

VALUE BEYOND COST SAVINGS

*How to Underwrite
Sustainable Properties*

**Expanded Chapter VI:
Sustainable Property Underwriting
Guidelines**

SCOTT R. MULDAVIN, CRE, FRICS



GREEN BUILDING FINANCE CONSORTIUM
www.greenbuildingfc.com

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About Expanded Chapter VI

This publication is Expanded Chapter VI of the Consortium's book: *Value Beyond Cost Savings: How to Underwrite Sustainable Properties*. *Value Beyond Cost Savings* presents the key findings and conclusions regarding the valuation and underwriting of sustainable properties based upon three years of independent research by the Green Building Finance Consortium.

Chapter VI is one of six "Expanded Chapters" from *Value Beyond Cost Savings: How to Underwrite Sustainable Properties* 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 and other locations.

This Expanded Chapter has the same table of contents as the book, 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.

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.

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.

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Collaborators/Other Contributors

We are and have been involved in important collaborative efforts addressing database development, energy research, valuation practice, and many other areas critical to financial assessment of sustainable properties with at least the following organizations:

- **Lawrence Berkeley National Laboratory**—energy and health issues
- **CoreNet Global**—energy issues
- **Royal Institute of Chartered Surveyors**—valuation and policy issues
- **Appraisal Institute**—valuation issues, training
- **National Association of Realtors**—sustainability curriculum
- **North American Commission for Environmental Cooperation**—policy, finance
- **Vancouver Valuation Accord**—valuation and regulatory issues
- **Database for High Performance and Sustainable Buildings**—database design and development
- **Rutgers Green Building Research Center**—REIT valuation research, other
- **International Youth Leadership for a Sustainable Future**—youth education
- **World Business Council for Sustainable Development**—analytics and communications
- **California Energy Commission**—transaction disclosure documents

We also appreciate the scores of other individuals and companies who have provided significant input and assistance in the project through their research and data, review of Consortium work product, and participation in interviews and surveys.

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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.

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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.

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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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Topical Index

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

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 ESCOs 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

Sustainable Property Underwriting Guidelines

<i>Value Beyond Cost Savings: How to Underwrite sustainable Properties</i>					
Chapter I Introduction	Chapter II Sustainable Property Investment Decisions	Chapter III Evaluating Property Sustainability	Chapter IV Sustainable Property Performance	Chapter V Sustainable Property Financial Analysis	Chapter VI Sustainable Property Underwriting Guidelines

A. Introduction

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.)

The underwriting process will vary by property type, type of investor, type of investment decision, and other factors as described in Chapter II. However, in all cases, underwriting goes beyond financial analysis and valuation to address the full range of risks inherent in real estate investment.

Chapter VI outlines the underwriting process for sustainable property investment.¹ Key differences in sustainable property underwriting are analyzed and modifications to conventional property underwriting guidelines are presented. Special considerations in

¹ 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.

underwriting service providers and energy/carbon reduction investment are highlighted and discussed in detail.

This chapter addresses existing and new/major retrofit underwriting separately. The risks and mitigation strategies for each type of investment are quite different. Such risks for existing properties include legal, environmental, physical, owner/operator, property management, and insurance. New or major retrofit projects face construction, debt interest carry, and take-out risks.

Substantial detail on sustainable property risk and risk mitigation is presented throughout *Value Beyond Cost Savings: How to Underwrite Sustainable Properties* and the Expanded Chapters. While we endeavor to incorporate references and summaries of that knowledge in the discussion of the Underwriting Guidelines below, a complete assessment of potential modifications to traditional underwriting or due diligence practices will have to incorporate knowledge and risk analysis from other parts of the book and Expanded Chapters. Key underwriting guidance from the book and Expanded Chapters is found in the following sections:

- Chapter II helps focus the Underwriting Approach required by outlining how underwriting will change based on the specific type of decision being made.
- Chapter III summarizes the methods required to factor in specific “definitions” of property sustainability into underwriting.
- Chapter IV outlines the facts and methods necessary to incorporate the lessons learned from prior experience with sustainable processes and features into the underwriting approach. The sections in Chapter IV-C: Process Performance that deal with integrated design, contracts/legal, and commissioning are particularly important, identifying key risk issues and best practices to mitigate potential problems.
- Chapter V describes how risk analysis is incorporated into the financial analysis and valuation of sustainable properties. Section E: Assess Costs/Benefits of Sustainable Property, and the referenced 40-page GBFC Sustainable Property Cost-Benefit Checklist in Appendix V-C; provide an organized guide to identifying and analyzing the cost-benefit trade-offs at the property level. Section F: Evaluate the Implications of Costs-Benefits presents a “Net Impact” methodology to help translate costs and benefits into information that can be applied in a financial analysis. In Section H: Risk Analysis and Presentation, key background on cash flow and building operating risks are summarized and a methodology for assessing and presenting risk in the context of sustainable decision-making is presented.
- The special challenges and issues involved in underwriting energy, space user demand and service providers are highlighted in Chapter VI.

The ideas and recommendations presented in 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 underwriting 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. The analysis in *Value Beyond Cost Savings: How to Underwrite Sustainable Properties* is not intended as legal advice or as a substitute for consulting appropriate counsel.

1. Applying Findings Conclusions and Methods

This chapter has broad applicability to sustainable property investment decision-making. However, the work is primarily directed to specific audiences and decisions in the private commercial real estate market as discussed below.

Target Audiences: The target audiences for this section are space users², equity investors, lenders, developers, appraisers, and commercial property brokers. Sustainable service providers and groups seeking capital for sustainable property investment will also benefit from this section, as well as students and industry practitioners seeking to understand the financial underpinnings of sustainable property investment.

Commercial Real Estate Properties: The Consortium focuses on commercial and multifamily properties. While many of the frameworks and methodologies will have some applicability to the single-family market, single-family property issues are not addressed in detail. Select single-family resources are also available on the Consortium’s Research Library and Industry Links under code 19.2.

Geographic Applicability: Individuals and organizations throughout the world influence The Consortium’s work. Additionally, the Consortium’s focus on fundamental methods and practices make its work particularly transferable across national boundaries. However, this section has a North American bias given the author’s background and experience.

Property Specific Investment Decisions: This chapter focuses on underwriting of an individual property.

Property Life Cycle: This section will be applicable, in varying degrees, to sustainable property investment decisions involving new buildings, existing buildings, and tenant improvements.

² “Space user” is a term we use to describe the occupants or users of real estate. It is a term that includes corporate and non-corporate owner-occupants, tenants, retail customers or other non-owner or tenant users of space.

Private Investment Decisions: The Consortium focuses on the underwriting of private investment decisions. However, understanding the types and magnitude of public benefits generated by a specific sustainable property investment is important to a private investor because of the potential to monetize public benefits by extracting the value they create for governments and tenants-investors.

Sustainable properties can have substantial social and environmental (public) value, and it is important to quantify and understand such benefits. Methodologically, public and private benefits should be assessed separately, and particularly from the perspective of valuation, it is critical to separate the concept of public and private value when evaluating a sustainable investment decision from a private sector perspective. This does not mean that public values and benefits cannot be considered by the private sector when making investment decisions, but only that such decisions should be made with a clear understanding of the differences between private and public values.

B. Underwriting Perspectives by Investor Type

1. Underwriting Output and Investor Type

The specific decision criteria, key underwriting issues, and form of output vary by type of investor as shown below in Exhibits VI-1.³ Mortgage underwriters typically have specific requirements that must be addressed. It is particularly important to understand that while equity investors can reap rewards for taking risks, lenders just get the mortgage payment. Consistently available cash flow to pay debt service is key for debt providers.

Sponsors or promoters of sustainable projects will be most successful in attracting capital if they understand explicitly what drives investment decisions for different types of capital providers. For example, the perspectives of different types of equity investors can vary dramatically. “Core” investors seeking returns of 6-8% and “opportunistic investors” seeking returns over 20% have very different investment criteria and underwriting perspectives. However, all equity investors will be more receptive to capital requests if well-reasoned support for taking risks is documented.

Tenant real estate decisions, once strategic goals are met, have historically been cost driven, with three-year or shorter simple-paybacks (sum of operating expense reductions exceed investment cost within three years) required for investment. Recognition of sustainable real estate’s contribution to enterprise value (recruiting, productivity, social

³ The specific guidelines, emphasis, and form of underwriting output will vary dramatically by the type of investment, property type, property life cycle, investor type, and many other factors as discussed thoroughly in Chapter II: “Sustainable Property Investment Decisions.” We re-emphasize the particular importance of the type of investor in this section.

license to operate⁴, etc.) has accelerated recently, but clear support for non-cost related benefits needs improvement.

Exhibit VI-1		
Underwriting Perspective by Investor Type		
Investor Type	Key Decision Criteria	Key Underwriting Issues
Investor/ Landlord	<ul style="list-style-type: none"> • Internal rate of return (DCF model) is key decision metric • Properly rewarded for risks taken if property performs above projections • Formal appraisal not required for decision-more important for higher leverage projects • Capital preservation-risk avoidance • Ability to implement change-phasing of improvements 	<ul style="list-style-type: none"> • Ability to measure and to monetize increased tenant demand and public benefits • Potential for loss of value due to functional obsolescence over holding periods which range from 3-10+ years • Risk and compliance analysis • Role of performance contracting; lease structure, other mechanisms to effectively allocate costs and benefits between owners and tenants • Highly variable tax impact based on type of investor
Space User	<ul style="list-style-type: none"> • Corporate return on equity, not property return on investment, is often hurdle rate for sustainable investment • Effect on primary business: not in sustainability/energy efficiency business • Not driven by formal appraisal • Reputation leadership; enterprise or business value, social license to operate. • Employee productivity, employee retention, health & satisfaction • Lease or buy? • Accounting treatment of value on balance sheet - cost vs. market 	<ul style="list-style-type: none"> • Incorporate property contributions to enterprise/business unit value into decisions • Recruiting <ul style="list-style-type: none"> Employee retention Productivity Health Etc. • Format/content of presentation key • Role of performance contracting • Capital vs. operating budget considerations
Spec Developer	<ul style="list-style-type: none"> • Internal rate of return (DCF model) is key metric • Decisions not driven by formal appraisal-but must satisfy construction lender • Value recognized by take-out buyer • Factors influencing development timing: positive (expedited permitting, faster absorption, etc.) and negative (project delays, contractor access and experience, etc.) • Construction/development risk mitigation (ability to satisfy construction lender) 	<ul style="list-style-type: none"> • Short holding period: ability to capture value of sustainable features at exit - preliminary measures/indicators of tenant-buyer demand. • Regulator/community support • Quality of real estate - ability to finance - independent of sustainable certification/features. • Development process risk mitigation • Avoiding poorly executed "value" engineering of sustainable features

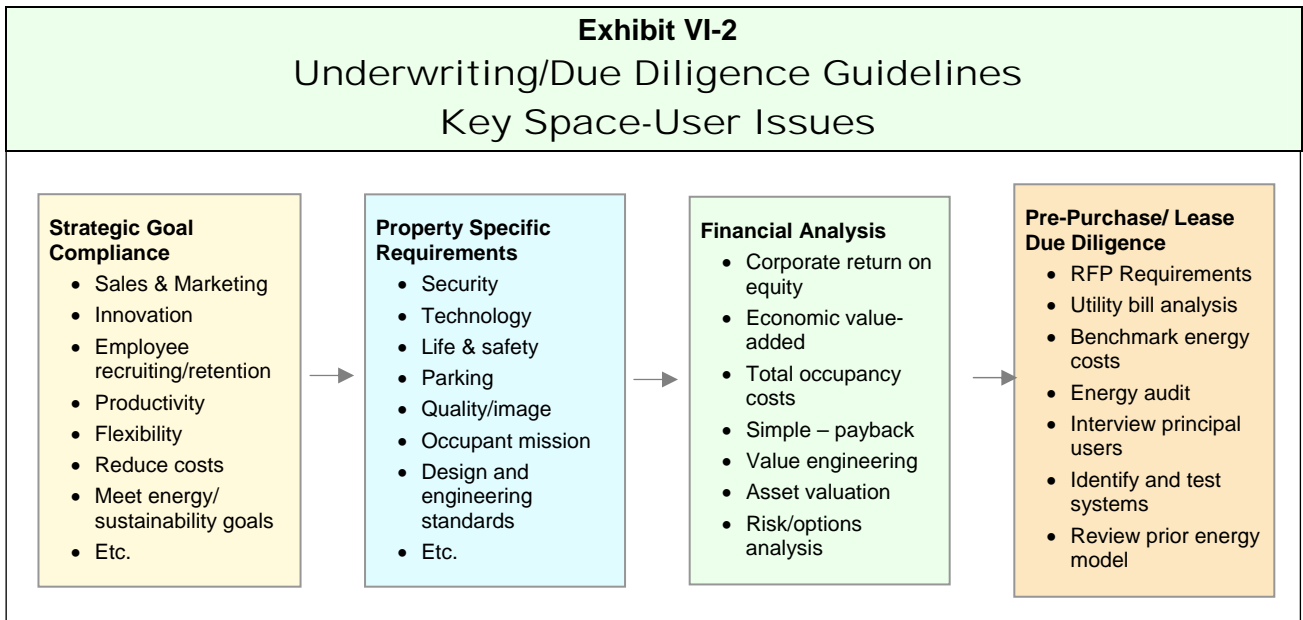
⁴ Successful companies effectively maintain a social license to operate. For example, when its customers view a company negatively, or worse as unethical or criminal, the company's social license to operate can be diminished.

Exhibit VI-1		
Underwriting Perspective by Investor Type		
Investor Type	Key Decision Criteria	Key Underwriting Issues
	<ul style="list-style-type: none"> • Cost/ease of sustainable certification process 	<ul style="list-style-type: none"> • Supporting projections and forecasts of stabilized performance
Tenant	<ul style="list-style-type: none"> • Marginal cost-time to implement • Employee productivity, employee retention, and health & satisfaction • Liability risk management • Corporate return on equity, not return on investment, is often hurdle rate for sustainable investment • Primary business paramount - not in sustainability/energy efficiency business • Reputation: leadership, recruiting and employee retention • Not driven by formal appraisal 	<ul style="list-style-type: none"> • Key decision criteria vary by: <ul style="list-style-type: none"> Tenant type Size Region Property Sub-market conditions • Incorporate property contributions to enterprise/business unit value into decisions <ul style="list-style-type: none"> Recruiting Employee retention Productivity Health Etc. • Capable service providers • Format/content of presentation key • Measure and mitigate potential impacts of implementation on primary business objectives • Role of performance contracting
Lender	<ul style="list-style-type: none"> • Quality/track record of borrower/contractors • Debt service coverage ratio • Loan to value ratio: formal appraisal required • Default risk: downside focus - limited upside for risk-taking unlike equity investor • Take-out/exit risk mitigation • Compliance: property condition, environmental, title, legal documentation, insurance, and zoning. 	<ul style="list-style-type: none"> • Borrower operator, management and service provider experience is key • Loss severity: quality and value of collateral • Integrating unique risk of sustainable properties - costs and benefits - into decision • Potential new third party reviewers - energy consultants, LEED consultants, etc. • Underwriting modifications needed across: <ul style="list-style-type: none"> Origination Appraisal Management Closing Servicing Etc. • Construction/take-out risk assessment

2. Corporate Real Estate Underwriting

Corporate property decisions, whether new construction or existing buildings, will be subject to many of the underwriting and due diligence guidelines presented for investors and lenders, but are also subject to additional underwriting and due diligence issues as summarized in Exhibit VI-2 and outlined in the Space User Underwriting Checklist shown in Appendix VI-A.

Since the primary purpose of real estate in a corporate or space-user situation is to contribute to the successful execution of the business’s overall strategic goals, all real estate property decisions must be evaluated for their strategic compliance, including their ability to promote marketing and sales, increase innovation, improve productivity, increase flexibility, and reduce costs.



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 returns on investment hurdles are important. Simple payback analysis, total occupancy costs, risk and option analysis, and other analytic techniques are also employed.

C. Key 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

1. New Mix and Priority of Service Providers

Sustainable properties require new services and service providers to be successful. Additionally, many traditional service providers need sustainable property experience. Capacity and quality issues are critical underwriting concerns for capital sources because experienced and capable service providers can significantly reduce investment risk. Section D below provides additional detail on underwriting sustainable property service providers.

2. Modified List of Costs and Benefits (Risks)

Sustainable properties are subject to some different risks than conventional properties. Sustainable properties face increased risks due to new processes, products, materials, and regulations, but also reduce or mitigate many 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.

One of the most important issues in underwriting the financial performance of sustainable properties is a full understanding of the risks associated with the pro-forma cash flows in the DCF model. For the purposes of improving sustainable investment decision-making, the Consortium recommends more detailed documentation of the risks of sustainable property investment, both positive and negative, to provide decision-makers with proper context for evaluating pro-forma financial performance.

An important component of “*Value Beyond Cost Savings: How to Underwrite Sustainable Properties*” is the 40-page detailed assessment of the costs and benefits of sustainable properties presented in Appendix V-C: GBFC Sustainable Property Cost Benefit Checklist.

The primary purpose of the GBFC Sustainable Property 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 also help in the determination of data and analysis requirements, and suggest questions to ensure key costs and benefits are fully identified and addressed.

An important secondary use of the checklist is as a framework for use by due diligence officers and investment/lending committees to cross-examine borrowers or operators seeking equity to develop judgments about the quality of thought and analysis that potential capital seekers applied in preparing their financial analyses and related support documentation in their investment packages.

3. Priority of Energy/Carbon Reduction Investment

Energy/carbon reduction investment has become a more significant component of property value and risk due to climate change and the dramatic response by regulators, space users (owner occupants and tenants), and investors. As demand for energy efficient property by these groups increases, properties that are well positioned relative to energy/carbon (either already efficient or the cost of necessary improvements is economically feasible) will increase in value and those that are not will lose value due to economic and functional obsolescence.

Additionally, most sustainable property investments are based on projections of, often substantial, energy/carbon reduction, rather than actual use. Accordingly, given its enhanced importance, underwriters need to conduct an enhanced level of due diligence relative to the accuracy and reliability of forecasts. Section E below provides a detailed discussion of underwriting energy/carbon reduction investment.

4. Importance of Process and Feature Underwriting

GBFC's Sustainable Property Performance Framework presented in Chapter IV highlights the importance of separating the different elements of sustainable property performance in order to properly evaluate financial performance. Our research shows that process performance drives the success of sustainable features and systems, which, in turn, determine building performance. To assess potential financial implications of a building with a specific level of sustainable performance, one must next measure the market response (regulators, space users and investors) to the building's sustainable performance. Keeping the data and types of performance separate helps to assess the fit and relative importance of information.

GBFC's Sustainable Property Performance Framework also provides a structure for underwriters to use in their efforts to mitigate risks. 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 shown in our research, risk and uncertainty around building performance can be significantly mitigated through underwriting of sustainable processes and features/systems.

GBFC's Performance Framework prompts key lines of inquiry on sustainable processes, including: was the integrated design process implemented appropriately? Were contracts sensitive to the issues of sustainable properties? Did service providers and contractors have the requisite competence and capacity to get the work done? Have sufficient resources been spent on commissioning, measurement, and verification, as well as the training of occupants and staff?

The Framework also prompts feature-based questions like: are the features and systems specified in the building pioneering, or do they have proven track records? (Pioneering systems, features or materials are not necessarily a bad thing, and significant benefits can be achieved, but there may be some additional risk that will offset the benefits of their implementation unless properly mitigated.) Fortunately, the sustainable property investment market is significantly more mature today than even a few years ago, enabling significant risk mitigation through proper attention to process and features performance issues.

5. Priority of Government Regulations and Incentives

Government regulations and incentives are a more important part of the economics and risks of sustainable properties and must be more diligently underwritten.

Government Incentives

Significant benefits are available from local, regional, state or provincial, and federal governments as well as utilities and other organizations. These benefits can be quite substantial and include:

- Increased Floor Area Ratio and zoning/density bonuses
- Expedited permitting and approvals
- Design and code flexibility
- Rebates, construction cost off-sets, grants
- Financing assistance, subsidies
- Tax benefits: Federal, State, and Local—credits, favorable accounting treatment (Tenant Improvements, etc), tax reductions, etc.
- Government mandated carbon trade value

The specific sustainability or energy efficiency thresholds required by each governmental level in order to obtain incentives must be identified and evaluated. These thresholds should then be compared to the project's actual or projected sustainable outcomes/performance to enable an assessment of the magnitude of potential benefits. Better understanding and articulation of a property's potential public benefits can reduce the risks of achieving benefits.

Many lenders are also resistant to “crediting” value added by incentives, tax benefits and other subsidies because they might not be available to them if they must foreclose on a property, and governments can change/modify benefits. Borrowers must address these concerns and articulate how, or if, sustainable property benefits should be treated differently.

Better understanding a property’s potential public benefits and a clear articulation of the property’s Public Benefits can reduce the risks of achieving benefits. What property owners/developers need to know and do to effectively articulate a project’s public benefits include:

- Develop a structured understanding of the types of public benefits a sustainable project can generate (See section D of Appendix V-A and Chapter V, Sections C-2a and F-3);
- Be able to articulate and show the link between types of property features, systems and sustainable outcomes and the specific public benefits;
- Analyze how the subject property specifically contributes to each of the public benefits claimed;
- Specify the magnitude of benefits, and appropriately caveat method used to quantify. Because in many cases a single property will contribute only a small portion of the broader public benefit, cite both the larger benefit and likely property contribution. Because substantial sums of money are spent to deal with peak demand loads and related infrastructure costs, which are not typically incremental costs, the marginal benefit of many sustainable features/systems, which can address peak demand issues, may be much higher than originally contemplated.
- Present the subject property’s public benefit contributions in relative terms to other conventional properties. This relative presentation, particularly if quantified, can provide a basis for a “relative” allocation of incentives or regulatory relief.

One key challenge in the application of Sustainable Public Benefits Analyses is that most of the data and analyses that have been done to date have been done at a general industry rather than a property specific level. The more property specific the analysis, the more likely benefits will be achieved.

Government Regulations and Policies

Federal, state, provincial, and municipal regulations relative to sustainability are increasing in breadth and level of sustainable/energy efficiency requirements. Thousands of governments around the world now regulate energy efficiency and sustainability. Building energy labeling and sustainable mandates are becoming more common as governments shift their reliance from incentives to regulation.

The importance of sustainability and energy efficiency are significantly enhanced by these regulations. Lenders and investors need to be concerned about the ability of properties to meet changing regulations in a cost effective manner. Properties that cannot meet regulations cost effectively could lose significant value do to required capital expenditures.

Local, state and federal governments can even more directly impact property value because of the growing sustainability requirements for the properties they own and lease.⁵ Sustainable property requirements for new construction have been prominent in many governments for some time, and requirements for government leases are increasing. With over 18% of all commercial space in the United States government owned, and significantly more in many other countries (approximately 13% of which is office space), this is a significant market that will have broader influence on leasing policies throughout the country.⁶

The potential impact for a specific property will be a function of evaluating the level of government leasing in the subject property's submarket, trends relative to government leasing, government lease rollover expectations, and the specific sustainability thresholds required by different levels of government compared to the subject property. Evaluation of this potential benefit must take into consideration not only sustainability issues, but also the suitability of the subject property relative to other minimum requirements of government tenants related to security and other issues.

6. Underwriting Health and Productivity Benefits

Sustainable properties can produce significant health and productivity benefits for occupants. Thus, best practices underwriting of sustainable properties should include an evaluation of potential health and productivity benefits because occupants (tenants, owner-occupants, or visitors/customers) are the most critical component of building performance. Individuals and/or enterprises that are healthy, productive, profitable, and happy as a result of their buildings should respond favorably from a market perspective, enabling higher revenues, reduced risk, and improved financial performance for building owners.

Measure of Occupant Performance

Occupant performance has two key measurement components, as shown below in Exhibit VI-3:

- The individuals occupying the space; and,
- The Enterprises that lease or own the space.

⁵ Governments occupy approximately 18% of commercial space in the United States according to "Who Plays and Who Decides, a March 2004 Study completed by Innovologie, LLC for the US Department of energy.

⁶ "Who plays and who decides; the structure and operation of the commercial building market," March 2004, Innovologie, LLC for DOE.

Exhibit VI-3 Measuring Building Performance: Occupants	
Individual	<p>Health</p> <p>Productivity</p> <p>Satisfaction</p>
Enterprise	<p>Reduction in Resource Use</p> <ul style="list-style-type: none"> • Reduction in energy and water use • Reduction in building waste • Reduction in pollution emissions • Reduction in carbon footprint <p>Improved Reputation / Leadership</p> <ul style="list-style-type: none"> • 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 <p>Compliance With Internal / External Policies / Initiatives</p> <ul style="list-style-type: none"> • Corporate energy / sustainability requirements • Corporate social responsibility reporting • Global Reporting Initiative • Carbon Disclosure Project • Minimum requirements of socially responsible investment funds <p>Reduced Risk to Future Earnings</p> <ul style="list-style-type: none"> • 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

While most researchers and industry analysts have focused on individual occupant performance (health, productivity and satisfaction), enterprise-level occupant performance is also critical to measure and understand. As shown above in Exhibit VI-3, enterprise-level occupant performance consists of reductions in resource use, improved reputation/leadership, compliance with internal/external policies or initiatives, and reduced risk to future earnings.

A key focus of occupant performance is the occupant’s share of potential reductions in resource use/cost, relative to property owners. Who pays for the sustainable investments and who gets the benefits? To properly allocate costs and benefits between landlords and tenants, leases terms controlling these distributions must be analyzed.

Improved reputation/leadership can be assessed directly by surveys, stock analyst reports, and indirectly through assessment of how sustainable property investment has influenced recruiting, employee retention or satisfaction, marketing and sales, and brand awareness. This “evidence” of occupant performance relative to improved reputation and leadership may be found in the surveys and market research done for other parts of an occupant’s business, and not typically in a traditional building measurement or monitoring program.

Occupant performance relative to compliance with internal/external policies and initiatives can be measured through an examination of trends in the importance of owned or leased real estate to the Global Reporting Initiative, the Carbon Disclosure Project, the requirements of socially responsible investment funds, government agencies, or a corporation’s own CSR strategy and communications. At a property level, the question is how important is sustainable owned or leased real estate to the types of tenants expected to be leasing in the building?

The final measure of enterprise-level occupant performance is reduced risk to future earnings. This type of performance can be measured through monitoring of litigation and legal costs, subleasing trends relative to sustainable property, energy cost volatility, and changes in the level of importance of sustainability to key employees, customers, capital providers, vendors, and other stakeholders. If the importance of sustainability increases to the stakeholders, the risks to future earnings, on either a positive or negative basis, could be significantly influenced by sustainable property investment.

Key Considerations in Assessing Occupant Performance Information

Identifying, evaluating, and applying the results of research testing the relationship between sustainable building features/ outcomes and health and productivity benefits is challenging. Fortunately, the challenge is not dissimilar to the difficulties the business world faces in the application of any scientific or academic study. Additionally, as discussed above, perfect studies or knowledge about the relationship between buildings and health or productivity is not required in order to be useful.

Some of the key issues to be considered in assessing and applying the results of health and productivity studies include:

Access to key research

It is difficult and time consuming to identify and access the key scientific research related to health and productivity benefits. Appendices IV-C and IV-D identify and describe over 200 studies and the Consortium’s Research Library and Industry Resources sections (see index code 10.1, 10.2 and 15.63) provide additional detail and updates of ongoing scientific research. As with the selection of comparable properties, it is difficult to know if someone advocating the potential health and productivity benefits of a property has

identified the key studies, or just included those that support their point. The best way to address this issue is to seek independent sources, and rely upon meta-studies⁷

Understanding how and why sustainable property outcomes affect health and productivity.

While there has been a significant amount of research, as presented in Appendix IV-C and IV-D, that test whether sustainable outcomes like indoor environmental quality, temperature control, lighting, privacy and interaction, ergonomics, and access to the natural environment affect health or productivity, the science on *how and why* these sustainable outcomes influence health and productivity is still not well understood in many cases. What are the physiological and psychological characteristics of light, temperature control, or noise that influence health and productivity. Better understanding and articulation of these linkages will result in improved hypotheses and better, more logical testing and presentations that will be more convincing to the business community.

Linking specific features/strategies to sustainable outcomes

While studies demonstrating a relationship between ventilation, dampness, daylighting, etc. and health and productivity outcomes are well established, the volume and quality of research that links specific sustainable features or strategies to specific ventilation, dampness or daylighting outcomes is often not as robust. Importantly, even when the linkages are well understood, many scientific studies do a poor job describing sustainable features or strategies, making application of these studies to specific buildings with a defined set of features or strategies difficult.

Statistical/data problems

The reliability and accuracy of the specific quantitative results from many of the health and productivity studies is questionable. This is due to the extreme difficulty in the collection of data, and controlling for the scores of variables that influence occupant health or productivity. Since health and productivity studies tend to focus on a particular sustainable feature or outcome, the problem of evaluating a whole building, with a combination of sustainable features and outcomes, is also difficult.

One framework that we particularly like that assists in understanding the statistical relationship between building science and health is one created by Mark Mendell, an epidemiologist working at Lawrence Berkeley National Laboratories, and a board member of the Consortium. Dr. Mendell has created a practical framework for categorizing the basis for believing something causes an adverse affect. His “What We Know” framework is summarized below.

⁷ Meta-studies are those completed by an expert in a particular field that provide a summary assessment and analysis based on a review of key studies. The review is based on a qualitative, and often quantitative, assessment of the results of studies that have been done in the field. The websites of key research organizations like the Lawrence Berkeley National Laboratory, Carnegie Mellon and others can also be helpful in this regard.

Documented causal relationships
Significant, replicated, consistent, unbiased, dose-related, plausible
Persuasive scientific findings
Replicated, significant findings, and alternate explanations seem unlikely
Suggestive scientific findings
But “correlation does not prove causation”
Beliefs based on informal observations
Sometimes guides and predicts future science, but sometimes based on error, coincidence, or hidden factors

Dr. Mendell’s framework is similar to a related framework used by the Institute of Medicine in their official reviews of health issues.

Dose-response relationships

While the studies linking indoor environmental quality, lighting, daylighting, temperature control, noise, and other sustainable outcomes to building health or productivity are robust in many cases, the studies are often insufficiently specific to enable a clear relationship between the amount of the sustainable outcome (lighting, noise, etc.) and building health or productivity. Accordingly, it makes it difficult to assess whether a particular building, with its sustainable outcomes or designed outcomes, will be sufficient to achieve the results identified in the studies.

Value Beyond Cost Savings: How to Underwrite sustainable Properties covers the issues of health and productivity in many places. The six-step process for financial analysis (Chapter V, Section A), which clarifies the steps required to assess how occupant performance (including health and productivity benefits) influences occupant demand which then influences rent, occupancy, tenant retention and other financial performance variables. The evidence supporting how sustainable properties affect occupant performance is further detailed in Expanded Chapter IV, Section F-4, Expanded Appendices IV-C and IV-D, and expanded Chapter V, Section C2.

7. New Sustainable “Sub-Financial” Analysis

Sustainability sub-financial analyses are those analyses and models that provide quantitative insight/data that is typically combined with other information and analyses to aid valuers/financial analysts in their specification of key financial assumptions (rent, rent growth, occupancy, absorption, tenant retention, and operating costs) in a DCF analysis, or related traditional real estate financial model.

Sustainable sub-financial analyses include Comparative First Cost Analysis, DCF Lease-Based Cost-Benefit Allocation Modeling, Health Benefits Analysis, Sustainability Options

Analysis, Enterprise Value Analysis, and Risk Analysis and Presentation (RAP). While many sustainability sub-financial analyses are uniquely derived for specific property situations, the importance of quality independent analyses of this type is critical to the articulation of value and risk in sustainable properties.

The key point in understanding sustainability sub-financial analyses is that in most cases these analyses do not result in specific data inputs that you can input directly into a DCF analysis. As their name implies, these types of analyses provide information and insight, which is combined with non-sustainable considerations in the final selection of key inputs such as rent, absorption and occupancy.

For example, there are scores of studies that demonstrate the relationship between building outcomes, such as increased ventilation rates, and improved health (reduction in sick building syndrome or asthma, for example). However, even if a specific dollar health cost savings could be estimated for a building, further analysis (new “sustainable sub-financial analysis) would have to be done to determine how the health cost savings would accrue to a potential space user.

A health related sustainable sub-financial analysis for an owner-occupied building (corporations, governments, institutions, non-corporate business entities) would generate an analysis of potential occupant benefit that would depend on the level of health costs paid by the building owners for their employees and a few other factors. Much of the potential health cost savings would accrue to the building owner-occupants.

However, for an investor owned building, the key issue in estimating the financial impacts of health cost savings is to look at how tenants value such potential benefits, and then how they value these benefits in the context of all the other benefits and factors that enter into their selection of space. Accordingly, any health cost benefits analysis is only a contributing factor to the development of financial inputs for a traditional real estate analysis. However, such analyses, if independently done and appropriately presented, can significantly influence leasing and/or investment decisions resulting in improved financial performance.

D. Underwriting Service Providers

1. Introduction

The quality and capacity of service providers was identified by our sustainable performance survey respondents as one of the key factors leading to failure or underperformance, and also a significant opportunity for risk mitigation through retention of qualified and experienced service providers.⁸ While experienced service providers are

⁸ The Consortium conducted a survey of experienced sustainable consultants, developers and investors to assess those sustainable features and processes that had the highest level of failure and underperformance. The results of this survey

critical to any real estate project, issues of service provider quality and capacity take on particular importance in the sustainable property investment marketplace. Rapid growth of the sustainable property marketplace and a disproportionate level of new products, materials, systems and processes enhance the opportunity for service provider underperformance when dealing with sustainable properties.

2. The Sustainable Property Services Markets

The services required to successfully complete a sustainable project will generally differ from a conventional project in two key ways: 1) the core service providers will have certain specialized knowledge about sustainability; and 2) the project will likely require several additional specialized services. Specialized services are required on many sustainable projects because they often have systems, features and verification requirements that conventional buildings do not have.

For the purpose of this section and the broader purposes of the *Value Beyond Cost Savings: How to Underwrite sustainable Properties* book, we define the service provider markets broadly, incorporating a full range of real estate and construction/development services as shown in Exhibit VI-4 below. More specialized sustainability related services are presented in bold, further emphasizing the importance of properly underwriting the services team.

The issues of service provider quality and capacity will vary significantly by property type, market, and the specific type of service. Given the rapid growth in the sustainable marketplace, some of the specialty consulting services such as daylighting consultants, commissioning agents, and other sustainable specialists are typically the hardest to find.

and related research are presented in Chapter IV, Sections D and E, which address sustainable process and feature performance.

Exhibit VI-4	
Service Provider Markets*	
Real Estate Services	Construction-Development Services
<ol style="list-style-type: none"> 1. Diversified national real estate service firms 2. Real estate consulting 3. Appraisal 4. Commercial property brokerage 5. Tenant representative brokerage 6. Residential property brokerage 7. Commercial mortgage/equity brokerage 8. Residential mortgage brokerage 9. Property/asset management 10. Real estate law 11. Real estate tax consulting 12. Real estate accounting 13. Planning 14. Property condition due diligence 15. Environmental due diligence 	<ol style="list-style-type: none"> 1. LEED consulting 2. Sustainability/strategy consulting 3. Systems/management consulting 4. Commissioning 5. Energy/other performance contracting 6. Energy modeling/consulting 7. Energy audits/assessments 8. Renewable energy consulting 9. Daylighting consulting 10. Cost estimation 11. Construction management/consulting 12. IAQ analysis and consulting 13. Urban design 14. Landscape design and architecture 15. Project architecture 16. Interior design 17. General contracting/building 18. Specialized sub-contracting (HVAC, roofs, plumbing, electrical, etc.) 19. Specialized equipment/ product installer 20. Renewable energy contracting 21. Engineering: general 22. Engineering: electrical 23. Engineering: mechanical 24. Engineering: civil 25. Engineering: soils/geotechnical 26. Engineering: other specialties

* “New” sustainable property focused services are highlighted in bold.

Many of the most experienced service providers focus their attention on their long-term clients and larger, more complicated projects, making it particularly difficult for smaller, less sophisticated projects, and new owners/developers who have not been big consumers of services in the past.

3. Service Provider Risks

Service provider capacity and quality are linked. When the capacity of experienced service providers is more limited, the quality of service provider options can suffer. Key failures or underperformance due to service provider capacity and quality problems include:

- Project delays that disrupt potential occupants and/or increase costs to the project development process.
- Insufficient or inadequate commissioning, leading to startup delays and additional occupant complaints and longer-term costs.

- Less experienced service providers may have more difficulty in “buying-in” to the integrated design process and create team problems due to less sophisticated communications.
- Reduced willingness to implement more pioneering or sophisticated sustainability approaches, which could result in long-term reductions in operating performance. What is pioneering or sophisticated to a less experienced service provider may be understood to be less risky to a more experienced service provider.
- Higher cost is a definite potential result of poor service provider capacity or quality. When demand exceeds supply, price will, and has, gone up for most experienced service providers. More importantly, those service providers with experience significantly reduce the relative cost disadvantages of sustainable property investment. Major builders like Swinerton, Webcor, Turner and many others assert publicly that construction of projects that are certified LEED should cost little or no more than a conventional project.

4. Service Provider Underwriting Best Practices

One of the ways to address potential service provider quality problems is to carefully design contracts, carefully review warranties, and move towards performance-based compensation, at least for some parts of service provider compensation. Greater specification of goals and outcomes, as well as the specific process and approach that a service provider will follow, can also be important.

Credentials and education can assist in the “vetting” process of evaluating service providers, but it will be important to understand the specific course of study and requirements of accreditations, certifications or other professional labels that people acquire. A credential does not mean that a specific individual or firm will be better than an individual or firm without such accreditation, but it shows a focus and willingness to understand the unique aspects of sustainable property investment that could make your project run smoother.

Given that the service provider undersupply problem is not likely to be rectified in the short term, owners and developers should also invest to train in-house staff in sustainable building principles and practices. Some owners/developers complain that if they spend a lot of money to train their people in sustainability they will just leave and get another job. This does happen, but owners/developers must remember that the alternative is that you don’t train them and they stay.

Another critical best practice element to understand is that sustainable practice is only a portion of what a real estate or a construction/development services provider needs to know. Depending on the specific area of specialty, it is critical that owners/developers do not over-emphasize sustainable training or focus to the detriment of fundamental real

estate and construction/development skills. For example, fundamental leasing, construction, or architecture skill, independent of sustainable knowledge, is critical to successful projects. Owners/developers need to be careful trading off experience in the fundamental skill sets required to complete a project for a firm or individual's specialization on sustainable practice.

Finally, there are a growing number of organizations that identify, assess, and certify service providers such as contractors, plumbers, electricians, commissioning agents, and other professions on their sustainability expertise. The credibility and rigor involved with these different groups is highly variable. The key here is to understand explicitly the requirements for certification and/or listing in the directory and use the list accordingly. Even if a list requires no special requirements other than interest in sustainability, it could be useful.

It should also be noted that, given the penetration of sustainability through every aspect of building design, construction and operations, sustainability training is now integrated into the general education requirement for many professional certifications.

Two interesting developments in the certification and assessment of sustainable service companies are the B-Corporation and the Sustainable Performance Institute's Green Firm Certification. Both these efforts aim at enhancing the independence and credibility of firm claims of sustainable operating practice and/or competence.⁹

B Corporations are designed to address two problems, which hinder the creation of social and environmental impact through business:

- The existence of shareholder primacy which makes it difficult for corporations to take employee, community, and environmental interests into consideration when making decisions; and
- The absence of transparent standards, which makes it difficult to tell the difference between a 'good company' and just good marketing.

B Corporations' legal structure is designed to expand corporate accountability and enable them to scale and achieve liquidity while maintaining mission. While not specifically designed for service companies, B Corporations' performance standards are designed to enable consumers to support businesses that align with their values, investors to drive capital to higher impact investments, and governments and multinational corporations to implement sustainable procurement policies. <http://www.bcorporation.net/why>

⁹ The author has not done a detailed assessment of the claims and assertions of these two entities and their programs, but cites them as two interesting and credible efforts to address the issues involved in conducting due diligence on service providers.

The Sustainable Performance Institute (SPI) certification program is designed to improve design and construction organizations' ability to manage and deliver sustainable projects by monitoring and certifying their consistent use of processes that consistently result in sustainable building design and construction. SPI certification will examine an organization's performance through documentation of its:

- Strategy, policies, infrastructure and leadership
- Production processes, e.g., schematics, design development, construction administration, etc.
- Support processes, Human Resources, Marketing, Internal design/spec standards, Tools and Resources.
- Partnering, e.g., proposals, contracts scope/fee change, deliverables and working relationships with stakeholders.
- Outcome measures of its own environmental footprint and its projects' performance

As articulated by the SPI institute:

“SPI differs from LEED in that SPI focuses on organizational processes. LEED focuses either on individual's technical knowledge or on building performance. At the same time, SPI supports The US Green Building Council's LEED certification for buildings, and the associated LEED accreditation for individuals and recognizes each as potential evidence of performance and capability. Achieving LEED certification for its projects is one measure of the effectiveness of an organization's sustainable processes. Having LEED Accredited Professionals in the firm can help achieve sustainable results. However, neither of these is sufficient to guarantee that an entire organization has consistent capabilities. SPI differs from LEED in that SPI focuses on organizational processes and looks at the organization as a whole, rather than at individuals or projects. SPI is also similar to LEED™ EBOM (Existing Bldg Operations & Maintenance) in that it allows an initial phase to establish policies whose impacts are then evaluated over time. Then, organizations are re-evaluated periodically to validate maintenance of quality. “

Retaining service providers with specific experience in the property type and challenges anticipated for a specific project is perhaps the most important practice to mitigate risk. Accordingly, spending sufficient time to develop a “vetting” process for the different sustainability specialties, and/or hiring LEED consultants or other team leaders with significant experience in this vetting process is important.

In this section, we briefly present three key service providers and what decision-makers should look for in selecting these professionals and organizations.

- Design Team

- Contractor
- Asset/Property Manager

The role of each of these groups and suggested key questions to ask in selecting each are presented in the subsections that follow.

The Design Team

The design team includes various professionals including architect, mechanical engineer, lighting designer, professional engineer and others. The decision-maker should consider the following questions to assess the experience level of the development team, individually and together, as it pertains to energy efficiency.

- Is the professional LEED accredited or accredited with similar credentials internationally? Are they experienced with LEED, Green Globes, ENERGY STAR or other certifications sought on the project?
- On how many properties?
- What were their results? Successes? Failures? Can they articulate lessons learned from past projects?
- Do they (the design team) have any experience working together?
- Do they have the willingness to work together collaboratively?
- Who will act as the lead to facilitate collaboration and to ensure that integrated design principles are employed?
 - Set a clear alignment of interests.
 - Ensure that interests are aligned throughout and incentives to completion support alignment.
- Who has final decision-making authority?
- Who bears ultimate responsibility for meeting objectives?
- Who covers over budget items?
- Who reaps the benefits of meeting objectives?

Contractor

The contractor is ultimately responsible for executing the sustainable design. Experience in installing new-technology components and in sustainable construction practices is highly desirable. Some of the key questions to ask in selecting an energy efficiency contractor are as follows:

- How much experience does the contractor have in sustainable building?
- How early has the contractor been brought into the design process?
- Does the contractor understand the objectives?
- Is the contractor being incentivized on the basis of these objectives?

- Do the sustainable design features increase construction complexity?
- Will bringing the team together early on minimize these complexities?
- How reliable is the construction budget?
- Are materials readily available?
- Have the materials been tried and tested?
- Do the construction methods have a proven track record?
- Does the contractor have experience in the particular methods being proposed?
- Should contingency reserves be increased due to sustainable features or should they be decreased due to integrated design input?
- How will building codes and regulation either limit possibilities or create complexities?
- Are there any hurdles in getting insurance or bonding due to non-traditional construction materials or methods?
- Do sub-contractors have experience in sustainable building?
- Is it necessary to develop, communicate and train on new protocols or building methods?

Asset /Property Managers

Increasing reliance is being placed upon asset managers to help building owners achieve energy cost savings for individual buildings and portfolios. Asset managers have broad discretion to undertake a wide variety of measures ranging from re-lamping to retrofits. Demonstrated experience and competence in energy cost management, including implementation of energy efficiency upgrades, have become crucial qualifications for such professionals and organizations.

- What experience have you had in implementing energy conservation projects (low-cost/no-cost, upgrades, retrofits, etc.)?
- What were the payback periods of those projects?
- What training has staff had in ENERGY STAR benchmarking for properties and portfolios?
- What is your experience or training as regards sustainable operating and maintenance practices?

E. Underwriting Energy/Carbon Reduction Investment

1. Introduction

Energy/carbon reduction is a critical driver of sustainable property value. Energy has become more central to achieving and maintaining environmental certifications and meeting corporate and regulator minimum occupancy standards. Accordingly, it is a key

contributor to property value beyond energy cost savings. In this section, we summarize some of the key issues in underwriting energy/carbon reduction investment from a capital provider perspective.

Given the increasing attention being paid to climate change and the role of greenhouse gasses in that change, public and private decision-makers are becoming increasingly concerned with carbon efficiency. Since the analysis and methodologies addressed in this book are primarily couched in terms of energy efficiency, it is important to understand the distinction between energy efficiency and carbon efficiency. While we have chosen to use the term “energy efficiency” in our report, underwriters need to understand the difference.

A simplified example will help to clarify this distinction. A building may derive all of its energy needs from onsite solar power. With regard to onsite energy consumption, the building will have a zero carbon contribution. At the same time, it may be equipped with inefficient equipment and be operated inefficiently, resulting in a relatively high consumption of energy on a per square foot basis. While it is not an energy efficient building, it is a carbon efficient building. This is why various measures of energy efficiency, and the EPA’s ENERGY STAR program in particular; include measures of a building’s source energy (the energy used to generate or transport the energy used onsite) and the greenhouse gases associated with that source energy.

While “*Value Beyond Cost Savings: How to Underwrite sustainable Properties*” focuses on private energy investment decisions, it should be noted that the cutting edge thinking on energy and sustainability has evolved to the concept of Restorative Buildings.

As AIA|COTE’s founding chair Bob Berkebile has noted, we need to design and construct buildings that are not only “less bad” in terms of energy, productivity, and health; we need sites and buildings that actually produce more energy than they use, that treat air and water so they are released back into the environment cleaner than before, and that use resources efficiently, but for maximum beauty. A record number of LEED platinum buildings are underway or have been completed. These are amazing spaces. Yet truly smart construction calls for realizing the next level of sustainability: the idea of living or restorative buildings.¹⁰

2. Introduction to Measuring Energy Performance

First of all, what is energy, how is it measured, and what does it cost? Energy is the capacity to do work and can take a number of forms such as thermal, mechanical, electrical and chemical. Common units of measurement are the British thermal unit (Btu, or in thousands, kBtu) and the watt-hour (Wh, or in thousands, kWh), where 1 kWh = 3,413 kBtu.

¹⁰ “Getting Rid of Green Design,” Greg Nook, AIA.
http://www.aia.org/cote2_template.cfm?pagename=cote_a_200707_green

The cost of energy is the amount of energy consumed multiplied times the price per unit of energy. Some utilities have different rate scales depending on the time of day (e.g., peak, off-peak, shoulder and other rates) or the time of year.

Energy Cost Savings for a new construction project can be defined as follows:

New Construction Project

Energy Cost Savings = Price per Unit of Energy X (Quantity of Energy Consumed in a Conventional Project Design - Quantity of Energy Consumed in a Sustainable Project Design)

Cost savings can be measured for the whole property or on a per square foot basis, and can be measured monthly, annually or at some other frequency. For example:

Price of energy = \$0.015/kBtu

Building Size = 100,000 sf

Annual Energy Consumption under Conventional Design = 90 kBtu/sf/yr

Annual Energy Consumption under Sustainable Design = 60 kBtu/sf/yr

Energy Cost Savings = \$0.015/kBtu X 100,000 sf X (90 – 60) kBtu/sf/yr
= \$45,000/yr

The Conventional Project Design is typically a baseline case that meets minimum building code requirements for the jurisdiction in which the property is located. For example, in California, Title 24 sets a minimum energy performance level for new construction. For the purposes of baseline comparisons for LEED certification, for example, the baseline is determined by following the Energy Cost Budget Method described in Section 11 of the building standard for energy performance, ASHRAE/IESNA 90.1-1999 or local code, whichever is more stringent.¹¹

Analogous to the new construction definition above, Energy Cost Savings for an investment in energy efficiency upgrades or retrofit to an existing building can be measured as follows:

Energy Efficiency Upgrade Project

Energy Cost Savings = Price per Unit of Energy X (Quantity of Energy Consumed Under Existing Project Configuration - Quantity of Energy Consumed After Energy Efficiency Upgrades)

¹¹ “Evaluating the Energy Performance of the First Generation of LEED-Certified Commercial Buildings”, Rick Diamond, Mike Opitz, Bill Von Neida, Shawn Herrera, p. 4.

A crucial aspect of the comparisons of forecast energy consumption between baseline and sustainable designs is that they only assume certain energy end uses for systems that the design team can control (so-called regulated energy components)¹², such as:

- HVAC
- Building envelope insulation
- Service hot water systems
- Percentage glazing
- Solar shading
- Fan and pump motor efficiency
- Installed lighting power density
- Other specified systems

The baseline and sustainable comparisons do not include the impacts of process energy, which has to do with the actual use of the building and can cause wide discrepancies between forecast and actual energy consumption. Process energy has a specific definition in ANSI/ASHRAE/IESNA Standard 90.1-1999, *Energy Standard for Buildings Except Low-Rise Residential Buildings*: “energy consumed in support of a manufacturing, industrial, or commercial process other than conditioning spaces and maintaining comfort and amenities for the occupants of a building.” Examples of process energy components are presented below and may include some of the biggest end uses in new commercial buildings¹³.

- Server rooms
- Lab equipment
- Cooking or restaurant equipment
- Security systems
- Building control systems
- Fire safety systems
- Computers
- Printers
- Copiers
- Other plug loads

As discussed in more detail below, process energy can be a major reason why a sustainable building’s energy performance may fall short of expectations.

¹² These items are referred to as “regulated” energy components, because they are regulated by applicable building codes.

¹³ “The Proof is Performance: How Does 4 Times Square Measure Up?” High Performance Buildings, Winter 2008, p. 31.

ENERGY STAR has become the most important measure of energy/carbon performance that is cited in many building environmental certification programs as well as being an important benchmarking tool in its own right. A summary of two key ENERGY STAR programs is presented below.

ENERGY STAR's Portfolio Manager: Portfolio Manager is the EPA's energy consumption benchmarking tool for existing buildings. It allows users to enter data on a building's basic characteristics and energy consumption, and generates an Energy Performance Rating (EPR), which is essentially a percentile ranking (1 to 100) of the building's energy performance in relation to its peers. Buildings with an EPR of 75 or higher are eligible to receive the ENERGY STAR label.

ENERGY STAR generates an Energy Performance Rating on a scale from 1 to 100. An EPR of 50 implies that the building's energy performance is equivalent to that of an average building. The rating is based on source energy, which includes energy used to generate and distribute the energy used at the site. The rating is also weather normalized, thereby taking into consideration heating and cooling demands by region.

ENERGY STAR also produces a Statement of Energy Performance that provides summary information on energy intensity, energy cost, and CO₂ emissions for the current period, a baseline period, and comparisons to the industry average and the minimum ENERGY STAR labeling requirements.

Verification is an important part of the labeling process because it gives third party decision-makers confidence in the reliability and accuracy of the rating and the information provided to get it. Further, the verification confirms the existence of other attributes that are important to investors.

In order to receive the ENERGY STAR label, a Professional Engineer (PE) must certify information submitted to ENERGY STAR. The validation of the information has two key components:¹⁴

- The PE must verify that the data entered about the building are accurate. This includes verifying the values entered for its physical characteristics, operating characteristics, and energy consumption.
- The PE must visit the building and verify that it conforms to current industry standards for indoor environment. These standards cover temperature and humidity, illumination, outside air ventilation, and control of indoor air pollutants.

¹⁴ Professional Engineers Guide to the ENERGY STAR Label for Buildings, EPA, November 16, 2006, p. 3.

ENERGY STAR's Target Finder: A second EPA ENERGY STAR tool, called Target Finder, allows users to enter data on a proposed building's basic characteristics (the same as Portfolio Manager with the exception of energy use) and a target EPR (75 or higher to be ENERGY STAR labeled), and generates the projected energy use required to meet the target. The estimated design energy use can then be compared to the target use to see if the proposed building will meet its goal. If it does not, the building can be redesigned to be more energy efficient to the extent necessary to meet its target.

Target Finder uses the same statistical framework as Portfolio Manager, flipped around to solve for a different variable. It should be noted that energy modeling or forecasting to estimate design energy use is conducted outside of Target Finder. Also, it should be noted that there are often significant discrepancies between energy forecasts and actual building performance (discussed in detail below). Therefore, there is no guarantee that a building designed to be ENERGY STAR labeled would perform at the level necessary to receive the label, once the building has been in operation for a year.

The Distinction Between Intended Design, As-Built Design and Actual Performance

As a prerequisite to understanding how to assess an energy forecast's reliability and accuracy, it is crucial to understand the differences between the intended design of a new construction project or upgrade, the as-built design and the actual operating performance of the building. This subsection addresses these concepts in turn.

Intended Design: The intended design is a set of physical property specifications for building orientation, lighting, HVAC and other mechanical components, for a building of a given size. The periodic (e.g., monthly or annual) energy consumption for such a design can be simulated through the use of energy forecasting models, based on assumptions for a given use and occupancy of the project such as:

- Floor plan
- Construction type
- Number of occupants
- Number of computers
- Hours of operation
- Building use (offices, computer rooms, lunch rooms, copy rooms, etc.)
- Lighting loads
- Plug loads
- Other

Energy consumption can be forecast in the baseline case (meeting minimum building codes) and for various combinations of energy efficiency features constituting various levels of sustainability, always using the same set of assumptions for building use and occupancy.

Forecast energy savings is the difference between a) the energy consumption forecast in the baseline design and b) the energy consumption forecast under a sustainable design, both for a given set of assumptions for building use and occupancy.

As-Built Design: The as-built design is the design of the building as actually constructed. The as-built design may deviate from the intended design for several reasons:

- Changes in project budget
- Integrated design opportunities revealed during construction
- Problems with implementing new technologies
- Poor construction
- Other

The as-built design may have more or less energy efficient features or different combinations of energy efficient features than the intended design.

Similar to the intended design, periodic energy consumption for the as-built design can be simulated through the use of energy forecasting models, based on assumptions for a given use and occupancy of the project.

Actual Operating Performance: After the building has been placed in service, the actual use and occupancy become known. Furthermore, the actual energy consumption becomes known and, typically after at least a year of operations, a baseline measure of actual annual energy consumption for the building can be developed.

Actual energy savings is the difference between a) the energy consumption forecast under the baseline design, given the actual building use and occupancy, and b) the actual energy consumption.

So who should be concerned with what? An Owner/User evaluating energy efficient designs for a new building, is going to be concerned with forecast energy savings, i.e., is the additional investment (if any) justified by the forecast energy savings? An investor considering designs for a new building (as well as a lender or appraiser) is going to be concerned more with the absolute level and cost of energy consumption, as this will translate directly to NOI and value.

Once the building is built and occupied, the occupancy and use profile represent the actual requirements of the Owner/User or Tenant. Whether or not these requirements were foreseen during the planning stages of the project, the Owner/User will benefit directly from the implementation of the energy efficient features.

3. The Importance of Energy Prices

Energy prices impact the underwriting of sustainable properties in several important ways – in estimating energy cost savings, in projecting cash flows and determining value, and in assessing risk.

First, energy cost savings anticipated from an investment in energy efficiency are defined as the quantity of energy saved times the price of energy. In modeling energy cost savings, engineers typically utilize the then current rate schedule from the utility companies that serve or will serve the subject property. Higher than anticipated energy prices result in higher savings, and lower than anticipated energy prices result in lower savings, for the same level of investment, all other things being equal.

Secondly, the absolute level of energy prices will determine future operating expenses and thereby impact projections of NOI and the appraised value of the subject property. Historical energy prices for electricity, natural gas and all energy sources (Total Energy) have demonstrated volatility over time. While prices are generally trending upward, spikes and fluctuations occur in the short run. This volatility is even more apparent when assessing monthly data. One indication of the uncertainty regarding energy prices is the fact that Total Energy prices rose at an average annual rate of 14.6% from 1970 to 1982, only 1.1% from 1982 to 2000, and increased at an average annual rate of 5.7% from 2000 to 2004.

Finally, the risk associated with rising and/or volatile energy prices will be mitigated by reductions in energy consumption at the subject property, and conversely will remain unmitigated in the absence of such reductions. The perception of reduced (increased) risk can cause cap rates and discount rates to be lower (higher).

As shown in Exhibit VI-5, the overall energy efficiency of commercial buildings actually improved from 1979 to 2003 as measured by a decline of 21% in energy intensity from 115.0 to 91.0 kBtu/sf. However, during the same time period, energy expenses in commercial buildings rose from \$0.78/sf to \$1.51/sf, an increase of 94%. This apparent anomaly is explained at least in part by a 119% increase in energy prices from \$5.21 to \$11.41 per million Btu from 1979 to 2003.

Exhibit VI-5			
U.S. Commercial Buildings Energy Intensity and Expense Select Years			
	Energy Consumption kBtu/sf	Energy Expense \$/sf	Total Energy Prices \$
1979	115.0	\$0.78	\$5.21
1983	98.2	\$1.13	\$8.39
1986	86.6	\$1.04	\$7.30
1989	91.6	\$1.12	\$7.55
1992	80.9	\$1.06	\$8.13
1995	90.5	\$1.19	\$8.28
1999	85.1	\$1.21	\$8.53
2003	91.0	\$1.51	\$11.41

Source: Energy Information Administration

The sensitivity of NOI and hence property value to energy prices can be analyzed by borrowing a concept from the dismal science of economics. The elasticity of property value (or NOI) with respect to energy prices can be defined as:

$$\text{Elasticity} = \frac{\% \text{ Change in Property Value}}{\% \text{ Change in Energy Prices}}$$

This price elasticity depends on the level of operating expenses in relation to Effective Gross Income, i.e., the operating expense ratio, and energy’s share of operating expenses at the subject property. Exhibit VI-6 presents the price elasticity of value for a range of expense ratios and energy’s share of expenses.

Exhibit VI-6							
Elasticity of Property Value with Respect to Energy Prices							
Energy Costs as a % of Operating Expenses	Operating Expense Ratio						
	20%	25%	30%	35%	40%	45%	50%
20% E Costs	0.05	0.07	0.09	0.11	0.13	0.16	0.20
25% E Costs	0.06	0.08	0.11	0.13	0.17	0.20	0.25
30% E Costs	0.08	0.10	0.13	0.16	0.20	0.25	0.30
35% E Costs	0.09	0.12	0.15	0.19	0.23	0.29	0.35
40% E Costs	0.10	0.13	0.17	0.22	0.27	0.33	0.40
45% E Costs	0.11	0.15	0.19	0.24	0.30	0.37	0.45
50% E Costs	0.13	0.17	0.21	0.27	0.33	0.41	0.50

Source: Green Building Finance Consortium

For example, this means that a property with a 35% operating expense ratio and energy costs that are 35% of operating expenses will have an energy price elasticity of value of 0.19. This implies that a 10% increase in energy prices will result in a 1.9% reduction in property value, all other things being equal. If energy costs are 50% of operating expenses, the same increase in energy prices will result in a 2.7% reduction in property value, all other things being equal.

Total energy expenses will depend on the mix of energy use at the subject property and the price of each source. As shown in Exhibit VI-7, the mix of energy consumption is generally consistent over different building sizes, although larger buildings tend to use less natural gas. Electricity and natural gas comprise the lion’s share of energy consumption for commercial buildings in the U.S., accounting for approximately 80% of energy use for buildings over 100,000 sf, 94% for smaller buildings, and averaging 87% for all buildings. The mix of energy consumption is generally consistent over different building sizes, although larger buildings tend to use less natural gas.

Exhibit VI-7								
Commercial Building Energy Consumption by Source: 2003								
(Trillion Btu)								
	Building Size Category (sf)							
	1,001 to 10,000		10,001 to 100,000		100,000+		All Buildings	
Electricity	685	55%	1,405	55%	1,469	54%	3,559	55%
Natural Gas	482	39%	909	36%	709	26%	2,100	32%
Fuel Oil	71	6%	74	3%	83	3%	228	3%
District Heat	[1]	0%	165	6%	460	17%	625	10%
TOTAL	1,248	99%	2,553	100%	2,721	100%	6,522	100%

[1] Insufficient data.

Source: Energy Information Administration

The Energy Information Administration maintains a vast amount of data on energy production, trade, consumption, prices and other information. Their home page is:

<http://www.eia.doe.gov/>.

Their Energy Overview can be found at:

<http://www.eia.doe.gov/emeu/aer/pdf/pages/sec1.pdf>

and their summary of Energy Prices can be found at:

<http://www.eia.doe.gov/emeu/mer/pdf/pages/sec9.pdf>.

4. Sustainable Property Energy/Carbon Reduction Features

Energy efficiency in commercial buildings can be achieved through a variety of combinations of features, some of which are physical and some of which are operational. Examples of physical characteristics of an energy efficient building are a properly sized, high efficiency HVAC system or motion sensors. Examples of operational characteristics are calibrating thermostats or the practice of day cleaning by the janitorial crew.

We have assembled a comprehensive list of features of sustainable properties, a subset of which pertains to energy efficiency, summarized in Expanded Chapter III, Appendix III-A in the Energy & Atmosphere and Operations & Maintenance sections. The list provides a description of each feature, definitions of key terms, and references to various sustainability rating systems and standards. It was compiled from interviews and a review of the primary sustainable property rating systems, trade associations, publications, books, case studies and websites, including the following:

- LEED (New Construction¹⁵, Existing Buildings, Core & Shell, Commercial Interiors)
- Green Globes
- ASHRAE 189P¹⁶
- NAHB
- BOMA International, 30 Easy Ways to Save Energy For Little or No Cost
- Sustainable Building Technical Manual¹⁷
- Green Building A to Z¹⁸
- And others

It should be noted that many of the LEED prerequisites and credits are outcome oriented, for example, Optimize Energy Efficiency. Achieving the outcome can be accomplished through a combination of features, such as daylighting, occupancy sensors, re-lamping, etc. In such instances, we have attempted to list these individual sub-features adjacent to the more general LEED feature. This list is somewhat data and LEED and other systems have evolved to include even more priority for energy investment. The Appendix does still provide a good overview of the menu of energy feature options.

Since part of our mission is to identify the linkages between energy efficiency features and underwriting, it is important to note that there are many such features that can have multiple impacts on property underwriting. For example, daylighting can reduce energy costs and thereby reduce operating expenses. It can also contribute to worker productivity and thereby increase rents.

The list is intended to be generic in nature and, therefore, is not specific to any particular property type. To a certain extent, common sense dictates the importance of certain

¹⁵ LEED-NC (New Construction) addresses design and construction features for both new buildings and major renovations of existing buildings.

¹⁶ ASHRAE 189P: Standard for High-Performance Green Buildings Except Low-Rise Residential Buildings (Public Review Draft May 2007). It should be noted that ASHRAE 189P is a standard for high-performance buildings and not a sustainability rating system.

¹⁷ Public Technology, Inc, USGBC

¹⁸ Jerry Yudelson, New Society Publishers, 2007.

features to a given property type. For example, daylighting will have significant positive effects in a retail context but may not be appropriate in an industrial context. Permeable asphalt is more important to retail or suburban apartments than to downtown office properties. In other instances, the professional design and engineering team will need to be involved in identifying the alternatives and assessing the applicability of various energy efficiency features to a specific property type and investment situation.

Sustainable Property Feature/Strategy Resources

A proliferation of resources is available to developers, investors, tenants, and corporate real estate professionals to assist them in understanding the general energy/carbon reduction strategies and sustainable features available to them. As the industry has matured during the last 2-3 years, the lists of optional features and strategies has become more specific to the types of decisions being made—new vs. existing, property type, etc.

Another key source of sustainable features ideas and insights are case studies. Most of the case studies performed to date are sufficient for use in identifying and screening ideas, but are not sufficiently detailed or financially oriented to be used effectively for property specific financial analysis.

There are lists and menus to fit most any level of detail and specification. The one list that is not available is the precise list of strategies and features appropriate for your property. That list will have to be determined through an integrated design/values process where you meet with the relevant stakeholders to decide what it is you value and how you want to pursue those values through sustainable design, construction and property operations.

The selection of documents and websites cited below is a sample of some sources we have found particularly useful to understanding the sustainable features and options available to sustainable property investors. Given the rapid growth in these types of resources, the web sites of key trade groups serving developers, investors, corporate real estate professionals, property type specialists, and key service providers like architects and engineers should be regularly consulted for the latest information. The resources below are weighted to North America, but are valuable for anyone evaluating sustainable buildings. Country and region specific resources should also be consulted.

A valuable source of information on the application of energy efficiency features in commercial buildings is the EPA Website, which includes a “Partners in Practice” section containing case studies of “best practices” implemented by ENERGY STAR Partners. It can be found at:

http://www.energystar.gov/index.cfm?fuseaction=partners_in_practice.showHome

Another useful resource is BOMA BEEP, the Business Owners & Managers Association Energy Efficiency Program. It is an educational program focused on teaching commercial real estate professionals how to reduce energy consumption and costs with proven no-cost

and low-cost strategies for optimizing equipment, people and practices. For more information, see, for example, “30 Easy Ways to Save Energy” at:

<https://www.boma.org/AboutBOMA/IndustryInsights/>

A description and assessment of select case-study databases is presented in Appendix III-B and at:

(<http://www.greenbuildingfc.com/Home/Reports.aspx>) The case studies presented in the RICS Green Value Study completed in 2005 are also good because they provide good detail, include interviews with tenants and owners where possible, and begin to focus on valuation and financial performance issues:

(<http://www.greenbuildingfc.com/Home/DocumentDetails.aspx?id=121>) More detail on case studies is available in the Research Library (15.2) and Industry Resources (15.2) sections of the Consortium’s website. (<http://www.greenbuildingfc.com/Default.aspx>)

Whole Building Design Guide: <http://www.wbdg.org/about.php>

The WBDG is the only web-based portal providing government and industry practitioners with one-stop access to up-to-date information on a wide range of building-related guidance, criteria and technology from a 'whole buildings' perspective. Currently organized into three major categories—Design Guidance, Project Management and Operations & Maintenance—at the heart of the WBDG are Resource Pages, reductive summaries on particular topics.

Development of the WBDG is a collaborative effort among federal agencies, private sector companies, non-profit organizations and educational institutions. Its success depends on industry and government experts contributing their knowledge and experience to better serve the building community.

The WBDG web site is offered as a service to the building community by the National Institute of Building Sciences (NIBS) through funding support from the Department of Defense, the NAVFAC Engineering Innovation and Criteria Office, the Army Corps of Engineers, the U.S. Air Force, the U.S. General Services Administration (GSA), the Department of Veterans Affairs, the National Aeronautics and Space Administration (NASA), and the Department of Energy, with the assistance of the Sustainable Buildings Industry Council (SBIC). A Board of Directors and Advisory Committee, consisting of representatives from over 25 participating federal agencies guide the development of the WBDG.

ASHRAE Green Tips:

http://www.engineeringforsustainability.org/docs/greentips_2006.pdf

ASHRAE identifies and describes 30 tips for implementing sustainable development. These tips cover key sustainable features and lay out strategies for implementation, cost considerations, and other resources to review.

ASHRAE Guides: <http://www.ashrae.org/publications/>

ASHRAE publishes a number of useful guides. The most specific to sustainability is the ASHRAE Green Guide, Design, Construction and Operation of Sustainable Buildings, 2006. This 390-page guide provides detailed descriptions and assessments of a broad array of sustainable features, processes, and strategies. This publication is available at a relatively small price.

Another good guide that is freely available is ASHRAE's Advanced Energy Design Guide.

New Buildings Institute Core Performance Guide, January 2008

<http://www.encyvermont.com/pages/Business/BuildingEfficiently/DesignResources/CorePerformance/>

The new *Core Performance Guide* offers a simplified approach to achieve predictable energy savings in small-to-medium-sized commercial buildings—without the need for energy modeling. This document brings together over 30 criteria defining high performance in building envelope, lighting, HVAC, power systems, and controls. With this easy-to-use tool, building design and construction professionals will be able to establish clear targets and implement strategies to cost-effectively reduce energy use in new buildings by 20-30% compared to the Vermont Commercial Energy Code (2005 Vermont Guidelines for Energy Efficient Commercial Construction based on IECC 2004 and ASHRAE 90.1-2004).

In general, the *Core Performance* requirements are most appropriate for new buildings and major renovations ranging from 10,000-70,000 square feet for offices, schools, and retail, but you can apply the concepts to projects of any size and building type.

Green Rehabilitation of Multifamily Rental Properties and Green Operations and Maintenance, Guide and Toolkit, Bay Area LISC and Build it Green, 2008

<http://www.greenbuildingfc.com/Home/DocumentDetails.aspx?id=854>

<http://www.greenbuildingfc.com/Home/DocumentDetails.aspx?id=856>

Excellent practical guides to developing and operating sustainable multi-family properties.

YourBuilding.org, Australia

<http://www.yourbuilding.org/display/yb/Home>

One of the best sustainable building websites in the world specifically designed for investors, developers, space users, valuers and other private sector participants. This site is very rich with detail across many aspects of design, valuation, marketing and many other key areas. Most importantly, it is intelligently organized around terms and categories that will ring true to real estate industry representatives. Don't check this site out if you have anything else to do today, it is seductive with all its internal links.

Better Bricks, Website, Northwest Energy Efficiency Alliance, USA

<http://www.betterbricks.com/>

This is another excellent all around website notable for its organization around property types, separating operations from design and construction, and practical easy to use functionality. Many excellent resources including the High Performance Portfolio Framework which provides some insights on the process of moving towards greater energy efficiency/sustainability from the perspective of owners, users, and other private real estate participants. <http://www.betterbricks.com/DetailPage.aspx?ID=673>

BuildingGreen.com

<http://www.buildinggreen.com/menus/topics.cfm>

This is an excellent well-organized web site with an excellent bibliography, searchable product database and a Learning Center with links to many lists of key sustainability features and articles. Also the home of one of the largest case study databases in the industry.

BOMA International Green Resources and Energy Efficiency Network

<http://www.boma.org/BOMA/Templates/Org/GeneralTemplate.aspx?NRMODE=Published&NRORIGINALURL=%2fAboutBOMA%2fTheGREEN%2f&NRNODEGUID=%7bB26487D-2B2D-45D7-8876-E8A1DBF7E496%7d&NRCACHEHINT=NoModifyGuest#>

Numerous sustainability resources including 30 easy ways to save energy.

International Council of Shopping Centers Sustainability Portal

<http://www.icscseed.org/event/icsc-retailgreen-conference-and-trade-exposition>

Many resources including link to a green retail best practices database sponsored by Greening Retail.

Lawrence Berkeley National Laboratories Energy and Environmental Technologies Division

<http://eetd.lbl.gov/r-bldgsee-cb.html>

This website provides access to scores of interesting studies and guidance on energy, Indoor Environmental Quality (IEQ), and related sustainability topics.

American Institute of Architects, Best Practices Guides

<http://www.aia.org/bestpractices>

Extensive collection of writings on a broad array of architectural best practices with many sustainability topics covered in areas including contracts, design, etc.

Natural Resources Defense Council

<http://www.nrdc.org/buildinggreen/strategies/default.asp>

Strong website with well-organized practical suggestions for sustainable building.

UC Berkeley Center for the Built Environment Studies

<http://www.cbe.berkeley.edu/research/publications.htm>

The Center's projects fall into two broad program areas: First, their research team and industry partners are developing ways to "take the pulse" of occupied buildings--looking at how people use space, asking them what they like and don't like about their indoor environment, and linking these responses to physical measurements of indoor environmental quality. This feedback is highly valuable for those who manage, operate, and design buildings. Secondly, they are studying technologies that hold promise for making buildings more environmentally friendly, more productive to work in, and more economical to operate. This helps the center's manufacturing partners to target their product offerings, and facility management and design partners to apply these new technologies effectively.

Whole Building Integration for Commercial Buildings and Commercial Building Design and Performance, National Renewable Energy Laboratory

http://www.nrel.gov/buildings/comm_whole_building.html

http://www.nrel.gov/buildings/comm_building_design.html

Two excellent websites with substantial detailed information on many features and processes.

DOE Energy Efficiency Toolkit

<http://www.eere.energy.gov/buildings/highperformance/toolbox.html>

Excellent site covering all aspects of energy planning and implementation.

Flex Your Power, State of California

<http://www.fypower.org/about/>

Flex Your Power is California's statewide energy efficiency marketing and outreach campaign. Initiated in 2001, Flex Your Power is a partnership of California's utilities, residents, businesses, institutions, government agencies and nonprofit organizations working to save energy. The campaign includes a comprehensive website, an electronic newsletter and blog, and educational materials. Flex Your Power has received national and international recognition, including an ENERGY STAR Award for excellence.

24 No-Brainers for your Next Project, Alan Whitson, Building Design and Construction, November 2006.

<http://www.greenbuildingfc.com/Home/DocumentDetails.aspx?id=962>

The title says it all. This is a quick checklist of issues to consider based on Mr. Whitson's substantial experience in the field. His presentations "Green to Gold," "Lighting for Profit," and others provide significant detail on sustainable features with some of the most direct and practical advice regarding cost-benefit implications in the market today.

Carnegie Mellon School for Architecture, Center for Building Performance and Diagnostics http://www.arc.cmu.edu/cbpd/iw/iw_about.html

This site provides a listing of some of the key features for the structure, enclosure, interior, lighting, controls, connectivity, and HVAC. The Center has much more information, including their BIDS system, which has the most complete and organized assessment of building related scientific studies influencing the workplace that I have seen, but it is not generally available except to financial supporters of the Center.

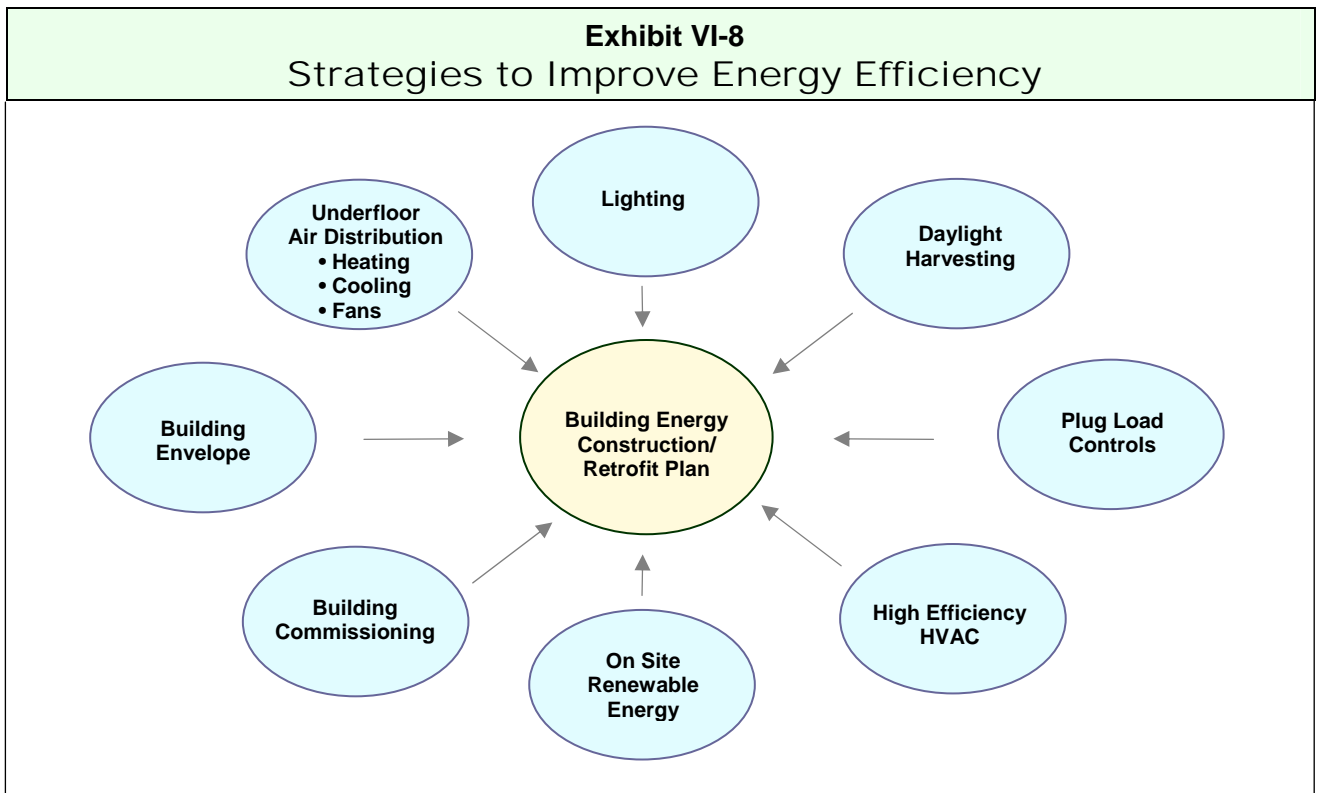
Carnegie Mellon's BIDS, Building Investment Decision Support, is a case-based decision-making tool that calculates the economic value added of investing in high performance building systems based on the findings of building owners and researchers around the world. The framework of multiple life-cycle variables to cost justify key design innovations within a rich data base of international case studies, and the EVA/NPV calculator that incorporates a range of financial assumptions linked to international organizations, is fully patented by U.S and Pennsylvania law as well as legally adopted by all Advanced Building Systems Integration Consortium (ABSIC) members.

5. Sustainable Property Energy Features and Building Outcomes

A sustainable features based approach to understanding sustainability is a good first step, and necessary to financial analysis, but it is the eventual measurement of building outcomes/performance that will have the greatest long-term effect on financial performance. As shown in Exhibit VI-8 below, there are at least eight major "features" to employ in developing a building energy construction or retrofit plan: lighting, daylight harvesting, plug load controls, building envelope improvements, high efficiency HVAC, on-site renewable energy, under-floor air distribution, and building commissioning.

- **Lighting:** Design lighting to occupant and task; maximize fixture, lamp and ballast efficiency; use automatic controls, high efficiency light bulbs, LED lighting, occupancy sensors, timers.
- **Daylight harvesting:** Windows, skylights, clerestories (vertical windows placed at or near the top of exterior walls), and monitors (stepped roof combined with clerestories), daylighting controls.
- **Plug load controls:** Efficient vending machines, EnergyStar copiers, faxes, and printers.

- **High efficiency HVAC:** “Right size” equipment, high efficiency components, energy efficient motors, various speed drives, improved controls, economizer strategies.
- **On-site renewable energy:** Photovoltaic systems, passive solar systems, geothermal heating/cooling systems.
- **Building commissioning:** Verification and testing of systems and performance.
- **Building envelope:** Light or reflective roofs, double- or triple-glazed windows, shading strategies, shading projections, interior shading devices, high-performance glazing.
- **Underfloor** The Evidence of Space User Demand **air distribution:** Floor by floor air handling units, thermal insulation of decks, etc.



The key point illustrated by Exhibit VI-8 is that, depending on the features chosen, and the specific strategy employed for a particular property, there are many different ways to achieve building energy efficiency. In developing a building energy or construction/retrofit plan, it is also important to take a holistic approach, explicitly evaluating the many interrelationships among energy efficiency strategies. For example, the level and type of lighting, or daylighting, will have significant implications for heating, cooling and thermal comfort. The overall projected energy use will affect the size of the HVAC system required.

Process issues are also critical to determining the best combination of sustainable features for a property. Critical to potential energy performance is having electrical engineers and building operations people provide appropriate early input. Experienced building commissioning agents can also provide value from the start of a project, rather than just performing a test at the end.

Again, from a financial perspective, the best way to deal with all the complexities of the various features is to focus on actual building performance. The problem with this strategy is that so much of sustainable investment involves forecasting how changes or additions to the sustainable features in the building will change the energy or water use. Accordingly, underwriters and appraisers will need to conduct their due diligence using energy performance forecasts prior to getting actual building performance data in many cases.

6. Feature/Strategy Based Financial Analysis Tools

There is also a plethora of modeling and evaluation tools for individual energy efficient features that provide not only estimates of energy savings but in some instances, financial evaluations as well. One very useful source of information for many of these features is the U.S. Department of Energy (DOE) Energy Efficiency and Renewable Energy website¹⁹:

http://www.eere.energy.gov/buildings/tools_directory/subjects.cfm/pagename=subjects/pagename_menu=other_applications/pagename=subjects

http://www.eere.energy.gov/buildings/tools_directory/

http://www.eere.energy.gov/buildings/tools_directory/alpha_list.cfm

The website contains a list of energy modeling tools along with a detailed assessment of each:

This directory provides information on 345 building software tools for evaluating energy efficiency, renewable energy, and sustainability in buildings. The energy tools listed in this directory include databases, spreadsheets, component and systems analyses, and whole-building energy performance simulation programs. A short description is provided for each tool along with other information including expertise required, users, audience, input, output, computer platforms, programming language, strengths, weaknesses, technical contact, and availability. (Source: U.S. DOE website)

¹⁹ While we note this as a source of information on modeling individual energy efficiency features, it is also a source of information on whole-building energy simulation models.

A comprehensive assessment of Traditional Sustainability Financial Tools well suited to cost-based feature and strategy analysis is presented in Chapter V: “Sustainable Property Financial Analysis,” Section C-2 and in more detail in Appendix V-A.

7. Underwriting Process for Energy/Carbon Reduction Investment

A key ingredient in the energy investment underwriting process is a forecast or projection of the dollar savings that the investment is likely to yield over time. For new construction or major renovations, this projection typically relies on some sort of energy model to analyze how the interaction of the specific design features of a property affect overall energy use. This model output of energy use can then be compared to a “baseline” building, typically one that meets minimum building code requirements for the jurisdiction in which the property is located or in the case of a retrofit can also be compared to existing energy use or use presuming conventional improvements. The energy savings can then be converted to a dollar figure, using energy price forecasts. However, many energy modelers caveat their analysis so that it is not predicting absolute energy costs, but only the marginal savings due to specific energy saving measures.

In this section, we identify key energy forecasting risks and outline best practices for underwriting focused on assessing the reliability and accuracy of energy forecasts from a laypersons (non-engineering) perspective.

Energy Forecasting Risks

The key risk of energy models and their forecasts is that the actual building fails to live up to the performance indicated in the model. A significant underperformance of expected energy savings would have a negative impact on net operating income (NOI), reducing expected building value and the owner/ investor’s rate of return (ROI). In an extreme scenario, this underperformance could even cause the building to breach a debt service coverage ratio covenant, or at a minimum drastically alter Simple Payback or Simple ROI calculations upon which investment decisions may have been based.

Below, we discuss the reasons why 1) energy forecasts differ from actual energy performance; and 2) energy savings forecasts may differ from (i.e., fall short of) actual energy savings. These findings are based on a review of key literature and interviews with ten top energy-forecasting specialists.

1. Energy forecasting models, while generally considered fairly accurate, are subject to some level of intrinsic error ranging from 10% to 20%. This forecasting error is interpreted as the percentage error between actual energy consumption and forecasted energy use based on a building’s actual design characteristics and use profile, including actual energy used.

Examples of whole building energy simulation models include eQuest, DOE-2, Trane Trace, EnergyPlus, 700, and GB Studio. There are many modeling and

evaluation tools for individual energy efficient features that provide estimates of energy consumption and energy savings. The U.S. Department of Energy website provides an assessment of numerous energy modeling tools, and the Center for the Built Environment website <http://www.cbe.berkeley.edu/> contains various assessments of energy forecasting models as well.

2. The accuracy of the forecasts closely depends upon the skill level of the modeler. Skilled modelers can tweak or trick the model to adjust for factors that might otherwise be outside the capabilities of the model. In some instances, highly skilled modelers will write and validate new algorithms to address specific design features. However, sometimes the tedious task, including making decisions on many assumptions, is assigned to newer, less-skilled staff members. Energy modeling is part art and part science, and energy-modeling practices are not consistent.
3. Given the proliferation of new building technologies, it has been increasingly difficult for modeling software to keep up. For example, it can be difficult for a model to accurately integrate the effects of daylighting and natural ventilation.
4. The design parameters of the building fall outside of the range that the model can adequately handle. For example, while models account for window area, building design may include a particularly large amount of window area. Another example is a model's ability to simulate daylighting effects for a 15-foot deep room, while the design calls for a 30-foot deep room.
5. The model or modeler does not adequately address property type issues that arise, for example, in big-box retail, laboratories, hospitals or other specialized property types, nor addresses unusual design features such as building arms, wings or projections.
6. There are design flaws in energy efficiency components that may be relatively new and/or untested. The components do not perform as expected.
7. Thermal massing causes cooling loads to be greater than anticipated. Thermal massing results from the absorption by building components of heat generated from solar, machinery, human and other sources.
8. The building is not built to the original design specifications--energy efficient features have been omitted or improperly installed.
9. The building is not built to the original design specifications: space design has changed, adding lunchrooms, additional copy rooms, etc.
10. The building is not operated in the same manner as the assumptions used in the design phase:

- Process energy (described above) was not taken into consideration on the design phase.
 - Occupants or facility managers override energy saving features.
 - Longer hours of operation.
 - More occupants.
11. Sustainable O&M techniques are not employed. Research has indicated that buildings with sound O&M practices may outperform other buildings that have more energy efficient features.
 12. Sufficient time was not allowed for the building to “settle down” after being put in service and before measuring energy consumption. A rule of thumb is that it takes about one year for a newly constructed building to settle down or stabilize in terms of its energy consumption.
 13. Fundamental commissioning was not performed. If energy efficient systems have not been commissioned to operate as designed, expected performance levels will not be obtained.
 14. Actual variations in weather: Energy models are based on assumptions about local historical weather patterns. In the first year a new building is benchmarked against modeled performance, weather may be more severe than assumed during the design phase.
 15. Improper weather benchmarking: In locations that are subject to micro-climate variations (such as the San Francisco Bay Area of California), weather at the site may differ from the weather at the location from which historical data was taken in the modeling process, for example, at an airport.
 16. For existing buildings, prior deferred maintenance in relation to upgrades leads to increased energy use. For example, replacing broken light fixtures that used no energy with energy efficient fixtures that use some energy will increase energy consumption and energy costs.
 17. Actual energy prices may differ from those used to forecast energy cost savings. Energy models typically include forecasts of energy costs for the building as well as consumption. Total energy consumption for the year is based on an hour-by-hour simulation of energy consumption. Energy costs are based on assumptions about energy prices, which are usually assumed to be the prices in effect at the time the modeling is done, including peak, off-peak, shoulder and other utility pricing mechanisms. If energy prices are higher or lower than assumed in the modeling process, actual energy cost savings will differ from the forecast. A more detailed analysis of the importance of energy prices in underwriting energy efficiency investments is provided below.

Proposed Best Underwriting Practices for Energy Efficiency Forecasting

This section presents our summary of proposed best practices for underwriting energy efficiency forecasting in real estate. Keeping in mind that underwriters will approach these decisions using tried and true fundamental methodologies, it is a summary of things to look for and questions to ask that are distinctly different when considering energy efficiency investments. It starts with an overview of the impacts on the underwriting process of recognizing the “value” of energy, followed by the special considerations relating to forecasts of energy performance, qualifications of key service providers, and the issues of split incentives and capital and operating budget conflicts.

Overview of the Energy Efficiency Underwriting Process

To aid in understanding where energy forecasting fits, we provide an overview to the broader question of underwriting energy efficiency investment. A stakeholder underwriting an energy investment decision needs to go through the following comprehensive analytical process:

- What is the menu of features available?)
- What combination of features is optimal in my situation?
- What is the initial cost of the set of features?
- What are the forecast energy cost savings and offsets from the investment?
- What situations can cause such a forecast to be inaccurate? (See detailed list of questions for vetting an energy forecast below.)
- What are the non-energy savings and offsets from the investment?
- What are the risks associated with implementing the feature(s)?
- What is the risk mitigants associated with implementing the feature(s)?
- Who benefits from the feature(s)?
- Will I pay for the entire cost or will some other private party share it?
- What is the best way to finance the investment (See ESCOs.)?
- What are the tax benefits of implementing the feature(s)?
- What is the success or failure experience associated with implementing the feature(s)? (e.g. case studies)
- What problems have others encountered in implementing the feature(s) and how did they solve them?
- What is the theoretical link between the feature(s) and all possible beneficial financial outcomes (such as higher rents, lower expenses)?
- What are the financial, non-property-specific benefits of the feature(s), such as corporate reputation, recruiting benefits, access to SRI capital, etc.?

- What are the public, non-monetized benefits of the feature(s), such as cleaner air, etc.?
- What evidence supports the linkages noted above?
- What are the strengths and weaknesses of the evidence?
- How does the evidence apply to my property type?
- What must I do to ensure that integrated design concepts are incorporated into my proposed set of features?

By finding the answers to these questions, real estate stakeholders will come closer to making optimal decisions regarding energy efficiency investments in real estate.

Assessing the Reliability and Accuracy of Energy Performance Forecasts

Given the importance of assessing the reliability and accuracy of energy forecasts, we have prepared a list of questions that will assist the underwriter in this process.

Questions to Vet Forecasts of Energy Cost Savings

- What benchmark data is available from comparable conventionally designed properties?
- Have clear and aggressive energy use targets been identified?
- Which combination of energy efficiency strategies would be most effective for this project?
- Are there any design features that are outside of the range of the energy model's capabilities?
- How reliable is energy modeling?
 - How much experience does the engineer have with this type of modeling project?
 - Have their modeling results on other projects been reviewed to compare modeled vs. actual results?
 - What benchmarks can be utilized to track accuracy and highlight variances to the norm?
 - What data is available to support modeling results in similar projects with similar systems?
- Have different design alternatives been modeled?
 - Model and analyze energy efficiency strategies collectively, not independently (for example, a project such as upgrading an inefficient chiller that may have a 3-year payback when analyzed in isolation could instead have a 5-month payback when coupled with load-reducing strategies such as high-efficiency lighting or high-performance glazing.) Combining a lighting

retrofit and high-performance glazing [with a] new smaller chiller might have the same capital cost as a larger chiller. Additional benefits may [be] derived from more efficient operations and consequently lower operating costs.

- How will you ensure that the alternatives will meet the objectives?
- How will building performance be monitored over time?
 - Does the design allow for operational enhancements as needed?
 - How will adjustments be made and subsequently measured?
- Has the design team fully vetted potential negative design elements and identified appropriate mitigants? For example, daylighting can have the unintended consequence of glare and excessive heat. Mitigants may include proper glazing, or the use of outside design features to block direct sun from work surface.

Many of the risks to reliable and accurate forecasts above can be effectively mitigated with three important steps: using an experienced energy modeler, hiring a competent commissioning agent, and ensuring proper measurement and verification.

Experienced energy modelers can often tweak the modeling software packages to more accurately reflect cutting-edge features and building nuance that less-experienced modelers may miss. They will also have a track record of modeling projects and can provide the owner with a reasonable idea of the range of variation to expect from the predicted results based on experience.

Competent commissioning agents will work with the building systems to ensure that they perform as designed, thereby providing more accuracy to energy forecasts. They will also run functional tests of the buildings systems before occupancy and check how close these systems come to their expected performance. If they underperform significantly, a good Commissioning agent will also be able to develop solutions to the problem.

Proper measurement and verification (M&V) will also provide the O&M staff with live data to verify that the building is performing as expected. This way, if they see actual energy use significantly higher than predicted energy use, they can diagnose the systems in order to bring actual energy use more in line with the predicted values, assuming that they are trained in how to interpret and act upon the M&V data.

Conflicts Between Capital and Operating Budgets

The discussion thus far has been predicated on the assumption that energy efficiency decisions are made at the enterprise level. That is, some decision-maker or decision-making body attempts to make a decision that will optimize enterprise value, based on all costs, benefits and risks affecting the enterprise. However, this is not always the case. In some organizations, there is a separate decision-making process, and a separate decision-

maker, for operating budgets and capital budgets. While certain energy efficiency upgrades may have a worthwhile positive impact on reducing operating expenses, they may not be undertaken because funding would have to come out of a capital budget, and decision makers who control the capital budget may have different priorities. It should be noted that these conflicts could exist even when the same person is responsible for both capital and operating budgets.

A possible solution to this barrier to efficient investing is for the enterprise to restructure management and incentives to allow for an integrated approach to decision-making and optimal enterprise level decisions to be made.

8. The Evidence of Building Energy Performance

Underwriting energy/carbon reduction investment requires both a process and set of practices, but also evidence of the reliability of initial development costs estimates, energy forecasts, and longer term building energy performance. For decisions on the implementation of specific features like daylighting or lighting controls, additional evidence of performance at the feature level is needed. Below, we summarize some of our performance findings presented in detail in Chapter IV, Sections C, D and E: “Building Energy Use”

Development Costs

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.) promote publicly that sustainable construction should cost no more, and the research shows that in many cases it does not.

Perhaps the biggest cost barrier for sustainable property investment is not measured in dollars, but in implementation time and risk. For example, you can show a developer that studies have shown that a sustainable building will only “cost” 2% more, but they still have legitimate “cost” concerns. The sustainable building process will require new types of contracts, leases, insurance, subcontractors, and contractors, and will require a more integrated design and project management process, different than what the developer has been used to. What is the cost of these required changes? Sophisticated discussions of costs and proper interpretation of the surveys that are done in the marketplace require consideration of this question.

The uncertainty surrounding estimates of initial costs is mitigated by the fact that a number of studies (summarized above) indicate little or no additional costs to build a sustainable project. Clearly, caveats to this view include the necessity of employing integrated design techniques and the extent to which a project exceeds minimum energy

efficiency requirements for sustainable certification. With regard to energy efficiency in particular, one such study noted:

If the decision to pursue energy efficiency is made early in design, it should be possible to meet minimum requirements [LEED prerequisites] without adding cost. With an integrated design approach, savings may even be realized. If energy efficiency is not addressed early the costs can become significant.

Many energy efficiency measures involve little or no additional cost, but rather focus on efficient design, right sizing of equipment, and improvements in basic building systems.²⁰

The costs of achieving higher levels of energy efficiency are also highly dependent on property type as well as geographic location:

For some building types, improvements in energy efficiency can actually lead to reduced construction cost, since the improvements come from reducing dependence on mechanical systems and improving the passive design of the building. Examples where this can occur include libraries, community centers, schools, and such like, particularly where the climate is relatively benign. For other building types, such as hospitals and laboratories, higher levels of energy efficiency can involve significant increases in first cost.²¹

These observations relate primarily to new construction projects where there is virtually unlimited latitude with regard to building design. Alternatively, in the case of an energy efficiency upgrade to an existing building, where key design elements such as building orientation and envelope are fixed, initial costs will most certainly be greater than zero.

Substantial additional detail on initial or “first” costs is presented in Expanded Chapter V, Appendix V-A, Section C1 and on pages 79 to 84 of Expanded Chapter IV: “Sustainable Property Performance.”

Energy Process and Feature Performance

Substantial additional detail is provided on the identification of risks, implementation best practices and performance evidence for Daylighting, Lighting Controls, Integrated Design, Commissioning, and Measurement and Verification in Chapter IV, Sections C. and D. As discussed in detail in that chapter, careful evaluation of features and processes is a critical component of sustainable property underwriting that can significantly reduce risks.

²⁰ “Cost of Green Revisited: Re-examining the Feasibility and Cost Impact of Sustainable Design in the Light of Increased Market Adoption”, Davis Langdon, 2006.

²¹ Ibid.

Building Energy Use

In summary, evidence from the key studies to date looking at actual energy-use savings from LEED certified buildings²² suggests such buildings use 15% to 40% less site energy than non-LEED buildings, consistent with the anecdotal evidence the Consortium has reviewed from numerous case studies.²³ Actual energy savings in EnergyStar buildings has also been found to be in the 30% range.

Key studies agree that while average site energy savings are 15% to 40%, or approximately 30%, there is 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 forecast savings. Many factors are cited to explain the variability in forecasts including the occupancy type and energy intensity of the users.

The most widely cited source of energy performance evidence, the February 2008 New Building Institute study, has been challenged by subsequent research. The 2008 NBI study concluded that LEED certified buildings on average use 25-30% less energy than non-LEED buildings. An initial follow-up study refining the NBI data and analysis concluded that energy savings were as low as 18%, ranging from 18% to 39%, but that 28% to 35% of the LEED buildings actually used more energy than similar conventional buildings. A second follow-up study reported as its main conclusion that LEED office buildings on average used 17% less site energy, but total source energy for LEED buildings was actually higher than the corresponding average for similar commercial stock.

Each of these three key studies brings up a myriad of complex statistical and energy measurement issues, and offers conclusions that suggest investors/valuers need to be careful in applying any general statistics to specific property analysis, and be naturally 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.

This rest of this section in Chapter IV contains an overview of select reports, articles, academic studies and case studies that provide evidence of the link between sustainable

²² 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.

²³ 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.

certification, energy efficiency, and real estate returns and value. Its purpose is to provide decision-makers with a general sense of how these linkages are assessed and the order of magnitude of what one can expect from energy efficiency investment.

9. The Impact of ESCOs on Underwriting Energy Efficient Investment

The analysis thus far has been predicated on the assumption that all costs, benefits and risks accrue to the enterprise making the investment decision. However, financing structures exist to shift these costs, benefits and risks, in whole or in part, to a third party, thus dramatically changing the approach to the underwriting decision. For example, this shift can eliminate the initial cost of the investment and strip off only a portion of the energy cost savings to the building owner. Such arrangements are typically referred to as Energy Performance Contracting (EPC) and Energy Service Companies (ESCOs). A useful description of EPC is found in “Introduction to Energy Performance Contracting” is excerpted below:

EPC is a turnkey service, sometimes compared to design/build construction contracting which provides customers with a comprehensive set of energy efficiency, renewable energy and distributed generation measures and often is accompanied with guarantees that the savings produced by a project will be sufficient to finance the full cost of the project. A typical EPC project is delivered by an Energy Service Company (ESCO) and consists of the following elements:

- **Turnkey Service** – The ESCO provides all of the services required to design and implement a comprehensive project at the customer facility, from the initial energy audit through long-term Monitoring and Verification (M&V) of project savings.
 - Energy audit
 - Design engineering
 - Construction management
 - Arrangement of long-term project financing
 - Commissioning
 - Operations & Maintenance
 - Savings Monitoring & Verification

- **Comprehensive Measures** – The ESCO tailors a comprehensive set of measures to fit the needs of a particular facility, and can include energy efficiency, renewables, distributed generation, water conservation and sustainable materials and operations.
 - Lighting
 - Heating, air conditioning and ventilation
 - Control systems
 - Building envelope improvements (insulation, roofs, windows, etc.)
 - Cogeneration and CHP
 - Demand Response
 - Renewables and biomass
 - Water and sewer – metering and use reduction
 - Sustainable materials and operations

- **Project financing** – The ESCO arranges for long-term project financing that is provided by a third-party financing company. Financing is typically in the form of an operating lease or municipal lease.
- **Project Savings Guarantee** – The ESCO provides a guarantee that the savings produced by the project will be sufficient to cover the cost of the project financing for the life of the project.²⁴

In 2006, 58% of ESCO activity came from the MUSH sector (municipal and state governments, universities and colleges, K-12 schools, and hospitals) and 22% came from the federal sector. Only 9% of ESCO activity came from the commercial building sector, with limiting factors including the following:²⁵

- Split incentives between landlords and tenants
- Short-term leases
- High investment hurdle rates for non-owner occupied space
- Owners' perception that long-term debt will hinder property resale

One innovative approach to the last obstacle in the list is to tie the repayment obligation to the building utility meter rather than the building owner. This is essentially the same as having the new owner assume the obligation or debt that financed the energy efficiency upgrade in the first place.

Another useful summary of the role of ESCOs is found in the *Sustainable Building Technical Manual*:²⁶

Many private companies are realizing the potential profits of energy financing and have specialized in energy-efficiency equipment financing and installation. These enterprises are known as energy service companies (ESCOs) that specialize in retrofitting buildings with state-of-the-art energy equipment. In most cases ESCOs are for-profit companies that can finance, plan, and manage a retrofit project.

Energy-efficiency projects are generally arranged so energy savings are greater than monthly financing costs, thus establishing a positive cash flow for the project. In some cases the building owner arranges for its own financing and then pays the ESCO to install and possibly manage the system. In this case, the ESCO serves as a specialized engineering firm and is paid for its services. In many cases, the ESCO arranges for financing (either through its own resources or through a third party). Financing through an ESCO may result in higher financing costs since ESCOs do not receive interest rates as favorable as municipalities.

²⁴ "Introduction to Energy Performance Contracting", ICF International and National Association of Energy Services Companies, October 19, 2007, pp. 1-2, 6-7.

²⁵ "Introduction to Energy Performance Contracting", ICF International and National Association of Energy Services Companies, October 19, 2007, pp. 17-18.

²⁶ *Sustainable Building Technical Manual: Green Building Design, Construction and Operations*, produced by Public technology Inc., US Green Building Council, Chapter 24.

ESCOs will usually audit energy expenditure before the retrofit project and monitor after the project's completion to guarantee energy savings. Additionally, some ESCOs will assume responsibility for all or part of building operations. Involvement of facility managers and their staff during the entire retrofit (from audit through commissioning) is considered essential for project success.

The Manual concludes that the benefits of contracting with ESCOs are that they:

- Offer specialized financial and technical expertise and experience;
- Guarantee energy savings and therefore minimize the financial risk;
- Offer a range of creative financing options;
- Perform building energy audits and suggest cost-effective energy technologies and measures; and
- Assume the administrative burden of monitoring and verifying energy costs.

The Manual summarizes four types of contractual arrangements for compensating the ESCO contractor and allocating energy cost savings:

1. **Fixed Percentage:** The practice of “shared savings” where the contractor receives a set percentage of the savings over the previous energy consumption for a set period of time.
2. **Direct Payout:** The contractor receives all of the savings for a set period of time, also known as a “fast payout.”
3. **Fixed Saving:** A “chauffage” agreement where the building owner is guaranteed a level of saving, with any shortfalls met by the contractor or any excesses paid to the contractor for a set period of time.
4. **Flat Fee:** An “energy savings” agreement where the contractor is paid a set fee for energy services. If the building uses less energy, the contractor keeps the difference. If the building uses more, the contractor pays the difference.

One area of concern for ESCOs is dealing with the uncertainties of energy savings projects. These uncertainties can result in what appear to be high premiums for guaranteeing 100% of the projected savings, or alternatively, some companies guaranteeing only a portion, say 50%-100%, of projected savings. When guaranteed savings are lowered, many projects no longer meet the financial requirements for adoption.²⁷ The overriding problem is a lack of data to establish actuarial-like analysis of the risks of project performance to allow for more accurate pricing of performance contracts.

Another key issue for performance contractors is getting performance contracts for total energy use, rather than on a piecemeal basis for various features and strategies. Progress is being made on more comprehensive performance contracts, and alternative comprehensive

²⁷ See “From volatility to value: analyzing and managing financial and performance risk in energy savings projects”, ENERGY POLICY, Evan Mills, Steve Kromer, Gary Weiss, Paul A. Mathew. www.elsevier.com/locate/enpol

service delivery approaches, offering the potential for an expansion of this market in the future.

F. Underwriting Space User Demand

A potential increase in demand for a sustainable property by space users is one of the most important benefits that a property can achieve.²⁸ Space user demand is the foundation of enhanced revenue, increased investor demand, and the reduction of potential economic obsolescence.

This section provides some insights into the process for evaluating space-user demand. The term space user demand is used because in doing valuation or market analysis, much of the detailed work talking with brokers and tenants, evaluating tenant profiles and leases, and forecasting future supply and demand conditions is done with the intent of understanding what tenants in the market demand, and how the subject property meets projected demand given its location, size, floorplate, access, and other building and/or submarket attributes.

Once demand is understood, valuers and underwriters assess the financial implications of tenant demand by evaluating a property's tenant demand relative to comparable properties. Rental rates, future rental rate increases, absorption rates, equilibrium occupancies, lease terms, tenant retention rates and capitalization and discount rates are then selected. Valuer research on tenant demand will influence their selection of each of these key financial model inputs.

The full process for underwriting space user demand, which of course varies dramatically by property type and geography, is discussed in many other books and publications and not discussed in detail here. In this section, we provide some insights and practices for evaluating space user demand for sustainable properties that complements the more complete space user demand analysis that is typically done by valuers or underwriters.

A key conclusion of the Consortium's work is that the process for evaluating space user demand does not have to fundamentally change for sustainable properties. Given the structured process the real estate industry has developed for integrating many different quantitative "sub-financial" analyses into the qualitative process of selecting rents, occupancies and other financial model inputs, it is well suited to the assessment of properties with sustainable attributes.

²⁸ "Space user" is a term we use to describe the occupants or users of real estate. It is a term that includes corporate or non-corporate occupants, tenants, retail customers or other non-owner or tenant users of space.

1. Space User Market Segmentation Analysis

The process for evaluating enhanced space user demand, and the ability of an owner to monetize these benefits through higher rents, occupancies, faster absorption, etc., starts with an assessment of the types of space users (tenants or owner occupants) expected for a property. What key issues drive these particular types of tenants? Are they influenced by their internal or external commitments to carbon disclosure or reduction? Do they care about potential health or productivity benefits? Is an environmentally or socially responsible reputation important to them, their customers, or employees?

The following five space user segments serve as a starting point for assessing potential demand for sustainable property by space users:

- Space users significantly influenced by enterprise value;
- Government tenants with sustainable real estate policies or mandates;
- Vendors/suppliers encouraged/required by customers to consider sustainability;
- Space users with direct ties to sustainability; and,
- “Friends” of sustainability.

Each of these space user segments is discussed below.

Space Users Significantly Influenced by Enterprise Value

Enterprise Value Analysis is a new type of sustainability sub-financial analysis that needs to be more rigorously applied to the property markets. The focus of this type of analysis is on the value created by sustainable property investment at the enterprise level. Significant work has been done in recent years to better understand and measure the non-real estate (business unit or enterprise) value of real estate decisions. The types of benefits from sustainability investment that are analyzed in this type of analysis include employee attraction and retention, leadership value, promotional value, health and productivity benefits, and other related benefits.

One challenge to the analysis and articulation of the value of sustainable property investment to the enterprise is in transitioning from a general discussion of these benefits to a discussion about the potential magnitude of these benefits for a specific property. The influence of potential enterprise value benefits on the decision of space users will vary based on the types of space users, their business strategies, the demographics of their employees, and the nature of the customers that they serve, among other factors.

Once an understanding of the key drivers of potential space users is established, the next step is to assess the likelihood of whether the subject property will generate the types of sustainable outcomes-building performance important to expected occupants. Some of the key sustainable property outcomes that generate Enterprise Value include:

- Reduction in resource use

- Reduction in energy and water use
- Reduction in building waste
- Reduction in pollution emissions
- Reduction in carbon footprint
- Superior location and access
 - Limits auto use
 - Environmental sensitivity
- Occupant performance
 - Occupant satisfaction
 - Improved health/absenteeism
 - Productivity: working environment—focus/energy level
- Flexibility/adaptability of occupied space
 - Design
 - Systems
 - Materials
 - Energy sources
- Sustainability compliance
 - Certifications
 - Regulations
 - External commitments
 - Internal policies

The success a subject property has in achieving the key sustainable outcomes identified above will determine the extent to which the property will be able to achieve sustainable real estate-related enterprise value benefits. Key examples of the types of sustainably related enterprise value benefits are listed below:

- Reduction in enterprise costs
 - Reduction in churn costs
 - Reduction in employee costs: productivity
 - Reduction in employee health costs
- Improved reputation/leadership
 - Recruiting
 - Employee retention/satisfaction
 - Public relations/brand management
 - Retain “social license” to operate
 - Improved marketing and sales
 - Increase company market value
 - Increase company market liquidity
 - Address shareholder concerns
- 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

The level of potential influence on key DCF model inputs like rents, occupancies, absorption, tenant retention will depend on the specific types of tenants, level and type of sustainability achieved, and sophistication of the marketing of these benefits to target audiences.

Improved reputation/leadership

The importance of improved reputation/leadership to potential space users can be deduced by evaluating the specific space users and the level of sustainability contemplated for a project. Companies with an emphasis on brand promotion and external marketing, larger companies, companies with potentially controversial products or practices, companies that public and promote corporate social responsibility reports, and others are good candidates to be positively influenced by sustainable property investment. Sustainable properties that make a leadership position in sustainability or energy efficiency will be more likely to influence potential space users in this regard.

Compliance with internal/external policies/initiatives

Properties whose potential space users, either individually or as a sector, have made it a policy to comply with external policies and initiatives such as the Global Reporting Initiative or Carbon Disclosure Project will be more likely to be influenced by sustainable property investment. These external policies have in many cases led to more detailed and important internal corporate real estate or related occupancy policies that can place a high priority on sustainable property occupancy.

Reduced risk to future earnings

Evaluating potential space user understanding of how sustainable properties can reduce risk to future earnings is a bit less direct. While the risk benefits are quite clear and compelling, it is likely that the overall influence of reduced risk to future earnings and its influence on space user demand will be best reflected in surveys of tenant or space user interest, or other anecdotal information and trends regarding space user understanding of the value of sustainable property investment. Research on the risk-reducing attributes of

sustainable investment generally has become well publicized, with substantial financial benefits accruing to companies that incorporate sustainability concerns into their overall business.

Once an understanding of the key drivers of potential space users is established, the next step is to assess the likelihood of whether the subject property will generate the types of sustainable outcomes and building performance important to expected occupants.

Government Tenants with Sustainable Real Estate Mandates or Policies

Local, state and federal governments are increasingly requiring that their employees work in sustainable properties. Sustainable property requirements for new construction have been prominent in many governments for some time, and requirements for government leases are increasingly being implemented as leases turn within government organizations. With over 18% of all commercial space in the United States government owned, and significantly more in many other countries (approximately 13% of which is office space), this is a significant market that will have broader influence on leasing policies throughout the country.²⁹

The potential impact for a specific property will be a function of evaluating the level of government leasing in the subject property's submarket, trends relative to government leasing, government lease rollover expectations, and the specific sustainability thresholds required by different levels of government compared to the subject property. Evaluation of this potential benefit must take into consideration not only sustainability issues, but also the suitability of the subject property relative to other minimum requirements of government tenants related to security and other issues.

Vendors/Suppliers Encouraged/Required by Big Customers to Consider Sustainability

Some large companies like General Electric and Wal-Mart are beginning to put sustainability requirements on their vendors and others in their supply chain to be more sustainable. These initiatives have grown over time, and while relatively small today, are likely to increase.

Evidence of this phenomenon can be ascertained for a property in a particular marketplace by studying the profile of tenants in the marketplace. Again, this is just another of the many issues influencing space user demand, but is likely to grow. For example, nearly 1,500 global businesses signed on to the United Nation's Global Compact in 2008, signaling the growing interest of businesses that want to align their practices with the initiatives in environmental, social, and governance principles.

²⁹ "Who plays and who decides; the structure and operation of the commercial building market," March 2004, Innovologie, LLC for DOE.

Approximately 7% of the 700-plus respondents in the annual survey of Global Compact participants indicated that they require Global Compact participation when selecting suppliers. About a third said they extended their commitment to the Global Compact to their subsidiaries. While these numbers are still small, they represent a significant and growing trend to extend the leadership of certain powerful companies on sustainability issues down through the supply chain.

Space users with direct ties to sustainability

There are a growing number of tenants that have a direct tie to the sustainable property business: architects, engineers, consultants, contractors, lawyers, energy firms, product companies, etc. etc.

There is increasing evidence of the growing size of the sustainable property market and companies with direct ties to the industry. For example, membership in the U.S. Green Building Council has grown dramatically to nearly 19,000, with over 81,000 LEED-accredited professionals.³⁰

“Friends of Sustainability”

Demand from space users is also heightened by those individuals who want to “do the right thing,” independent of evidence of financial benefit. It is difficult to quantify the size of this marketplace, but service providers, builders, tenants and others that took on a leadership role without “proof”, initiated the green building industry.

Demographics can play a key role here with younger people and people in certain geographic locations more likely to be concerned about sustainability ideals independent of financial considerations.

2. Space User Demand Risks

An independent assessment of the affect of sustainability on space user demand and property risk must consider potential negatives of sustainability related to space user demand. These negatives include:

- Excess investment relative to market demand;
- Failure of space user demand to meet expectations;
- Building operating problems.

These issues are briefly discussed below.

³⁰ U.S. Green Building Council, February 2009.

Excess Investment Cost Relative to Market Demand

Invested more than market willing to pay

Every real estate project faces risk from over-investment—spending more on a building or project than the market is willing to pay for it. For sustainable properties, which are often difficult to clearly define, and certainly the marketplace have an unclear understanding of the differences in levels of sustainability, this issue can be even more important.

Selected incorrect combination/mix of sustainable features

To assess the applicability of this particular risk, it is necessary to compare the level of sustainability planned for a project, and the related costs, with the particular profile of the space users expected in the building based on an analysis as described in the prior section. Tenant surveys and an initiative like the Sustainable Leasing Initiative, which provides a minimum checklist of the types of sustainability requirements multinational corporations want, can provide some indications of the minimum standards required by the space user market. While the evidence is anecdotal, the Consortium's research suggests that achieving the highest levels of sustainability (a gold or platinum level for a LEED certification) is probably not needed to capture much of the space user demand. This may change over time as the market matures and higher levels of sustainability become the norm, and will certainly not be true for the LEED headquarters buildings of most major space users, where a high level of certification is typically desired, but appears to be the case as of 2009.

Failure of Space user Demand to Meet Expectations

- Price/non-sustainable factors dominate specific target occupiers
- Tenants not educated enough
- Less demand from smaller tenants in smaller buildings
- Gross-lease market does not encourage tenant focus on cost savings
- Liability limits marketing benefits
- Incorrect assessment of likely space users

To assess the applicability of this particular risk, the valuer/underwriter needs to consider the sophistication and education of likely space users, market conditions, which could make rent a dominant factor for some types of users, potential limitations in marketing benefits, and consideration of the specific terms of leases (particularly if it is an existing building).

Building Operating Problems

- Products underperform

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

This potential risk is particularly applicable for existing buildings, which sometimes experience underperformance problems in the initial ramp-up after a sustainability retrofit as tenants, management, and maintenance staff learn about operations of the newly retrofitted building.

3. The Evidence of Space User Demand

As emphasized above and throughout *Value Beyond Cost Savings: How to Underwrite Sustainable Properties*, the evidence for space user demand must be developed through a structured analytic process at the property level. One of the ways to think about the process is that the underwriter is testing whether some of the general evidence and trends are applicable for a subject property, and determining the magnitude of potential affects. Accordingly, the general evidence of the market demand for sustainable properties is relevant and important. The market performance and building performance (occupant performance) of sustainable properties was fully presented in Expanded Chapter IV: “Sustainable Property Performance” in Sections E and F. Key findings and conclusions relevant to Space User demand are summarized here.

As a starting point, to properly interpret and apply sustainable market performance research it helps to understand the following three principles:

- **Principle One:** Different decisions require different types of market data.
- **Principle Two:** Failure to understand the different types of market research will lead to failure in interpretation and application.
- **Principle Three:** Sweat the details when applying market research to property level decisions.

A detailed discussion of these principles is presented in Expanded Chapter IV, Section F-2.

To better understand and ease the interpretation of sustainable property market and financial performance research, we report research results in four key categories.³¹

³¹ We combine sustainable market and financial performance research together because much of the research in the field covers both these topics in their studies.

Expert-Based Financial Analyses: Conducted primarily by valuers/market analysts on a property-by-property basis following traditional market analysis practices.

Statistics/Modeling-Based Financial Analyses: Conducted primarily by academics applying statistical modeling techniques to large databases of properties.

Surveys and 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.

The key conclusions of our research are summarized below with detailed evaluations of key studies and evidence presented in Expanded Chapter IV, Section F-3.

Expert-Based Financial Analyses

Real estate valuers and/or market/financial specialists conduct these studies. The basis for conclusions in these studies is typically based on conclusions drawn from specific analyses of buildings, following a process that is similar to a traditional market analysis process, although typically more cursory. Key studies of this type draw general conclusions based on detailed property-by-property analysis of a portfolio of properties. Strong individual case studies, if independently done by a specialist using the appropriate process, would fit here

In summary, these studies supported significant value enhancement for sustainable properties. Value enhancement was generated through operating cost savings and enhanced occupant demand that expressed itself through faster absorption, higher equilibrium occupancy, higher rents, and better tenant retention. Access to subsidies and regulatory benefits were also documented to add value. The expression of increased occupant demand was not consistent in all properties studied, 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.

Our conclusions are based primarily on our review of the findings from seven important expert-based financial analyses:

1. “Do Green Buildings Make Dollars and Sense?” Norm Miller and Dave Pogue USD-BMC Working Paper 09-11, Draft: November 6th, 2009
2. “High Performance Green Building: What’s It Worth? Investigating the Market Value of High Performance Green Buildings,” Theddi Wright Chappell, Chris Corps, May 2009;

3. “Green Value: Green Buildings, Growing Assets,” Royal Institute of Chartered Surveyors, Canada, 2005, Oct. 2005;³²
4. “Valuing Green: How Green Buildings Affect Property Values and Getting the Valuation Method Right,” Richard Bowman, John Wills, Green Building Council of Australia, 2008; and,
5. “Financial Analysis of LEED EB Implementations,” Craig Sheehy, Envision Realty, 2008.
6. “Energy Efficiency Improvements: Do They Pay?” Brian A. Ciochetti and Mark D. McGowan, MIT Center for Real Estate, February 2009.
7. “Towards a Green Building Infrastructure Investment Fund,” Trent Berry, Compass Resource Management, February 2007.

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.

Understanding how the real estate industry assesses market performance is instructive in understanding why we believe expert-based studies offer the best evidence of sustainable property market performance. If a sophisticated real estate investor wants to understand a specific property’s market demand and potential value, they typically hire a market feasibility consultant, valuer/appraiser, or internal staff that are trained in these specialty areas. These analysts follow well-recognized procedures in data collection and analysis, focusing on direct comparable properties in the sub-market, market and economic trends for the local and regional markets, detailed assessment of tenant demands and preferences in the marketplace, and many other analyses. At the end of the analysis, they select specific inputs for their financial models (rents, vacancy rates, tenant retention, capitalization rates, discount rates, etc.) and make a determination about the potential financial performance of their properties. These well recognized procedures include a substantial number of quantitative analyses including forecasts of supply and demand, structured analysis of comparable properties, and numerous other financial analyses of specific operating expense inputs, occupancy or absorption trends, and other key information that is then integrated in a more qualitative way into the final determination of financial variables.

An important observation about the above process is that the industry standard is for investors to select market analysts or valuers to do a detailed quantitative/qualitative analysis of the market. At a recent meeting of pension real estate investors with over a trillion dollars of real estate invested among the 60 participants, we asked whether any of

³² This study is also sponsored by BC Hydro, the British Columbia government, English Partnerships, Greater Vancouver Regional District, Green Buildings BC, the Canada Green Building Council, Natural Resources Canada, Resources naturelles Canada, and Realpac.

the participants had ever relied upon a statistical modeling-based approach to generate rents, occupancies, or sales price for the valuation or underwriting of any property. The answer was “No.” The reason the industry relies upon a more quantitative/qualitative approach to market analysis and valuation is that it is the best way, given the numerous factors that must be considered simultaneously, and the inability to obtain reliable results at a property level using statistics/modeling based analysis.

Statistics/Modeling-Based Financial Analyses

Statistics/modeling-based studies typically will involve a large number of sustainable and non-sustainable properties, with statistical modeling focused on determining the incremental contribution of a sustainable certification or rating on rent levels, sales prices, occupancies, or other specific financial variables. These studies are typically completed by academics with real estate and/or finance backgrounds.

In this section, we review and present the findings from the following six statistics/modeling-based financial analyses:

1. “The Investigation of the Effects of Eco-Labeling on Office Occupancy Rates, Frank Furst and Patrick McCallister, *Journal of Sustainable Real Estate*, Fall 2009
2. “New Evidence on the Green Building Rent and Price Premium,” Frank Fuerst and Patrick McAllister, presentation to ARES conference, April 3, 2009.
3. “Doing Well by Doing Good? Green Office Buildings,” Piet Eichholtz, Nils Kok, and John M. Quigley, UC Berkeley Fisher Center for Real Estate & Urban Economics working paper, January 2009.
4. “Does Green Pay Off?” Norm Miller, Jay Spivey, Andy Florance, *Journal of Real Estate Portfolio Management*, Fall 2008.
5. “Green Design and the Market for Commercial Office Space,” Justin Benefield, Jonathan Wiley and Ken Johnson, *Journal of Real Estate Finance and Economics*, forthcoming.
6. “The Greening of US Investment Real Estate—Market Fundamentals, Prospects and Opportunities,” Andrew Nelson, RREEF Research, November 2007.

The statistics/modeling-based financial analyses cited above provide **general** support for a positive relationship between a green building certification (LEED or EnergyStar) and improved rents and sales prices for commercial properties. However, all of the studies have significant methodological, data, and statistical limitations that limit the reliability/applicability of the numerical conclusions to specific property valuations.

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 make it difficult to rely upon the numerical results. 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.

An observation about most of the research reports cited above is that they are all the second, or in one paper, the third research reports on the same topic. Accordingly, the papers cited above and reviewed in this section include many of the most recent papers completed (as of the publication of this chapter) and provide the most refined data and statistical approaches. In the case of the three studies where we were able to review the earlier reports, rent and sales price premiums had declined significantly from prior study versions.

In reviewing and applying the information from the six studies cited above, it is critical to know what they are, and what they are not. The methodologies in the studies do not reflect industry practice to assess rent and price premiums in individual properties, and methodology and data limitations are significant, and in most cases acknowledged by authors in their work. Use of the statistics without appropriate understanding of the caveats and the coverage of the studies is not appropriate. 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.

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. A detailed analysis of the kinds of methodological and statistical review that is needed in applying this kind of information can be found in the Consortium's special report titled "Quantifying 'Green' Value: Assessing the Applicability of the CoStar Studies," Scott Muldavin, Green Building Finance Consortium, June 2009. <http://www.greenbuildingfc.com/>

Keeping the caveats and application cautions in mind, what do the four statistical studies actually show?³³ As shown in Exhibit IV-14 below, with the exception of the Wiley and Johnson paper, which I was not able to review in detail, rent premiums from LEED properties were shown to be from 0% to 6%, and EnergyStar premiums ranged from 3.3% to 5%. These 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. The Fall 2009 study by Fuerst and McCallister reported occupancy rates in LEED buildings 8% higher, and in EnergyStar buildings 3% higher.

³³ 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.

Exhibit VI-9				
Statistics/Modeling-Based Sustainable Property Financial Analysis				
	Rent Premiums		Sales Price Premiums	
	<i>EnergyStar</i>	<i>LEED</i>	<i>EnergyStar</i>	<i>LEED</i>
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.

While the rent and occupancy premiums reported appear plausible, to date the Consortium's research 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. 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.

Sales price premiums range 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.

Based on interpretation of the statistical models, these results imply that LEED or EnergyStar certifications, independent of all the other factors that would affect sales price, are responsible for very significant sales price premiums, well beyond plausible premiums detected in tenant and investor surveys and case studies. We are particularly concerned about potential distortions due to insufficiently granular control for time, with value change during the time period studied increasing rapidly, with certified property sales, due to their very limited time series, happening during the periods of the most rapid value growth.³⁴

³⁴ 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.

Again, we are strong believers that sustainable properties can be more valuable, due to the increases in regulator, space user and investor demand and positive “net” risks, but do not believe that the numerical results from these studies of sales price premiums are reliable indications of potential value increases at this time.

Surveys and Market Research

This category includes a broad array of research including tenant/occupant surveys, investor surveys, general surveys of corporate sustainability trends, sustainable related market or demographic research, tenant segmentation analysis, and other research that would contribute to an understanding of space user and investor demand and its implications on their willingness to pay more for sustainable real estate. Studies of churn costs, space flexibility, occupant satisfaction, and health and productivity are critical to space user demand, but are really aspects of building performance. The focus of the research categorized here is on work that assists in interpreting how space users or investors would respond to such building performance.

One of the difficulties in presenting market performance evidence for sustainable properties is that market analysis is inherently microanalysis, involving detailed property-specific analysis. For example, assessing the demand by regulators for a sustainable property is difficult to express generally, because demand for a property is a function of the regulations and incentives offered by municipal, state or federal governments, as well as the utilities and other specialized regulators for a specific property, based on its geographic location, property type, and the nature of the type of sustainable property investment.

Similarly, general statements about space user demand are also difficult because the analysis of the market demand by potential occupants for sustainable space is a function of the type of property, the particular geographic market, the profile of actual or potential property occupants, and other factors such as existing lease structures and market conditions.

Investor demand is somewhat easier to address generally, given the more regional, national, or even international capital markets for many real estate properties, but the type, size, quality and other attributes of a property will significantly influence a particular property’s investor demand due to its sustainability. Most importantly, regulator and space user demand drive investor demand, which are unique to specific properties.

Surveys and related market research make up the bulk of what actual valuers and underwriters use to value and underwrite the risks of sustainable properties. Expert-based research has been very limited to date, with only a handful of credible studies. Statistics/modeling-based market performance research has never been used by the industry to implement detailed property-specific valuation and due diligence. Accordingly, valuers and underwriters must collect and integrate many different sources of quantitative

and qualitative research to assist them in deriving their opinions about key financial inputs including rents, occupancies, tenant retention, cap rates, discount rates, and expenses.

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-A and Appendix V-A. 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 related traditional real estate financial model.

For the purposes of this section, we highlight and discuss three key types of surveys and market research, as shown below:

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

Space User and Investor Sustainability Surveys

Space user and investor sustainability surveys provide insight into the potential magnitude and/or direction of sustainability demand by type of tenant or investor. Further segmentation by geography and/or property type and other categories is often possible.

The keys to extracting value and insight from these more general surveys is to look at the survey trends over time, the questions asked, the date the survey was taken, the independence of the survey organization, and most importantly, as much specificity as possible about the types of tenants, investors, or other respondents that are surveyed. If detailed information from these surveys is used in the interpretation of the results, important hypotheses about potential market demand for a particular property can be established, which valuers and underwriters can then test through more detailed market research and property-specific tenant, investor, and broker surveys, as is customary practice for valuers and underwriters.

A list of important tenant and investor surveys (and related respondents) is presented in Expanded Chapter IV, Exhibit IV-14.³⁵ These surveys, which became more frequent in 2005 and 2006, demonstrate an increasing trend of tenant and investor understanding of, and interest in sustainable property. Generally, space users indicate an interest in sustainability, and in some cases a willingness to pay, but also reinforce the importance of cost savings and related financial concerns. While space user demand has continued

³⁵ This chronological list of survey research includes space user and investor surveys, surveys of other real estate industry professionals, and surveys of corporations regarding their general preferences for sustainability. Many of these surveys are available on the Consortium’s website under index codes 15.8 and 15.9 in the Research Library or Industry Resources sections.

during the economic crisis, select surveys report an even greater focus on cost savings or value, with a priority on organizational survival, rather than sustainability.

Corporate Sustainability Surveys and Research

Corporations and other owner-occupants are significant players in the commercial real estate markets. Corporations own approximately half of the commercial real estate market. Additionally, they lease a substantial portion of space owned by others.³⁶ Corporate sustainability surveys and research incorporate a broad array of work evaluating the corporate sustainability movement and related issues.

The focus of this research from a real estate perspective is to understand how potential corporate space users “value” sustainability, and how important their real estate sustainability strategy is as part of their overall sustainability initiatives. Research looking at the real estate components of the Global Reporting Initiative, Carbon Disclosure Project, or corporate social responsibility reporting is some of the types of work that would be included here, as well as general surveys of corporate sustainability interests, and any comments they have specifically on real estate.

Additionally, more specialized studies of how corporations value sustainability-related benefits like reduced churn cost, increased space flexibility, or improved health and productivity of employees could also be included here. Again, the focus of the research categorized here is not on whether a building produces health and productivity or churn benefits, but in how different types and segments of the space user market react to buildings with such sustainable features or outcomes.

The results from the many surveys and research studies we have reviewed show a clear trend of increasing focus by corporations on sustainability, with growing emphasis on the key role real estate plays in sustainability and climate change.

A key component of corporate sustainability research is not only to develop hypotheses of the types of space users that have a greater demand for sustainable real estate today, but also to understand the trends in which future tenants may demand such services. Any investor buying a multi-tenant building today, with leases rolling over years into the future, must be sensitive not only to today’s demand, but also to underlying changes in the market that could affect future demand and performance.

³⁶ This estimate is very approximate, based on a 20-year history of capital markets research by Scott Muldavin, and review of the “Non-residential Buildings Energy Consumption Survey” (CBECS) of the Energy Information Administration. According to the EIA and CBECS research as of 1999, there were 4.7 million commercial buildings in the United States, of which 89% were privately owned and 60% of those were owner occupied. A detailed breakout and analysis of the commercial building industry is provided in “Who Plays and Who Decides, The Structure and Operation of the Commercial Building Market, US Dept. of Energy, Innovologie, LLC, John Reed et al., March 2004.

Tenant Demographics and Market Segmentation

This category of market research covers any kind of academic research or related study that provides a detailed understanding of space user demand for sustainability. An example of this kind of survey would be demographic research, such as has been done in the hotel industry, which assesses the demand for sustainability by potential hotel occupants based on their age. This research, which is still in its infancy, shows substantially greater demand for sustainability by hotel occupants that are 35 years or younger, compared to middle and older age hotel users. Of course, geographic, income, and other demographic characteristics could also be important in defining sustainability demand, enabling more informed decisions to be made by valuers and underwriters relative to the financial impacts of sustainability on key financial variables like rents, occupancies, cap rates, etc.

Important research that evaluates tenant market segmentation and related issues is being conducted utilizing CoStar's Tenant Module that enables analysis of the types of tenants leasing, or not leasing, in sustainable properties. "Why Do Companies Rent Green? Real Property and Corporate Social Responsibility," published on June 4, 2009, authored by Piet Eichholtz, Nils Kok, and John Quigley and further work of this type is underway by the authors.

"Why Do Companies Rent Green" is an update of a similar paper from a year ago, focuses on the most critical question of every sustainable property valuation assignment—what drives the leasing of potential occupants of "this" building, and how important is sustainability to them? By providing descriptive and statistical analysis of tenant preferences for sustainability from over 1000 sustainable office properties and 3000 tenants of those buildings, Eichholtz, Kok and Quigley have provided invaluable insight to valuers and underwriters trying to understand how different types of tenants will respond to a building's sustainability. Their results on tenant preferences provide excellent hypotheses that valuers can now test through traditional market research and interviews at the property-submarket level.

There is growing market information available on the demand for green by different types of tenants (CoStar data on leases for example) and survey data that reflect different demographics, geographies, and other key issues. These studies are improving and being done more frequently. For example, CoStar released interesting information on the leases and buildings that have been identified as green, as shown in Exhibit VI-10. This chart shows that for all leases signed in the database that CoStar maintains, law firms were the most likely tenant sector to sign leases in green buildings, with over 14% of all leases signed nationally in green buildings. As this data gets more robust, and can be effectively analyzed at a submarket level, it will provide significant insights into the potential space user demand for sustainable buildings based on the likely tenant profile that an owner is focused on serving.

Exhibit VI-10				
Demand for "Green" Differs by Type of Tenant				
CoStar Data: Leases March 2006 to March 2008				
Rank by % Sq. Ft. Green	Industry Sector	Green Leases	Green Sq. Ft.	% Green Sq. Ft.
1	Law firms	131	2,219,470	14%
2	Insurance	49	953,423	10%
3	Financial Institutions	108	2,029,324	9%
4	Agricultural/Mining/Utilities	70	1,661,257	8%
5	Real Estate	38	305,006	5%
5	Accountants	17	127,266	5%
7	Computers/Data Process	43	952,157	4%
7	Engineers/Architects	39	391,518	4%
9	Business Services	95	862,683	3%
9	Medical	23	463,029	3%
9	Government	14	242,322	3%
12	Personal Services	67	899,447	2%
12	Communications	8	206,441	2%
14	Manufacturing	40	1,027,090	1%
14	Retailers/Wholesalers	34	733,814	1%
16	Transportation	6	138,687	0%

Source: CoStar Group Study—Presentation, April 2008

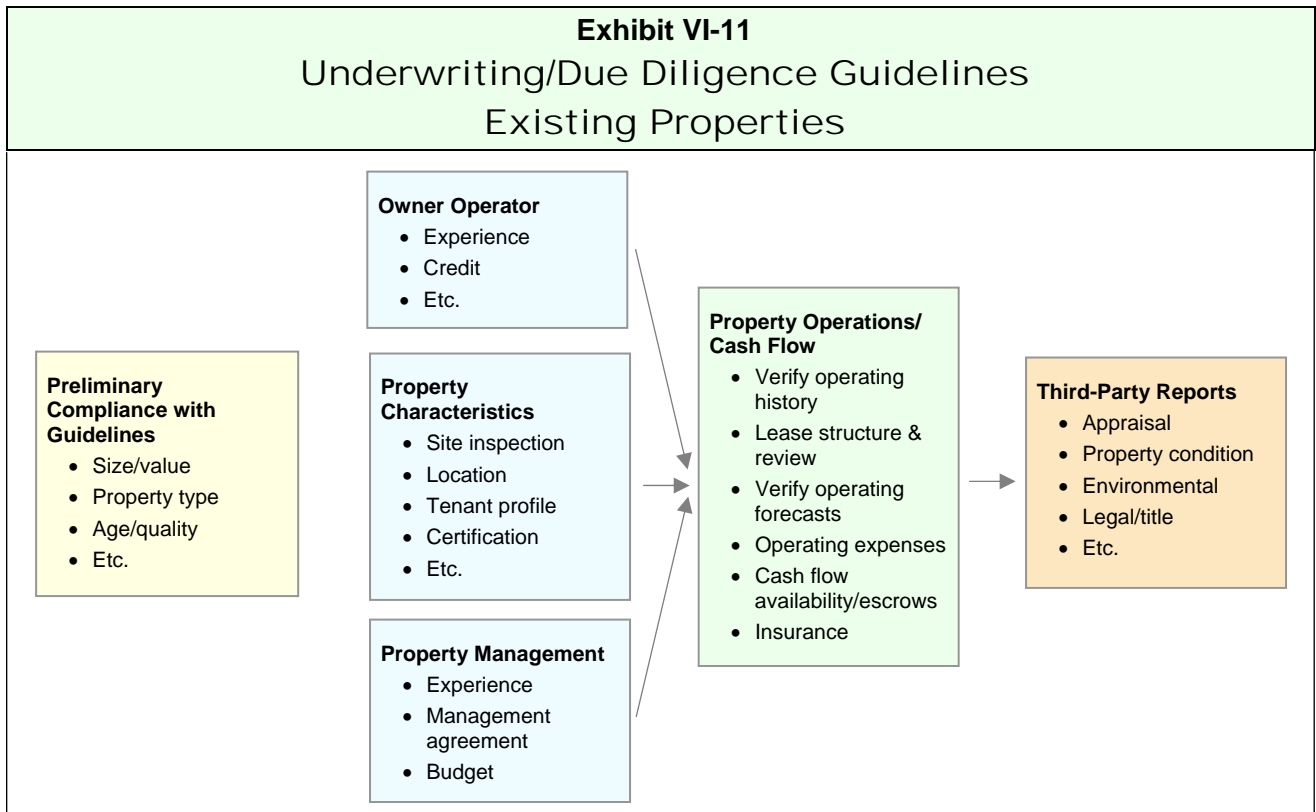
Significant good work continues to come from Australia. In *Benchmarking Sustainability*, published June 2009 at [Yourbuilding.org](http://www.yourbuilding.org):

<http://www.yourbuilding.org/Article/NewsDetail.aspx?p=83&mid=1587>

the results of a Building Use Study, which compared an Australian building (The Szencorp Building) against 55 other Australian and 81 international buildings, and incorporated a follow-up survey of tenants, showed that tenants, three years after an initial survey was done, were dissatisfied with some of the promised sustainable benefits, but showed a high level of tolerance towards achieving solutions due to the buildings sustainability. Tenant education and behavior modification were identified as critical investments to maximize potential productivity benefits.

G. Existing Building Underwriting Guidelines

The underwriting guidelines for existing buildings are shown below in Exhibit VI-11 and in more detail in Appendix VI-B. These guidelines 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.



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 ideas and recommendations presented below 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 not an attorney, nor is offering legal advice and legal questions should be reviewed with appropriate counsel.

Further detail and background on existing office building retrofit decisions and building operations is available in “*Retrofitting Office Buildings to be Green and Energy-Efficient*”, a book published in late 2009.³⁷ Chapter 2 provides some insights into analyzing green retrofit opportunities. Chapter 3 provides significant detail on the elements of a green office retrofit and Chapter 4 provides information on managing the retrofit process. Chapter 6 provides a primer on green leases and building operations.

1. Preliminary Compliance with Investment Guidelines

The first thing to consider when evaluating an existing sustainable property is whether or not that particular property complies with your organization’s investment guidelines. Whether you are an owner/user, an equity investor, or a lender, it is important to identify the basic parameters that your organization will base its preliminary decisions about the types of sustainable property investments that your organization is willing to make. This type of preliminary investment screening is done to ensure compliance with the organization’s strategic goals and is typically performed whether an organization invests in sustainable properties or not.

Each organization’s list of investment parameters or guidelines will be influenced by the type of business the company is engaged in, the company’s goals with respect to sustainability, the way an organization assesses the performance of its real estate assets, etc. Below is a list of parameters or guidelines containing items that an organization might consider when performing its initial screening of an existing sustainable property.

- 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

³⁷ “*Retrofitting Office Buildings to be Green and Energy-Efficient*”, principal authors Leane Tobias and George Vavaroutsos, Urban Land Institute, 2009.

- Loan to Replacement Cost
- Vacancy/Credit Loss
- Income, Occupancy, and Expense Calculations
- Tenant Quality/Lease Structure
- TI/LC Allowance

In developing the above list, it is imperative that the company make its goals with respect to its sustainable property investment explicitly clear and that these goals and objectives are clearly communicated to the department responsible for performing due diligence or underwriting the organization's sustainable property investments.

2. **Owner/Operator**

Below is a list of underwriting/due diligence areas typically investigated when evaluating an owner/operator. Special underwriting/due diligence considerations for sustainable properties are noted below.

Credit Analysis & Reference Checks – No modifications identified.

Property Type/Operations Experience – How much experience does the owner/operator have operating buildings of this particular property type? If the owner/operator has experience operating conventional buildings of a particular property type, how different is the operation of a sustainable property? Identify key areas of operation that might prove problematic and think through potential solutions in advance.

Experience with Subject Property – What is the owner/operator's history with the subject property? Have they owned the property for some time or did they recently purchase the building? Did they build it themselves or did someone else? The more knowledge that an owner/operator has about the subject property, the lower the risk that problems will be experienced in the operation of the property. This issue can be particularly relevant in the case of sustainable buildings, which are more likely to have custom systems, or features requiring specialized knowledge or experience to successfully operate.

Financial Strength-Net Worth – No modifications identified.

Judgments, Liens, Bankruptcies, Legal search - No major modifications identified. There is always an issue when multiple levels of finance are involved in a single project relative to ownership structure, lien status, and responsibilities in under different economic scenarios. This could be important in making sure whoever owns or manages the property maintains sustainability certifications and performance.

Bank Statement Review - No modifications identified.

Ownership Form - No major modifications identified. If multiple levels of financing are involved it is important to understand ownership and lien status, as it is with any real estate investment.

Indemnifications, Guarantees, Carve-outs – It is possible that some contracts with service providers may involve legal language that requires additional attention—see legal/contracts discussion in Appendix V-C and Chapter IV-C-2. It is possible that government guarantees will also become a part of sustainable property finance and these will have to be reviewed and underwritten.

Disclosures - No major modifications identified. It might be a good idea to identify and seek disclosures between various service providers—commissioning agent and engineers, for example, to ensure independence in advice. It is not necessarily bad for one service provider to provide multiple types of service, but if compliance and review are involved, it is important to assure independent approaches to service are maintained.

3. **Property Management**

Property Type Specific Management Experience & Track Record – In evaluating a property manager’s experience in the context of a sustainable property, the most important consideration continues to be that the property manager has experience with a particular property type. While it is desirable that a property manager has experience managing sustainable properties containing similar systems and features, it is not an absolute requirement that this is the case. As discussed in more detail below, a good manager can reduce the importance of specific sustainable property management experience by having certain internal policies, systems and training in place.

Employee/Tenant Training – One indication of how qualified a property manager is to manage a sustainable building, is to consider whether that property manager has provided any special training to its employees in connection with the building’s sustainable features. For example, if the building has a “green roof,” have the employees of the property management company received any special training on maintenance procedures that will maximize the performance and life of the roof? Similarly for new HVAC systems and building controls, etc.

Optimal performance of sustainable buildings also depends, in part, on having tenants who are knowledgeable in the operation of sustainable features. It is therefore important that a property manager provide tenants with some training and other information on how to properly operate some of the sustainable systems within the building. An example of this might include training on how to operate climate control or window shading systems. Since tenants are also frequently responsible for overseeing and paying some portion of the cost for the installation of tenant improvements in their space, having a property manager that provides some amount of training or guidance to tenants on the types of

materials to use, contractors who are experienced in the installation of “green” improvements, etc. will help ensure that the property will perform as designed.

Management Agreement Review – Having a property manager who is knowledgeable about a building’s sustainable features is important to the overall performance of that building. Because the importance of proper maintenance and performance of building systems is heightened in a sustainable building, the likelihood that a property manager may need to be replaced is increased. Consequently, when reviewing the management agreement, special attention should be paid to the sections addressing termination of the agreement including penalties, and “cause.”

Leasing Agreement Review – With the growing popularity of “green” leases, this is an area that potentially requires modifications. “Green” leases, most commonly used in office leasing, generally include provisions requiring tenants to have recycling programs, engage in energy efficient behavior, etc. In fact, some of the most important green lease issues involve education, performance assessment measurement and monitoring, and other clauses addressing behavioral issues and responsibilities and enforcement mechanisms.

Additionally, when evaluating the proposed allocation of sustainable costs and benefits it is important to make sure the proposed allocations match lease terms. See the Consortium’s Research Library code 24.5 for many detailed publications addressing green lease issues.

List of Employees and Compensation – Since sustainable buildings frequently contain more advanced technological systems for climate control, lighting, etc., repair and maintenance of these systems may require more a property manager to have more skilled personnel on staff. A review of the property manager’s employees and their compensation can provide insight into whether a property manager is appropriately staffed to effectively manage a sustainable property.

Employee Agreements/Laws - No modifications identified.

Property Management Budget – Consideration should be given to the requested capital expenditures, reserves, training, and related sustainable expenditures. If no budget for retro commissioning is cited, it should be questioned or considered in the context of asserted energy saving benefits.

Security Deposit Verification - No modifications identified.

4. **Property Characteristics**

Site Inspection-- Site inspections by appraisers, underwriters, and engineers, in particular, will need to be modified to include sufficient information on a properties sustainable attributes and performance to enable a thorough underwriting and valuation. Various efforts are underway to develop these more detailed site inspection requirements, or

information supportive of these efforts, by the Green Building Due Diligence Group, the Database for High Performance and Sustainable Building (DASH), the Royal Institute for Chartered Surveyors, ASHRAE, ASTM, and others.

While specific site inspection and related data collection will be driven by the specific type of property and investment, the Royal Institute of Chartered Surveyors, in a recently published Valuation Information paper, provides guidance on collection of a properties sustainability characteristics around the issues of land-use; design and configuration, construction materials and services, location and accessibility considerations, fiscal and legislative considerations, and management and leasing issues.³⁸

Additional site inspection issues are driven by the need to better understand the sustainability demands of regulators, space users and investors, as well as to better understand and conduct due diligence on the forecasts of reduced energy, water, and other costs. These issues are addressed throughout “*Value Beyond Cost Savings: How to Underwrite Sustainable Properties*”.

Age and Physical Characteristics – The site inspection report should be modified to include some observations about the site’s sustainable features. For example a site inspection report might note whether the site is a “green field” or “in-fill” site, the site’s access by public transportation, or the existence of any storm-water management features, heat island minimization features, open space or habitat restoration elements, etc.

Functional Design/Obsolescence - An analysis of a sustainable property’s functional design/obsolescence should to be modified to include an analysis of significant sustainable features. Because of rapid changes in “sustainable” buildings systems, stakeholders in sustainable properties should investigate key building systems to determine whether they may be obsolete or not, the “remaining useful life” of these systems, and any associated “costs to cure” or replace these systems in the future.

Location – See site inspection discussion above.

Parking Ratios – Conventional parking ratios or requirements may be impacted by some of the building’s sustainable features including access to public transportation, and other features that encourage car pooling or riding a bike to work (i.e. bike storage area, showers, etc.).

Access – key issues here relate to the mix of options to access the property. Depending on the property’s location, occupants, and visitors, sustainable sites, to be economically viable, will often need a mix of public and private transportation options. It is important to consider and balance sustainability needs and occupant demand in the context of current

³⁸ Sustainability and Commercial Property Valuation, Valuation Information Paper 13, Royal Institute of Chartered Surveyors, September 15, 2009.

demand, and considering the potential for government action, which might change requirements or options.

Tenant Profile -- Quality and Mix – In general, underwriting for sustainable properties needs to include a more detailed analysis of existing and potential tenants at times of tenant rollover to enable an assessment of the magnitude of potential tenant demand for sustainable property. As discussed in detail in the book, estimating sustainable property demand at a property level requires more attention on tenant profiles and make-up than with conventional properties. (See prior section F: Underwriting Space User Demand)

Tenant concentrations in a particular industry increase a property's investment risk by not having a more diversified tenant mix. This is a risk associated with some sustainable buildings because of the types of tenants these buildings may attract in certain markets and for some specific buildings. For example, consider a sustainable building that targets tenants in the building construction field (i.e. contractors, architects, engineers, interior designers, etc.). It is not difficult to see that if there were a decline in construction activity that investment losses stemming from tenant who could no longer pay their rent would be more likely at this building than those at a building having a more diversified tenant base. In situations where this is the case, stakeholders should be aware of industry concentration risk and mitigate this risk to the extent possible.

Ground Leases – Since the existence of a ground lease on a property impacts that property's overall value, potential sustainable property investments where there is a ground lease in place should be evaluated in this context similar to conventional properties.

Gov. Regulations/Permits/Licenses – The issue of government regulations, permits and licenses with respect to sustainable buildings is most relevant in two areas. First, does the project, as currently built, have all of the required permits? Some sustainable buildings may contain features that require a special permit or conditional use permit. For example, a special permit might be required for projects that have an on-site power generation feature (i.e. solar, wind or natural gas turbine). It is important for stakeholders to check that the proper approvals and permits are in place for non-conventional features that are part of a sustainable building.

Second, it's important to consider the various regulatory and/or entitlement incentives that many cities offer to sponsors of new and existing "sustainable" properties. See Section C6 above for more detail on the special considerations in underwriting government regulations and incentives.

Brand/Franchise Agreements - No modifications identified.

Property Certifications/Performance Assessments –Stakeholders in sustainable buildings should be aware of any property certifications or performance assessments on their particular building and also be aware of any on-going costs or requirements to

maintain the certification. For example, in order to maintain an EnergyStar certification for a building, the owner must meet the program requirements and submit information on an annual basis.

5. Property Operations/Cash Flow

Key tasks in underwriting property operations and cash flow are listed and discussed below:

Operating History-verification

- Operating Statements
- Rent Roll
- Historical Occupancy/Collection Losses
- Tenant Sales Data (retail only)
- Expense Recoveries
- Other Income
- Estoppels (verification)

Lease Structure and Review

- Lease Abstracts/Major Lease Review
- Standard Lease Agreement
- Signed Non-standard Leases
- Objectionable Provisions Assessment

Operating Expenses

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

Capital Expenses/Escrows and Holdbacks

- Replacement Reserves
- Tenant Improvements

- Leasing Commissions
- Capital Expenditures

Operating 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.

Operating History—Verification

The fundamental methodologies used by underwriters to verify operating history like reviewing operating statements, rent rolls, lease audits, expense recoveries etc. remain the same for sustainable properties.

Lease Structure and Review

More focused and specialized attention to the specific distribution of costs and benefits to landlords and tenants are necessary to properly evaluate the financial performance of sustainable property investments. First, for any existing building with leases, or a new building with pre-leasing agreements, the specific terms of the lease are necessary to allocate the costs and benefits of sustainable improvements, particularly related to energy. The specific allocation of costs and benefits will vary based on whether it is a gross, net or fixed base lease, or some other hybrid; the specific terms and mechanics of expense recoveries, and other lease terms.

DCF Lease-Based Cost-Benefit Allocation Models are an extension of the Discounted Cash Flow modeling process. More focused and specialized attention to the specific distribution of costs and benefits to landlords and tenants are necessary to properly evaluate the financial performance of sustainable property investments. First, for any existing building with leases, or a new building with pre-leasing agreements, the specific terms of the lease are necessary to allocate the costs and benefits of sustainable improvements, particularly related to energy. The specific allocation of costs and benefits will vary based on whether it is a gross, net or fixed base lease, or some other hybrid; the specific terms and mechanics of expense recoveries, and other lease terms. The level of benefits to the tenant are also important in that energy cost savings is part of the total cost of occupancy in making a decision to be in a space.

A set of principles and provisions to address the split-incentive issue is presented in: Energy Efficiency Lease Guidance to Address the “Split Incentive”, authored by Sean

Patrick Neill: <http://cycle-7downloads.com/Downloads.html>. Cycle-7 and HR&A Advisors developed this lease guidance under the auspices of the Natural Resources Defense Council. Financial support was provided from the New York State Energy Research and Development Authority (NYSERDA), the City University of New York (CUNY) Building Performance Lab, and the Rocky Mountain Institute (RMI). The guidance emerged from a series of three half-day seminars in New York City that included major national landlords, major tenants, attorneys, brokers, engineers, environmental advocates and government officials.

“Green Leases”

Leases have an even more central role in assessing the financial performance of sustainable properties, beyond cost and benefit allocation. In addition to the specific terms allocating the costs and benefits of sustainability improvements, leases play an important role in establishing clear environmental performance objectives, management of tenant energy use including sub-metering, building operating hours and lighting controls; clear standards for operational performance in HVAC systems and other systems; and clear guidelines for hazardous materials, green cleaning, recycling, the fit-out of tenant spaces, and other building rules and regulations. Fortunately, significant attention has been paid to developing “model” green leases and these issues are starting to be addressed.

Some of the information necessary to evaluate the relative costs and benefits for landlords and tenants include:

- Current rent roll or lease abstracts;
- Detailed history of expenses affected by upgrades;
- Market leasing, valuation, and vacancy assumptions;
- Estimated upgrade cost on a tenant-by-tenant basis;
- Estimated savings on a tenant-by-tenant basis;
- Estimated timetable for upgrade completion;
- Cost recovery provisions and existing leases;
- Debt and tax assumptions, if applicable.

Whereas typical discount cash flow software can deal with the first three bullet points, additional analyses will be needed to address some of the other issues.

Additional information on green leases in the context of green property operations is presented in Chapter 6 of *“Retrofitting Office Buildings to be Green and Energy-Efficient”*, a book published in late 2009 (see Chapters 2 and 4)³⁹. A more comprehensive source of examples and information on green leasing can be found on the Green Building

³⁹ *“Retrofitting Office Buildings to be Green and Energy-Efficient”*, principal authors Leane Tobias and George Vavaroutsos, Urban Land Institute, 2009.

Finance Consortium's website, both the Research Library and Industry Resources sections under the code 24.5 for Green Leasing:

<http://www.greenbuildingfc.com/Home/ResearchLibrary.aspx>

Addressing the Issue of Split Incentives

Some questions that can be investigated regarding leasing and lease structures include:⁴⁰

- Are there any unique marketing opportunities due to sustainable features?
- What are the prevailing types of leases for this product in this market?
 - How can the leases be modified to create shared incentives like expense caps? Can expense savings be shared?
 - Can you provide tenants with manuals and training to maximize efficiencies and consequently savings?
 - FSG or NNN leases
 - NNN lease, savings on operating costs accrue to the tenant. Additionally, health and worker productivity gains also accrue to the tenant. Reduced liability due to mold or other unhealthy building litigation may accrue to both landlord and tenant.
 - FSG lease, savings on operating costs may accrue to either the landlord or tenant, depending on the pass through agreement. Reduced liability due to mold litigation accrues primarily to landlord.
 - Do existing leases in place limit pass throughs on a sustainable retrofit?
 - How long are these leases in place?
 - Can the existing leases be renegotiated to share upside as well as costs with tenants?
 - Will NNN lease constrict ability to pass-through higher first costs?
 - Do smaller markets or submarkets limit pass-throughs?
 - What is the profile of the market competition?
 - Do tenants have the option to choose from more efficient comparable properties? (Conventional, inefficient and older properties would be expected to suffer greater turnover, lower rents and higher vacancies)
 - Do the leases reflect shared incentives for sustainability?
 - Are rental rates consistent with or better than comparable market?
 - Lease roll-over, TI's
 - Monitor and track rollover percentage and TI requirements to track against conventional properties.

⁴⁰ Ibid, p. 34.

Tenant Acceptance

- What are the significant costs that impact tenant viability? Can sustainable features address these?
- Do tenants benefit from lower operating expense pass-throughs resulting in more financially stable tenants and lower default risk?
- How vulnerable is tenant to rising utility costs?
- Does tenant have any exposure to changes in regulatory requirements? Carbon cap or tax?
- Will tenants/workers accept cleaning and maintenance people working during peak hours?
- Can increases in worker productivity be utilized as a marketing tool? What data is available to support this claim? Similar buildings or design or project usage?

Operating Expenses

Underwriting of operating expenses requires some modifications for sustainable properties. Operating costs for sustainable properties can be reduced in at least eight different ways:

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 maintenance costs.

The first step in analyzing the applicability of potential operating cost benefits is to evaluate actual or projected resource use and cost, and assess the reasonableness of measurements and reporting. Are the measurement metrics correct? Are appropriate historic time periods used? Are projected benefits based on a combination of sustainable features and strategies logically estimated?

Reduced resource use, particularly reductions in energy and water use, and resulting cost savings, have typically been perceived as the easiest to analyze and assess quantitatively, and thus have been emphasized by real estate decision makers. This perception is largely accurate, particularly for existing sustainable properties with seasoning, but there are still key issues to consider when evaluating the financial performance of a property as a result of reduced resource use. Key issues include the reliability and accuracy of forecasts, the durability of reduced resource use over time, the influence of changing resource prices, the

effect of lease structure and allocation of benefits over time, and the quality/reliability of measurement and verification practices.

The specific challenges and methodology to assess the reliability and accuracy of energy forecasts were presented in Section E of this Chapter. Energy is by far the most important issue in understanding the value and financial performance of sustainable properties, and thus should be focused on in the underwriting or due diligence analysis. Energy costs are significant in the operating cost budget and reduced energy use is also the most integrally tied to regulator, space user and investor demand.

Many of the other non-energy related resource use benefits are of less magnitude, and it is more reasonable to rely upon forecasted savings based on design intent and an analysis of sustainable property process and feature risks. For example, lower maintenance costs can be achieved through reduced expenditures to clean carpets, less frequent light bulb replacement, and changes in the schedule and nature and cleaning, among other factors.

In most cases, sustainable property investment will not result in increased operating costs, but perhaps operating costs that are higher than initially projected. For example, while the original projections could be for a 40% reduction in energy use, insufficient training of engineers, maintenance staff, and tenants, as well as systems or service providers that do not meet performance expectations, could limit the reduction in energy use to a lower number, say 25%. Additionally, energy costs could have gone down significantly, like they did in 2008, reducing operating cost reductions, while resource use reduction may have met original projections.

Additionally, sustainable properties require additional monitoring and measurement of sustainability outcomes, and, in addition to the capital cost to put in such systems, there are additional operating costs which will be required, including, at least initially, additional time and expense to administer and address lease issues.

If values go up due to the sustainable property investment, higher real estate taxes could result, increasing operating costs beyond historical norms.

Building operating problems can occur on sustainable properties primarily due to products, systems, service providers, maintenance staff, and other factors in the production and operation of a sustainable building that are more pioneering, or untested relative to their reliability. These learning curve issues are more likely to occur in the early operations of a building, but can also occur later due to untested durability and functioning over time of some systems.

Capital Expenses/Escrows and Holdbacks

Key sustainability issues here relate to the magnitude and timing of tenant improvements and leasing commissions. If sustainable properties reduce tenant turnover, significant reductions in TI and leasing commission costs could be achieved. Basic methods and

practices related to escrows and holdbacks should remain basically the same. However, as discussed in the other sections of the book, due to the responsibilities of contractors, developers, and other service providers to achieving environmental and related certifications, additional contract terms and possibly holdbacks or claw-backs may be warranted.

For owner occupants, reduced “churn” costs could be important. The Institute of Facility Management (IFMA) defines “churn” rate as the number of moves in a year expressed as a percentage of the total number of offices occupied. Churn rates averaged 36% in a 2007 IFMA survey, down from 44% in 1997 and 41% in 2002.

“More than 85% of the moves are ‘re-stacking’ moves, which take place within the same building. Those re-stacking moves take different forms. Box moves, in which employees move to existing workspaces, involve relocating files and supplies, not furniture, wiring, or telecommunications systems.

Furniture moves are more complex and involve reconfiguring existing furniture or adding new furnishings, although changes to telecommunications are usually minimal. Construction moves are the most complex and include new walls and telecommunications systems and additional wiring for power and data.

Costs associated with the three major elements involved in these moves—furniture, cabling, and walls—vary depending on a number of factors. These include prevailing labor rates, materials used (Category 5e cable versus Category 6), and technology support required. A facility designed for wireless access can reduce costs considerably because no wiring is required.

IFMA-member companies reported that box moves average \$152, whereas furniture moves cost \$679 per move, excluding power and cabling changes. Moves that include changes to power and cabling range from \$200 for simple changes to \$600 for extra circuits and receptacles. Typically, costs per drop (bringing two or three cables into a workstation) are an additional \$300 to \$450, and that’s only for data cabling; electrical is additional. Thanks to wireless networks that allow people to work from anywhere in the building, “soft costs,” associated with downtime (lost productivity) are less of a problem than they used to be.⁴¹

The potential benefits of reducing churn costs will be a function of the level of churn for the types of space users that will be occupying the space, and the specific types of sustainable features (under floor air ventilation, carpet tiles, etc.).

According to IFMA research, the primary drivers of churn are

- Reorganization (70%)

⁴¹ Churn Reconsidered, Herman Miller 2008; “Project Management Benchmarks,” IFMA, Research Report #28, 2007, p. 41.

- Routine churn (53%); which includes collocating groups to improve collaboration and maximize efficiencies within and between departments
- Expansion (46%)
- Consolidation (33%)
- Downsizing (11%) and mergers (9%) are the weakest drivers of churn.⁴²

Operating Cash Flow Forecast Verification

The key purpose of operating cash flow forecast verification is to reduce the uncertainty for decision-makers about the financial performance conclusions (loan to value, debt service coverage ratios, rates of return, etc.) upon which they will base their decisions. The level of uncertainty and risk inherent in a cash flow forecast will determine the level of return required for investment. Higher risks require higher returns, or in the case of a mortgage investment will require higher interest rates, or in most cases just result in a mortgage request being denied.

The verification of the operating cash flow (revenues minus expenses) includes a full range of real estate analytics (the types will vary based on the context and type of decision). Local market analysis, comparable property assessments, lease rollover analysis, and review of forecasted financial inputs like rents, occupancies, rollover vacancies, and the full range of expenses, are standard activities that will be done for both sustainable and conventional properties. The fundamental financial analysis process for sustainable properties is the same as for conventional properties. Modifications to the process that are required are discussed in depth in Chapter V and in the section above on Underwriting Space User Demand.

To provide a context for interpreting the risks related to cash flow forecasts, we present detail on cash flow/building ownership risks for sustainable properties in Section H: Risk Analysis and Presentation, of Chapter V: Sustainable Property Financial Analysis.

6. Insurance

Property and Casualty – Over ten insurance companies now offer Certified Green Building Replacement and Green Upgrade property insurance coverage. Certified Green Building Replacement covers all of the costs required to restore a damaged sustainable building to its previous certified level in the event of a covered loss. Green Upgrade property insurance pays for the restoration and upgrade costs for a conventional building to some predetermined sustainable standard in the event of a covered loss. Each company’s “green” endorsement differs, but essentially rebuild to a green standard.

There is direct evidence of lower property/casualty insurance costs for sustainable properties, based on policies offered by Fireman’s Fund Insurance, Lexington, ACE,

⁴² Ibid.

Traveler's, Liberty Mutual Property, and others.⁴³ In evaluating the cost savings from insurance policies it is important to assess both the actual cost savings as well as benefits due to coverage enhancements and other changes.⁴⁴

Additionally, at least one insurer (Fireman's Fund) offers a 5% discount on its insurance premiums for certified "green" buildings under the LEED or Green Globes programs. As a rationale for the discount, Fireman's has noted that "green" buildings are attractive to insurers because there's "less risk in a building that is constructed with products and systems so state-of-the-art that they lower operating costs, increase resale [appraisal] values, create a healthier work environment, and provide an opportunity for greater worker productivity."

Liability – See Property & Casualty discussion above.

Business Interruption – See Property & Casualty discussion above.

7. Third-Party Reports

Appraisal Report – There are a variety of modifications to the standard appraisal process that should be incorporated by an appraiser when valuing a sustainable building. However, the appraisal industry is still on the front-end of understanding and incorporating the valuation concepts documented in "*Underwriting Sustainable Property Performance*" into their practices. Training classes are underway, new practices are being developed and old practices refined to make necessary adjustments. See Valuation Considerations (Section H of Chapter V) for more detail.

Key to interacting with appraisers is to understand that appraisers are required to do their best job at determining value (market value in most business applications). Accordingly, if costs are less and regulators, space users and investors are increasing their demand for sustainable properties, then appraisers must try to correctly assess value.

To aid appraisers in their work, those seeking appraisals can be aware of and sensitive to the type of information appraisers need, as well as techniques for integrating the information into a value opinion. Appraisers who have experience with sustainable properties and features can be helpful, but frankly all appraisers or real estate consultants are trained to investigate what potential tenants and investors want, and it is this market test, if done correctly, should lead to higher values for sustainable properties in many situations.

⁴³ "The Green Built Environment in the United States, 2008 Year-end Update of the State of the Insurance Market," Marsh, February 2009.

⁴⁴ Ibid.

Fortunately, the underwriting process for many (most) sustainable investment decisions does not involve a formal appraisal, but the concepts of value will still be critical to decision-makers.

Property Condition/Quality: Engineers report – Since sustainable properties often have special features and systems that can be costly to repair or replace, any property condition report should specifically address the condition of these features. See Site Inspection in section 4 above.

Pest Inspection Report - No modifications identified.

Environmental - No modifications identified.

Legal, Title and Survey - No major modifications identified. Given the breadth of potential financing sources—equity, debt, mezzanine debt, equipment financing, etc. it may be important to understand lien priority and the rights of different finance providers to claim personal property as collateral and the effects this might have on property performance.

Government Regulations – See discussion of Government Regulations under the “Property Characteristics” section above.

Tax Consultant Report – There is a variety of Federal, State and local tax incentives and credits that are available to owners of sustainable properties. Because these tax incentives can have a substantial impact on a sustainable property’s overall economics, it is important for project sponsors to have a clear understanding of these tax incentives in both the development and operations phases. Most real estate owners and investors rely on the advice of a tax consultant (i.e. a CPA or real estate attorney) when making investment decisions in conventional buildings. Therefore, it is important that owners or investors in sustainable properties use a tax consultant who is knowledgeable about tax issues related to these properties.

Insurance-Risk Management Consultant – See discussion under the “Insurance” section above.

Sustainability Related Third-Party Involvement – The use of a “Sustainability” Consultant would be most important in situations where a building owner/sponsor was interested in renewing or applying for some type of sustainability certification. Because applying for most sustainability certifications requires specialized knowledge and can be time and paper intensive, many building owners opt to use the services of a sustainability consultant (e.g. a LEED Accredited Professional (LEED AP)) to help them navigate through this process.

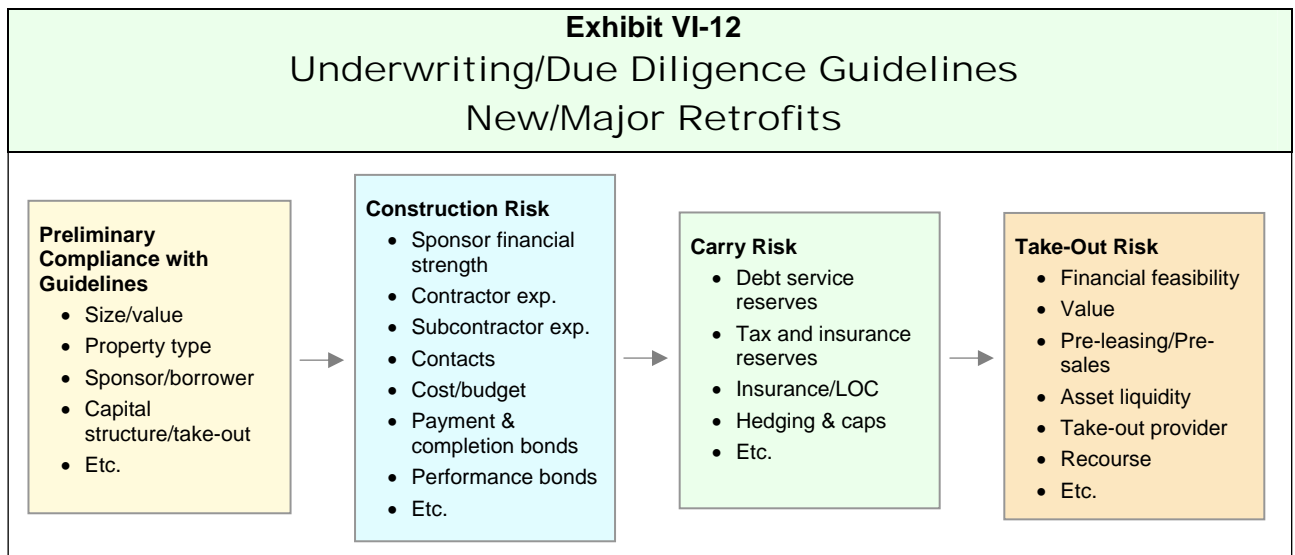
Depending on the size of the investment and volume of investments, it may also be a good idea to have sustainable property specialists either on retainer as consultants or on staff.

Training of existing staff on sustainability is also an excellent solution because sustainability is not a property type, but really a set of attributes or outcomes of a property. These “experts” would be able to assist in assessing the reliability of forecasts based on the particular sustainable attributes of a property and assist other staff. One of the important aspects of sustainability is that it is not an isolated topic, but a small part, in most cases, of nearly all jobs in the real estate industry.

Additionally, sustainable building certifications often require that a third-party verify that certain key building systems are working as designed. This process is known as commissioning and is often performed by third-party consultants in the context of achieving a sustainability certification.

H. New/Retrofit Buildings

The key underwriting issues for new construction or major retrofits are shown in Exhibit VI-12 and in more detail in Appendix VI-C. These issues are addressed in this section from the perspective of a lender or equity investor that is evaluating a capital investment in a new development or major retrofit project. Unlike existing buildings, 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.



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 ideas and recommendations presented below 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 not an attorney, nor is offering legal advice and legal questions should be reviewed with appropriate counsel.

Additional insight on the importance of green building risk issues from the perspective of the construction industry is presented in “*Green Building: Assessing the Risks*”, published by Marsh in 2009 (<http://global.marsh.com/news/articles/greenbuildingsurvey/index.php>). This report identifies the most significant risks associated with green design and construction based on a series of four interactive forums in major US cities. A total of 55 construction industry executives identified five major categories of risks as being most significant: financial, standard of care/legal, performance, consultants/subconsultants and subcontractors, and regulatory.

In addition to identifying the key risks, the Marsh Report also identified potential solutions and reaches the following conclusion in its Executive Summary:

“Despite the concerns about these exposures, many of these risks can be addressed to varying degrees through the availability of commercial insurance and surety solutions, or in some instances mitigated through contractual agreements. The commercial insurance market is evolving with respect to green building exposures. As underwriters become more adept at assessing and quantifying the risks associated with green building, we may see a growth of green building-specific coverages.”

1. Preliminary Compliance with Investment Guidelines

The first thing to consider when evaluating a new/retrofit sustainable property is whether or not that particular property complies with your organization’s investment guidelines. Whether you are an owner/user, an equity investor, or a lender, it is important to identify the basic parameters that your organization will base its preliminary decisions about the types of new/retrofit sustainable property investments that it is willing to make. This type of preliminary investment screening is done to ensure compliance with the organization’s strategic goals and is typically performed whether an organization invests in sustainable properties or not.

Each organization’s list of investment parameters or guidelines will be influenced by the type of business the company is engaged in, the company’s goals with respect to

sustainability, the way an organization assesses the performance of its real estate assets, etc. Below is a list of parameters or guidelines containing items that an organization might consider when performing its initial screening of a new/retrofit sustainable property.

- 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
- TI/LC Allowance

In developing the above list, it is imperative that the company make its goals with respect to its sustainable property investment explicitly clear and that these goals and objectives are clearly communicated to the department responsible for performing due diligence or underwriting the organization's sustainable property investments.

2. **Owner/Developer**

Below is a list of underwriting/due diligence areas typically investigated when evaluating an owner-operator. Special underwriting/due diligence considerations for sustainable properties are noted below.

Equity Level: No major modifications identified. It should be understood that sustainable projects often have more upfront costs and equity levels and budgets should reflect these additional costs. (These costs are typically offset by the benefits of more sophisticated and integrated design and planning, but more cash flow is needed early)

Sponsor Experience: Sponsor experience is key for any new construction project, and even more so with sustainable properties where it is widely understood that experienced developers and contractors are much better able to control and maintain any potential cost premiums to minimal levels.

Sponsor Financial Strength – Liquidity—No modifications identified.

Credit Analysis & Reference Checks – No modifications identified.

Property Type/Operations Experience – This is less of an issue for a new construction project, but could be an issue relative to the evaluation of the “take-out” lender or investor. How much experience does the owner/operator have operating buildings of this particular property type? If the owner/operator has experience operating conventional buildings of a particular property type, how different is the operation of a sustainable property? Identify

key areas of operation that might prove problematic and think through potential solutions in advance.

Experience with Subject Property – What is the developer/contractors history with the subject property and/or property type? Have they owned the land/property for some time or did they recently purchase the land/building? Did they build it themselves or did someone else? Again, the focus here is on development experience—and it is even better if the developer has operations experience.

Financial Strength-Net Worth – No modifications identified.

Judgments, Liens, Bankruptcies, legal search - No major modifications identified. There is always an issue when multiple levels of finance are involved in a single project relative to ownership structure, lien status, and responsibilities in under different economic scenarios. This could be important in making sure whoever owns or manages the property maintains sustainability certifications and performance.

Bank Statement Review - No modifications identified.

Ownership Form - No major modifications identified. If multiple levels of financing are involved it is important to understand ownership and lien status, as it is with any real estate investment.

Indemnifications, Guarantees, Carve-outs – It is possible that some contracts with service providers may involve legal language that requires additional attention—see legal/contracts discussion in Appendix V-C and Expanded Chapter IV-C-2. It is possible that government guarantees will also become part of sustainable property finance and these will have to be reviewed and underwritten.

Disclosures - No major modifications identified. It might be a good idea to identify and seek disclosures between various service providers—commissioning agent and engineers, for example, to ensure independence in advice. It is not necessarily bad for one service provider to provide multiple types of service, but if compliance and review are involved, it is important to assure independent approaches to service are maintained.

3. Construction Risk

General Discussion of Construction/Development Risks

The net impact of construction-development risk on a sustainable project will be largely determined by the type of sustainable investment, the level of sustainable or energy certification sought, and the experience of the design and construction team implementing the project. Owners seeking the highest levels of sustainability, where more pioneering design, construction, products and systems are employed, will experience significant risk. While such risk is inherent in those companies or individuals taking leadership roles in

sustainability—in fact I once heard “leadership” defined as “taking action without proof”—the positive benefits of leadership are also powerful and need to be carefully evaluated.

Construction-development risk is driven by property cost uncertainty, property performance uncertainty and legal and contractual risks. Pioneering design and construction, the availability of experienced contractors and subcontractors, pioneering products and systems, building code and regulation complexities and limitations, and other issues drives property cost uncertainty. Property performance uncertainty will result from the volatility of energy costs, problems with the reliability of the results of energy modeling, and underperformance in products, materials, systems or contractors. Legal and contractual risks exist due to the enhanced expectations on architects, contractors, subcontractors and LEED consultants. Finally, all of these risks can affect potential completion of the project, delaying revenues and increasing construction costs.

The primary way sustainable properties can reduce development risks is through the reduction of entitlement risk. Sustainable projects can be beneficial in overcoming potential neighborhood opposition, improving the timing and content of regulatory approvals.

The primary way construction-development risks are addressed in sustainable properties is through mitigation. Integrated design, quality commissioning, improved/early goal setting and value clarification among participants in the project, and generally better communications among key participants in the process can reduce risk. Legal risks can be addressed through more explicit service provider contracts, insurance, and earlier and better communication.

Finally, it is important to place sustainably related development risks in context. New developments or major retrofits are risky endeavors. Cost volatility, product failures, subcontractor problems, delays, legal risks, and other issues are not “sustainability” issues per se, and the incremental aspect of sustainability needs to be kept in mind when evaluating “sustainability” risks.

Checklist of How Sustainable Property Investment Can Reduce Construction Risk

Sustainable projects can reduce construction risk through:

- Reduced cost volatility
 - Commissioning
 - Integrated design
 - Local materials
 - Improved/earlier goal setting; “values clarification”
 - Better communications among key participants in process
 - Reduce entitlement risk
 - Improved timing and content of neighborhood/public appearances

- Improved timing and content of regulatory approvals
- Reduced legal risks
 - More explicit service provider contracts
 - Better, earlier communication

Construction risk is the risk that a project will not be completed to the planned quality level on time or within the allocated budget. Construction risk can result from delays, financial problems, contractual issues, legal problems, design issues, operational problems or environmental issues. Construction risk is also unique to each project. Each project has its own stakeholders, regulatory issues, and other factors that are unknown or unknowable at the start of a project.

The primary way that construction risk is mitigated is through higher equity requirements, fixed price construction contracts, retainage, budget contingencies, and payment, completion, and performance bonds.

Based on a survey by Marsh published in early 2009, the surety markets (that provide payment, completion and performance bonds) have not specifically responded to the green industry. They noted the specific concerns revolving around onerous contract provisions and the risk of inadvertently guaranteeing a specific performance or efficacy for energy usage, water consumption, and/or LEED certification. These markets are looking at green contracts more closely, and it is possible, as more positive experiences are achieved, that new products will be available in this area.⁴⁵

To assess potential benefits due to reduced construction risk, as a result of sustainability, it is important to evaluate the specific sustainability experience of the contractor, subcontractors, design team and other project participants. Given the added potential communication problems from having additional participants, team experience working together, or a plan to mitigate lack of prior team experience can be important.

A specific assessment of the key factors that can reduce cost volatility, entitlement risk, and legal risk should be made for the subject property.

Checklist of How Sustainable Property Investment Can Increase Construction Risk

Sustainable property investment can increase construction risk, which is defined as the risk that a project will not be completed on time or within the allocated budget. Some of the key issues that can increase construction risk include:

- Pioneering design and construction

⁴⁵ “The Green Built Environment in the United States, 2008 Year-end Update of the State of the Insurance Market,” Marsh, February 2009.

- Contractor bidding climate and uncertainty: contractors demand payment for uncertainty in the bidding process
- Pioneering products/systems
 - Untested performance and reliability
 - Availability
 - Combining new systems/technology
 - Potential for rapid functional obsolescence
- Systems interoperability
- Increased new/retrofit construction complexity
- Potentially underestimated contingency reserves
- Building codes and regulation complexities/limitations
- Service provider capacity and experience
- Specialized subcontractors / equipment
- LEED / Certification compliance
- Regulatory compliance

Tips for Assessing Construction Risk for a Specific Property

An evaluation of construction risk is similar to the evaluation of the potential for increased development costs above. While much of the risk can be mitigated through using experienced contractors and service providers; limiting untested or pioneering design, construction and features; and engaging an experienced sustainable certification consultant to lead you through the process, paperwork, and other required tasks, many sustainable properties will still experience significant additional construction risk.

One example of increased risk can occur with building codes and related regulations. With over a hundred years of building codes based primarily on life and safety factors, even well-intentioned municipal and state governments cannot eliminate the conflicts that exist with some aspects of sustainable properties. Waterless urinals have been a particular issue as many local governments, due to union and other pressures, either do not allow waterless urinals, require dual sets of plumbing, or do not allow waterless urinals for an individual tenant build-out. With governments, building owners, and tenants starting to come together on these issues, it is hoped that these kinds of risks can be further mitigated in the future.

Performance bonds, payment bonds, completion bonds, and other types of surety are also used to mitigate construction risk. Performance bonds protect lenders in the event the contractor fails to complete the project as agreed. Payment bonds are an undertaking by the surety that all persons supplying labor and materials to the project will be paid. Completion bonds involve the surety agreeing to complete the project, regardless of cost.⁴⁶

⁴⁶ US CMBS: Moody's Approach to Rating Commercial Real Estate Construction Loans, January 20, 2006.

Sustainable projects, like conventional projects, can mitigate risk through these types of surety. Based on a survey by Marsh in early 2009, sureties have not developed any new products or services for the green building marketplace, and have made no specific adjustments to their underwriting criteria to deal with this sector. Some sureties surveyed did have specific concerns revolving around onerous contract provisions and the risk of inadvertently guaranteeing a specific performance or efficacy for energy usage, water consumption, and/or LEED certification. Green contracts are being closely monitored.

Marsh also reports that some jurisdictions have implemented regulations that require bonds to guarantee LEED certification and specific performance standards. Such regulations have generated scrutiny from surety companies both individually and on the part of the industry association. However, green building ordinances that contain surety requirements have not yet been pushed down to the contractor level. There have been no known issues of green related contractor defaults.⁴⁷

Standard construction loan risk management techniques will also reduce potential risks. Reputable and experienced borrowers, construction managers, or a guarantor of debt by a credit-worthy borrower guarantor is one method. Construction loan draws should be linked to construction performance, based on inspections and lender approvals. Delay cost reserves covering any potential expenses that could be incurred (such as might be payable to a key tenant due to delay) can also be put in place. Budget contingencies, typically at 5% to 10% of the total project budget, are also usually required.

Recourse with Financially Strong Borrower - No modifications identified.

Contractor-Subcontractor Experience/Capacity – One of the top risks. It is important to evaluate the specific sustainability experience of the contractor, subcontractors, design team and other project participants. Given the added potential communication problems from having additional participants, team experiencing working together, or a plan to mitigate lack of prior team experience can be important.

Construction-Design and Other Contracts –Sustainable properties introduce a number of important legal and related contractual risks that increase development risk if not appropriately mitigated through improved contracts, training, and behavior. Some of these risks include:

- Design firm professional liability
- Marketing Risks: fraud, misrepresentation, etc.
- Miscellaneous Contracts: Construction contracts, warranties, escrow contracts, insurance documents, and other specialized legal documents also add risk, simply because they are new and may be untested by owners and developers.

⁴⁷ Extracted from “The Green Built Environment in the United States, 2008 Year-End Update of the State of the Insurance Market,” Marsh, early 2009.

Appropriate legal representation and/or other specialized services should be retained to mitigate these types of risks

Design Firm Professional Liability

Design firm professional liability is primarily an issue for architects and design firms who want to limit the potential for litigation, but improved and more clearly specified contracts will also help investors. For any owner or investor who has gone through litigation, they know that even the winners often do not “win.”

From the owner perspective, design and construction is already complex, and additional sustainability requirements and issues can make it even more so. Given the leadership of architects and designers in sustainability, it is natural and appropriate for owners to look to architects for education and guidance in this new field. However, it is important that the owner understand that their job is to communicate the importance of the economics, and the values that they are seeking in a project, and it is to their benefit to have contracts that clearly lay out the relative risks and responsibilities between architects and designers and owners.

The architectural community has stepped up their responsibilities to sustainable design in recent years:

Looking at AIA B101-2007, the standard form of contract between architect and owner, sustainable duties are immediately apparent. That document provides, in pertinent part:

3.2.5.2 The architect *shall* consider environmentally responsible design alternatives such as material choices and building orientation, together with other considerations based on program and aesthetics that are consistent with the Owner’s program, schedule and budget for Cost of the Work. (Emphasis added)

Thus under the AIA contract, for the very *first* time, the architect is actually required to consider and evaluate green or sustainable design alternatives as part of the base services.

The AIA Canons of Ethics create and impose similar duties, taken one step further. Under the modern Canons, the architect now actually has duties running to the environment. In that regard, Canon IV – Obligations to the Environment, specifically provides:

Members should *promote* sustainable design...

E.S.6.1 Sustainable Design: In performing design work, members should be environmentally responsible and *advocate* the design, construction and operation of sustainable buildings and communities.

E.S.6.3 Sustainable Practices: Members should use sustainable practices within their firms and professional organizations, and they should *encourage* their clients to do the same. (Emphasis added.)⁴⁸

Architects and owners need to be careful and understand the role of an “advocate” for sustainable design, and appropriately recognize their relative responsibilities and roles. Frederick Butters, in his article⁴⁹, provides an example of this issue:

For example, the architect who takes the AIA documents’ admonishment to “advocate” for sustainable design and sustainable products to heart and recommends to the owner an HVAC system based on a heat pump package that draws on a geothermal or water source. Unfortunately, the projections regarding the temperatures at which the geothermal or water source run are erroneous and the actual temperatures are warmer than projected. As a consequence, the system is less efficient and unable to maintain comfort on 10 percent of the warmest days in the summer. Tenants are angry and withholding rent. Vacant space remains vacant. The owner is faced with a complete retrofit of the HVAC system in order to resolve the problem at substantial expense. The owner looks to the design professional to correct the problem. While it may seem like a good idea, geothermal-based energy sources are unpredictable. If the architect does not clearly and sufficiently indicate the positives and negatives of the HVAC options, the client will be looking to the architect to make him or her whole. Becoming an advocate for many types of sustainable approaches may cause the design professional to overlook the messy reality for the sake of being a good advocate.

The American Institute of Architects understands the importance of risk issues and has a series of 14 different memoranda in the risk management best practices strategies section on their website.

Other potential design risks include:

Liability for the increased cost of certain types of damages, such as lost profits, lost business opportunities, increased tax burdens, and energy costs.

Liability for warranting an outcome without having complete control over things such as construction means and methods and operation and maintenance.

Liability for structural problems and leaks associated with green roofs.

Lack of proper green experience and qualifications on the part of the design team.

Lack of control over material specifications and substitutions on the part of the contractors.

The 2009 Marsh Report made the following observations:

⁴⁸ “Greening the Standard of Care: Evolving Legal Standards of Practice for the Architect in a Sustainable World,” Frederick F. Butters, *Real Estate Issues*, Counselors of Real Estate, Vol. 33, No. 3, 2008.

⁴⁹ *Ibid.*

As of May 2008, all markets surveyed acknowledged that it is premature to draw any conclusions or to offer new coverage. Much will likely depend on the claim activity or lack thereof.

Insurers already have experienced claim activity. Below are several examples:

- Claim by developer against architect because building did not achieve LEED Gold Certification.
- Claim against architect and structural engineer due to water infiltration from green roof.
- Claim against design team because the cork flooring they specified resulted in water retention and mold.
- Claim against architect because lack of green product availability caused project delays.
- Claim against architect because health problems of tenants' employees increased despite warranties that the indoor air quality would improve.

Most markets believe that traditional design professional liability policies provide a significant amount of coverage for the negligent performance of professional design services. However, the general consensus is that a key difference between traditional design and green design involves enhanced performance expectations (i.e., energy savings, employee productivity, etc.) and an evolving standard of care, which may not be covered by traditional architects and engineers professional liability insurance policies.

As of the date of creating this book, no insurance companies surveyed have made changes to their underwriting criteria, pricing and/or coverage with respect to the design of green buildings. Several insurers do provide risk and contract management advice for their design firm clients. Focus is placed on the avoidance of performance guarantees, the appropriate standard of care, and a well-defined scope of services.”⁵⁰

Marketing Risk

Owners could also be subject to significant legal risk in the marketing of their projects.

Sustainable property investors and developers are subject to claims of misrepresentation and fraud resulting from property marketing. These risks arise largely because the marketing process begins well before a project is certified, a lack of knowledge about the studies and data they cite, insufficient consideration of the specific application of studies and data to their project, and the actual variability in sustainability outcomes achieved by properties to date. As a result, sales and leasing brokers or principals marketing their projects have the potential to make claims that are untrue at the time that they make them.

⁵⁰ Extracted from “The Green Built Environment in the United States, 2008 Year-end Update of the State of the Insurance Market,” Marsh, February 2009.

Many in the market are confused about the difference between pre-certification, registration, certification, and other varying levels of sustainability. It is also important to be careful in making “first in market” claims or other claims that are not carefully researched. Given the long time frame in which marketing documentation often exists, these kinds of claims can also become untrue over the life of a document.⁵¹

It is particularly important not to cite industry studies without appropriate caveats and/or limitations. Many studies show that actual energy performance is quite volatile with a wide scatter among the individual results that make up an average energy savings. Consequently, if an owner cites averages in marketing their project, there is a high likelihood that they will be wrong.⁵²

There is also a substantial risk in presenting or promoting a project with unsupported claims in that capital providers, as part of their due diligence, often will uncover poorly supported or misleading facts and statistics, thus undermining the credibility of all of the appropriately argued and supported information in a funding request.

These risks can be mitigated through training of staff and the development of protocols for reviewing marketing and promotion materials. A good discussion of these and other issues can be found in “Selling and Governing the Green Project: Owner Risks in Marketing, Entitlement and Project Governance,” Paul D. Arelli, *Real Estate Issues*,” Counselors of Real Estate, Vol. 33, No. 3, 2008. On a similar note, unsubstantiated or over-stated claims made during the entitlement process can also lead to problems, and potentially be turned around on a developer by becoming part of the requirement(s) of the development agreement.

The Federal Trade Commission has published a brochure, “Complying with the Environmental Marketing Guides” that provides the FTC staff’s view of the law’s requirements. The FTC Act gives the Commission the power to bring law enforcement actions against false or misleading marketing claims, including environmental or “green” marketing claims.

The FTC issued its Environmental Guides, often referred to as the “Green Guides,” in 1992, and revised them most recently in 1998. The Guides indicate how the Commission will apply Section 5 of the FTC Act, which prohibits unfair or deceptive acts or practices, to environmental marketing claims. Like other industry guides issued by the FTC, the Environmental Guides “are administrative interpretations of laws administered by the Commission for the guidance of the public in conducting its affairs in conformity with legal requirements.” Conduct that is inconsistent with the positions in the Environmental

⁵¹ “Selling and Governing the Green Project: Owner Risks in Marketing, Entitlement and Project Governance,” Paul Arelli, *Real Estate Issues*, Counselors of Real Estate, Vol. 33, No. 3, 2008.

⁵² “Energy Performance of LEED® for New Construction Buildings,” Cathy Turner and Mark Frankel, *New Buildings Institute Final Report*, March 2008, pp. 1-4.

Guides may result in corrective action by the Commission, if after investigation, the Commission has reason to believe that the conduct violates prohibitions against unfair or deceptive acts or practices.

The Environmental Guides apply to all forms of marketing for products and services: advertisements, labels, package inserts, promotional materials, words, symbols, logos, product brand names, and marketing through digital or electronic media, such as the Internet or email. They apply to any claim, express or implied, about the environmental attributes of a product, package or service in connection with the sale, offering for sale or marketing of the product, package or service for personal, family or household use, or for commercial, institutional or industrial use. See the complete text of the Environmental Guides.

<http://www.ftc.gov/bcp/edu/pubs/business/energy/bus42.shtm>

Insurance - No major new products for the industry identified as of early 2009. Consult appropriate legal and or risk management advisor.

Cost, Budget Contingencies – There is a general consensus in the building construction industry that the cost to build sustainable buildings is the same or a slight premium over the cost to build a comparable conventional building⁵³. This issue is discussed below.

Increased Development Costs

One of the most hotly debated issues in the sustainable property sector is whether sustainable properties or retrofits cost more than conventional properties. This “first cost” analysis is discussed at some length in Chapter IV, Section E-1 as well as in Appendix V-A. As fully discussed in those sections, the clarification of the cost question, as well as a full consideration of cost-increasing and cost-decreasing attributes of a sustainable project are critical to addressing this issue.

Sustainable properties do have additional costs compared to conventional properties. Sustainable certifications, more sophisticated energy modeling, and higher legal and commissioning costs increase development costs over conventional projects. Higher costs for products, materials, systems, and specialized service providers are possible, and to be expected in some cases, but this will vary dramatically by project and geography, as well as the particular market conditions relative to the contractor bidding climate and other factors.

There have been dramatic improvements in the cost and availability of sustainable products, systems and materials in recent years, and growing sophistication and capacity of service providers. However, projects seeking a leadership position as to their

⁵³ A 2006 study prepared by Davis Langdon entitled *Costs of Green Revisited* concluded that: “there is no significant difference in average costs for green buildings as compared to non-green buildings.”

sustainability rating, or in the use of pioneering products or systems, will experience both higher costs, and greater uncertainty than conventional properties.

We have not seen specific evidence of higher tenant improvement costs or higher financing costs, but both are possible. Higher tenant improvement costs could result from the use of relatively expensive glass or lighting systems in internal spaces, or from product or service provider capacity and experience issues. Financing costs could be higher if lenders do not recognize the value of some sustainable improvements, increasing the amount of high cost equity that is needed. Additionally, with greater up front expenditures for planning and other activities, construction interest may also increase due to earlier and larger loan draws.

Development costs can also increase through project delays due to the complexity of sustainable construction, delayed product or system deliveries, or capacity issues relative to contractors and subcontractors. Such delays can increase construction cost due to timing and management problems and an increase in construction period interest.

Tips for Assessing Development Costs for Specific Properties

Potential increased development costs can be evaluated through assessing development budgets, sustainable process and feature issues, and other mitigation strategies. The potential for increased development costs can be mitigated through an evaluation of the integrated design process, contracts, service provider capacity, and a review of the nature of the sustainable features and systems to check for any pioneering or higher risk design and construction elements.

Another key issue in thinking about the incremental cost of sustainable construction is to be careful to not attribute too much of any construction cost increase, or volatility, to sustainability alone. For example, in the four years prior to the economic collapse in 2008, the Producer Price Index (prices of materials and components for the construction industry) went up 40%, compared to just 18% for the consumer price index.⁵⁴ Some of the key inputs into the construction process increased at a much faster rate during this time period:

- Crude oil: 301%
- Diesel: 252%
- Asphalt: 190%
- Gasoline: 167%
- Copper and brass: 146%
- Iron and steel: 114%
- Concrete: 36%
- Consumer Price Index: 18%

⁵⁴ “Smart Construction: Economical Building Solutions to Offset Soaring Materials Prices,” Leo Pardo Construction, Bureau of Labor Statistics, Jan. 04 to Jan. 08 time period, 2008.

The rapid increase in the cost of fuel during this time period influenced most costs. It affects petroleum-based materials such as asphalt, plastic, rubber, PVC, insulation and roofing shingles, and every single construction material requires manufacturing and transportation, sometimes across thousands of miles, which consumes fuel. Accordingly, while fuel prices are significantly down in 2009, sustainable products and practices (emphasis on local materials) can both mitigate construction costs and construction cost volatility.

It is also important to remember when evaluating potential incremental increases in development costs for sustainability, that it is often difficult to get a statistically significant answer, given the relatively high variance in bids by contractors for the same construction plan. While estimates of bid variance of 5% to 10% for construction contracts is a reasonable rule of thumb, a recent study of commercial interiors projects found that average bid swings for many components, such as ceiling tile and carpets, had an average bid swing of 5%, while electrical bid swings pushed as high as 20%. This was important in that approximately 25% of the interior construction costs was spent on electrical, based on the study's results.⁵⁵

While this type of analysis is important for any project, it should be noted that the key issue in making a sustainable property investment decision is not whether the initial costs are more than a conventional project, but whether the additional costs, if any, are supported by sufficient benefits to justify potentially higher initial costs.

Assessing the Net Impact of Sustainable Development Costs

The net impact of sustainability on development costs is often misunderstood, or presented either as only a cost or a benefit issue, while a true understanding of the issue can only be determined by evaluating the net impact of costs and benefits after consideration of risk mitigation measures.

Sustainability can lead to increased development costs due to costs of certification, energy modeling, legal, and commissioning costs. Also, depending on the particular type of property, level of sustainability, and geographic market, products, materials, contractors, and service providers can also cost more than traditional non-sustainable investment. In addition, delays due to product or system deliveries, or over-stressed service providers or contractors can increase construction interest costs and delay the receipt of revenues.

Equally important, but seldom discussed, is the “cost” that developers, investors or owner occupants face due to required changes in their standard operating procedures. The most successful sustainable projects have specialized contracts, specialized subcontractors, more upfront planning and an integrated whole building approach to design and construction. Finding and developing new vendors, subcontractors, architects, and other

⁵⁵ Ibid.

service providers can be costly. Furthermore, learning new development processes, altering contracts and leases, and other required sustainable activities could be daunting to many. While experienced owners and service providers claim that costs and process issues are not significant, new investors to the sustainable property market need to be aware of these less quantifiable “costs.”

Sustainable property investments can realize significant reductions in development costs through their ability to capitalize on incentives offered by utilities, local, state and Federal governments. Expedited permitting and approvals, design and code flexibility, rebates, financing assistance, and tax benefits are just some of the incentives available in the marketplace today to offset potential increases in development costs.

Development costs may also be reduced through improved private debt and equity financing. As the capital markets have shifted from ready availability of capital to limited access, a potential benefit of sustainable projects will be their improved access to financing. Improved access might take the form of better loan to value or debt service coverage ratios, more lenient reserve/holdback requirements, or simply meeting a minimum standard required by an investor. The growing availability of Socially Responsible Investment capital for real estate suggests that some sustainable real estate projects will have access to financing that might not otherwise have been available were they not sustainable projects.

It is important to caveat the discussion of potential financing benefits because real estate finance is driven primarily by non-sustainable issues, and will continue to be so in the future. Accordingly, it is unlikely that sustainable attributes will overcome the typical factors that prevent projects from accessing reasonable cost financing, including insufficient equity, inexperienced sponsorship, unsubstantiated financial projections, bad location, or an unsustainable competitive advantage.

A critical component of an analysis of sustainable development costs is to evaluate a property on an integrated basis. While some sustainable features, such as renewable energy systems, green roofs, new windows, and other improvements can cost incrementally more than non-sustainable alternatives, it is often possible to downsize some systems (such as HVAC systems) and reduce costs in other parts of the budget to offset increased costs in another part of the budget.

Finally, while the additional costs from integrated design, improving contracts, and commissioning can increase costs, they can also reduce costs due to reductions in the number and magnitude of change orders, reduced operational startup costs, and other operational improvements.

Construction Manager/Service Reviews: Critical for all projects, including sustainable properties. Reviewers should have experience in the kinds of issues that can arise with sustainable projects (See Chapter IV on Sustainable Property Process and Feature Performance)

Product/Systems/Materials Performance: Critical for all projects, including sustainable properties. Reviewers should have experience in the kinds of issues that can arise with sustainable projects (See Chapter IV on Sustainable Property Process and Feature Performance)

Funding Mechanics: Inspections/lien waivers/Draw Mgmt: Not materially different from traditional projects. Draw schedules may vary from traditional projects due to higher initial planning and design fees due to integrated design process.

Payment, Completion and Performance Bonds - Based on a survey by Marsh published in early 2009, the surety markets (that provide payment, completion and performance bonds) have not specifically responded to the green industry. They noted the specific concerns revolving around onerous contract provisions and the risk of inadvertently guaranteeing a specific performance or efficacy for energy usage, water consumption, and/or LEED certification. These markets are looking at green contracts more closely, and it is possible, as more positive experiences are achieved, that new products will be available in this area.

4. Carry Risk

Sustainable Property Investment Can Reduce Carry Risk

Carry risk addresses the possibility that a construction loan will default in the payment of interest during the construction lease-up period. This risk is most acute in the later years of the term of a construction or mini-perm loan. Interest reserves are established to cover the expected time to build and lease up the project, together with a small contingency. Insurance policies can also be obtained that backstop loan payments until establishment of an adequate stabilized debt service coverage ratio (typically 1.0 or better). A letter of credit or an advancing mechanism may also be used, and hedges and caps are also important in mitigating carry risk.

Sustainable property investment can reduce carry risk in the following ways:

- Reduced time to construct
- Reduced time to lease-up
- Reduced “carry” risk insurance cost
- Increase pre-leasing
- Reduced entitlement risk

The primary additional attributes of a sustainable project that will reduce carry risk are those that support a compelling favorable lease-up story relative to the specific space users

expected to occupy the property. While reducing the cost of carry insurance is one potential benefit, this is not yet possible in the marketplace as of early 2009.⁵⁶

Debt Service Carry Reserves: No major modifications anticipated.

Real Estate Tax and Insurance Reserve - No modifications identified.

Insurance/Letters of Credit – To the extent that a compelling favorable lease-up case can be made for a sustainable building relative to a conventional building, insurance and/or letters of credit may, in the future, become less expensive for sustainable buildings.

Floating Rate Risk--Hedging and Caps - No modifications identified.

Pre-leasing/Pre-Sales: If pro-forma cash flows provide for enhanced revenues due to absorption speed and pricing for sustainability, pre-leasing requirements to prove-up premiums might be anticipated.

5. Take-Out Risk

Sustainable Property Investment Can Reduce Exit or Take Out Risk

The risk that the construction loan's balloon payment will not be executed as planned is referred to as take-out risk.⁵⁷ If a construction loan does not have a highly rated take-out lender, then the risk of executing the take-out is a function of the economics of the completed real estate project. Accordingly, sustainable properties with proven demand by regulators, space users, and investors, and the resulting increase in value and financial performance will have significantly lower take-out risk.

A loan's potential for reduced take-out risk is directly related to the clear articulation of the subject property's superior economics as a result of increased regulator demand, space user demand, and investor demand.

A property's exit risk (for equity investors/developers) is also significantly reduced by anything that increases the demand from investors or buyers for their final product. This benefit should be common in many sustainable projects, but it is important not to overestimate the magnitude of this benefit, given the many other factors that affect investor and space user demand on any particular project. The best evidence of these benefits will be information that is supportive of the key economic arguments given the subject property's specific attributes.

⁵⁶ Ibid.

⁵⁷ "US CMBS: Moody's Approach to Rating Commercial Real Estate Construction Loans," January 20, 2006. This section discussed loan-related take-out risk as well as exit-risk, a similar concept for equity investors/developers, who must eventually sell their property to capitalize on its value.

A loan's potential for reduced take-out risk is directly related to the clear articulation of the subject property's superior economics as a result of increased regulator demand, space user demand, and investor demand.

Sustainable Property Investment Can Increase Exit/Take-Out Risk

Sustainable property developments, like all developments, are subject to exit or take-out risk. Take-out risk is the risk that a construction loan's balloon will not execute as planned. Exit risk relates to the sufficiency of the price an owner would be able to achieve at the time of sale.

Failure to execute a take-out could be due to rising interest rates, capital market distress, and/or sustainable property underperformance in areas like those shown below:

Building envelope performance

- Product / system performance: combining new systems and technologies
- Energy cost volatility
- Contractor experience / performance
- Service provider performance
- Building underperformance
- Market underperformance

The key issues in assessing the implications of sustainability on exit or take-out risk for a specific property include those issues addressed above in the construction and legal risk sections, but are even more heavily focused on real estate market risk.

The financial performance and value of a property is key to exit/take-out risk. Permanent take-out loans will typically have specific requirements relative to pre-leasing, pre-sales, or other specific targets that must be met. Sufficient value is key to equity investors, particularly developers; whose profitability is driven by sales prices once the project is complete.

Unlike conventional properties, not only does the market have to be strong for the property, but there is also a more significant issue relative to commercial broker and appraiser recognition of that value. While both the commercial brokerage and appraisal industries are ramping up their training and education efforts in the sustainability area, it will take a number of years for these service providers to increase their understanding and acceptance of sustainability benefits.

One of the key market risks that needs to be assessed is whether the level of sustainable property investment matches the demand by tenants and investors in the marketplace. For example, while a high level platinum or gold LEED building is a very desirable outcome, depending on the types of space users and most likely buyers in the marketplace, it is possible that the level of expenditures required to reach the highest levels of sustainability

might be viewed as an over-investment relative to the market. This type of risk is similar to that experienced by all developers, who must match their building design and quality successfully with market demand, or risk the consequences.

Another interesting area of risk that needs to be considered is that of the building enclosure. Daniel Lemieux, AIA, in a recent article, stated it this way: “Energy efficiency is not the only goal of a sustainable building. Other goals include indoor environmental quality and durability. Simply put: uncontrolled rainwater penetration, condensation and moisture ingress are three of the most common threats to the long-term durability, structural integrity and performance of the building enclosure. In the past, statistical data has suggested that collectively they represent up to 80% of all construction related claims in the United States.”⁵⁸

Mr. Lemieux goes on further to say that “since 2004, a new pipeline of litigation has begun to form, partially stimulated by the growing demands of sustainability for improved energy and related resource use. He suggests that the primary problems in the context of building enclosure failure originate from errors and omissions arising from the frequently short-circuited design process, one that reflects the compartmentalization of design and, in many instances, the attempt to relocate design responsibility downstream to the subcontractors and trades responsible for the work.”⁵⁹

Mr. Lemieux suggests that specialized building enclosure commissioning can assist in reducing potential problems with the building enclosure.

6. Third-Party Reports

Appraisal Report – There are a variety of modifications to the standard appraisal process that should be incorporated by an appraiser when valuing a sustainable building. However, the appraisal industry is still on the front-end of understanding and incorporating the valuation concepts documented in *Value Beyond Cost Savings*” into their practices. Training classes are underway, new practices are being developed and old practices refined to make necessary adjustments. See Valuation Considerations (Section H of Chapter V) for more detail.

Key to interacting with appraisers is to understand that appraisers are required to do their best job at determining value (market value in most business applications). Accordingly, if costs are less and regulators, space users and investors are increasing their demand for sustainable properties, then appraisers must try to correctly assess value.

⁵⁸ “Trust, But Verify: Building Enclosure Commissioning in Sustainable Design,” Daniel J. Lemieux, AIA, *Real Estate Issues*, Counselors of Real Estate, Vol. 33, No. 3, 2008; Bomberg, M. T., and Brown, W.C. (1993), “Building Envelope and Environmental Control: Part I – Heat, Air and Moisture Interactions,” *Construction Canada* 35 (1), 15-18.

⁵⁹ *Ibid.*

To aid appraisers in their work, those seeking appraisals can be aware of and sensitive to the type of information appraisers need, as well as techniques for integrating the information into a value opinion. Appraisers who have experience with sustainable properties and features can be helpful, but frankly all appraisers or real estate consultants are trained to investigate what potential tenants and investors want, and it is this market test, if done correctly, should lead to higher values for sustainable properties in many situations.

Fortunately, the underwriting process for many (most) sustainable investment decisions does not involve a formal appraisal, but the concepts of value will still be critical to decision-makers.

Property Condition/Quality: Engineers report (Change title to: Construction Manager Reports – Monitoring) – Since sustainable properties often have special features and systems that can be costly to repair or replace, any property condition report should specifically address the condition of these features.

Environmental - No modifications identified.

Legal, Title and Survey - No modifications identified.

Government Regulations – See discussion of Government Regulations under the “Property Characteristics” section above.

Tax Consultant Report – There is a variety of Federal, State and local tax incentives and credits that are available to owners of sustainable properties. Because these tax incentives can have a substantial impact on a sustainable property’s overall economics, it is important for project sponsors to have a clear understanding of these tax incentives in both the development and operations phases. Most real estate owners and investors rely on the advice of a tax consultant (i.e. a CPA or real estate attorney) when making investment decisions in conventional buildings. Therefore, it is important that owners or investors in sustainable properties use a tax consultant who is knowledgeable about tax issues related to these properties.

Insurance-Risk Management Consultant – See discussion under the “Insurance” section above.

I. Conclusions

Underwriting properties with sustainable features does not involve a fundamental change in existing methods and practices. However, underwriters need to enhance their education of sustainability and learn some new techniques, and dust-off some old ones, to effectively identify, price and mitigate sustainable property risks.



Appendix VI-A Space User Property Underwriting Checklist⁶⁰

1. Strategic Goal Compliance
<p>Support Social License to Operate</p> <p>Promote Marketing and Sales Increase Innovation Improve Employee Recruiting and Retention</p> <p>Increase Productivity</p> <ul style="list-style-type: none">• Meet Logistics Requirements: Vendors and Customers• Integration of Business Units <p>Increase Flexibility</p> <ul style="list-style-type: none">• Assets Off Balance Sheet• Match Occupancy Durations <p>Reduce Costs</p> <ul style="list-style-type: none">• Assets off Balance Sheet• Match Occupancy Durations• Reduce Capital Costs• Reduce operating Costs• Energy Efficiency/Cost Goals/Standards <p>Meet Energy and Sustainability Goals</p> <ul style="list-style-type: none">• Prescriptive Standards• Performance Standards
2. Property Specific Requirements
<p>Security</p> <p>Technology</p> <p>Life and Safety</p> <p>Parking</p> <p>Quality-Image</p> <p>Mission Driven Occupant Requirements</p> <p>Design and Engineering Standards</p> <p>Human Resource Standards</p> <p>Maintenance and Operations Requirements</p> <p>Etc.</p>

⁶⁰ This underwriting checklist identifies some of the key tasks and analytic practices used by space users. Based on the type of investment the space user is making, the tasks on this checklist need to be combined with either Appendix I-B, the Existing Building Underwriting Checklist, or Appendix VI-C, the New/Major Retrofit Building Underwriting Checklist.

3. Financial Analysis

- Corporate Return on Investment Hurdle
- Economic Value-Added
- Total Occupancy Cost Analysis
- Company Capital Investment “Hurdle” Rate
- Low-Bid/Cost Assessment
- Simple Return on Investment
- Simple Payback
- Life Cycle Cost Assessment
- Value Engineering
- Sale-Leaseback Analysis
- Asset Valuation
- Risk/Options Analysis

4. Pre-Purchase/Lease Due Diligence⁶¹

- Compliance with RFP Requirements
- Utility Bill Analysis
- Benchmark Energy Costs
- Energy Audit
- Evaluate Lease Structure and Terms
- Interview Prior Users of Space
- Identify and Test Systems-Commissioning
- Review Prior Energy Modeling

⁶¹ These are some of the key energy-related due diligence activities undertaken by corporate real estate executives as reported in CoreNet Global’s April 2007 study: “The Energy Challenge: A New Agenda for Corporate Real Estate.”

Appendix VI-B

Existing Building Underwriting Checklist

1. Preliminary Compliance with Investment Guidelines
<ul style="list-style-type: none"> 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 Improvements/Leasing Commissions Allowance
2. Owner/Operator
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> 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

Appendix VI-B

Existing Building Underwriting Checklist

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
<p>a. Operating Cash Flow History-Verification</p> <ul style="list-style-type: none">• Operating Statements• Rent Roll• Historical Occupancy/Collection Losses• Tenant Sales Data (retail only)• Expense Recoveries• Other Income• Estoppels (verification) <p>b. Lease Structure and Review</p> <ul style="list-style-type: none">• Lease Abstracts/Major Lease Review• Standard Lease Agreement• Signed Non-standard Leases• Objectionable Provisions Assessment <p>c. Operating Expenses</p> <ul style="list-style-type: none">• 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 <p>d. Capital Expenses/Escrows and Holdbacks</p> <ul style="list-style-type: none">• Replacement Reserves• Tenant Improvements• Leasing Commissions• Capital Expenditures <p>e. Operating Cash Flow Forecast-Verification</p> <ul style="list-style-type: none">• 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.

Appendix VI-B

Existing Building Underwriting Checklist

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

Appendix VI-C New/Major Retrofit Building Underwriting Checklist

1. Preliminary Compliance with Investment Guidelines
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> Recourse with Financially Strong Borrower Contractor-Subcontractor Experience/Capacity Contracts—Construction, Other Insurance Cost, Budget Contingencies Construction Manager/Service Reviews Product/Systems/Materials Performance Funding Mechanics: Inspections/Lien waivers/Draw Mgmt Payment, Completion and Performance Bonds
4. Carry Risk
<ul style="list-style-type: none"> Debt Service Carry Reserves Real Estate Tax and Insurance Reserve Insurance/Letters of Credit Floating Rate Risk--Hedging and Caps Pre-leasing/Pre-Sales

Appendix VI-C New/Major Retrofit Building Underwriting Checklist

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



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