none"> <li>• <b>Location of space (lower, middle or upper floors)</b></li> <li>• Open versus built-out floor plan</li> <li>• Common versus dedicated restrooms</li> </ul> <p><b>Tenant Specific</b></p> <ul style="list-style-type: none"> <li>• <b>Rental rate (cost) for space</b></li> <li>• Perceived building prestige</li> <li>• Other tenants located in the building</li> <li>• Proximity to clients/customers</li> <li>• Adequate parking ratio</li> <li>• Adequacy of lobby</li> <li>• Curb appeal of building</li> </ul> <p><b>Sustainability Specific</b></p> <ul style="list-style-type: none"> <li>• Potential health benefits</li> <li>• Potential productivity benefits</li> <li>• Reduced energy/water cost volatility</li> <li>• Improved recruiting</li> <li>• Improved employee retention</li> <li>• Leadership—improved corporate market value</li> <li>• Reduced subleasing risk</li> </ul>
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Exhibit 8

## Conclusion

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As I stated at the beginning of this report, just because an analysis has a strong qualitative basis does not make it bad. In fact, every property value or strategic decision involves a substantial amount of qualitative assessment and judgment. That is how decisions are made in the business world, and it is the job of the sustainability industry to develop the data and organize it in a way that can be utilized by investors,

lenders, developers and corporate real estate executives, as well as the commercial brokers and appraisers, to assist them in their decision-making process. Ultimately, I believe that specific investment decisions regarding sustainable properties will be based on a combination of quantitative analyses informed by the qualitative factors and the judgment of underwriters, appraisers, and decision-makers.

