Value Beyond Cost Savings

How to Underwrite Sustainable Properties

Executive Summary

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About This Book

This book presents the key findings and conclusions regarding the valuation and underwriting of sustainable properties from three years of independent research by the Green Building Finance Consortium.

Value Beyond Cost Savings: How to Underwrite Sustainable Properties is supplemented by separate publication of six "Expanded Chapters", which provide 400 additional pages of in-depth research, analysis, and performance information, all available without charge to the public from the Consortium's website.

This book has the same table of contents as the Expanded Chapters, enabling readers wishing to delve into more depth on a topic to easily find the appropriate sections in the Expanded Chapters. This book also references many checklists, databases, documents, and resource links in the Expanded Chapters and in the Consortium's web-based Research Library. This Chapter and the book include some color, but the publications are designed to print in black without loss of information.

The Green Building Finance Consortium maintains a searchable Research Library and Industry Links database on its website: http://www.GreenBuildingFC.com. The Research Library and Industry Links databases include thousands of documents coded using the GBFC's unique index designed for the sustainable finance and investment industry. The structure of the index is consistent with the organization of "*Value Beyond Cost Savings: How to Underwrite Sustainable Properties*". Future sustainable performance and related research updating the book on an ongoing basis will be available in the Research Library. An annotated copy of the Research Library index is presented as Appendix A.

The mission of the Consortium is to enable private investors to evaluate sustainable property investments from a financial perspective. To accomplish this, we have identified and developed suggested modifications to valuation and underwriting methods and practices and are widely communicating the results of our work through our book, other publications, web-based research library, speeches, and collaborations.

Importantly, the Consortium is financed independent of green building product or professional organizations, relying on funding from The Muldavin Company Inc. and Consortium Members which include leading real estate industry trade associations and companies, governments, and non-governmental organizations. Trade association members include BOMA International, the Mortgage Bankers Association, the Urban Land Institute, the Pension Real Estate Association, and the National Association of Realtors.

About the Author

Scott Muldavin is Executive Director of the Green Building Finance Consortium, a group he founded in 2006, and President of The Muldavin Company, Inc. For over 25 years, Mr. Muldavin has advised leading real estate companies including CalPERS, RREEF, Bank of America, Mitsui Trust and Banking, Great West Life, Prudential Real Estate, Ohio State Teachers Retirement System, Wells Fargo Bank, The Government of Singapore Investment Corporation, Catellus Development Corporation, Equitable Real Estate, and Standard Insurance Company.

Mr. Muldavin has been a lead real estate consulting partner at Deloitte & Touche, co-founded the $3+ billion private real estate company Guggenheim Real Estate, served on the Advisory Board of Global Real Analytics, an advisor for $2 billion of REIT and CMBS funds, and completed over 300 consulting assignments involving real estate finance, mortgage lending, investment, valuation and securitization. Mr. Muldavin's engagements and work experience provide him with broad experience in equity and debt transaction structuring, underwriting, due diligence, investment fund design, and corporate real estate.

Mr. Muldavin has advised scores of equity investors and developers. As a co-founder of Guggenheim Real Estate, Mr. Muldavin has been involved in capital formation, investment strategy, due diligence and served on the investment committee. He has assisted pension funds including CalPERS, Ohio State Teachers, and Alaska Permanent Fund in their investment and organizational strategies. He has advised investment managers including RREEF, Prudential Real Estate, Amstar, Hunt Realty, and others on strategy, capital formation, organizational change, and due diligence practices.

Mr. Muldavin has been involved in the Real Estate Investment Trust (REIT) market since the early 1980s advising clients including Merrill Lynch, CalPERS, Kilroy Realty and others concerning new REIT securities offerings and investment issues. As an investment committee member of Guggenheim Real Estate, he monitored the REIT market and participated in investment decisions concerning the allocation of hundreds of millions of dollars of REIT investments.

Mr. Muldavin has been involved in mortgage underwriting for over 25 years. He was the lead consultant that developed the first commercial mortgage risk-rating system for Standard & Poor's Corporation in the early 1980's and was a national leader of the Real Estate Financial Institutions practice for Deloitte & Touché, where he worked with financial institutions to improve their underwriting and servicing systems, assess risks in their mortgage portfolios, and estimate loan losses. He also authored the quarterly "Real Estate Finance Update" in *Real Estate Finance*, for 16 years; developed the Real Estate Capital Flows Index, which was published quarterly for many years by the Pension Real Estate Association and Institutional Real Estate Inc.; and authored key articles and reports on mezzanine financing, mortgage servicing, risk management, capital volatility, and other topics.

Mr. Muldavin was also a leader of the corporate real estate practice at Deloitte and Touché and during his career has advised corporations such as Texaco, Phoenix American Corporation, Nissan Motors, Pacific Enterprises, Universal Studios, House of Blues Corporation, Johns Manville, and many others on their leasing, acquisition and real estate strategies.

Mr. Muldavin has been involved in the structuring and due diligence of real estate property and business transactions for over 25 years. He has completed due diligence engagements involving the acquisition of office buildings, retail properties, hotels, multi-family properties, industrial properties, large land parcels, mortgage portfolios, mortgage companies, commercial banks, real estate service companies and other real estate assets.

As an advisor and Investment Committee member of Guggenheim Real Estate, Mr. Muldavin reviewed hundreds of retail, office, industrial and multi-family investment opportunities throughout the United States, as well as investments in mezzanine loans, B-piece investment funds, preferred equity, and REITs.

Mr. Muldavin is a frequent speaker on real estate finance, investment, valuation and sustainability. He has authored over 225 articles published in *Real Estate Finance*, RICS Property World, *Bankers Magazine*, *Urban Land, European Real Estate Yearbook*, *The Journal of Property Management, The Pension Real Estate Quarterly*, *Real Estate Issues*, *The Investment Property and Real Estate Capital Markets Reports, Institutional Investor*, *Builder and Developer*, *The Real Estate Accounting and Tax Journal*, and other industry publications.

Mr. Muldavin is a graduate of UC Berkeley and Harvard University, and has been recognized by the American Society of Real Estate Counselors and the Royal Institute of Chartered Surveyors, each of who have awarded him their highest level of professional certification. Mr. Muldavin is also on the Advisory Board of the Journal of Sustainable Real Estate and an Honorary Fellow of the Institute of Green Professionals.

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Executive Summary

Introduction

The real estate industry has made substantial strides in the integration of sustainability into property decisions since the Consortium was formed in 2006. The strategic question of whether investors should consider sustainability issues in their property decisions has largely been asked and answered, with the majority of asset managers and corporate real estate directors now struggling to assess the performance of their properties, identify opportunities for improvement, and make necessary changes in their organizations to address new sustainability priorities.[1]

While strong progress has been made, the real estate industry is struggling to quantify and articulate the value of sustainable property investment. The vast majority of investment decisions, even by sophisticated investors, are being made based on simple payback or simple return on investment (ROI) calculations.[2] Most investors, and many tenants, today understand that sustainable properties can generate health and productivity benefits, recruiting and retention advantages, and reduce risks, but struggle to integrate benefits beyond cost savings into their valuations and underwriting.[3]

The failure by property investors to appropriately incorporate revenue and risk considerations into sustainable investment decisions has led to underinvestment in sustainability. Today, with increasing government regulations and incentives and rapidly growing tenant and investor interest in sustainability, failure to properly incorporate value considerations beyond cost savings will increasingly result in sub-optimal financial results for investors. As a consequence, society will not be able to achieve its carbon reduction goals.

In accordance with its mission and the needs of the industry, the Green Building Finance Consortium (GBFC) presents *Value Beyond Cost Savings: How to Underwrite Sustainable Properties*, a book designed to assist private investors in making better financially based sustainable property investment decisions.

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[1] We use the term investors in many parts of the book to reference the many types of investors including corporations, equity investors (pension funds, REITS, private owners, etc.), lenders, tenants, and developers.

[2] For example, if I invest $100 and get $33 per year in energy savings then my payback will occur in 3 years and my ROI is 33%.

[3] The term "underwriting" in this report refers broadly to the independent due diligence that lenders, equity investors, developers, corporate real estate executives and other real estate decision-makers undertake prior to their sustainable property acquisition, construction, financing, or leasing decisions. The term "valuation" is also broadly used to reference both formal and informal methods of analyzing and communicating private property market value.

Chapter II: Sustainable Property Investment Decisions

The first step in conducting a proper financial analysis is to clearly understand the investment context. The specific analytic methods, data, and decision metrics required are determined based on the type of investor and investment decision. Additionally, the specific type of property (office, retail, etc.), stage of development (new, existing, etc.), location, set of sustainable features and sustainability certifications will also critically affect the analysis.

Exhibit II-1
Methodology for Underwriting Sustainable Properties

Step 1: Investment Context

Investor →	Decision Type →	Property
Investor/ Landlord	Build	Type
Owner/User	Buy	State of Development
Spec Developer	Operate	Location
Tenant	Lease	Sustainable Features
Lender	Finance	Certification(s)

Chapter III: Evaluating Property Sustainability

The first part of this Chapter clearly defines sustainability, provides an extensive "menu" of typical sustainable features, and identifies and provides links to scores of resources to help investors understand the types of sustainable investment attributes and features are possible.

Next, the role of certifications and assessment systems is evaluated. Practically, reliance on a single certification program for underwriting is not realistic because investors must be able to evaluate the financial implications of sustainable property investment, however large or small, regardless of whether a certification has been achieved. Investors with properties in different markets or countries must employ underwriting practices that are adaptable to local conditions.

For the purposes of a financial analysis, it is important to understand the range of assessment systems and tools that are in use or under development. In market-based financial analysis or valuation, numerous certification and assessment systems will typically be applied to a single property.

Sustainable property certification and assessment systems come in many forms. In order to aid evaluation and understanding of these alternative approaches, we identify and provide links to nearly 100 systems organized around six categories:

- Building environmental assessments and certifications;
- Occupier focused assessments;
- Government regulations and assessment systems;
- Other building performance assessments and standards;
- Product/material assessments and certifications; and,
- Service provider assessments and certifications.

Key findings and conclusions regarding how to evaluate sustainability in financial analysis include:

- Financial analysis and valuation for any single property is influenced by many sustainability definitions. Valuation and financial analysis are market driven, and the specific sustainability certifications and definitions that influence regulators, users, and investors will drive the financial analysis and valuation.

- Sustainability is not a property type, but a property performance outcome determined by sustainable features, strategies, and certifications. Accordingly, sustainability is just one of many factors to consider in valuation or underwriting, with the majority of risk and value considerations being driven by traditional factors influencing a building's attractiveness to tenants and investors.

- Environmental certifications and assessments cannot be the primary basis for financial analysis or valuation because:
  - Environmental certifications measure environmental performance, not financial performance;
  - Environmental certification levels are not comparable, because they can be based on entirely different combinations of sustainable features and outcomes;
  - Many properties with valuable sustainable features may not be certified.

- The influence of sustainability on value can be analyzed. For example, every office building has a unique combination of features and attributes, but somehow the industry is able to analyze and value office buildings.

- LEED certification has become the definitive market leader in the U.S. and a growing influence internationally for the institutional investment market, and, to some degree, the owner-occupant market. While certifications like LEED and other leading certification systems around the world cannot be the sole basis for analysis, they have significant value independent of the attributes or performance of the certified property.

- Sustainable certificates with the strongest market acceptance by regulators, users, and investors will have the highest values independent of the sustainable features or building performance. This "premium" for a specific certification will vary significantly over time by property type, market, and level of certification.

Chapter IV: Sustainable Property Performance

This chapter presents a practical approach to thinking about sustainable property performance and "value" that corresponds with traditional real estate property analytics and decision-making. The Consortium's approach moves away from the quest to design and implement the "killer" quantitative study that proves the incremental value of sustainability, to instead focus on the process and data needed to assess value for specific properties.

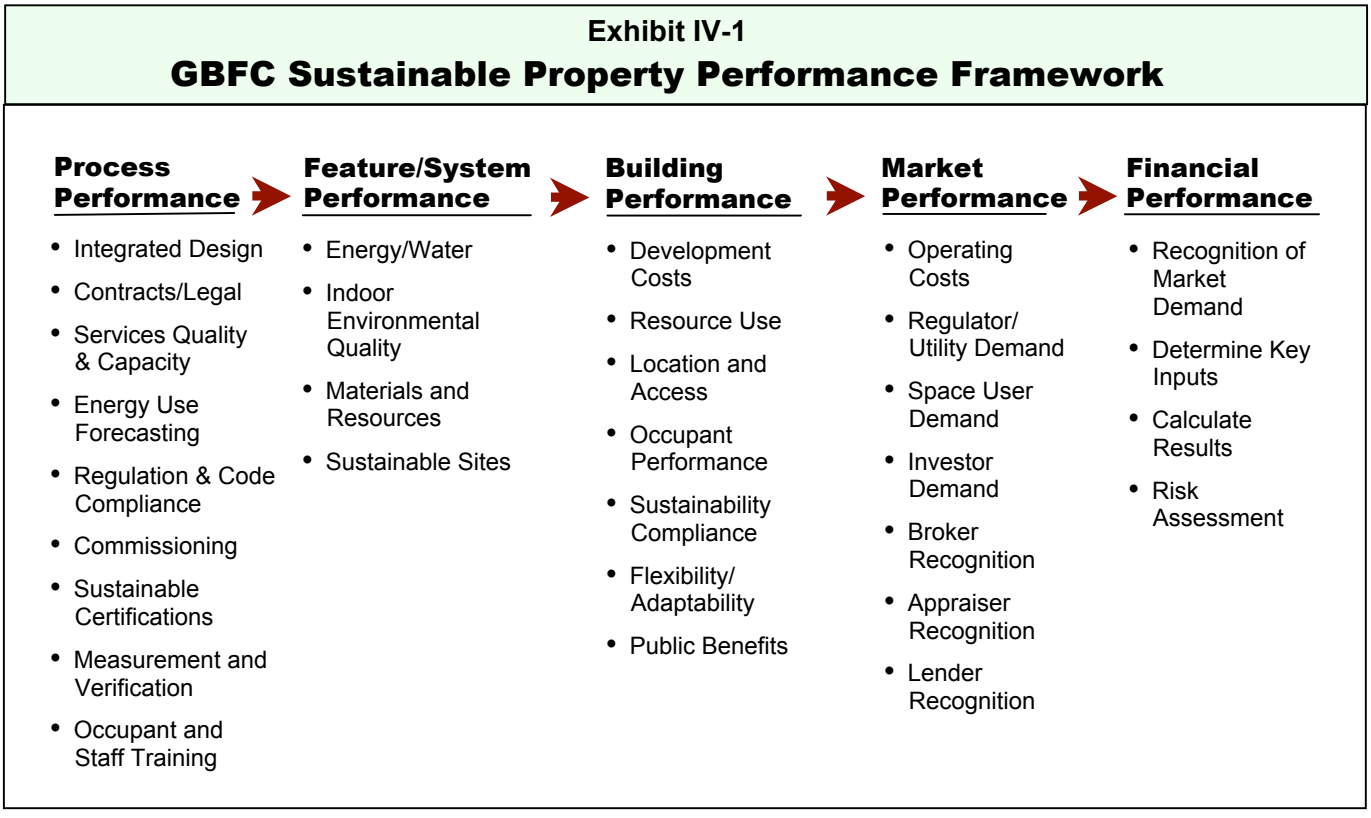
GBFC Sustainable Property Performance Framework

Measuring and understanding sustainable property performance is the foundation of financial analysis, valuation and underwriting. While over 100 sustainable property performance and certification systems were identified in Chapter III, all of them left out critical performance information necessary to sustainable property financial analysis and valuation. To address this deficit, we developed GBFC's Sustainable Property Performance Framework, a new framework for organizing and evaluating sustainable property performance information to directly support financial analysis, valuation and underwriting.

GBFC's Framework introduces Market Performance, the "missing link" of sustainable property performance required to assess the financial implications of sustainable property investment. A graphic presentation of the framework is shown below in Exhibit IV-1 and presented in more detail in Appendix C of the book.

Exhibit IV-1

GBFC Sustainable Property Performance Framework



GBFC's Sustainable Property Performance Framework provides a structure for underwriters to use in their efforts to mitigate risk. Since most significant sustainable property investment decisions will be based on forecasted building performance (energy use, occupant performance, development costs, etc.) underwriters are, or should be, focused on reducing uncertainty and risk related to the forecasted performance. As has been proven in our research, risk and uncertainty around building performance can be significantly mitigated through underwriting of sustainable processes and features/systems.

Process Performance

Strong performance at the process level is the foundation for successful sustainable property investment. Building sustainability is fundamentally a process of best practices that leads to "sustainable" outcomes. It is critically important to get these processes right in order to deliver a successful high performance building. Poor execution of these processes can lead to a variety of negative consequences, including underperforming systems, uncomfortable environments, or increased cost.

There are scores of different sustainable property processes. We focus on seven key sustainable property processes that have been identified by our survey respondents, case studies, and the literature as important potential sources of sustainable property failure and underperformance:

a. Integrated design/project delivery;
b. Contracts/legal;
c. Service provider quality and capacity;
d. Energy use forecasting;
e. Regulation and code compliance;
f. Commissioning; and
g. Measurement and verification.

In the book and Expanded Chapters we provide detailed assessment of research on the performance and best practices for each of these seven key processes.

Feature Performance

Feature-based performance analysis has an important role in underwriting/due diligence. Beyond simple payback or return on investment analysis, it is critical for capital providers to understand the relative risks associated with the implementation of different features or strategies.

To better understand feature risks, and identify key features to focus on, we interviewed a score of top consultants, developers, investors, and corporate real estate professionals to determine those features with a history of failure and underperformance. Based on this survey, case studies and other research, we made the decision to focus on six important features that were repeatedly mentioned during our survey of respondents as having experienced failure or underperformance:

a. Underfloor Air Distribution
b. Green Roofs
c. Daylighting
d. Lighting Controls
e. Waterless Urinals
f. Materials

In the Book and Expanded Chapter IV we provide detailed assessment of research on the performance and best practices for each of these six key features.

Building Performance

Sustainable property performance at the building level is the foundation for valuation and financial analysis. Understanding development costs, resource use, occupant performance, level of sustainability achieved, and the location and flexibility of a building is critical to being able to assess potential demand for "sustainability" from the market.

In this section of Chapter IV, we summarize key evidence documenting sustainable property building performance for the following categories:

1. Development ("First") Costs
2. Whole Building Performance Studies
3. Building Energy Use
4. Occupant Performance
5. Durability/Adaptability/Flexibility

A summary of some of the key points are presented below and in much more detail in the Book and Expanded Chapter IV.

- *Summary of Development ("First") Cost Research*

The evidence from key research and case studies analyzing the performance of sustainable properties regarding development costs (often referred to as "first costs") is that a certified sustainable property costs 0-2% more, with higher levels of certification costing up to 10% more. Many major construction companies (Swinerton, Webcor, Turner, etc.) publicly promote that sustainable construction should cost no more, and the research shows that in many cases it does not. (Expanded Chapter IV provides a detailed analysis of first cost analysis and the most important research to date on the topic)

Cost research has primarily been completed on new projects, but at least for achieving LEED EB, costs do not appear excessive for relatively modern buildings. Evidence presented from the first 60 LEED EB analysis of a well know consultant for office buildings averaging 400,000 square feet and 25 years of age showed average costs of only approximately $ 90,000 with rapid payback. More extensive retrofits will be subject to substantially greater cost volatility due to often unknown, and costly, problems that can

arise when moving walls and making other major changes. Cost will also be significantly influenced by process and feature performance.

- *Summary of Energy Use Performance Research*

Evidence from the key studies to date looking at actual energy-use savings from LEED certified buildings[4] suggests such buildings use 15% to 40% less "site" energy than non-LEED buildings, consistent with the anecdotal evidence the Consortium has accumulated from numerous case studies.[5] Actual energy savings in Energy Star buildings has also been found to be in the 30% range.

While average site energy savings range from 15% to 40% in key studies, there is a wide variability in performance around the mean. More importantly for real estate investors, actual energy performance was not closely correlated with modeled performance at the property level, increasing uncertainty and risk in forecasting savings. Many factors are cited to explain the variability in forecasts including the occupancy type and energy intensity of the users.

Each of the key energy use studies bring up a myriad of complex statistical and energy measurement issues, and suggests investors/valuers need to be careful in applying any general statistics to specific property analysis, and be skeptical concerning forecast energy savings or links between environmental certification and energy savings.

However, as LEED and other environmental certifications are becoming more energy sensitive, and energy technologies and strategies become more tested, results and commentary from properties certified in the first five years of this century will not define what is possible or likely with energy efficiency and renewal strategies. The key is to be an informed consumer of "scientific" research.

- *Summary of Occupant Performance Research*

Occupant performance has two key components of measurement, as shown below in Exhibit IV-2:

- The actual occupant: individuals working in or using space; and
- Enterprises that lease or own the space.

[4] It should be noted, and considered in evaluating the results, that even the studies cited here published in 2008/2009 only evaluate buildings certified through 2006.

[5] Most building managers are familiar with site energy, the amount of heat and electricity consumed by a building as reflected in utility bills. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery, and production losses, thereby enabling a complete assessment of energy efficiency in a building. More detail on the differences and their importance can be found at http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_benchmark_comm_bldgs .

Exhibit IV-2 **Measuring Building Performance: Occupants**	
Individual	**Health** **Productivity** **Satisfaction**
Enterprise	**Reduction in Resource Use** • Reduction in energy and water use • Reduction in building waste • Reduction in pollution emissions • Reduction in carbon footprint **Improved Reputation / Leadership** • Recruiting • Employee retention / satisfaction • Public relations / brand management • Retain "social license" to operate • Improved marketing and sales • Increased company market value • Increased company market liquidity • Shareholder concerns addressed **Compliance With Internal / External Policies / Initiatives** • Corporate energy / sustainability requirements • Corporate social responsibility reporting • Global Reporting Initiative • Carbon Disclosure Project • Minimum requirements of socially responsible investment funds **Reduced Risk to Future Earnings** • Legal risks—sick building syndrome and mold claims, business interruptions, building remediation costs, etc. • Reduced sub-leasing risk if downsizing, relocating, etc. • Reduced operating cost volatility • Reduced risk to reputation • Improved defense of competitive advantages • Reduced risk of future compliance costs

In summary, based on all of the Consortium's research, including its review of over 200 individual health and productivity studies identified in Appendices IV-C and IV-D of Expanded Chapter IV, its review of resource reduction in sustainable properties, its detailed analysis of the costs and benefits of sustainable properties in Chapter V, and its evaluation of corporate sustainability policies and trends towards sustainable buildings, **there is a clear positive relationship between sustainable property investment and occupant performance**. Occupant performance measurement is in its infancy, as is the occupant market's response to improved occupant performance, but the trends are supportive of further close attention and analysis.

The key scientific studies that support the Consortium's summary conclusion above and more detailed conclusions on health and productivity below are presented in substantial detail in Appendices IV-C and IV-D of Expanded Chapter IV. In Appendix IV-C, we first

documented as many of the different alleged health or productivity benefits cited by the industry as we could find, then found the specific research study where the alleged benefit was cited. In this process, we identified over 100 additional, as yet un-cited research reports that may also be of interest. For Appendices IV-C and IV-D, the studies were categorized as follows:

Study Categories	Number of Studies	Percentage
Indoor Environmental Quality	64	27%
Temperature Control	15	6%
Lighting	19	8%
Privacy and Interaction	13	6%
Ergonomics	17	7%
Access to Natural Environment	36	15%
Whole Building	40	17%
Other References	33	14%
Total	**237**	**100%**

As is discussed in detail in Expanded Chapter IV, care must be taken in citing and using specific numerical conclusions from many of the studies, but existing research has established a clear positive relationship between certain sustainable building outcomes and positive health benefits.

Market Performance

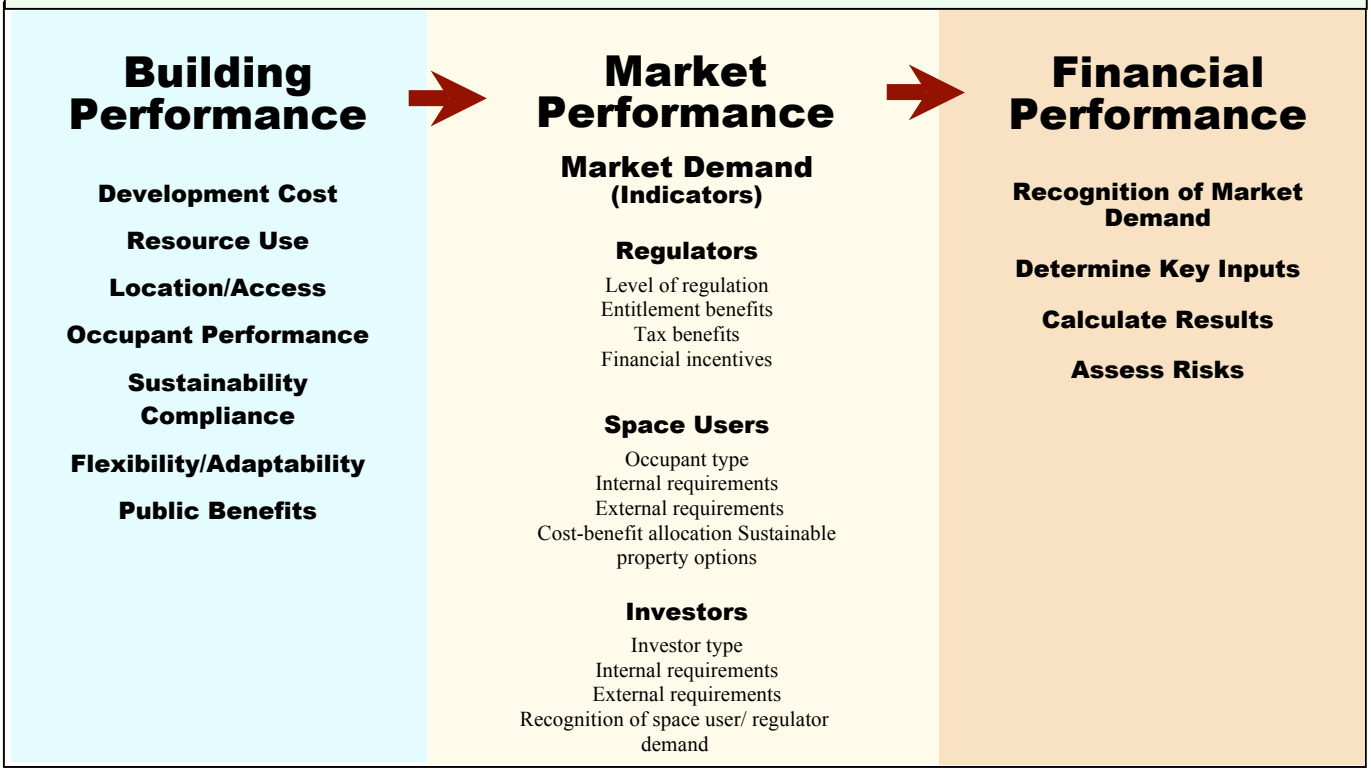
There is substantial evidence to support enhanced regulator, space user, and investor demand for sustainable properties. The significant demand for sustainable properties is evidenced by expert-based financial analyses, statistical based analysis, survey/market research, and well-reasoned valuation theory.

Market performance is the missing link that ties building performance information to financial performance. Historically, the green building industry has done a poor job of articulating the value of sustainable property investment because they have equated building performance (energy/water savings, health and productivity benefits, etc.) with financial performance, without taking the critical intermediary step of assessing of the response of the market to the building's performance (see Exhibit IV-3 below). Additionally, the industry has improperly applied general studies to specific property decisions without proper analysis.

Full consideration of the market's response to a building's performance ensures proper consideration of revenue and risk, and important issues like the allocation of costs and benefits of sustainability between owners and tenants. The importance of market performance as a link between building performance and financial performance is highlighted in Exhibit IV-3.

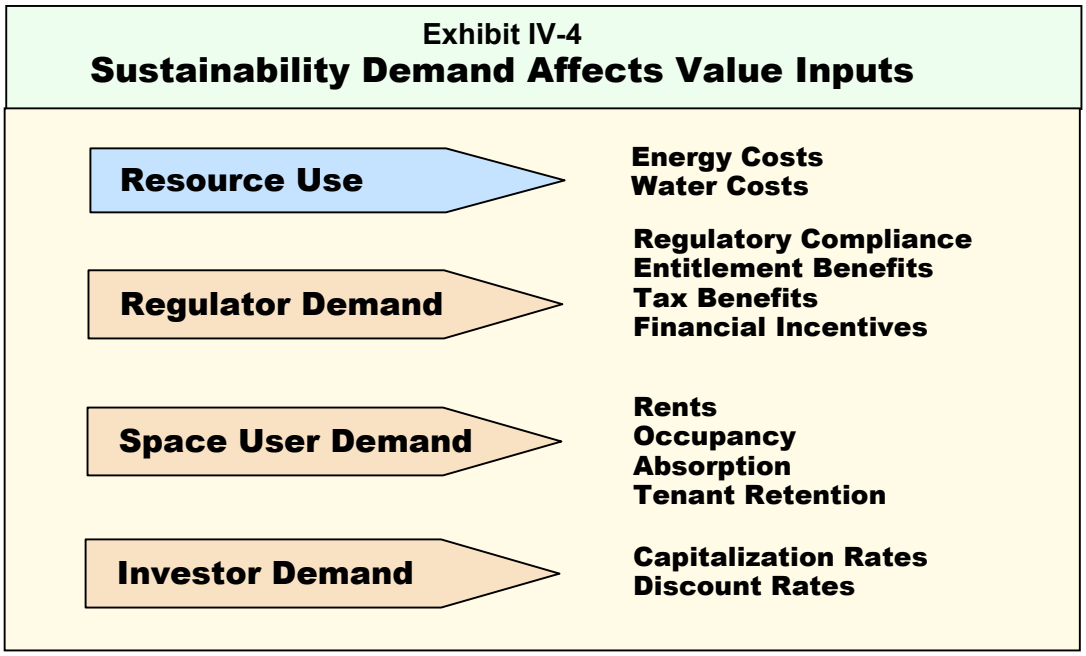
Exhibit IV-3

Sustainable Property Market Performance: The Missing Link



While downplaying market performance issues is a critical problem in general performance or cost-benefit studies, it is a fatal error in the ability to assess the financial implications of sustainable property investment for an individual property. As shown in Exhibit IV-3, to get from building performance to financial performance for a specific property, you must evaluate the market demand for sustainable property by regulators, space users, and investors, then assess whether brokers, appraisers, and lenders in the specific markets where the property is located recognize sustainable market demand. Finally, you must determine key financial model/valuation inputs factoring in both sustainable and non-sustainable issues.

Regulator, space user, and investor demand are critical to value, as shown below in Exhibit IV-4. If valuers only considered resource use (energy costs, etc.) and ignored market performance, as measured by demand, key value issues affecting entitlements, rents, cap rates and other issues would be ignored. In essence, revenue and risk considerations would not factor into decision-making, a recipe for long-term underperformance.



To better understand and ease the interpretation of sustainable property market and financial performance research, we segment and categorize the research into four key types:[6]

- **Expert-based financial analyses.** Conducted primarily by valuers/market analysts on a property-by-property basis following traditional valuation practices.
- **Statistics/modeling-based financial analyses.** Conducted primarily by academics applying statistical modeling techniques to large databases of properties.
- **Surveys/market research.** Surveys and related market research studies addressing regulator, space user, and/or investor demand.
- **Foundational background and theory.** Foundational research and theoretical studies that address key issues in sustainable property valuation and financial analysis.

- *Summary Conclusions From Expert-Based Analyses*

These types of studies and research provide the best evidence of sustainable property market and financial performance. These studies are typically conducted by experts in real estate valuation or market analysis, and follow in form, if not always in depth, the process used by valuers and market researchers to generate rents, cost, and related real estate property financial assumptions. Key specific studies are identified and analyzed in the Book and Expanded Chapters. Summary conclusions are presented below.

Expert-Based Financial Analyses support the following conclusions:

[6] We combine sustainable market and financial performance research together because much of the research in the field covers both these topics in their studies.

- Faster absorption of tenants—improved pre-leasing;
- Achieve competitive rents—in some cases higher then competitors;
- Reduced tenant turnover;
- Higher equilibrium occupancies;
- Competitive lease terms;
- Reduced operating and maintenance costs;
- Attract superior grants, subsidies and other inducements; and,
- Achieve high or moderately high tenant satisfaction scores.

The expression of increased occupant demand was not consistent across properties or studies, with some projects experiencing faster absorption and higher occupancy, but not significantly higher rents or better lease terms. Investor and tenant interviews on specific projects supported increased value conclusions and suggested trends of increased tenant and investor demand moving forward. As to the magnitude of potential value increases, this was not specifically quantified, but on average incremental value increases of around 10% was suggested.

- *Summary of Consortium Conclusions on Statistics/Modeling-Based Financial Analyses*

Statistics/modeling-based financial analyses provide "general" support for a positive relationship between a green building certification (LEED or Energy Star) and improved rents and sales prices for commercial properties. However, all of the studies to date have significant methodological, data, and statistical limitations that limit the reliability/ applicability of the numerical conclusions to specific property valuation or decision-making. In most cases, the studies cover only office buildings in the United States, so any application to other property types or regions needs to be carefully considered.

While the specific numerical results may be of limited reliability, it does not imply that the rent and sales price premiums are necessarily overstated, just that methodological and data limitations introduce substantial uncertainty in the specific numerical results. Use of the statistics without appropriate understanding of the caveats and the coverage of the studies is not appropriate

Small sample size, problems in controlling for time, and numerous other statistical problems are particularly relevant for the sales price premium analysis, but also apply to the rent premium analysis in the cited studies. For example, one of the limitations of the studies is that they tend to focus on rents, while many other important value increasing attributes, like faster absorption, better lease terms, higher tenant retention rates, and lower risks (discount and cap rates) are also possible indicators of tenant preference, but these variables are not evaluated in the existing studies.

Keeping the caveats and application cautions in mind, what do the four statistical studies actually show?[7] As shown in Exhibit IV-5 below, with the exception of the Wiley and Johnson paper, which we were not able to review in detail, rent premiums from LEED properties were shown to be from 0% to 6%, and Energy Star premiums ranged from 3.3% to 5%. The Fall 2009 study by Fuerst and McCallister reported occupancy rates in LEED buildings 8% higher, and in EnergyStar buildings 3% higher.

Exhibit IV-5
Statistics/Modeling-Based Sustainable Property Financial Analysis

	Rent Premiums		Sales Price Premiums	
	EnergyStar	***LEED***	***EnergyStar***	***LEED***
Fuerst & McAllister, April 2009[1]	5%	6%	31%	35%
Eichholtz, Kok & Quigley, January 2009[2]	3.3%	0%	16%[2]	0%
Miller, Spivey & Florance, Fall 2008	N/A[3]	N/A[3]	5.8%	9.9%
Wiley & Johnson (forthcoming)	7%-9%	15%-17%	$30/sq.ft.	$130 sq.ft.

[1] Fuerst & McAllister disclose many of the problems with their methodology and data, and conduct a more robust statistical analysis on a smaller, more comparable sample of office properties that results in a 3.7% rent and 19.6% sales price premium for LEED.

[2] The authors make an adjustment for occupancy level, which changes results to show a 6% premium for EnergyStar. The premium for LEED in this adjusted approach was 9%, but not statistically significant. The sales price calculation is not independently derived, but rather based on rent premium and cap rate assumptions using direct cap sales method.

[3] No statistical analysis of rent premium included as part of their analysis.

These rent and occupancy results, while subject to significant statistical and methodological issues, at least appear plausible, based on the Consortium's assessment of scores of tenant surveys and discussions with many more tenants and investors. It should be noted that many types of tenants, in different markets and property types, have reported that they would not pay more, suggesting caution in applying any average figures to any particular building. The Consortium's research to date suggests that the increasing space user demand for sustainable properties is more likely to be reflected in absorption rates, tenant retention, and adjustments to risk, rather than a direct rental price premium.

Sales price premiums from the studies ranged from 5.8% to 31% for EnergyStar properties and 9.9% to 35% for LEED certified properties. Due more severe statistical, methodological, and data problems in sales price analyses, the Consortium places little confidence in these specific numerical results. [8]

[7] The analysis in "The Greening of US Investment Real Estate—Market Fundamentals, Prospects and Opportunities," by RREEF Research in November of 2007 does not do a controlled statistical study, but rather compares occupancies and rents between certified and non-certified properties, and thus does not meet the statistical rigor that is attempted by the other four studies listed above.

[8] Sustainable Real Estate Development: The Dynamics of Market Penetration by John Goering, published in the Fall 2009 *Journal of Sustainable Real Estate*, provides a good summary of statistics-modeling based research, and the issues involved in applying the conclusions of this research. He also looks at the key issues influencing the adoption of sustainable building in the industry.

The Consortium's work confirms that sustainable properties should be more valuable, due to increases in regulator, space user and investor demand, and a "net" positive risk assessment, but do not believe that the numerical results from most statistics/modeling based studies of sales price premiums are reliable indications of potential value increases at this time.

- *Summary of Surveys and Market Research*

In summary, the results of these surveys and market research are very supportive of increasing demand by tenants and investors for sustainable property. More importantly, as research improves, and surveys become more sophisticated in their questions and reporting, significant detail about the specific types of tenants and space users that are likely to exert a strong preference for sustainable properties, or indifference, will be clarified, providing strong quantitative input for valuation and due diligence professionals.

Surveys and market research are part of a broader array of supportive "Sustainable Sub-Financial Analyses" that we define and describe in significant detail in Expanded Chapter V-C and Appendix F. Sustainable sub-financial analyses are those analyses and models that provide quantitative insights/data that is typically combined with other information and analyses to aid valuers/underwriters in their specification of key financial assumptions in a discounted cash flow analysis, or a related traditional real estate financial model.

In Expanded Chapter IV, we highlight and discuss three key types of surveys and market research:

- Space user and investor sustainability surveys;
- Corporate sustainability surveys and research; and
- Tenant demographics and market segmentation.

Financial Performance

Sustainable property financial performance is not a simple concept, and needs to be clearly defined and articulated when presenting financial performance evidence. For example, when talking about sustainable property financial performance, you must first clearly specify whether you are talking about value or returns for the property overall, or the incremental rate of return or value contribution of incremental investments in sustainable features and strategies.

Sustainable property financial performance can also refer to feature-based financial performance measured by simple payback and rate of return analyses. These types of analyses are conducted for individual sustainable features or strategies like green roofs, daylighting, underfloor air distribution, etc. It is also important to keep clear whether one is talking about projected or actual financial performance.

The complexities of sustainable property financial performance is further highlighted by the scores of different types of sustainable property investment decisions, including minor retrofits, major retrofits, commercial interiors, new acquisitions, new construction, and many variations in between. The appropriate measurement and analysis for determining sustainable property financial performance will vary by the type of decision and other factors.

As is detailed in Expanded Chapter V, to understand the implications of sustainable property investment on financial performance, one must consider, at least conceptually, a discounted cash flow analysis. The DCF produces specific financial performance measures including an internal rate of return and value. Of course, no estimated rate of return or value estimate can be properly interpreted, and incorporated into a sustainable property investment decision, without a full and comprehensive understanding and consideration of risk.

- *Summary of Sustainable Property Financial Performance Evidence*

In summary, the volume of sustainable property financial performance evidence is still small. The significant dearth of sales and leasing transactions, and substantial value and rent declines since 2008, will also continue to make it difficult to generate statistics/ modeling based empirical evidence.

However, evidence from the key expert-based financial analyses and statistics/modeling-based financial analyses presented in the prior sections shows a clear trend towards improved rents, occupancies, risks, and resulting rates of return and value. Additionally, by fully identifying and assessing the positive and negative sustainability risks of specific properties, and carefully evaluating surveys/market research, there is hope for more intelligent assessments of the value contributions of sustainable property investment. Risk has a significant and direct effect on financial performance and needs to be integrated much more explicitly into all real estate decision-making.

Not unexpectedly, enhanced rate of return and value performance evidence to date has been more incremental than dramatic. This result is reasonable given that sustainable features and strategies are just one part of the rate or return or value equation for any particular property. Additionally, the key forces driving value—enhanced regulator, space user and investor demand—have only recently been increasing measurably.

Chapter V: Sustainable Property Financial Analysis

In this chapter we present a six-step process for sustainable property financial analysis as shown in Exhibit V-1. We also present checklists and tools to assist financial analysis, and discuss key considerations in the role and implementation of sustainable property valuation.

Exhibit V-1
Six Steps to Sustainable Property Financial Analysis

1. **Select Financial Model**
2. **Evaluate Property "Sustainability"**
3. **Assess Costs/Benefits of "Sustainability"**
4. **Evaluate Financial Implications of Costs/Benefits**
5. **Determine Financial Model Inputs**
6. **Risk Analysis and Presentation (RAP)**

Regardless of the type of decision, an independent financial assessment of a sustainable property investment decision typically involves a financial model. We identify financial modeling methods currently being employed for a range of sustainable property investment decisions for new construction, acquisitions, corporate real estate decisions, and investments in specific sustainable property features. We also discuss how to select the best method and data for a given decision.

Select Financial Model

Financial analyses alternatives can logically be separated into four categories:

a) Traditional Sustainability Financial Analyses;
b) Traditional Real Estate Financial Analyses;
c) Sustainability Sub-Financial Analyses; and
d) Public Sustainable Benefits Analyses

A summary of the approximately forty sustainable property financial analyses alternatives is presented below in Exhibit V-2 and in substantial detail in Appendix F. More detailed descriptions; examples, observations and key links are also provided in Expanded Chapter V and in the Research Library under index codes 1.1 to 1.5.

We focus our presentation on discounted cash flow analysis, the most common approach used for underwriting and valuing real estate, and the central analytic model required to understand the financial implications of sustainable property investment.

Exhibit V-2

Sustainable Property Financial Analysis Alternatives

A. Traditional Sustainability Financial Analyses

1. Simple Payback
2. Simple Return on Investment (ROI)
3. Simple Change in Asset Value: Direct Capitalization (SCAV-DC)
4. Simple ROI and General Cost-Benefit Analysis
5. Life Cycle Costing (LCC)
6. Value Engineering
7. ENERGY STAR Building Upgrade Value Calculator for Office Properties
8. ENERGY STAR Cash Flow Opportunity
9. Life Cycle Assessment (LCA)
10. Post Occupancy Analyses (POE)

B. Traditional Real Estate Financial Analyses

1. Cost Management
2. Discounted Cash Flow Analysis (DCF)
   - Change in Asset Value
   - Net Present Value
   - Internal Rate of Return
3. After Tax Cash Flow Analyses
4. Valuation
5. Total Occupancy Cost (Cost of Ownership) Analysis
6. Economic Value Added

C. Sustainability Sub-financial Analyses

1. Comparative First Cost Analysis
2. DCF Lease-Based Cost-Benefit Allocation Models
3. Sustainability Options Analysis
4. Churn Cost Savings Analysis
5. Productivity Benefits Analysis
6. Health Cost Savings Analysis
7. Government/Utility Incentives and Rebates Analysis
8. Enterprise Value Analysis
9. ENERGY STAR Financial Value Calculator
10. Risk Analysis and Presentation (RAP)

D. Public Sustainability Benefits Analyses

1. Reduced Infrastructure Costs
2. Environmental & Resource Conservation Benefits
3. Land-Use Benefits
4. Climate Change Reduction
5. Economic Benefits
6. Security Benefits

Assess the Costs and Benefits of Sustainability

GBFC's Sustainable Property Cost-Benefit Checklist is a comprehensive listing of the potential costs and benefits of sustainable properties as shown below in Exhibit V-3. Put another way, it provides a comprehensive identification of potential positive and negative risks of sustainable property investment. It does not purport to be a complete listing of property costs and benefits, but only those incremental risks of sustainable property investment.

The primary purpose of GBFC's Cost-Benefit Checklist is to provide an organized inventory of potential costs and benefits for sustainable property investment. For valuers or underwriters, the checklist can help in the determination of data and analysis requirements, and provide a comprehensive questionnaire to ensure key costs and benefits are fully identified and addressed.

An important secondary use of the checklist is as a due diligence framework for use by due diligence officers and investment/lending committees. The checklist suggests questions to ask borrowers seeking a mortgage or operators seeking equity to develop judgments about the quality of thought and analysis that potential capital seekers applied in preparing their investment packages.

Exhibit V-3

GBFC Sustainable Property Cost-Benefit Checklist

I. Potential Building Benefits

A. Reduced Development Costs

1. Government incentives
2. Better private financing
3. Downsizing of some systems (HVAC, etc.)
4. Reduced number and magnitude of change orders
5. Reduced operational start-up costs

B. Reduced Development Risks

1. Reduce construction risk
2. Reduce carry risk
3. Reduce exit/take-out risk

C. Increased Space User Demand: Higher Revenues

1. Increased demand from space users concerned about enterprise value
2. Increased demand from government tenants with mandated sustainability
3. Increased demand from vendors/supply chain required by big customers (GE, Wal-Mart, etc.) to be more sustainable
4. Increased demand from tenants with direct tie to sustainability business—architects, engineers, consultants, contractors, lawyers, energy firms, product companies, etc. etc.
5. Increased demand from tenants wanting to "do the right thing"

D. Reduced Resource Use / Operating Costs

1. Lower energy use
2. Lower water use
3. Reduction in sewage/stormwater run-off
4. Reduction in building waste
5. Reduction in construction/demolition waste
6. Reduction in carbon footprint
7. Lower emissions
8. Lower property/casualty insurance costs
9. Lower maintenance costs

E. Improved Operations/Capital Costs

1. Reduced cost of changing space
2. Fewer tenant/occupant complaints
3. Reduced frequency of capital expenditures
4. Reduced tenant turnover/re-leasing
5. More reliable functioning of systems

F. Reduced Cash Flow/Building Ownership Risk

1. Improved ability to meet future regulatory requirements
2. Ability to capitalize on future government incentives
3. Improved ability to meet changing space user demand
4. Improved ability to meet changing investor demand
5. Prevent risk of loss of "social license" to operate building
6. Limit liability due to building related health issues—sick building, mold claims
7. Limit exposure to future compelling health and/or productivity research
8. Reduced risk of reliance on grid (terrorism)
9. Increased flexibility/adaptability
10. Reduced risk of building not operating as designed
11. Limit exposure to energy/water cost volatility
12. Reduced exit/take-out risk
13. Overall reduced potential loss of value due to functional, economic and physical obsolescence

G. Public Benefits[9]

1. Infrastructure cost benefits
2. Environmental and resource conservation benefits
3. Land-use benefits
4. Reduced climate change
5. Economic benefits
6. Security benefits

[9] Public benefits become private investor/landlord benefits when the investor/landlord can monetize the benefits through government regulatory relief, incentives, tax benefits, etc.

Exhibit V-3

GBFC Sustainable Property Cost-Benefit Checklist

(continued)

H. Increased Investor Demand

1. Reduced capitalization and discount rates: higher values
2. Reduced exit/take-out risk
3. Increased FAR—zoning---density bonuses
4. Improved access to debt financing

II. Potential Building Costs

A. Increased Development Costs

1. Certification, energy modeling, legal and commissioning costs
2. Higher cost specialized service providers
3. Higher cost products and systems
4. Higher tenant improvement costs for green improvements
5. Higher finance costs—more high cost equity; increased construction interest
6. Project delays

B. Increased Development Risk

1. Construction risk (cost and delays)
2. Legal/contractual risks
3. Exit/take-out risk

C. Decreased/Unchanged Space-User Demand

1. Excess investment cost relative to market demand
2. Space user demand does not meet expectations
3. Building operating problems

D. Increased Operating Costs

1. Higher maintenance costs--training, manuals
2. Vendor availability and pricing
3. Product or system failure/underperformance
4. More costly lease analysis and implementation
5. Higher real estate taxes
6. Costs of required additional monitoring/measurement
7. Resource cost increases

E. Building Operating Problems/Capital Costs

1. Products underperform
2. Service providers underperform
3. New systems learning curve for engineering staff/maintenance staff/etc.
4. New/different systems can reduce economies of scale for engineering staff for a concentrated portfolio of similar assets
5. Capacity/seasoning of service providers/contractors
6. Tenants do not cooperate

F. Increased Cash Flow Risk

1. Risk of rapid functional obsolescence
2. Process underperformance
3. Operating cost underperformance
4. Revenue underperformance
5. Value/sales price underperformance

G. Limited/No Increase in Investor Demand

1. Increase/no change in capitalization and discount rates
2. Energy cost declines increase payback periods, reduce value of sustainable investment
3. Existing leases limit ability to pass costs to tenants--capture sufficient benefits to justify costs
4. Failure of appraisers/brokers to accept value/enhanced performance

Determine Financial Variables

In step five, the goal is to specify specific financial model inputs—like rents, occupancies, tenant retention, etc.—taking into consideration, simultaneously, all factors, both sustainable and non-sustainable, that affect the financial model inputs.

For example, most office space user real estate decisions are driven by a host of key issues only marginally related to sustainable property:

- Supportive of strategic mission;
- Internal integration with other business units;
- Flexibility to meet changing space needs;
- Technology requirements; and
- Occupancy expense (cost) for space.

If a space cannot help space users achieve their strategic missions and provide the flexibility to meet changing needs, it will not be in strong demand. As the availability of sustainable space in the marketplace grows, it is likely that certain sustainable property attributes will become more of a minimum requirement, critical to implementing the strategic mission of space users.

The key financial model inputs for the discounted cash flow model are shown below in Exhibit V-4. Those inputs shaded in yellow are some of the assumptions most influenced by sustainable property investment.

Exhibit V-4
Discounted Cash Flow Model Inputs

Revenue

- Contract rental rates and other lease terms
- Market rental rates:
  - Ground floor retail $1.50/SF NNN
  - Office: floors 2-5 $2.50/SF FSG
  - Office: floors 6-10 $2.60/SF FSG
  - Office: floors 11-15 $2.85/SF FSG
  - Office: floors 16-19 $3.00/SF FSG
  - Office: floors 20-23 $3.20/SF FSG
- Annual rent growth
  - Year 1 3.0%
  - Year 2 6.0%
  - Year 3 5.5%
  - Year 4 5.0%
  - Year 5 4.5%
  - Years 6-10 4.0%
- Vacancy and collection loss - 5.0%
- Office lease terms and other assumptions - new and renewing tenants
  - Lease term - 5 years
  - Free rent - 0 months
  - Annual rent escalations - 3.5%
  - Downtime between tenants - 9 mos.
  - Renewal probability - 65.0%
- Parking revenues
  - Reserved parking - $225/space
  - Unreserved parking - $190/spacae
  - Annual parking revenue growth - 5.0%

Expense

	Year 1
Janitorial	$ 222,572
Porter	72,816
Window cleaning	44,625
Supplies	42,483
Trash removal	28,150
Fire & life safety supplies	31,760
Repairs & maintenance	505,807
Tools & equipment	13,500
Utilities	
– Electricity	647,633
– Gas	43,883
– Chilled water	588,000
– Water & sewer	21,797
Security	209,200
Landscape contract	23,200
Administrative	259,890
Advertising & promotion	25,900
Real estate taxes	2,376,310
Non-reimbursable expenses	37,670
Insurance	188,000
Management fee - 2.0% of Effective Gross Income	
Growth factor for real estate taxes	- 2.0%
Growth factor for other expenses	- 3.0%

Leasing Expenses & Capital Reserve

- Office tenant improvements
  - New tenants/2nd gen. space $ 15/SF
  - Renewing tenants $ 10/SF
  - Shell space $ 55/SF
- Leasing commissions
  - New leases 4.0%
  - Renewing leases 2.0%
- Capital reserves $0.35/SF

Property Acquisition & Disposition

- Property acquisition inputs
  - Purchase price $110.0 million
  - Closing costs 1.75% of purchase price
  - Loan fee 0.75% of loan amount
  - Total acquisitions costs $112.5 million
- Property disposition inputs
  - Residual capitalization rate 8.5%
  - Broker's fee and closing costs 2.0% of sales price

Investor Tax

- Ordinary income marginal tax rate 35.0%
- Capital gains tax rate 15.0%
- Cost recovery recapture tax rate 25.0%
- Allocation of cost basis to improvements 80.0%
- Depreciation schedule for improvements 39 years

Financing

- Loan amount $73.0 million
- Loan-to-value 65.0%
- Interest rate 7.5%
- Loan term 10 years
- Amortization schedule 25 years
- Loan points 1.0%
- Annual debt service $6.5 million

As the DCF input sheet in Exhibit V-4 illustrates, many factors beyond rents or sales prices influence financial performance. In many cases, depending upon the particular market conditions and nature of the sustainability improvements, market rental rates or annual growth rates may not change significantly, but renewal probabilities, the downtime between tenants, absorption levels, operating expenses and other changes can result, increasing value. It will depend on the nature of the property, space users, market conditions, and other factors.

Perhaps most importantly, sustainable property investment can reduce the risk associated with a particular property's cash flow. As discussed earlier, lower risk could reduce capitalization rates applied to final year net operating income, increasing potential appreciation on a property and reducing the discount rate applied to the property's cash flow over the holding period.

RAP is key to the future of sustainable property investment.

Sustainable properties face increased risks due to new processes, products, materials, and regulations, but also benefit from reduced or mitigated market, regulatory, construction, legal, and operating risks. Sustainable property decisions require a clear organized presentation of both positive and negative risks to provide appropriate context for assessing sustainable options and related return on investment calculations.

There are as many ways to RAP as there are different types of sustainable property investment decisions. However, the following guidelines should be helpful in thinking through the preparation of any RAP.

- **Clarity:** Perhaps the most important advice in preparing a RAP is that the presentation be clearly prepared and easy to consume. Discussions of positive and negative risks need to be specifically tied to the particular financial assumptions or other key assumptions in the investment package and/or financial model. The presentation should be logically consistent, discuss positive and negative risks, and provide rationale for how "net" risk impacts are assessed.

- **Comprehensive**: Perhaps one of the most important guidelines is that risks be fully presented. Real estate decision-makers are well versed in dealing with highly complex and risky decisions, and a project has a much better chance of being approved if the risks are fully presented. There is nothing more damaging to an investment approval decision than an investment committee member uncovering biased or incorrect information in a presentation, or uncovering risks that were not presented.

- **Process and Feature Focus:** As presented in Chapter IV: "Sustainable Property Performance," the success of a sustainable property can be significantly increased if sustainable processes and features are appropriately undertaken. Proper integrated design, energy modeling, commissioning, and related processes

are particularly critical to sustainable property risk mitigation. The selection and implementation of features can also reduce risk if properly done.

- **Enhanced Sensitivity Analysis:** Enhanced sensitivity analysis that enables decision-makers to understand the relative importance of particular risks can be particularly helpful in sustainable property investments. Many of the negative risks can be controlled through risk mitigation, and often the risks themselves are of relatively small magnitude, particularly in comparison to the positive risks possible through market and/or financial performance upside.

- **Risk Mitigation:** Risk mitigation that is undertaken through legal, surety, insurance, or other forms of due diligence should be clearly delineated.

- **Advanced Risk Analysis Techniques:** Depending on the type of decision, the sophistication of the underwriting/due diligence team, and the sophistication and requirements of the decision-makers, advanced risk analysis techniques should be considered. These types of risk techniques will vary based on the industry and situation, but would include multiple scenario analyses, alternative contracts and compensation, "value at risk" financial risk management tools, and many other techniques.

Valuation Considerations

This section summarizes some of the Consortium's key findings and conclusions that arise from our research regarding valuation of properties with sustainable attributes:

1. Sustainable properties should be more valuable
2. Valuation is not just about formal full narrative reports
3. Valuers have skills to make significant contributions to sustainability
4. Fundamental valuation methodologies do not need to change
5. Sustainable valuation must look beyond costs
6. Public value has increasing importance to private value
7. The income approach is critical to understanding sustainable value
8. Valuers need to get better at integrating risk analysis into value
9. Valuers must prove value of sustainability one property at a time
10. Performance measurement is key to sustainable property performance
11. Energy is a more critical issue for sustainable property valuation

Key Conclusions on the Financial Analysis of Sustainable Properties

The **most important conclusion** of this chapter is that financial models that generate results based solely or primarily on initial development costs and operating costs savings, like the most commonly used Simple Pay-Back or Simple Return on Investment (ROI) models, are inherently flawed because they fail to consider revenue or risk. These limitations are not new, but dramatic increases in regulator, space user and investor demand for sustainable properties during the last few years have substantially enhanced the negative implications of these limitations.

Fortunately, the **second most important conclusion** is that the most widely recognized financial model for evaluating real estate investments—discounted cash flow analysis (DCF), is well suited to address the financial implications of sustainability. Discounted cash flow analysis provides a conceptual framework and model that enables the user to integrate quantitative and qualitative analysis to measure sustainable property financial performance. Most importantly, it provides the means to translate the "intermediate" sustainable property cost and benefit outcomes like health or productivity benefits, expedited permitting, or lower operating costs, into financial measures like rate of return or net present value traditionally used by real estate capital providers.

A third key conclusion is that even if you do not execute a full DCF model in your underwriting, you must employ the logic and linkages inherent in a DCF model to accurately articulate potential implications of sustainable property attributes on financial performance. If you do not rigorously follow the framework, it is easy to under- or over-estimate the magnitude, and even the direction of, potential financial performance implications.

A fourth important conclusion is that sustainable property financial modeling and analysis requires a more sophisticated and explicit analysis and documentation of the risks—both positive and negative—that influence the cash flow to provide decision-makers the proper context for interpreting rate of return, net present value, or valuation conclusions.

Thinking explicitly about what will constitute an effective investment package[10] will make documentation of the work product easier. Some investment decisions require formal appraisals and due diligence reports, while other decisions can be made based on brief business case white papers and/or oral presentations. Most lenders require formal third-party appraisals and have structured underwriting requirements, while investors and corporations typically have their own customized formats for their real estate decisions.

[10] Investment package refers to the written or digital product of an underwriting/due diligence process. This could be an underwriting summary and all the supporting loan write-ups and third party reports, closing binders, etc. that would be typical for a mortgage; or a memo, financial schedule and/or PowerPoint presentation typical for many higher level strategic decisions.

The fifth key conclusion is that different types of decisions require different types of financial models, analysis and data. This concept, while obvious, is thoroughly examined in Chapter II, and is a primary theme in the Consortium's work.

Practically, many decisions involving sustainable property investment do not require sophisticated financial analysis in order to make the "Go" decision. For example, many operations and maintenance actions on existing properties cost little, or have Simple Payback (time required to pay back initial investment from operating cost savings) times of a year or less and can be paid for out of operating budgets or with minimal capital investment. However, even these decisions would be improved by consideration of risk and revenues—a more profitable (and environmentally beneficial) level of investment might be justified by a full financial assessment.

As society and the industry strive for higher levels of sustainability and energy efficiency, and investors move beyond the low hanging fruit, more structured financial analysis using the DCF framework and integrating risk and value considerations more explicitly will be required. Additionally, better financial models will enable more sophisticated decision-making about the level and phasing of sustainability investment.

The final key conclusion is that the biggest challenge to sustainable financial analysis is not the modeling, but the integration of sustainability considerations into the determination of the input assumptions. Not only must the underwriter clearly identify potential costs and benefits of sustainable property features, but also properly consider non-sustainable factors when determining rents, occupancies, and other key financial model inputs. This sounds difficult, and is, but is not substantively more difficult than what investors, developers, and appraisers do every day when considering the myriad of factors that affect the value and success of an investment.

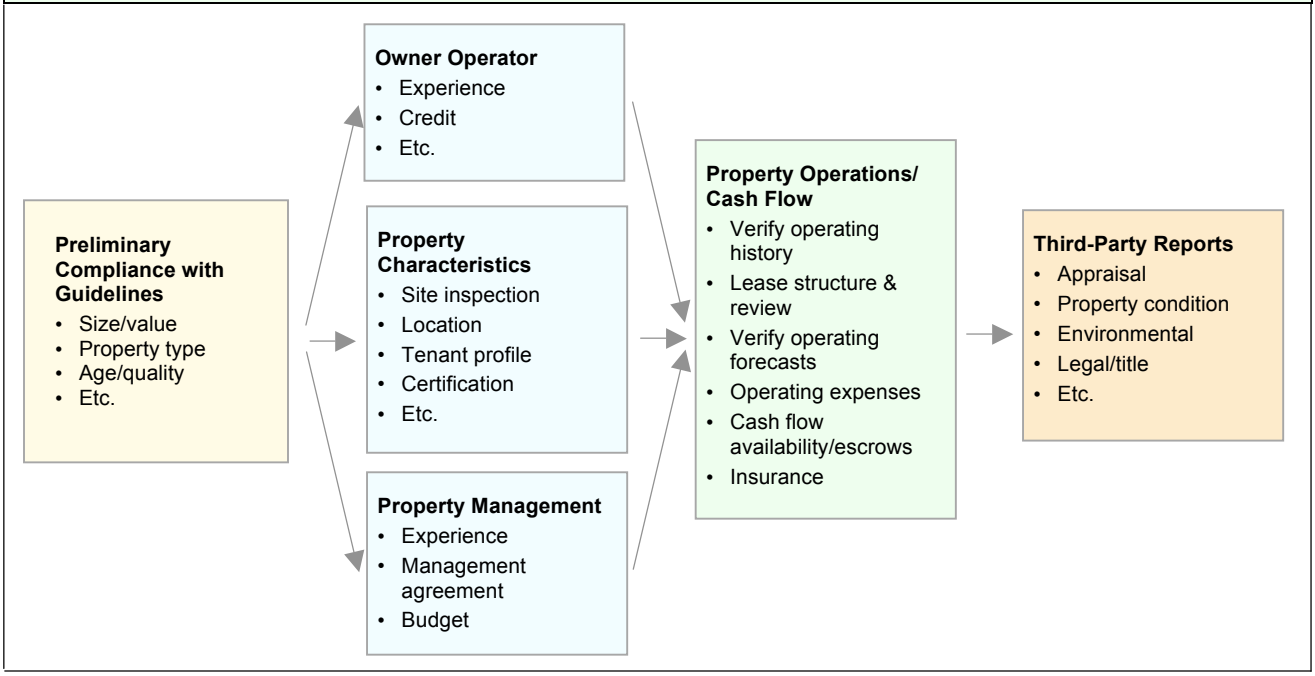
Investors historically have recognized that precise quantification of the relative value contribution of different property features—investment in landscaping versus investment in the lobby, for example—was not statistically reliable, nor did it need to be. Key financial model assumptions for a specific property, like rents, occupancies, absorption, or capitalization rates, are derived based on qualitative judgment and analysis of the best quantitative and qualitative information available. Real estate financial analysts and valuers need to accept and "own" the qualitative nature of their work, and get down to business doing a better job of it.

Chapter VI: Sustainable Property Underwriting Guidelines

Chapter VI outlines the underwriting process for sustainable property investment.[11] Key differences in sustainable property underwriting are analyzed and modifications to conventional property underwriting guidelines are presented. Special considerations in underwriting service providers, energy/carbon reduction investment, and space user demand are highlighted and discussed in detail.

The underwriting and due diligence guidelines we address for existing buildings are summarized below in Exhibit VI-1. These guidelines will generally be applicable to both lenders and investors, although lenders and investors may emphasize or de-emphasize particular issues given their specific needs and requirements.

Exhibit VI-1
Underwriting/Due Diligence Guidelines
Existing Properties

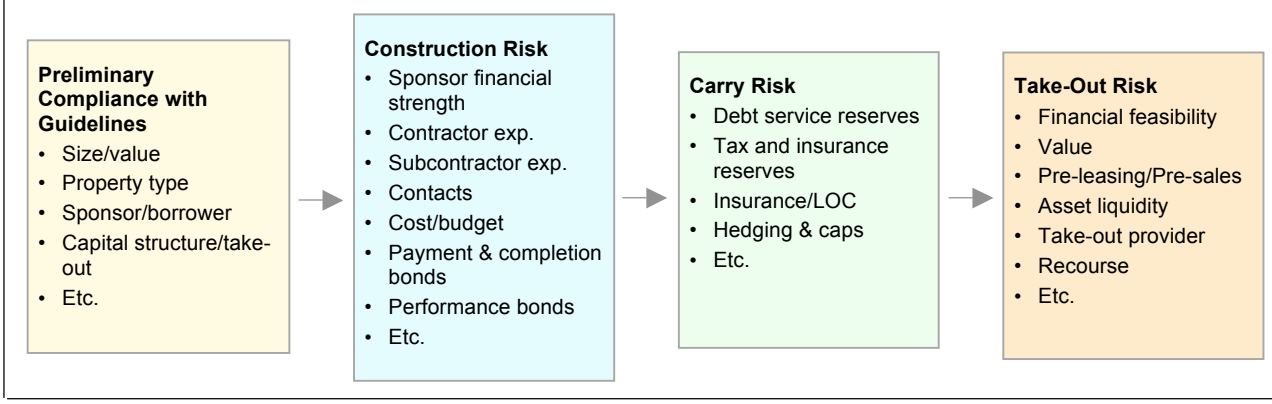


The key underwriting and due diligence issues for new construction or major retrofits are shown in Exhibit VI-2. New projects are subject to very different risks related to the

[11] The term "underwriting" in this report refers broadly to the independent due diligence that lenders, equity investors, developers, corporate real estate executives and other real estate decision-makers undertake prior to their sustainable property acquisition, construction, financing, or leasing decisions. The term "valuation" is also broadly used to reference both formal and informal methods of analyzing and communicating private property market value.

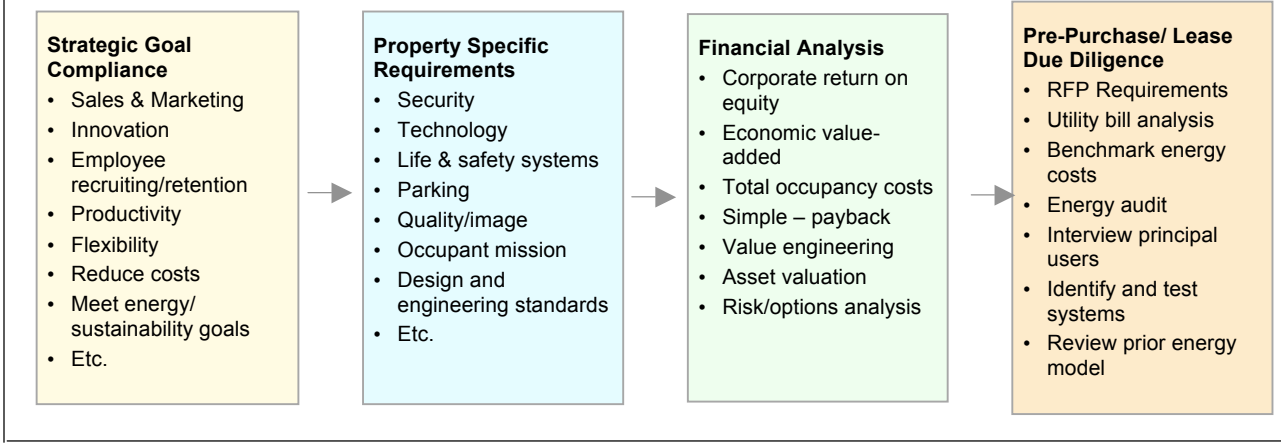
construction process, construction completion, cost control, costs to carry construction interest prior to "lease-up" (or sale), and achieving the market acceptance necessary to achieve an effective "take-out" by a permanent lender or buyer.[12]

Exhibit VI-2
Underwriting/Due Diligence Guidelines
New/Major Retrofits



Corporate property decisions will be subject to many of the underwriting and due diligence guidelines presented for investors, but are also subject to additional issues as summarized in Exhibit VI-3. All real estate property decisions must be evaluated for their strategic goal compliance.

Exhibit VI-3
Underwriting/Due Diligence Guidelines
Key Space-User Issues



[12] Typically, construction lenders require a permanent lender to commit to pay-off ("take-out") the construction loan once certain performance criteria have been met.

Corporate real estate decisions are often triggered by very specific property requirements related to security, technology and systems, parking, quality or image, and the specific mission of whoever is going to occupy the space.

Corporate real estate financial decisions are also underwritten differently than typical investors. Corporate return-on-investment hurdles are important. Simple payback analysis, total occupancy costs, risk and option analysis, and other analytic techniques are also employed.

Differences in Sustainable Property Underwriting

One of the most important conclusions of the Consortium's research from the last three years is that underwriting and valuation do not have to fundamentally change for sustainable properties. That said, the underwriting process is different. Many sustainable property decisions will require additional sub-analysis, new types of data, and a re-emphasis on different parts of the underwriting and valuation process. Seven of these key differences are summarized below:

1. New mix and priority of service providers
2. Modified list of costs and benefits (risks)
3. Priority of energy/carbon reduction investment
4. Importance of process and feature underwriting
5. Priority of government regulations and incentives
6. Underwriting health and productivity benefits
7. New sustainable "sub-financial" analysis

Existing Building Underwriting/Due Diligence

The GBFC Sustainable Property Underwriting Checklist for existing buildings is shown below in Exhibit VI-4. This checklist and the guidelines for each checklist item that are presented in Expanded Chapter VI are generally applicable to both lenders and investors, although lenders and investors may emphasize or de-emphasize particular issues given their specific needs and requirements. In all cases, lenders will be more focused on downside risk, because they do not fully share in the potential upside that equity investors obtain by taking additional risk (they just get the mortgage payment). A key focus in existing buildings for both lenders and investors is on verification of the property operations and cash flow as well as debt service coverage and value.

The ideas and recommendations presented below and in more detail in Expanded Chapter VI are not meant to be exhaustive. This chapter focuses on underwriting modifications, which may be warranted for a particular property due to its sustainability. Accordingly, we do not provide a complete assessment of the actions that need to be undertaken under each of the checklist items, but focus on marginal changes to process and procedures. Many

aspects of the underwriting process involve legal considerations including leases, contracts, mortgage documents, purchase agreements, etc. etc. The author of *Value Beyond Cost Savings: How to Underwrite sustainable Properties* is neither an attorney nor is offering legal advice, and legal questions should be reviewed with appropriate counsel.

Exhibit VI-4
Existing Building Underwriting Checklist

1.	**Preliminary Compliance with Investment Guidelines**
	Property Type/Sub-Type Size/Value Location Age Construction Type/Quality Floor plates/Elevators/Parking, etc Market Conditions Loan to Value/Cost Debt Service Coverage Ratios Internal Rates of Return Loan to Replacement Cost Vacancy/Credit Loss Income, Occupancy, and Expense Calculations Tenant Quality/Lease Structure Tenant Improvement/Leasing Commission Allowance
2.	**Owner/Operator**
	Credit Analysis-References Property Type/Operations Experience Experience with Subject Property Financial Strength-Net Worth Judgment, Liens, Bankruptcies, Legal search Bank Statement Review Ownership Form Indemnifications, Guarantees, Carve outs Disclosures
3.	**Property Management**
	Property Type Specific Management Experience Employee/Tenant Training Track Record Management Agreement Review Leasing Agreement Review List of Employees and Compensation Employee Agreements/Laws Property Management Budget Security Deposit Verification

4. Property Characteristics

Age and Physical Characteristics (site Inspection)
Functional Design/Obsolescence
Location
Parking Ratios
Access
Tenant Profile (primarily MF), Quality and Mix
Ground Leases
Gov. Regulations/Permits/Licenses
Brand/Franchise Agreements
Property Certifications/Performance Assessments

5. Property Operations/Cash Flow

a. Operating Cash Flow History-Verification
- Operating Statements
- Rent Roll
- Historical Occupancy/Collection Losses
- Tenant Sales Data (retail only)
- Expense Recoveries
- Other Income
- Estoppels (verification)

b. Lease Structure and Review
- Lease Abstracts/Major Lease Review
- Standard Lease Agreement
- Signed Non-standard Leases
- Objectionable Provisions Assessment

c. Operating Expenses
- Owner vs. Tenant Paid Expenses
- Utility Expenses
- Real Estate Taxes
- Personal Property Taxes
- Maintenance and Repairs
- Landscaping/Ground keeping
- Management Fees
- Property Service Contracts
- Operating Leases

d. Capital Expenses/Escrows and Holdbacks
- Replacement Reserves
- Tenant Improvements
- Leasing Commissions
- Capital Expenditures

e. Operating Cash Flow Forecast-Verification
- Local Market Analysis/Forecast
- Comparable Property Assessment
- Lease Rollover Analysis
- Large Lease Expiration Assessment
- Re-Lease Risk Analysis
- Review of forecasted rent changes, tenant retention, rollover vacancy, future occupancy assumptions, concessions, etc.

6. Insurance

Property and Casualty
Liability
Business Interruption

7. Third Party Reports
Appraisal Report Property Condition/Quality: Engineers Report Pest Inspection Report Environmental Legal, Title and Survey Government Regulations Tax Consultant Report Insurance-Risk Management Consultant Sustainability Related Third-Party Involvement

A key value of the checklist and our select comments on underwriting changes is to reinforce the point that sustainable property investment decisions involve much more than property value and cash flows, and that many of the underwriting actions typically undertaken can significantly help decision-makers understand and appropriately consider the positive and negative risks of sustainable property investment.

New/Retrofit Buildings

The key underwriting issues for new construction or major retrofits are shown in GBFC's Sustainable Property Underwriting Checklist for New/Retrofit buildings in Exhibit VI-5. These issues are addressed in the more detailed guidelines presented in Expanded Chapter VI from the perspective of a lender or equity investor that is evaluating a capital investment in a new development or major retrofit project.

New projects are subject to very different risks related to the construction process, construction completion, cost control, costs to carry construction interest prior to lease-up (or sale), and achieving the market acceptance necessary to achieve an effective take-out by a permanent lender or buyer.

Exhibit VI-5

New/Major Retrofit Building Underwriting Checklist

1. Preliminary Compliance with Investment Guidelines
Property Type/Sub-Type Size Location Construction Type/Quality Floor plates/Elevators/Parking, etc. Market Conditions Loan to Value/Cost Projected Rates of Return Loan to Replacement Cost Tenant Improvement/Leasing Commission Allowance

2. Owner/Developer
Ownership Form Level of Equity Investment Credit Analysis-References Property Type/Operations Experience Experience with Subject Property Financial Strength-Net Worth, Liquidity Judgment, Liens, Bankruptcies, Legal Search Bank Statement Review Indemnifications, Guarantees, Carve-outs Disclosures
3. Construction Risk
Recourse with Financially Strong Borrower Contractor-Subcontractor Experience/Capacity Contracts—Construction, Other Insurance Cost, Budget Contingencies Construction Manager/Servicer Reviews Product/Systems/Materials Performance Funding Mechanics: Inspections/Lien Waivers/Draw Mgmt Payment, Completion and Performance Bonds
4. Carry Risk
Debt Service Carry Reserves Real Estate Tax and Insurance Reserve Insurance/Letters of Credit Floating Rate Risk--Hedging and Caps Pre-leasing/Pre-Sales
5. Take-out Risk
Fundamental Project Feasibility-market, budget, timing, etc. Valuation Analysis: Pre vs. Post Completion Pre-Leasing: Volume and Tenant Quality Pro-forma Financials for As-Built Property Asset Liquidity Assessment Take-out Provider: rated or unrated? Borrower Recourse Integrated Default and Loss Severity Assessment Credit tenant/build-to-suit
6. Third Party Reports
Appraisal Report Construction Manager Reports-Monitoring Environmental Legal, Title and Survey Government Regulations Tax Consultant Report Insurance-Risk Management Consultant Sustainability Related Third-Party Involvement

A key value of the checklist and our select comments on underwriting changes is to reinforce the point that sustainable property investment decisions involve much more than property value and cash flows, and that many of the underwriting actions typically

undertaken can significantly help decision-makers understand and appropriately consider the positive and negative risks of sustainable property investment.

The underwriting guidelines presented in this chapter are based on a review of numerous underwriting guidelines, due diligence processes, and internal real estate decision-making documents. They can be applicable to both debt and equity investments, with particular focus or emphasis based on the type of investment decision and investor.

As a starting point, it must be understood that real estate investors do not want to eliminate risk. Risk enables investors to achieve higher returns and provides opportunities for investment. However, investors must be able to identify and understand risks well enough to price and or mitigate the risk. The underwriting process enables investors to better understand risks (market analysis, lease reviews, environmental and engineering due diligence reports, etc.) and mitigate them (legal review and contracts, insurance, loan to value or cost limits, reserves, guarantees, etc.)

Appendices

The appendices to each chapter are an important substantive component of the book. For example:

- Appendix A provides an annotated outline of the Research Library index
- Appendix B provides a detailed table of contents of all expanded chapters
- Appendix III-A is a 30-page menu of sustainable property features. (In Expanded Chapter III)
- Appendix III-D identifies and describes over 100 certification and assessment systems from around the world. (In Expanded Chapter III)
- Appendix C presents a detailed overview of GBFC's Sustainable Property Performance Framework.
- Appendices IV-C and IV-D identify and describe the main findings from over 200 sustainable property-related health and productivity benefits studies. (In Expanded Chapter IV)
- Appendix F identifies and describes over 40 pages of alternative sustainable financial models and analyses.
- Appendix G presents GBFC's 40-page Cost-Benefit Checklist.
- Appendix H presents a real world example DCF analysis
- Appendices VI-A, VI-B, and VI-C present GBFC's Underwriting Checklists for space users, existing buildings, and new/major retrofits. (These appendices are included in Chapter VI and Appendix I of this book)

Topical Index

This topical index is a guide to help locate information on select topics that are covered in multiple locations within this Book and the Expanded Chapters. Select other topics of interest are also indentified.

1. Development Costs/Initial Cost Analysis

- Chapter IV, Section E-1: Building Performance, Development ("First" Costs)
- Chapter V, Section C-2c: Sustainability Sub-Financial Analysis, Comparative First Cost Analysis
- Appendix F: Financial Analysis Alternatives: Comparative First Cost Analysis
- Chapter V, Section F-3: Assessing the Net Impacts of Sustainable Costs/Benefits, Development Costs

2. Green Leases/Split Incentives

- Chapter V, Section C-2c: Sustainability Sub-Financial Analysis, DCF Lease-Based Cost/Benefit Allocation Models
- Appendix F: Financial Analysis Alternatives: DCF Lease-Based Cost/Benefit Allocation Models
- Chapter VI, Section G-3: Property Management, Leasing Agreement Review
- Chapter VI, Section G-5: Property Operations and Cash Flow; Lease Structure and Review, Green Leases and Addressing the Issue of Split Incentives

3. Energy Investment

- Chapter III, Section C-1: Sustainable Property Features
- Chapter III, Section C-2: Sustainable Property Resources
- Chapter III, Section C-3: Sustainable Property Features and Building Outcomes
- Expanded Chapter III, Appendix III-A, Sustainable Property Features List
- Expanded Chapter III, Appendix III-D, Sustainability Assessment Systems/Tools

- Chapter IV, Section C-4: Process Performance, Energy Use Forecasting
- Chapter IV, Section C-6: Process Performance, Commissioning
- Chapter IV, Section C-7: Process Performance, Measurement & Verification
- Chapter IV, Section D-1: Feature-Based Financial Performance
- Chapter IV, Section D-2: Performance of Daylighting, Lighting Controls
- Chapter IV, Section E-2: Whole Building Performance Studies
- Chapter IV, Section E-3: Building Energy Use (Performance)
- Chapter V, Section C-2: Financial Analysis Alternatives, Energy Star
- Appendix F: Financial Analysis Alternatives: Energy Star
- Chapter VI, Section E: Underwriting Energy-Carbon Reduction Investment

4. Health and Productivity Benefits Analysis

- Chapter IV, Section D-2, Performance of Under floor Air Distribution and Daylighting
- Chapter IV, Section E-4: Occupant Performance, Health and Productivity
- Expanded Chapter IV, Appendix IV-C: Studies of Productivity and Health Cited by Industry
- Expanded Chapter IV, Appendix IV-D: Additional Studies of Productivity and Health
- Chapter IV, Section F: Market Performance, Space User/Investor Surveys and Tenant Demographics and Market Research
- Chapter V, Section C-2c: Sustainability Sub-Financial Analysis; Productivity Benefits Analysis; Health Benefits Analysis
- Appendix F: Financial Analysis Alternatives: Productivity Benefits Analysis; Health Benefits Analysis
- Chapter V, Section G-3: The Process for Determining Financial Model Inputs

- Chapter VI, Section F: Underwriting Space User Demand

5. Key Trends in Performance Measurement

- Chapter III, Sections D-2 and D-3

6. Public Benefits of Sustainable Properties

- Expanded Chapter III, Appendix III-D, Measuring Sustainability: Assessment Systems/Tools
- Chapter IV, Section C-5: Process performance, Regulations and Code Compliance
- Chapter V, Section C-2d: Public Sustainability Benefits Analysis
- Appendix F: Financial Analysis Alternatives: Public Sustainability Benefits Analysis
- Chapter V, Appendix G, GBFC Sustainable Cost/Benefit Checklist, Public Benefits
- Chapter V, Section F-3: Assessing the "Net Impact" of Sustainable Costs and Benefits, Public Benefits

7. Risk Analysis and Mitigation

- Much of the book focused on this topic. Key sections include:
- Chapter IV, Section C: Process Performance
- Chapter IV, Section D: Feature Performance
- Chapter V, Section C-2, Financial Analysis Alternatives, Risk Analysis and Presentation
- Chapter V, Section E: Assess Costs/Benefits of Sustainability
- Chapter V, Appendix G: GBFC Sustainable Property Cost/Benefit Checklist
- Chapter V, Section H: Risk Analysis and Presentation
- Chapter VI: Sustainable Property Underwriting Guidelines

8. Service Provider Risks and Underwriting

- Chapter III, Section D: Measuring a Property's Sustainability, Service Provider Certifications and Assessments
- Expanded Chapter III, Appendix III-D: Measuring a Property's Sustainability, Service Provider Certifications and Assessments
- Chapter IV, Section C-3: Process Performance, Service Provider Quality and Capacity
- Chapter V, Appendix G: GBFC Sustainable Property Costs/Benefits Checklist
- Chapter VI. Section D: Underwriting Service Providers
- Chapter VI, Section E-9: The Impact of ESCO's on Underwriting Energy/Carbon Reduction Investment

9. Space User Demand- Enterprise Value

- See references above to Health and Productivity Benefits Analysis, a component of Space User Demand
- Chapter IV, Section E-4: Occupant Performance
- Chapter V, Section C-2c, Sustainability Sub-Financial Analysis, Enterprise Value Analysis
- Chapter V, Appendix F: Financial Analysis Alternatives, Enterprise Value Analysis
- Chapter V, Appendix G: GBFC Sustainable Property Cost/Benefit Checklist, Space User Demand Analysis
- Chapter VI, Section F: Underwriting Space User Demand
- Chapter VI, Appendix I: Space User Underwriting Checklist

10. Sustainable Features Choices and Analysis

- Chapter III, Section C-1: Sustainable Property Features
- Chapter III, Section C-2: Sustainable Property Resources

- Expanded Chapter III, Appendix III-A: Sustainable Property Features Lists
- Chapter IV, Section D: Feature Performance
- Chapter VI, Section E-4: Sustainable Property Features/Strategies
- Chapter VI, Section E-5: Sustainable Property Features and Building Outcomes
- Chapter VI, Section E-6: Feature/Strategy Based Financial Analysis Tools

11. Three Principles for Applying Sustainable Property Market Performance Research

- Chapter IV, Section F-2: Three Principles for Applying Sustainable Property Market Performance Research

12. Underwriting Differences for Sustainable Property

- Chapter VI, Section C: Key Differences in Sustainable Property Underwriting

13. Valuation Issues for Sustainable Properties

- Chapter V, Section I: Valuing Sustainable Properties

ISBN 978-0-9826357-0-4